



UNIVERSITY OF GOTHENBURG

Perspectives on geological repository monitoring: confirmation, compliance, confidence building and societal vigilance

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Content

- Context of this presentation: MoDeRn
 - General description
 - Social sciences contribution (Tasks 1.3 & 1.4)

- Research results for T1.3 & T1.4
 - On monitoring objectives & strategies
 - (How) can monitoring contribute to confidence building?

CONTEXT OF THIS PRESENTATION

**MoDeRn: MONITORING DEVELOPMENTS
FOR SAFE REPOSITORY OPERATION AND
STAGED CLOSURE**

The MoDeRn Project (FP7 – 232598)

- Collaborative project co-funded by the European Commission – EURATOM (FP7 – 232598)
 - On **strategies and technologies for repository monitoring** in view of **long term safety**
 - Duration: 1st of May 2009 – 31 October 2013 (4 1/2 years)
 - 18 partners from 12 countries; coordinated by Andra
- Aim: providing a **framework for the development and possible implementation of near-field monitoring activities** and associated **stakeholder engagement** during relevant phases of the radioactive waste disposal process.
- Published project documents: www.modern-fp7.eu

Social Sciences Contribution

(UA – UEA – UGOT)

- Look at monitoring as a socio-technical combination
 - Relationship between monitoring and decision-making
 - Potential role of monitoring in building confidence in a repository system: What could be contributing factors?
 - Different stakeholders' understanding of and expectations towards (repository) monitoring
 - for this research: focus on local stakeholders
 - (local) Stakeholders' interest in discussing monitoring issues and how to put that in practice

- Understanding the experts
 - Document review and interviews with technical specialists
- Role of monitoring in building public confidence
 - Literature review of experiences: published accounts of relationship between stakeholders and monitoring activities in the nuclear sector and other contexts
- Reflection on the notions of vigilance and social trust
 - Drawing on literature on relations between experts and citizens
 - Focus on institutional arrangements

**Task 1.3 -
Report D1.3.1**

- Exploratory engagement activity
 - Explore potential for (lay) stakeholder engagement in identifying monitoring objectives and strategies

**Task 1.4 -
Report D1.4.1**

Exploratory Engagement Activity

- Research driven, small scale
- Outside of national disposal programmes
- Volunteers from local communities on existing nuclear sites (varied experience with RW issues)
 - Belgium, Sweden, UK
- Three stages:
 - National workshop(s) – common ‘protocol’
 - Technical visit (with subset of national participants) to research facilities in Switzerland
 - National feedback meeting

INTEGRATED CONCLUSIONS T1.3 & T1.4

**ON MONITORING OBJECTIVES &
STRATEGIES – WHY AND WHAT ?**

Why monitor ?

- Assumption among expert community that monitoring adds to public confidence building
- Participants in T1.4 acknowledge **potential** role of monitoring in public confidence building

BUT

- Different expectations with regard to monitoring
- Monitoring is only one aspect of confidence building

Why monitor ?

- Add to stakeholder confidence in safety of the repository
 - Compliance: with prevailing regulations & standards
 - Optimisation: in view of refinement or improvement

Important difference in emphasis on:

- PERFORMANCE **CONFIRMATION** (implementers & regulators)
- versus
- **CHECKING** EXPECTED BEHAVIOUR (citizen stakeholders)

Dealing with uncertainty

Optimisation

- Objectives are guided by what is technically feasible today
- BUT no excuse not to monitor certain parameters
- Importance of accompanying science programme
 - Lab simulations to complement monitoring
 - ▶ BUT: transferability of results?
 - Continuous search for monitoring alternatives
 - ▶ BUT: within limits (time and expenses) ⇔ societal choice

Optimisation

- Create decision milestones to encourage optimisation
 - e.g. restrict operational licence in time
- Stimulates continuous search for improvements
- Ensures sustained implementer performance

What does it mean: to monitor?

Monitoring is understood broadly, and could cover

- any data gathering relating to behaviour of a repository and its natural and social environment
- a period from site investigation to post-closure

Different from the technical research in MoDeRn:
 focus on repository monitoring or near field
 monitoring

What to monitor ?

T1.3

- Technical specialists assume 'lay' stakeholders to focus on environmental and post-closure monitoring
- Focus on environmental monitoring seemingly confirmed by literature reporting on cases of citizen and stakeholder involvement with monitoring
- BUT also attention to other issues: e.g. socio-economic impact monitoring

What to monitor ?

T1.4

- Local citizens **less concerned with what parameters and where** exactly to monitor
- BUT focus on comprehensiveness of programme
 - Does it measure **all that is relevant** to be sure that it is safe today and will remain safe in the long term?
 - Will it be able to detect less likely or unexpected events?
 - Does it have a broad scope in both space and time?

INTEGRATED CONCLUSIONS T1.3 & T1.4

**(HOW) CAN MONITORING
CONTRIBUTE TO CONFIDENCE
BUILDING ?**

Monitoring as vigilance

⇒ **keeping an eye / remaining 'on guard'**

- Not for experts alone to decide 'How much and for how long?' and 'How to organise it?'
(cf. Weinberg, 1972)
- Broad scope in space and time
 - Including post-closure
 - but no specification on what and where

Monitoring as vigilance

⇒ **keeping an eye / remaining 'on guard'**

- Comprehensive monitoring programme
 - Including monitoring of repository system conditions, environmental conditions and socioeconomic conditions, evolutions in knowledge and technology
 - (SE) : Need to know 'what happens in reality'

Recognition of trade-offs

- (BE) : What and how to monitor is determined by trade offs between the financial context, the social and political context and the level of knowledge and technology
- ⇒ This should be recognised and made explicit !

Monitoring requires a response plan

- Monitoring means you are prepared to respond in case of unexpected results
 - ≠ unexpected results equals something is wrong
 - ≠ action equals retrieval of waste
- To respond to worst case scenario, a 'plan B' should be available
- Need to maintain the capability to do so
 - Maintain knowledge, skills, (financial and material) resources, memory, ...

Monitoring - product and process (views from participants in T1.4)

- Implementer to act as monitor
- Regulator to monitor the monitor
- Additional mechanisms for building trust: e.g.
 - Independent oversight bodies
 - International guidance (rather than regulations)
 - ...
 - Active stakeholder engagement

Active stakeholder involvement ⇒ claimed virtues from literature

- Increasing confidence in monitoring and management programmes
 - Awareness and understanding of the nature of the problem
 - Awareness and understanding of the science underpinning its management

(e.g. Gray 1989; Burger and Gochfeld 2009; Hartwell et al 2011)
- Mediate relationship between citizens and experts
 - Enhancing social capital and community well being
 - Enhancing mutual understanding
 - Fostering more active forms of citizenship

(e.g. Ottinger 2009; Conrad and Hilchey 2011)

Active stakeholder involvement

⇒ lessons from MoDeRn

- Have an actual voice in decision-making on various steps in the disposal process
- Critical reflection in preparation and design / implementation / follow-up
- Enabling stakeholders to engage their own 'independent' expertise

Some examples from literature (D1.3.1)

- Involvement in **developing** the monitoring programme: 'co-defining' objectives and strategies
 - E.g. Belgian LILW repository; the Port Hope Area Initiative (Canada)
- Involvement in **following up** monitoring programme and activity: engagement in oversight, organising independent scrutiny
 - E.g. Local information en oversight committee (CLIS) around Bure URL (France); Municipal Monitoring Commission for the decommissioning of the Vandellòs I l'Hospitalet de l'Infant NPP (Spain)
- Involvement in **conducting** monitoring activity: participatory monitoring
 - E.g. Three Mile Island Citizen Radiation Monitoring Programme; Nevada test site Community Environmental Monitoring Programme (USA)

Active stakeholder involvement ⇒ lessons from MoDeRn

- Monitoring is part of a bigger story
 - Engagement with stakeholders on monitoring should be part of a wider process of consultation and participation dedicated to the question of geological disposal
 - Continuation of such a wider engagement process can be part of a broader approach to monitoring
- Public arenas at a local level to discuss safety issues and monitoring results
 - From T1.4: no agreement on active participation in monitoring

On communicating monitoring results

- Monitoring data must be made publicly available
 - Cf. Aarhus convention
 - BUT not necessarily in real time
 - AND with instructions on how to interpret them
- Priority on periodic reporting: aggregated data in context
 - Need for raw data to be available on demand to verify interpretation
 - Open reporting, also of regulatory inspection and audit
 - Different translations of the same message for different audiences
- Important to start dialogue in research phase
 - Swiss field trip stimulated further discussion and nuancing of beliefs and expectations

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THANK YOU

