

ROAD: Storage Responsibilities and Liabilities

Presentation to the Workshop “Dealing with Liability” organised
by Gassnova at the CO2GeoNet Open Forum

San Servolo, Venice, 11th May 2016

Andy Read

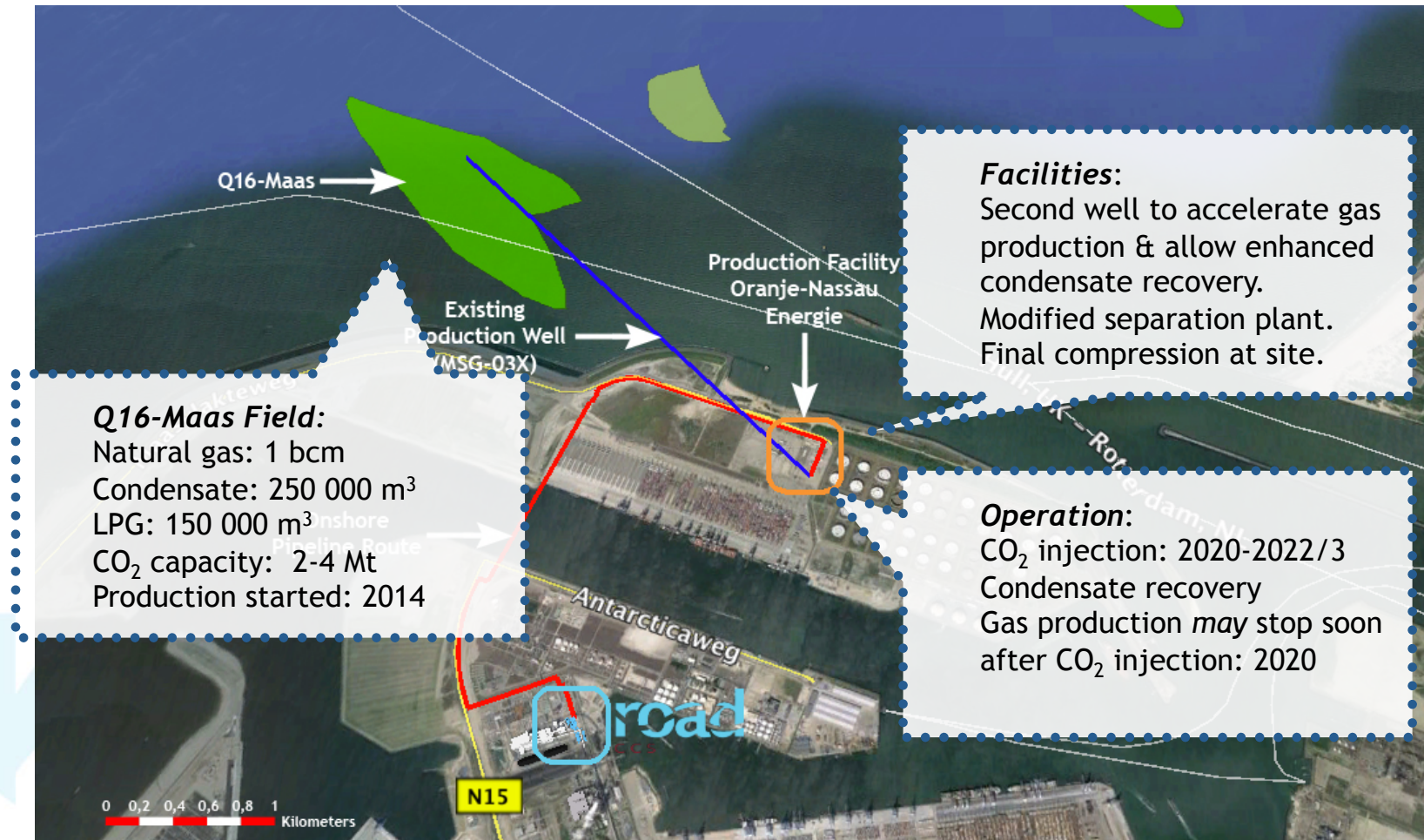
Talk contents

- Summary of storage aspects of the ROAD Project
- Responsibilities and Liabilities:
 - Civil
 - Environmental
 - Financial Security
 - Transfer of Responsibilities
 - Financial Mechanism
- Conclusions

Overview P18-4 & Q16-Maas



Storage Location



Key Responsibilities and Liabilities in CO₂-storage

- For storage operators there are a number of liabilities and responsibilities.
- Responsibilities are often considered similar as liabilities: incorrect!
- The legal framework offers possibilities to operators to transfer responsibilities to authorities. Liabilities, however, cannot be transferred.

Key Responsibilities and Liabilities in CO₂-storage

Framework of Responsibilities and Liabilities:

- Civil liability (Civil Codes)
- Environmental liability
 - Environmental liability directive
 - ETS directive and CCS directive
- Financial Security
- Transfer of responsibilities
 - Financial Mechanism

Key Responsibilities and Liabilities in CO₂-storage - Overview

| Civil | Environmental | CCS Directive |
|------------------------------|-----------------------------------|------------------------------|
| Civil (National Civil Codes) | Environmental liability directive | Financial Security |
| Mining law | ETS directive and CCS directive | Transfer of responsibilities |
| | | Financial mechanism |

Green = Key issues for CCS operators
Red = Minor issues CCS operators

1. Civil liability

- Civil liability related to offshore storage is covered by countries' national civil codes for the Exclusive Economic Zone (and beyond).
- Examples of civil liabilities (NL):
 - Unlawful acts (Civil code) - Party committing unlawful act (storage operator);
 - Strict liability for mining works (Mining law) - Permit holder.
- Risks on accidents resulting in civil liability of operators caused by CO₂-leakage are very unlikely. Considering the unlikelihood of an accident caused by CO₂-leakage, this risk is negligible. Nevertheless, estimates are made of the risks and could be covered by insurances.
- Liabilities can be transferred from operators to other entities.

2. Environmental liability

- Liability for damage to protected species, natural habitats, water and soil (Environmental Liability Directive).
- As CO₂ leakage will have no severe effect on the environment, besides possibly minor local acidification, the liability is limited.
- The main environmental liability for operators is to surrender EAU's in case of leakage of CO₂ (ETS and CCS directive).

2. Environmental liability

- Problem: leakages of CO₂ from storage site will require surrendering EUA's for emitted CO₂.

There are two main factors influencing the magnitude of this liability:

1. Amount of leaked CO₂ - *how is this estimated?*

2. Price-developments of EAU's.

- Possible solutions to mitigate this liability are:
 - Agree leakage estimation methodology upfront;
 - Banking of EAU's;
 - Not applying for emission permit;
 - Alternative schemes by agreement with Government, for example:
 - National insurance scheme underwritten by Government
 - EAU's withdrawn from (future) auctions to cover estimated leakage

2. Environmental liability

- Environmental liabilities can be transferred to a state government or other entity through contracts. However, the remaining risk of damage claims on operators should be hedged by insurances.

3. Financial Security

- Financial Security (FS) is to ensure that all obligations (responsibilities) of the operator arising from the permit can be met. FS has to be valid and effective before commencement of storage.
- FS includes costs for e.g. the following activities:
 - Closure;
 - Monitoring;
 - Reporting;
 - Corrective measures;
 - Surrendering EAU in case of leakage (blow-out).
- Problems arising from FS:
 - How to calculate the costs?
 - What financial instruments are accepted?
 - Mismatch with new ROAD funding structure

3. Financial Security

- Calculated costs for FS have to be periodically adjusted based on a ‘risk-based approach’.
- In the calculations of FS, changes over time (decreasing risks / costs) should be considered.
- Example 1: Calculation EUAs needed in case of leakage
 - FS is needed to cover costs for EAUS in case of an controlled emission (leakage) for the duration of 3 months (up to max. 1 year).
 - In this calculation the max. CO₂ release during 3 months through blow out is calculated. E.g. taking into account the max. speed of injection.

3. Financial Security - Examples

- Example 2: Costs for (final) monitoring plan.
 - The factors influencing the costs related to monitoring plans are flexible. Hence, these have to be coordinated with the authorities. ROAD had agreed that monitoring will increase if the reservoir behaviour gives concern (so increasing cost).
 - Base plan: Monitor pressure and temperature in the well, and compare against model predictions;
 - In case unexplained behaviour: increase monitoring efforts;
 - Worst case: 3D-seismic assessment.
 - As the FS can be adjusted, the costs for increasing monitoring can be taken into account.

3. Financial Security - Instruments

- It may vary from state to state which FS instruments are allowed. Operators and authorities have to find an agreement.
- Based on the CCS-directive, an exhaustive list of financial instruments is provided as eligible for FS:
 - Bank Demand Guarantee (Irrevocable Standby Letter of Credit);
 - Deposits to authority;
 - Irrevocable trust fund;
 - Escrow account;
 - Self-Assurance Based on Financial test.

4. Transfer of responsibilities

- The CCS directive offers the possibility for operators to transfer responsibilities to authorities.
- Transfer of responsibilities to authorities (including the responsibility for surrendering EUAs) is possible when the following requirements are fulfilled:
 1. Permit holder shows that the CO₂ storage is complete and permanent;
 2. 20 yrs (or shorter/longer at discretion of Minister) have passed since site closure;
 3. Permit holder has provided financial means to cover foreseeable costs (incl. monitoring for at least 30 yrs) - amount of contribution is to be decided on by state government (Financial Mechanism);
 4. Storage site is closed and facilities for injection are removed.

4. Transfer of responsibilities - Examples

- Possible solutions for fulfilling conditions:
 1. CO₂ storage is complete and permanent.
 - > Monitoring plan is by authorities declared sufficient to prove the complete and permanent containment of the stored CO₂.
 2. 20 yrs have passed since site closure.
 - > Minister uses discretion to allow a shorter period of time.
 3. Permit holder has provided financial means to cover foreseeable costs (incl. monitoring for at least 30 yrs) - amount of contribution is to be decided on by state government (Financial Mechanism);
 - > See following slides.
 4. Storage site is closed and facilities for injection are removed.

5. Financial Mechanism

- In order to allow transfer of responsibilities from an operator to an authority, the Financial Mechanism (FM) sets requirements for the contribution to be made available by the operator to the authority.
- The contribution may be used to cover the costs borne by the authority after transfer of responsibility to ensure complete and permanent containment after the transfer of responsibility.
- Problem: the amount of the contribution is decided upon by governments. With this discretion, governments could require higher financial contributions than anticipated, increasing costs at the end of the project (when there is no revenue stream).

5. Financial Mechanism

- Terms of contribution are to be agreed between operator and government.
- Minimum requirement by state governments is a financial contribution from operators covering the costs for additional years of monitoring (minimum of 30 years);
- Other costs that may be required by governments:
 - Costs for corrective measures for a defined time period;
 - Costs of surrender of EAU's due to leakage for a defined time period;
 - Costs of preventive and remedial action.

5. Financial Mechanism - Examples

- Agreement between the operator and authority has to be found on the calculation of the additional costs.
- Example of calculation for post-closure monitoring costs: gross calculation of costs made for e.g. seabed inspections:
 - Seabed inspections are due every 5th year.
 - Therefore 6 inspections are needed in 30 years.
 - Costs of inspections are €300 000 each.
 - Total sum of costs for inspections €1 800 000

6. Conclusions

- Liabilities cannot be transferred from the operator to another entity.
- Responsibilities can (under conditions) be transferred from the storage operators to authorities.
- However, these conditions vary from state to state as states have a discretion to set (additional) requirements in the financial mechanism.
- A challenge for operators is finding a compromise with authorities, preferably upfront. Key issues to agree are:
 - Monitoring plan and the estimation of leakage
 - The amount and form of the Financial Security
 - Requirements for transfer of (post-closure) responsibilities
 - The calculation of the Financial Mechanism.

A step back to look at the bigger picture...

Because I think that this is all rather stupid...
(personal view)

Who controls the risk?

- Actual technical risk of proven CO₂ leakage is very small, and the main risk are the wells
 - Environmental impact of a leak is localised and modest
 - Repair of a leaking well is a normal oil and gas business risk (manageable)
- But risks from future Government policy are very uncertain and could be large:
 - Monitoring plan and the estimation of leakage - *how much must you spend to prove there is no leak (proving a negative)?*
 - The amount and form of the Financial Security - *and impact of future carbon price*
 - Requirements for transfer of (post-closure) responsibilities - *what will be required as is proof of permanent storage by a future Government?*
 - The calculation of the Financial Mechanism - *what costs might future Governments choose to add in?*
- So the biggest liability risks are actually about future Government action

And who pays for the risk?

- CCS projects are uneconomic, and need Government support. Transport and storage is likely to develop as local monopoly - so regulated utility or “market maker” is likely.
- Under the responsibilities and liabilities of the CCS Directive, the largest risk (and therefore cost) arises from uncertainty on future Government action (including future carbon price).
- **So the Government has to regulate to ensure the project is paid to take a risk on future Government action.**
 - The less clarity the Government gives, or the longer the project, the higher the risk and therefore the higher the cost to the Government.

Shouldn't the entity with most control over a risk carry the risk?



And another thing...

- Risks and long term liabilities of CO₂ storage:
 - Monitoring plan and the estimation of leakage
 - The amount and form of the Financial Security
 - Requirements for transfer of (post-closure) responsibilities
 - The calculation of the Financial Mechanism
 - Indefinite civil liability
 - Indefinite environmental liability
 -
- Risks and long term liabilities of CO₂ emission to atmosphere:
 - None - a single upfront fee (the carbon price) applies to most industries (not all) and there is no further legal risk or liability
- Which is more environmentally harmful, CO₂ emission, or CO₂ storage?



Conclusion 2 - The big picture

- Major studies by IEA, IPPC etc show that CCS is necessary to meet climate targets, and it is also an EU objective:
 - CO₂ storage is a societal good, certainly much better than CO₂ emission
- The existing legislation creates a complex set of long term responsibilities and liabilities for the operator
- These responsibilities and liabilities can be managed with help from a supportive Government
 - CCS will only happen with a supportive Government, so this should be manageable
- But we have created a significant barrier for CO₂ storage, which Governments now have to remove or pay for.
 - While CO₂ emission is low cost and risk free, irrespective of future harm.

Q & A

ROAD | Maasvlakte CCS Project C.V.

Visit

Parallelweg 1
3112 NA Schiedam
The Netherlands

Post

P.O. Box 133
3100 AC Schiedam
The Netherlands

Contact

T: +31 (0)10 75 34 003
F: +31 (0)10 75 34 040
E: info@road2020.nl
W: www.road2020.nl

2. Environmental liability - EUAs

- Alternative solution: estimates of amount EUAs needed on a monthly basis
 - For each migration or leakage Operator estimates on a monthly basis (cumulative, previous month, forecast).
 - Operator reports the level 3 numbers for the previous month to the authority and purchases an equivalent number of EUAs at market price and hands these to the emission authority.
 - When drafting the allocation plan, the authority reduces the number of EUAs to be auctioned the following year by the cumulative quantity of reported monthly level 3 leakages from all storage complexes for the previous 12 months up to the time the national allocation plan is submitted.
 - At or around the date of the first auction of the following year emission authorities reimburse each Operator on a € per € basis for the EUAs submitted in the previous year. Emission authorities absorb any price increase or decrease.

2. Environmental liability - EUAs

| year A | year A+1 |
|---|--|
| Operator purchases in each month EUAs equivalent to the estimated and reported volume leaking and reaching the atmosphere | Published NAP includes summary of total reported escapes to atmosphere per storage facility and per Operator |
| Operator passes the purchased EUAs to XXXX with a record of their actual cost | XXXX reimburses each Operator for the EUAs submitted at the price of purchase |
| NAP drafted to include deduction equal to total reported leakages from storage complexes to the atmosphere for previous 12 months | Annual auctioned EUAs includes deduction for total leakages reported for previous year |
| e.g. aggregate amount leaked of 1 million tonnes. | 5 billion EUAs to be auctioned reduced by 1 million. |