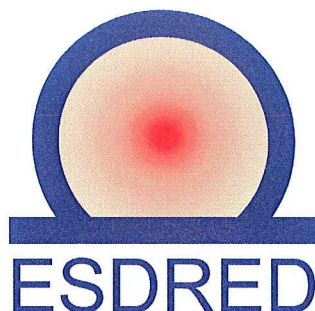




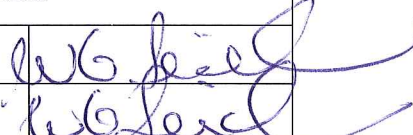

EUROPEAN
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Community Research



(Contract Number: **FI6W-CT-2004-508851**)

**DELIVERABLE 9 OF MODULE 5
WORK PACKAGE 10
CONFIDENCE BUILDING
&
COWAM 2**

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Approval:	W.K. SEIDLER	
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Dissemination Level		
PU	Public	X
RE	Restricted to a group specified by the partners of the ESDRED project	
CO	Confidential, only for partners of the ESDRED project	

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1 - EXECUTIVE SUMMARY

COWAM 2, which stands for **CO**mmunity **WA**ste **M**anagement, started on January 1, 2004 and ends on December 31, 2006. Except for the writing of the final reports all work essentially ended with the final AGM meeting which was held in Antwerp/Mol Belgium on July 6, 2006. ESDRED, via its IPC Wolf K Seidler, participated in Work Package 4 (Long Term Governance For Radioactive Waste Management) of this Project.

Over 2.5 years the work was largely focused on the four main themes shown below.

- Ethical considerations
- Responsibility and ownership
- Continuity of local dialogue and monitoring
- Compensation and sustainable development

Within this framework the objective of the WP was defined as coming up with a set of practical recommendations in order to better address long term issues in decision-making processes and prepare long term governance. These recommendations will constitute Chapter 4 of the WP4 Final Report which is due at the end of January 2007. Over the course of the project a number of significant essays were developed in the relation to the themes noted above. These include:

- Ethical Principles in the Long Term Governance of Nuclear Wastes
- Elements of Definition of Long Term Periods and Future Generations Related to Radioactive Waste Management
- What is “Long Term”? Definitions and Implications
- Quelle Gouvernance Pour le Long Terme, Favorisant une Ethique des Compensations Financières?

The understanding of the main WP themes was underpinned, at regular intervals, by case studies related to ethics (ENRON); to financing (MONA & France); transfer of responsibility (UNESCO), among others. These were mainly in the form of power point presentations.

A COWAM 2 web site (www.cowam.org) has been set up but is a bit thin on material at the present time. The intention is eventually to put on this site all final report and public documents and to keep the site running long (how long?) after the end of the current project.

A new 3 year COWAM project, “COWAM in Practice” has apparently been approved within the framework of FP6 and is due to start in January 2007. We are told that representatives from 5 countries will be the main players and that the focus will be on what is really happening in those countries.

The report which follows provides a very brief overview of the WP4 activities and reflects on the net impact the 2 projects may have had on each other. The presence of an ESDRED representative at the WP4 (Long Term Governance) meetings was beneficial for the COWAM 2 Project.

[ESDRED]

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2 - INTRODUCTION

2.1 *Overview of the COWAM 2 Project*

To understand the COWAM 2 Project one first needs to realise that it was preceded by a COWAM 1 Project which took place within the EURATOM FP5 Work Programme. It seems that this first project grew out of the difficulties that Radioactive Waste Management implementers were facing at the time (and continue to face). These difficulties were described as social distrust and political blockage as a result of strong societal opposition to the options developed by their promoters. A general lack of democracy in the decision-making process is given as one of the principal reasons for this situation. Hence a new initiative was born approaching this problem from the point of view of the local and regional communities concerned by Radioactive Waste Management (RWM). Subsequently the main objective of COWAM 1 was to carry out a collective and pluralistic reflection on ways to improve the decision-making process regarding Radioactive Waste Management.

At the termination of COWAM 1 there seemed to be a need to explore how the recommendations proposed by COWAM 1 could be further developed towards practical implementation. Moreover, it was deemed essential to maintain the involvement of the key stakeholders in the core of COWAM activities for the quality, legitimacy and robustness of its results. **COWAM 2** therefore specifically addresses the objectives of the EURATOM FP6 Work Programme regarding the "development and evaluation of alternatives measures, of better governance processes" with the aim "to develop decision processes that are perceived as fair and equitable by stakeholders involved".

The COWAM 2 project involves partners from 9 European countries including 3 from New Member States. It is a 36 month project (starting on 1/1/04 and ending on 31/12/06) with a 2.3 million Euro budget, half of which is funded by the European Commission.

The project consists of the following 6 Work Packages all aimed in one way or another at improving the waste management governance process:

- WP1 – Local Democracy & Participatory Assessment Methods
- WP2 – Local Influence in National Decision-Making Process
- WP3 - Quality of the Decision Making Process
- WP4 – Long Term Governance
- WP5 – Integration and Knowledge
- WP6 – Networking and Communication



2.2 Overview of Work Package 4 of the COWAM 2 Project

The Executive Summary of the first WP4 Annual Report describes the objectives of the Long Term Governance WP as follows “ - - - to identify, discuss and analyse the institutional, ethical, economic and legal considerations raised by the existence of a site for long term waste storage or deep geological disposal. Based on participants' expectations revealed during the first meeting, the following work-programme was proposed. Three main "tasks" have been identified:

- Elaboration of "ethical guidelines" regarding long term issues to be used by the stakeholders as "aiding tools" to evaluate the different waste management options they are facing. This is currently performed on the basis of ethical considerations regarding the rights of future generations, the responsibility issues, etc...
- Investigation of existing processes of long term management to identify their strengths and weaknesses. This will make it possible to establish performance criteria. Investigations are currently underway regarding the financial resource schemes for the long term management of waste and on the issue of responsibility.
- Elaboration of different scenarios (including notably technical, organisational, legal, ethical, economic aspects) for the long term management of radioactive waste and analysis of these scenarios on the basis of the ethical guidelines and performance criteria.”

WP4 was divided in three consecutive tasks.

Task 1 — First step: Define the issues at stake and review the state of the art (D4-4)

Task 2 — Additional syntheses, investigations and/or topical research (D4-7)

Task 3 — Establishment of practical recommendations (D4-10)

Expert Resource Persons (ERP's) provided written material on the three issues from time to time. This material was used for discussion with the Stakeholder Reference Group (SRG). Additional investigations were carried out by ERPs and select members of the SRG in order to advance the work towards conclusions and recommendations on each of the three issues. The WP4 activities were coordinated by Thierry Schneider from the Centre d'étude sur l'Evaluation de la Protection dans le domaine Nucléaire (France) or **CEPN**.

DELIVERABLES:

- D4-1: Minutes of the 1st SRG meeting (t₀₊₅)
- D4-2: List of Success Criteria (t₀₊₅)
- D4-3: Minutes of the 2nd SRG meeting (t₀₊₈)
- D4-4: Annual Task Progress Report 1 (t₀₊₁₂)
- D4-5: Minutes of the 3rd SRG meeting (t₀₊₁₄)
- D4-6: Minutes of the 4th SRG meeting (t₀₊₂₀)
- D4-7: Annual Task Progress Report 2 (t₀₊₂₄)
- D4-8: Minutes of the 5th SRG meeting (t₀₊₂₆)
- D4-9: Draft Final WP Report (t₀₊₃₁)
- D4-10: Annual Task Progress Report 3 (t₀₊₃₁)
- D4-11: Minutes of the 6th SRG meeting (t₀₊₃₂)
- D4-12: Final WP Report (t₀₊₃₆)

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2.3 ESDRED OBJECTIVES REGARDING COWAM 2

ESDRED participation in WP4 of COWAM 2 falls within the commitments outlined in the “Communication” part of Module 5 of the ESDRED Project, and specifically within WP10 “Confidence Building” of that Module. Section 6.5.3.1 of the Annex 1 to the Contract identifies the following objectives related to the ESDRED participation in WP4 of COWAM 2:

- Establishment of a link specifically with WP4 of COWAM 2
- Presentation of the ESDRED programme and objectives before the end of 2004
- Presentation of the ESDRED results as the project progresses (Section 8.5.7)
- Presentation of a Deliverable D9, describing the results of this participation to the Commission at Month 42

2.4 COWAM 2 OBJECTIVES REGARDING ESDRED

The role of ESDRED within WP4 of COWAM 2 was as one of 26 “Stakeholder Reference Group” representatives who obviously were intended to bring a variety of views, experiences and objectives to the meetings and especially to the many roundtable and working group discussions. Stakeholder representatives from the producer/implementer sub-group included people from ENRESA in Spain, ANDRAD in Romania, CEA & EDF & ESDRED/Andra from France. Only the CEA representative attended as many meetings as ESDRED.

At the outset there was no particular evidence of any real interest in the technological activities within ESDRED however given the theme of WP4 i.e. “Long Term Governance” there was interest in how Andra was handling the long term governance of the closed La Manche repository. Also since “compensation” to affected communities was a hot button topic throughout the deliberations there was always an interest by the group to learn more about how Andra had handled this issue at the Centre de l’Aube for example.

By the time of the third ESDRED Project presentation to the group, on July 5th, 2006 the level of interest of the group had increased tremendously.



3 - METHODOLOGY

3.1 *GENERAL*

The activities in this WP4 were under the direction of the WP leader, Thierry Schneider from CEPN, with the assistance of Caroline Schieber from the same organisation. It was intended to have 2 meetings per year. In the winter meeting the first day would be dedicated mainly to presentations by the Consortium (paid) participants, also referred to as the ERP's, and the second day would involve mainly round table discussions in smaller working groups. The second annual meeting would be a one day affair, in the summer, held in conjunction with the COWAM 2 annual general meeting involving all the work packages. This was the only opportunity for some cross fertilisation between the different WP's but in reality this was quite limited.

At the outset 4 themes were identified to guide the activities of the WP over the ensuing 3 years. These were:

- Ethical considerations
- Responsibility and ownership
- Continuity of local dialogue and monitoring
- Compensation and sustainable development

3.2 *First Meeting Gartow Germany April 15-17, 2004*

An important part of the first meeting was dedicated to introducing the participants who hailed from 8 different countries and who represented a variety of stakeholders including representatives from:

- NGO's
- Nuclear Research Institutes
- Universities
- Implementers (national waste management agencies)
- Waste Producers
- Communities
- Local Liaison Committees
- The church
- Nuclear Safety Authorities
- Independent Researcher & Journalist

This was followed by a general review of the work to be accomplished as outlined in the contractual documents and a special effort was made to understand the participants' expectations with the hope that these were in line with the outlined program. Eventually a detailed program for the rest of the year and a less detailed program for the 3 years of the



project were developed. The methodology to be used was to be based on the following three main tasks:

- a. The elaboration of “vigilance” criteria
- b. The investigation of existing processes of long term management to identify their strengths and weaknesses and
- c. The elaboration of different scenarios (including technical, organisational, legal, ethical, economic etc) for the long term management of radioactive waste and analysis of these scenarios on the basis of the vigilance and performance criteria previously developed

Finally the WP leaders and a few of the ERP’s made formal presentations regarding the four main themes outlined at the beginning of this chapter. To this a fifth theme was added by way of introduction i.e. “Institutional Considerations”.

3.3 *Remainder of the Project*

The remainder of the WP activities (5 meetings) revolved around discussions related to the themes and tasks identified and agreed during the first meeting. Usually this started with a power point presentation, which was later developed into a draft report, and, after extensive review and debate evolved into a final report. In the course of this activity certain stakeholders also prepared and presented papers and/or power point slide shows dealing with very personal opinions/experiences which related to the main themes of the WP. For example such presentations dealt with “ethical guidelines” or “long term considerations” or the “status of radioactive waste management in a specific country” or “local compensation and management issues” to name just a few.

Some of the most important documents which were so developed include:

List of Success Criteria – September 2004

Ethical Principles in the Long Term Governance of Nuclear Wastes – Sylvain Lavelle, ICAM - June 2005

Elements of Definition of Long Term Periods and Future Generations Related to Radioactive Waste Management – T. Schneider & C. Schieber - April 2005

What is “Long Term”? Definitions and Implications Thomas Fielder, ETH Zurich

Quelle Gouvernance Pour le Long Term, Favorisant une Ethique des Compensations Financières? Michel Bovy, SCK•CEN, April 2006



4 - RESULTS

Acting as the ESDRED Coordinator, and as the Module 5 Leader, I personally attended all (except one) of the COWAM 2, WP4, related meetings. My experiences and impressions are detailed in the present chapter.

4.1 *WHAT COWAM 2, WP4, GOT OUT OF ESDRED*

It is always more difficult to judge how someone else benefited from a given experience than to judge how one personally benefited from that same experience. I don't think it is an exaggeration to state that amongst the participants in the WP there was a fair amount of anti-nuclear sentiment and that, to the credit of those individuals, they attempted to appear neutral and not let their personal sentiments get in the way of fair and open discussion. I can't claim to have changed any biases or strongly held views but I did get the sense that at the end of 3 years I was more respected and better listened to by some than by those same people the first time they met me. During my last meeting with them all in Antwerp/Mol there was some evidence of real interest in how the ESDRED Project was evolving.

It is my impression that the impact of my presence and of my contributions to the discussions during 5 of the 6 scheduled meetings, including one brief verbal ESDRED presentation (first meeting) and 3 more elaborate ESDRED power point presentations was positive overall. Specifically I believe that the participants came away:

- Aware that ESDRED existed
- Aware that ESDRED was an EC FP6 project
- Aware that ESDRED was a major collaborative effort between a number of European RWM agencies and research organisations
- Aware that ESDRED was focused on the development of technology that is currently not available “off the shelf”
- Aware that ESDRED was enjoying some success, having already designed, built and demonstrated a prototype pushing robot, an air cushion device for the emplacement of heavy loads of radioactive waste canisters and various types of buffer configurations including bentonite rings
- Aware that beyond its technical challenges ESDRED has an additional mandate related to “communication” and especially to “confidence building”

Furthermore some of the participants:

- Had little or no interest in topics related to the disposal of radioactive waste unless it was tied to a commitment to stop producing any new waste (essentially tied to shutting down all nuclear power production facilities)
- Were very leery of any attempt by ESDRED, or others, to try to improve the understanding of RWM and hence to build confidence amongst the general public

It's probably fair to say that the interest of the group of participants was at least as much directed towards Andra as it was towards ESDRED!

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4.2 *WHAT ESDRED GOT OUT OF COWAM 2, WP4*

Being perfectly honest I would have to say that I don't believe that the ESDRED Project per se really got much out of COWAM 2. Could the ESDRED participants have benefited more if I had been more rigorous and more detailed in my occasional reporting? I don't think so. I say this because much of the WP4 discussion was focused on philosophical and sometime esoteric issues having to do with ethics, morality, compensation, the definition of long term, to name just a few. The actual ESDRED members, on the other hand, tend to be more excited by technology.

Nevertheless I believe that the Nuclear Industry generally, and Wolf Seidler in particular, benefited from the COWAM 2 experience. There is no doubt in my mind that some confidence building did occur. There is strong evidence for this based on the interest and the questions raised following my last two ESDRED power point presentations, as compared to my first presentation.

Notwithstanding that all of the participants were, in one way or another, familiar with radioactive waste and with some aspects of radioactive waste management, it was clear that the level of technical knowledge directly related to disposal was quite limited. There was therefore a strong need to "dumb down" any technical presentations failing which some members of the audience became quite frustrated and even verbal about their frustration. This was a good lesson to learn and one which has helped me in subsequent presentations at COWAM and elsewhere.

On a number of occasions I showed some Andra produced cartoons depicting certain disposal concepts in very simple terms. This too generated frustration among some of the audience, a reaction which I have to this day not fully understood – but at least I won't be surprised the next time it happens. In part this may have to do with people's fears i.e. the fear that once a concept can be described and turned into a video (even an animation) then it must be a "fait accompli" AND I HAVEN'T BEEN CONSULTED!!!

For those of us dealing with technology, and therefore not interacting directly with non-technical stakeholders on a regular basis, any interaction with the public is always beneficial. A better understanding of the public's fears, frustrations, biases etc enables us to do a better job of explaining what it is that we are doing and what we hope to achieve.

In summary therefore what I learned most is to better understand people's fears and frustrations. Today everyone wants to be involved in all/most of the decision making. Consultation is now very much a part of the standard *modus operandi* for almost all visible projects, not just nuclear. Anytime people get the impression that they are being presented with a finished product, especially one for which they have had little or no input and for which they have not been consulted, the reaction is very likely to be reserved or negative. It is important therefore, for those of us who speak to the public at large on technical developments, to stress that our work is like a jig saw puzzle piece i.e. contributing to a much larger picture WHICH HAS NOT BEEN FINALISED.

[ESDRED]

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5 - SUMMARY AND CONCLUSIONS

Overall the IPC's participation in the COWAM 2, WP4, was a positive personal experience. On the other hand I know that it did not directly benefit any of the other ESDRED participants and it is hard to imagine how it could have. For the most part the subject matter, especially the discussion papers that were prepared by the ERG's, was relatively dry and uninteresting to technologically motivated ESDRED players. UNLESS one had the opportunity to participate directly in the presentations and the ensuing discussions and debates it is difficult to imagine others getting genuinely excited about the topics being developed.

On the other hand I believe that many of the ERG's and SRG's in WP 4 came away with a clearer vision of the ongoing work related to RWM and the degree to which this work is taken seriously. We were able to diffuse long held notions of secrecy, of decisions already taken and of a lack of desire for open discussion. We were able to talk about concrete things (demonstrators) in a non-emotional way i.e. by occasionally getting people to use their eyes instead of their mouth.

As with any activity one ought sometimes to pause long enough to get a sense of the effort vs. benefit ratio. Given that the meetings were in far away places (4 different countries), sometimes not even easily accessible by fast public transport, the participation at the meetings could be quite time consuming. On the other hand it would have been impossible to have any impact at all in absentia. Other than attendance at meetings, including the preparation of presentation material, one could spend as much, or as little, effort as one chose when part of the SRG group. All the documents produced by the ERG's went through many revisions, always attempting to capture relevant input from those who took the time to read the material that was produced.

Insofar as the ESDRED participation in COWAM 2 was motivated by the "communication" and "confidence building" objectives within Module 5 of the ESDRED project I believe that it was a success. If nothing else I am sure that some of the large number of visitors to the ESDRED web site will be from COWAM 2 participants.

A project like COWAM 2 provides three unique opportunities:

1. To hear first hand about the fears and concerns felt by a large variety of stakeholders and to sense the inherent mistrust that many still feel and
2. To disseminate relevant information in a more or less neutral setting and in a very non-confrontational atmosphere
3. To balance the occasional irrational or incorrect argumentation with more rational logic and with facts

For these reasons alone I would recommend continued participation at a future COWAM 3 or similar project.

[ESDRED]

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6 - APPENDICES

6.1 APPENDIX 1 – Participants in COWAM 2 – Work Package 4

Stakeholders Reference Group

Belgium:

Hugo CEULEMANS	MONA-MOL
Jacques HELSEN	MONA

Germany:

Eckhard KRUSE	Church representative - <i>Coordinator of SRG</i>
Juergen WOLLRATH	BFS – Federal Office for radiation Protection - Safety of Nuclear Waste Management

Europe:

Laurent FUREDI	FORATOM
Mark O'DONOVAN	FORATOM

France:

Geneviève BAUMONT	IRSN
Eric CHAGNEAU	GIP Objectif Meuse
Joël CHUPEAU	EDF
Robert GRANIER	Local Liaison Committee – Gard
Benoit JAQUET	Local Liaison Committee (CLIS) - Bure
Olivier LAFITTE	Local Liaison Committee - La Hague
Alain MARVY	CEA - French Atomic Energy Commission
Wolf K SEIDLER	ESDRED Project - ANDRA Operator
Jérôme STERPENICH	Local Liaison Committee (CLIS) - Bure

The Netherlands:

Herman DAMVELD	Independent researcher and publicist
----------------	--------------------------------------

Romania:

Stella DIACONU	ANDRAD
----------------	--------

Spain:

Felisa GARCIA	ENRESA
Miquel FERRÚS SERAR	GMF
Fernando GARCIA	Mayor of Jarafuel, area of Cofrentes NPP
Meritxell MARTEL	ENVIROS Spain
Alfredo ROMERA	Mayor of Mesas de Ibor, area of Almaraz NPP

Sweden:

Olov HOLMSTRAND	Avfallskedjan (The Waste Network)
-----------------	-----------------------------------

Switzerland:

Pius KRÜTLI	ETH
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United Kingdom:

Lorraine MANN

Shelly MOBBS

Scotland against nuclear waste dumping

NRPB

Partners from COWAM Consortium

Belgium:

Gunter BOMBAERTS

Michel BOVY

Gaston MESKENS

SCK-CEN Mol

SCK-CEN Mol

SCK-CEN Mol

France:

Sylvain LAVELLE

Caroline SCHIEBER

Thierry SCHNEIDER

ICAM

CEPN

CEPN

Work Package leader

Switzerland:

Thomas FLÜELER

ETH

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6.2 APPENDIX 2 – COWAM2 – WP4 Meetings

First meeting*: 15-17 April, 2004, Gartow (Germany): 16 participants

Second meeting**: 7 July, 2004, Berlin (Germany): 19 participants

Third meeting: 17-19 February, 2005, Gartow (Germany): 20 participants

Fourth meeting**: 5 July, 2005, Ljubljana (Slovenia): 19 participants

Fifth meeting: 20-22 March, 2006, Barcelona (Spain): 18 participants

Sixth meeting**: 4-7 July, 2006, Antwerp/MOL (Belgium): 23 participants

*** = Informal verbal ESDRED Project overview only**

**** = ESDRED Power Point Presentation**

NOTE: The ESDRED representative, Wolf K Seidler had perfect attendance except for the fifth meeting which he missed due to a scheduling conflict.



6.3 APPENDIX 3 – ESDRED POWER POINT PRESENTATIONS

- Berlin, Germany July 7, 2004
- Ljubljana, Slovenia July 5, 2005
- Antwerp, Belgium July 5, 2006

NOTE: only the most recent presentation is included herewith as an example.

6th WP4 Meeting, Antwerp, Belgium, July 6, 2006

ESDRED PROJECT Update



Wolf K. Seidler
Antwerp - July 6th, 2006



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ESDRED
=
**Engineering Studies and Demonstrations
of Repository Designs**



Wolf K. SEIDLER – Antwerp – July 6th, 2006

2



KEY NUMBERS & DATA

- Start date: February 2004
- Project duration: 5 years
- Total budget: € 18.7 millions of which € 7.3 millions provided by the 6th Euratom Framework Programme for Nuclear Research and Training (2002-2006) of the European Union
- 13 participants



Wolf K. SEIDLER – Antwerp – July 6th, 2006

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THE PARTICIPANTS

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13 Organisations – 9 Countries

7 Radioactive Waste Management Agencies

Participant Short Name	Country	Participant Full Name
ANDRA	France	Agence Nationale pour la Gestion des déchets Radioactifs
ENRESA	Spain	Empresa Nacional de residuos radioactivos S.A.
NAGRA	Switzerland	National Genossenschaft für die Lagerung radioaktiver Abfälle
NIREX	United Kingdom	United Kingdom Nirex Limited
ONDRAF-NIRAS	Belgium	Organisme National des Déchets Radioactifs et des Matières Fissiles Enrichies/Nationale Instelling Voor Radioactief Afvalen Verrijkte Splijtstoffen
POSIVA	Finland	Posiva Oy
SKB	Sweden	Svensk Kärnbränslehantering AB



Wolf K.SEIDLER – Antwerp – July 6th, 2006

4



THE PARTICIPANTS

2/2

13 Organisations – 9 Countries

6 Technological R&D Organisations

Participant Short Name	Country	Participant Full Name
AITEMIN	Spain	Asociacion para la Investigacion y el Desarrollo Industrial de los Recursos Naturales
CSIC	Spain	Consejo Superior de Investigaciones Cientificas
DBE TEC	Germany	DBE Technology GmbH
ESV-EURIDICE-GIE	Belgium	European Underground Research infrastructure for Disposal of Nuclear Waste in a Clay Environment
GRS	Germany	Gesellschaft für Anlagen-und Reaktorsicherheit mbh
NRG	The Netherlands	Nuclear Research & Consultancy Group v.o.f.



Wolf K.SEIDLER – Antwerp – July 6th, 2006

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[ESDRED]

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THE OBJECTIVES OF THE PROJECT

Focus is on technology

- To fabricate and test **technological demonstrators**
- To promote a common European vision in terms of radioactive waste disposal **technology** applicable to various concepts
- To **disseminate the knowledge** acquired via technical papers, presentations, training courses, workshops, etc...



Wolf K.SEIDLER – Antwerp – July 6th, 2006

6



THE SCHEDULE

Nº	2003	2004	2005	2006	2007	2008	2009
1	Input data and functional requirements						
2		Prototypes Testing and Design					
3		Fabrication of Full scale demonstrators					
4			Demonstrations				
5				Evaluation and Final Report			
6	Training, Communication, Integration and Management Activities						



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SOME HIGHLIGHTS OF MAJOR RESULTS TO DATE



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6th WP4 Meeting, Antwerp, Belgium, July 6, 2006

MODULE # 1: Buffer Construction Technology

Demonstration Objectives

ANDRA: Design, fabricate & manipulate 4ton, 2.25 m Ø, bentonite rings

GRS: In situ construction & long term testing of bentonite plugs for water resaturation, gas permeability & other parameters

NAGRA: Backfilling of the annular gap between waste canister & mockup disposal drift wall using bentonite pellets and augers

NIREX: Non-intrusive monitoring experiments around a micro tunnel at Mont Terri using seismic technology

O/N: Backfilling of the annular gap between waste canister & mockup disposal drift wall using typical pumpable wet cement grouts and assorted dry materials placed with guns



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MODULE #1 : Buffer Construction Technology

Major Results to Date

ANDRA: First bentonite ring pressed at Issoire in France on June 12th using a 65 000 ton press. Second pressing planned for July 3rd.

GRS: First lab test completed; 2nd test running to end of year. First gas sealing experiment running at Mt Terri- three others to start soon

NAGRA: Computer modeling of buffer completed and steel mockup of disposal drift constructed

NIREX: First of 4 monitoring experiments at Mont Terri completed; evaluation in progress

O/N: Mockups for wet and dry backfilling tests constructed at MOL; testing is underway

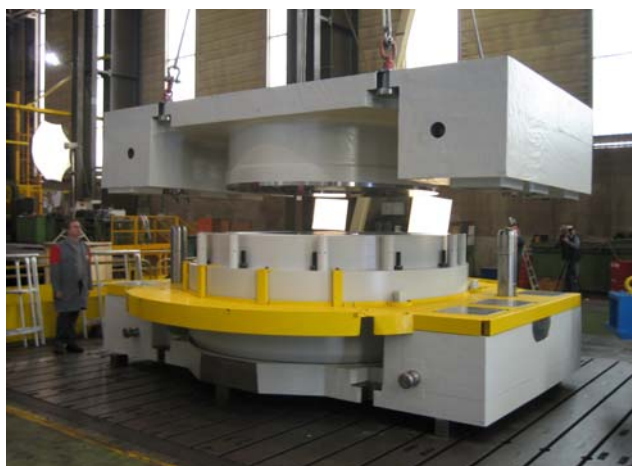


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MODULE #1 : Photos of ANDRA Results – Mold for the Fabrication of Bentonite Rings



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MODULE # 1 : Photo of ANDRA Results – Fabrication of First Bentonite Ring



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MODULE # 1 : Photos of GRS Results – Operations of Borehole Sealing in Mont Terri



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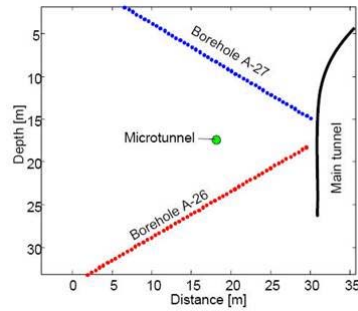
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MODULE #1 : Photos of NIREX Results – Logging Operations in Mont Terri

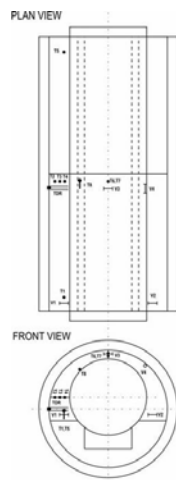


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MODULE #1 : Photos of ONDRAF/NIRAS Results – Construction of Mock- up for Back-filling Operations



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MODULE # 2: Waste Canister Transfer & Emplacement

Demonstration Objectives

ANDRA:

- Design, fabricate and test 1:1 scale prototype pushing robot for placing 2 ton vitrified waste canisters in horizontal disposal cells
- Design, fabricate and test industrial scale pushing robot based on results obtained with the prototype

DBE-TEC:

- Design, fabricate and test industrial scale emplacement equipment for placing 5 ton spent fuel canisters into vertical boreholes in salt
- Demonstrate the equipment including transport cart, transfer cask, emplacement device & a borehole lock at a surface facility



MODULE # 2: Waste Canister Transfer & Emplacement

Major Results to Date

ANDRA:

- First of its kind prototype pushing robot designed, fabricated, tested and demonstrated
- Equipment moved to an exhibition hall for future demonstrations

DBE-TEC:

- Basic design of vertical emplacement equipment completed
- Tenders being issued for final design & fabrication



MODULE # 2: Video of ANDRA Results

Musthane Prototype Pushing Robot



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MODULE #2: Photos of ANDRA Results / Layout of Test Bench



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MODULE #2 : Photos of ANDRA Results – Canister mock-up (left) and Pushing Robot (right)

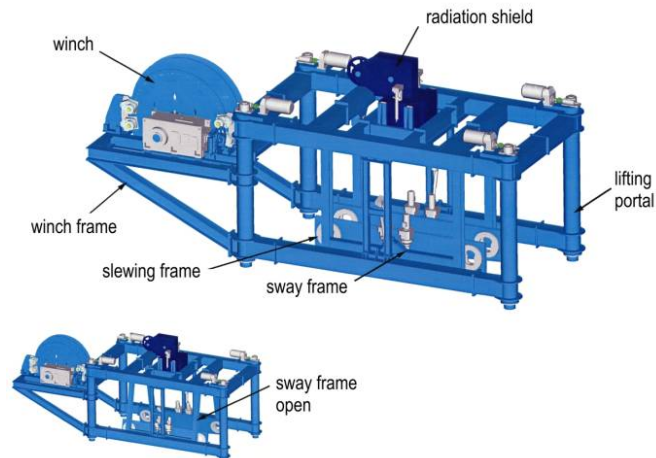


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MODULE # 2 : View of DBE-TEC Results – Design of Frame for Tilting the Canister from a horizontal to a vertical position



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MODULE #3: Heavy Load Emplacement Technology

Demonstration Objectives

ANDRA:

- Design, fabricate & test basic 1/3 scale transporter using air cushions
- Design, fabricate & test 1:1 scale emplacement equipment including mockup of horizontal disposal cell, gamma gates, 43 ton spent fuel canister, sliding plate and AIR cushion cradle
- Ditto for emplacement of 17 ton packages of bentonite rings

SKB:

- Design, fabricate & test 1:1 scale emplacement equipment including mockup of horizontal disposal cell, gamma gates, 43 ton spent fuel canister, sliding plate and WATER cushion cradle
- Demonstrate this equipment underground at Äspö



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MODULE # 3: Heavy Load Emplacement Technology

Major Results to Date

ANDRA:

- 1/3 scale air cushion transporter built, tested & demonstrated
- Full scale spent fuel emplacement demonstrator built and demonstrated; testing is ongoing
- Full scale bentonite ring emplacement demonstrator designed; fabrication in progress

SKB:

- Full scale spent fuel emplacement demonstrator built and erected underground at Äspö
- Testing is ongoing; demonstration planned for this fall



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MODULE #3: Video of ANDRA Results

Bertin Air Cushion Prototype Demonstration



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MODULE # 3 : Photos of ANDRA Results / Industrial Demonstrator / General View of Test Bench



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MODULE # 3 : Photos of ANDRA Results/Industrial Demonstrator Test Bench - Gamma Gates & Cart



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MODULE # 3 : Video of SKB Results



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MODULE # 3 : Photos of SKB Results – General Layout



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MODULE # 3 : Photos of SKB Results – Emplacement Machine



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MODULE # 4: Temporary Sealing Technology (low pH cement & shotcrete)

Demonstration Objectives

- Develop a cement formulation which will produce a concrete with a pH of less than 11
- Use this concrete to develop a shotcrete formulation which can be used to construct low pH concrete plugs for restraining bentonite plugs as they expand
- Develop a low pH shotcrete formulation for rock support
- Construct a low pH plug underground and load it to failure
- Apply a skin of rock support shotcrete underground and monitor results



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MODULE # 4: Temporary Sealing Technology (low pH cement & shotcrete)

Major Results to Date

- One metre long low pH plug constructed using shotcrete technique at Äspö
- Plug has been loaded to failure (sliding) and evaluation of results underway
- Skin of rock support shotcrete has been installed underground at Äspö and observation/monitoring is underway



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MODULE # 4: Photos of Temporary Sealing Technology Shotcreting Operations for Construction of Plug



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Module 5: Training & Communication

Major Results to Date

- Fully functional Web site www.esdred.info is in place
- First 17 Lecture Training Course “*Technology Related to Geological Disposal of High Level Long Lived Radioactive Waste*” has been developed and will be presented to the UNIVERSITY POLITEHNICA OF BUCHAREST on 7 & 8 November 2006
- An International Technical Conference on Practical Aspects of Deep Radioactive Waste Disposal is now confirmed for September 17 -19, 2007 at the Czech Technical University in Prague



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Module 5: Training in Bucharest



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Module 5: Communication in Prague



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6.4 APPENDIX 4 - List of Abbreviations & Acronyms

CEPN	Centre d'étude sur l'Evaluation de la Protection dans le domaine Nucléaire
COWAM	Community Waste Management
ERG	Expert Resource Group
ETH	Federal Institute of Technology (Switzerland)
ICAM	Institut Catholique d'Arts et Métiers (France)
IPC	Integrated Project Coordinator
RWM	Nuclear Waste Management
SCK-CEN	Studiecentrum voor Kernenergie – Centre d'étude de l'Energie Nucléaire (Belgium)
SRG	Stakeholder Reference Group
WP	Work Package

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