

CO₂ Field Lab Project

Presentation to CSLF, October 2010

Background

- ❖ **From demonstration projects to sequestration deployment:** Storage considered as an acceptable option for mitigation of climate change. By 2012, 3 projects for storage in saline aquifers > 5MT CO₂ /Y, 4 projects > 0.5 MT CO₂ /Y
- ❖ **Regulatory framework:**
 - EU legislation passed December 2008, to be derived state by state
 - Monitoring, Reporting and Accounting protocols are under development.
- However, the **issue of leakage** must be well addressed :
 - Safety: Minimize the Health, Safety & Environmental risk
 - Mitigation and early remediation
 - Public acceptance: credibility of geological storage challenged
 - Accounting: if leakage occurs, emission credits must be surrendered and the site stabilized (EU)

➔ **Crucially needed:** validated monitoring system for leakage
Currently: no means to assess such technologies.

CO₂FieldLab in one slide

CO₂ injected in permeable rocks in a well-controlled and well-characterised geological environment.

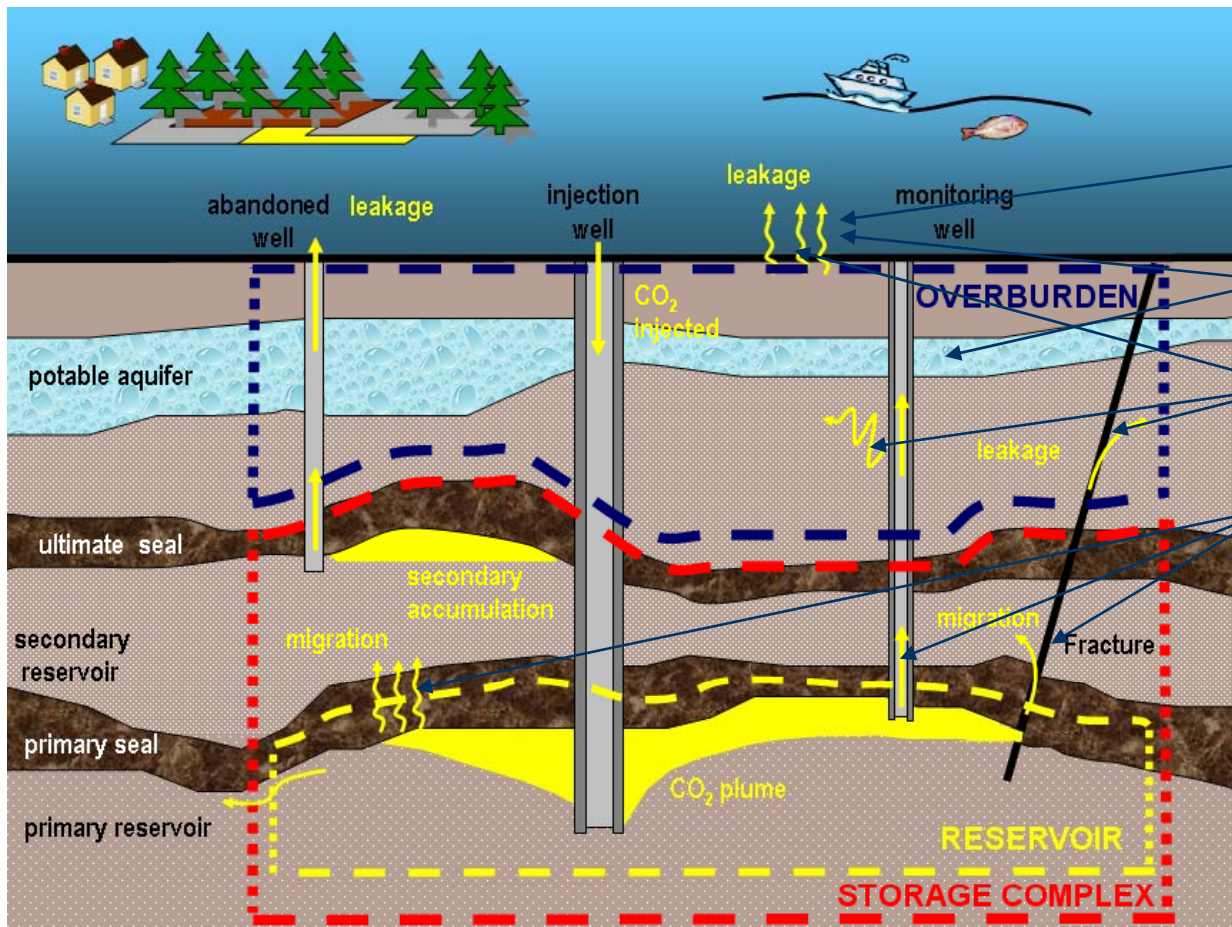
Shallow and very shallow subsurface in a Norwegian field



The underground CO₂ distribution will resemble leakages and will be monitored with an exhaustive set of techniques deployed by the project partners.

Assurance Monitoring

Four monitoring activities targeted at controlling containment



- 4-Leakage quantification
- 3-Impact detection and evaluation
- 2-Leakage detection
- 1- Control of barriers' integrity

Objectives

- **CO₂ injection in permeable reservoir**
 - **Shallow** (10-30 m)
 - **Deep** (200 – 300 m, ca. 200 tons in 2-4 weeks)
- Determine **sensitivity** of monitoring systems to detect subsurface **migration** & surface **leakage**
- Upscale results to **assess monitoring systems and requirements** ensuring safe CO₂ storage
- Test and calibrate **migration models** in well controlled conditions
- **Inform the public** about the safety of CO₂ storage by showing the performance of monitoring systems
- Develop monitoring **protocol / certification** scheme

The project is unique

- Controlled leakage experiment
- Main focus on detection limits:
 - For each monitoring technology, what is the detection limit (threshold)
- Combination/integration of monitoring tools and technologies
- Test of existing and novel technologies
- Focus on repeatability and permanent networks
- A better option than natural analogues
 - We have a controlled source of CO₂ and a well known geological environment

Project history

- Project approved by EUROGIA+ board (June 2009)
- Project approved by French Ministry (July 2009)
- Project approved by CLIMIT board (September 2009)
 - Phase 1 (appraisal, Sep. '09 – Sep. '10) approved
 - Phase 2 (CO₂ injection, Oct. '10 – Oct. '13) approved, in case 9% missing funding is found
- Project start 1 September 2009
- Go/no-go decision at the end of Phase 1



Partners

France

Schlumberger



BUREAU VERITAS GROUP



Norway

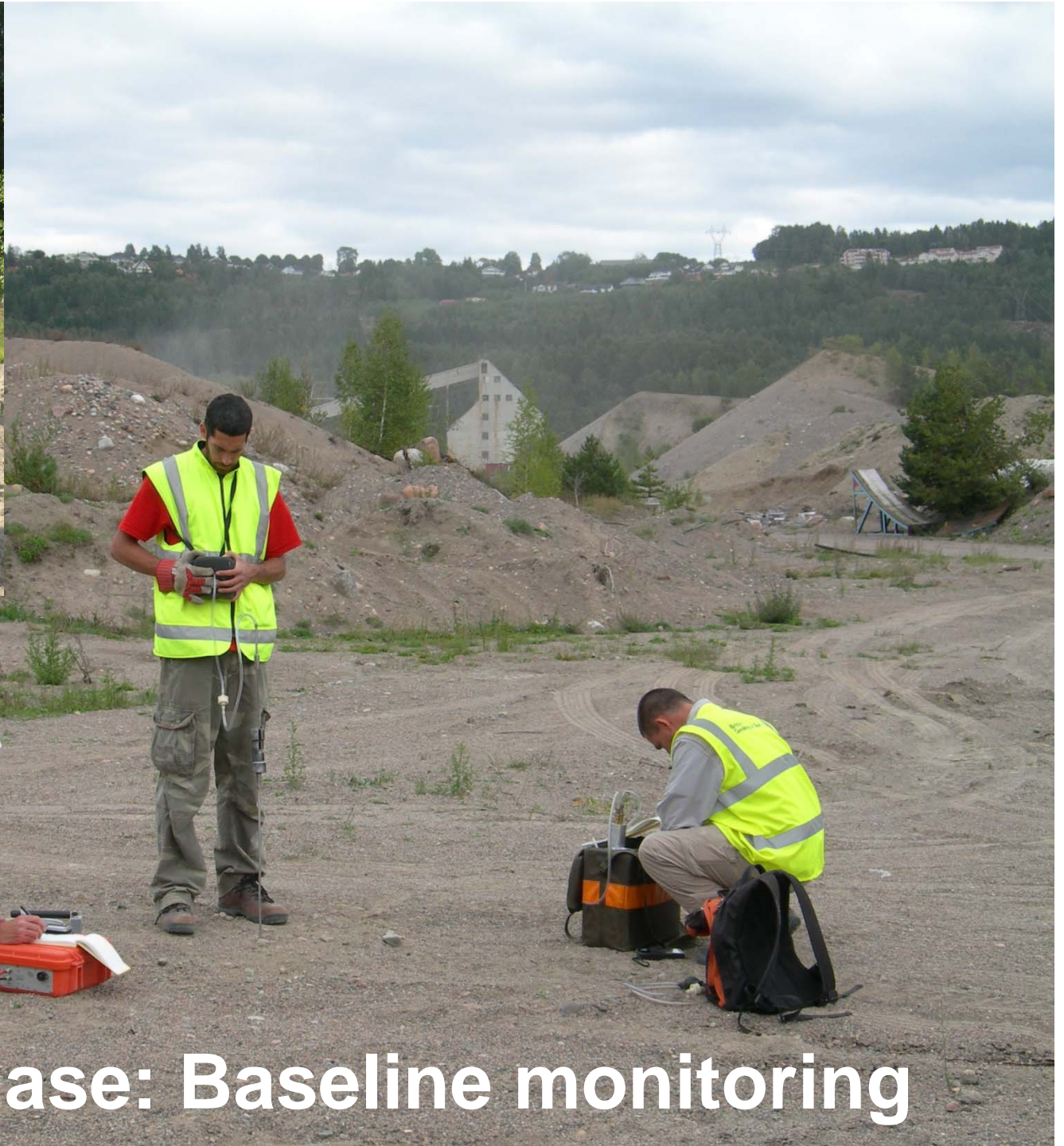


Great Britain



Drilling – June 10





Appraisal phase: Baseline monitoring

Mean CO₂ concentrations (soil gas)

- Original site: 0.13 %
- Alternative 1: 0.06 %
- Alternative 2: 0.38 %
- Seismic line E-W: 0.16 %
- Seismic line N-S: 0.20 %



External Communications

➤ Exposure in media

- Newspaper articles
- Norwegian national TV:
- Oil & energy minister's site visit



➤ Personal contact

- Public hearings (SINTEF, UiO)



- Direct mail about first survey

➤ Future exposure

- Press book (BV)
- Scientific publications
- Press releases

Timeline – phase 2 + 3

➤ Milestones – phase 2

- July 2011: shallow injection completed
- Spring 2012: deep injection initiated
- Spring 2013: coupled modeling reported, protocol
- September 2013: final report

➤ Milestones - phase 3 (parallel to Phase 2)

- December 2011: 1st abandonment plan
- September 2013: Site abandoned; project closure

Acknowledgements

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