

Norwegian regulatory requirements to well Integrity for CO2 injection wells and legacy well assessment

NINA RINGØEN

Drilling & Well technology



Norwegian Ocean Industry Authority

HAVTIL

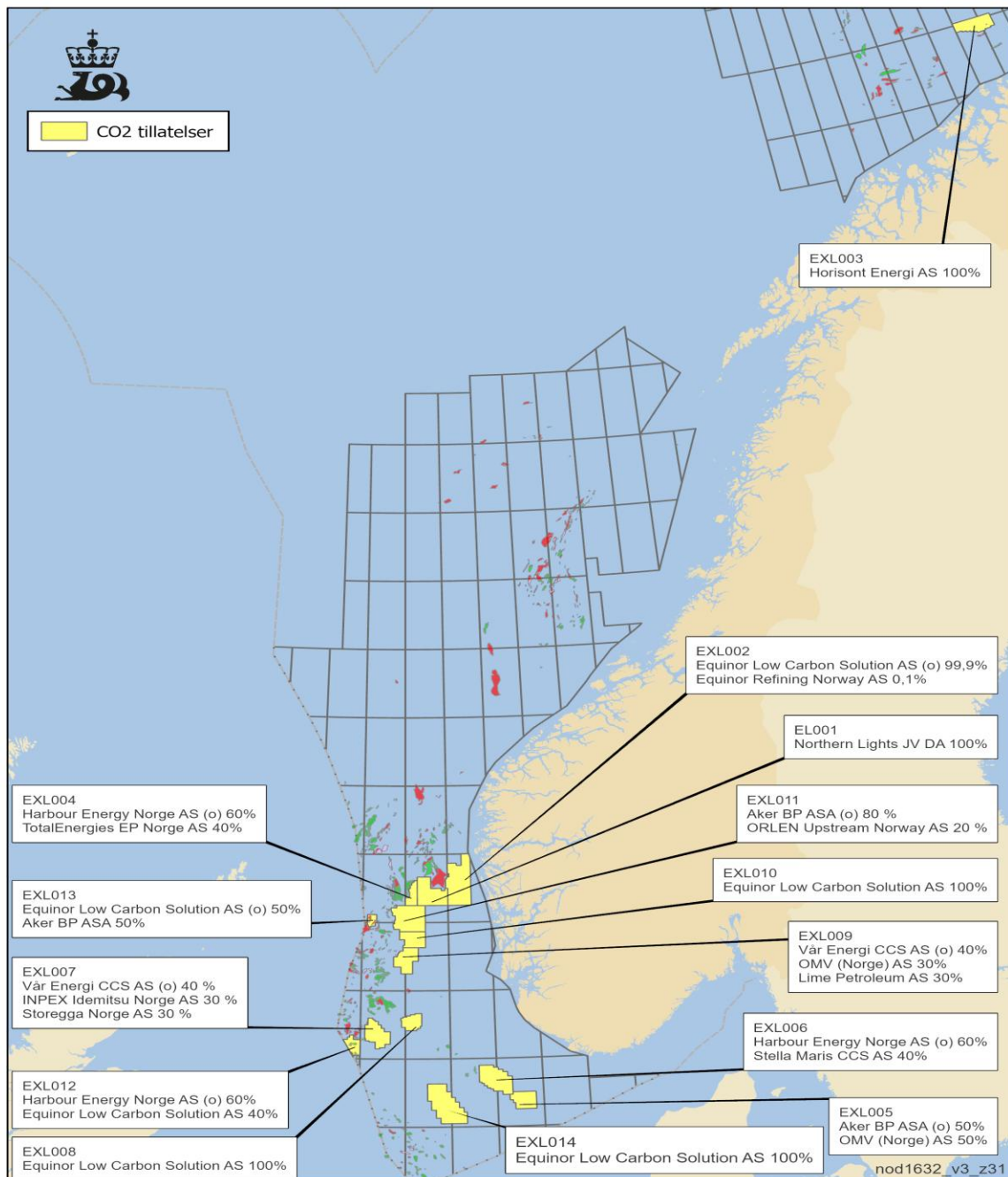
Regulatory responsibility
for

- safety,
- working environment,
- emergency preparedness and
- security

in Norway's ocean industry.

Reports to the Ministry of
Energy





CO2 storage on the NCS

EL 001: Northern Lights JV DA (Aurora/2019)

EXL 002: Equinor LCS (Smeaheia / 2022)

EXL 003: Horisont Energi AS (Polaris/2022)

EXL 004: Harbour Energy, Total Energies (Luna/2022)

EXL 005: Aker BP and OMV (Poseidon/2023),

EXL 006: Harbour Energi and Stella Maris CCS (Havstjerne/2023)

EXL 007: Vår Energi, INPEX Idemitsu, Storegga (Trudvang/2023)

EXL 008: Equinor LCS AS (Albondigas/2024)

EXL 009: Vår Energi, OMV, Lime Petroleum (Iroko/2024)

EXL 010: Equinor LCS AS (Kinno/2024)

EXL 011: Aker BP/ ORLEN Upstream (Atlas/2024)

EXL 012: Harbour Energy / Equinor LCS, (Kaupang/2024)

EXL 013: Equinor LCS / Aker BP (Forsete/2024)

EXL 014: Equinor LCS (Fritos/2025)

As of 06.11.2025 www.sodir.no

EL: Exploitation license

EXL: Exploration license

Legislation for *CO₂-transport and injection*

European Union

Directive 2009/31/EC

- Geological storage of carbon dioxide

Ministry of Energy

Regulation for CO₂ storage and transport

- Regulations relating to exploitation of subsea reservoirs on the continental shelf for storage of CO₂ and transport of CO₂

Ministry of Climate and the Environment

Pollutions Regulations

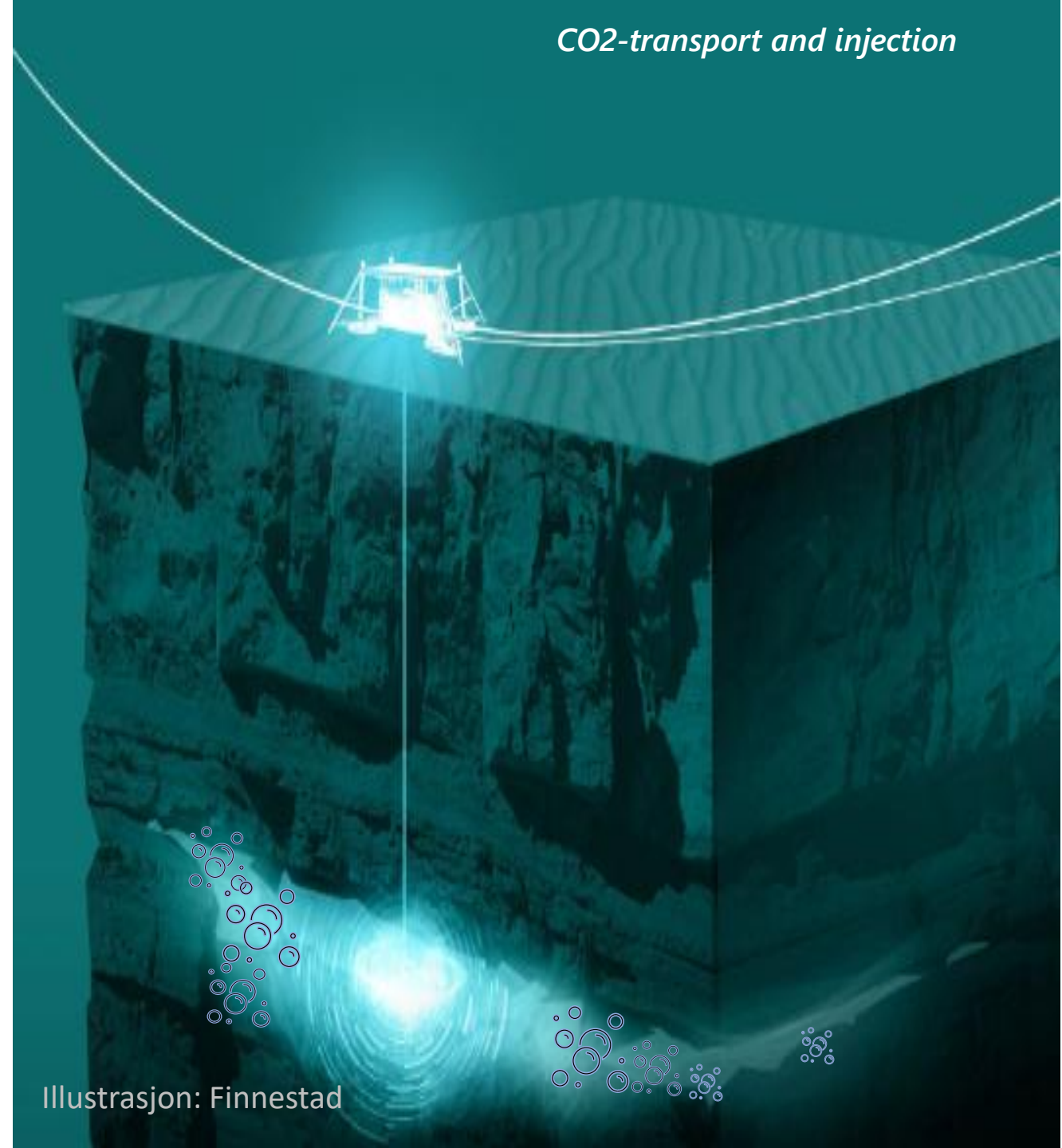
- Part 7A / chapter 35 in existing Pollutions Regulations

Norwegian Ocean Industry Authority (Havtil)

CO₂ safety regulations

- Regulations relating to safety and working environment for transport and injection of CO₂

CO₂-transport and injection



Illustrasjon: Finnestad

CO₂ safety regulations

CO₂ safety regulations

Regulations relating to safety and working environment for transport and injection of CO₂ on the continental shelf

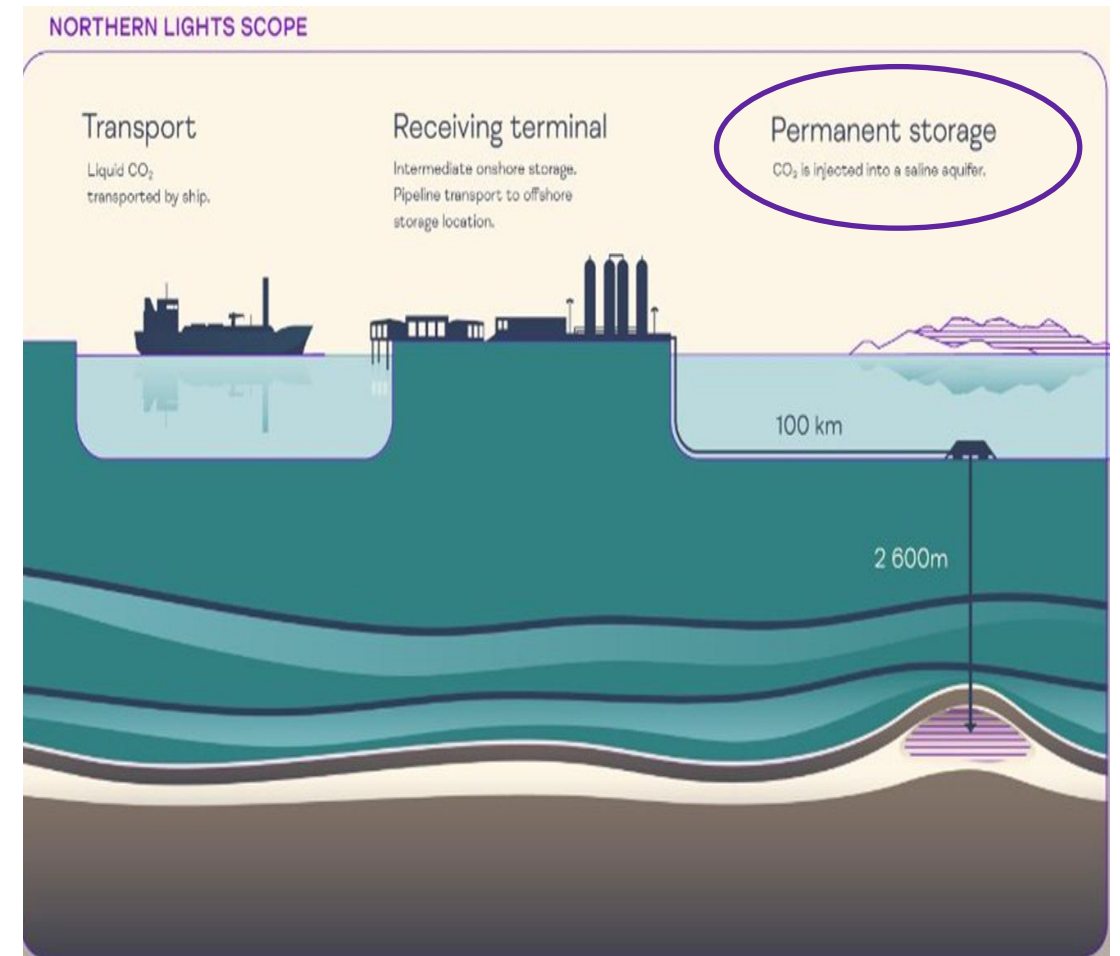
§ 17 Drilling and well systems and drilling and well activities

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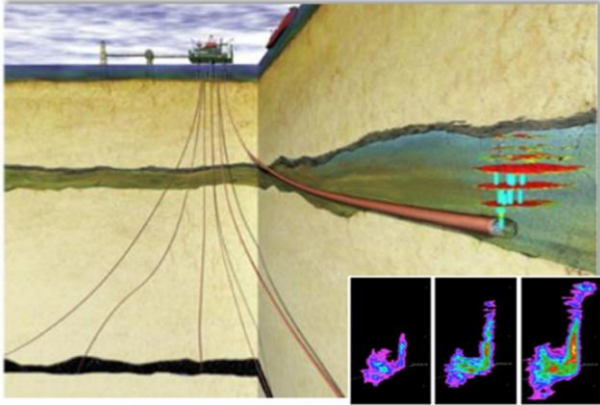
The requirements that apply to drilling and well systems in [Chapter VIII of the Facilities Regulations](#) and to drilling and well activities in [Chapter XV of the Activities Regulations](#), apply correspondingly to the scope of these regulations.

Last changed: 25 February 2020

Guidelines and audit reports with nonconformities related to the section

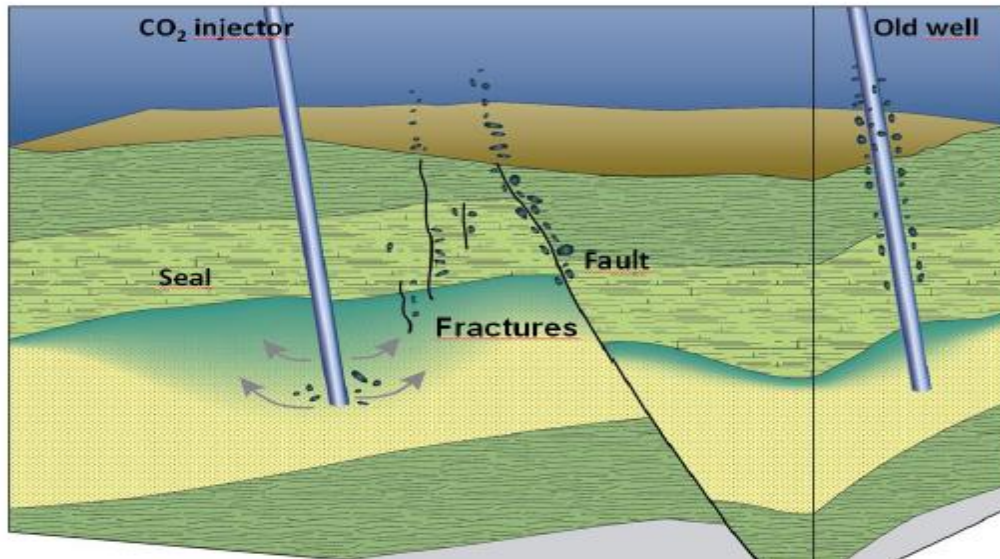


CO₂ Safety Regulation § 11



CO₂ SAFETY REGULATION §11

- The consequences for the well barriers of existing wells in the CO₂ storage complex shall be accounted for.



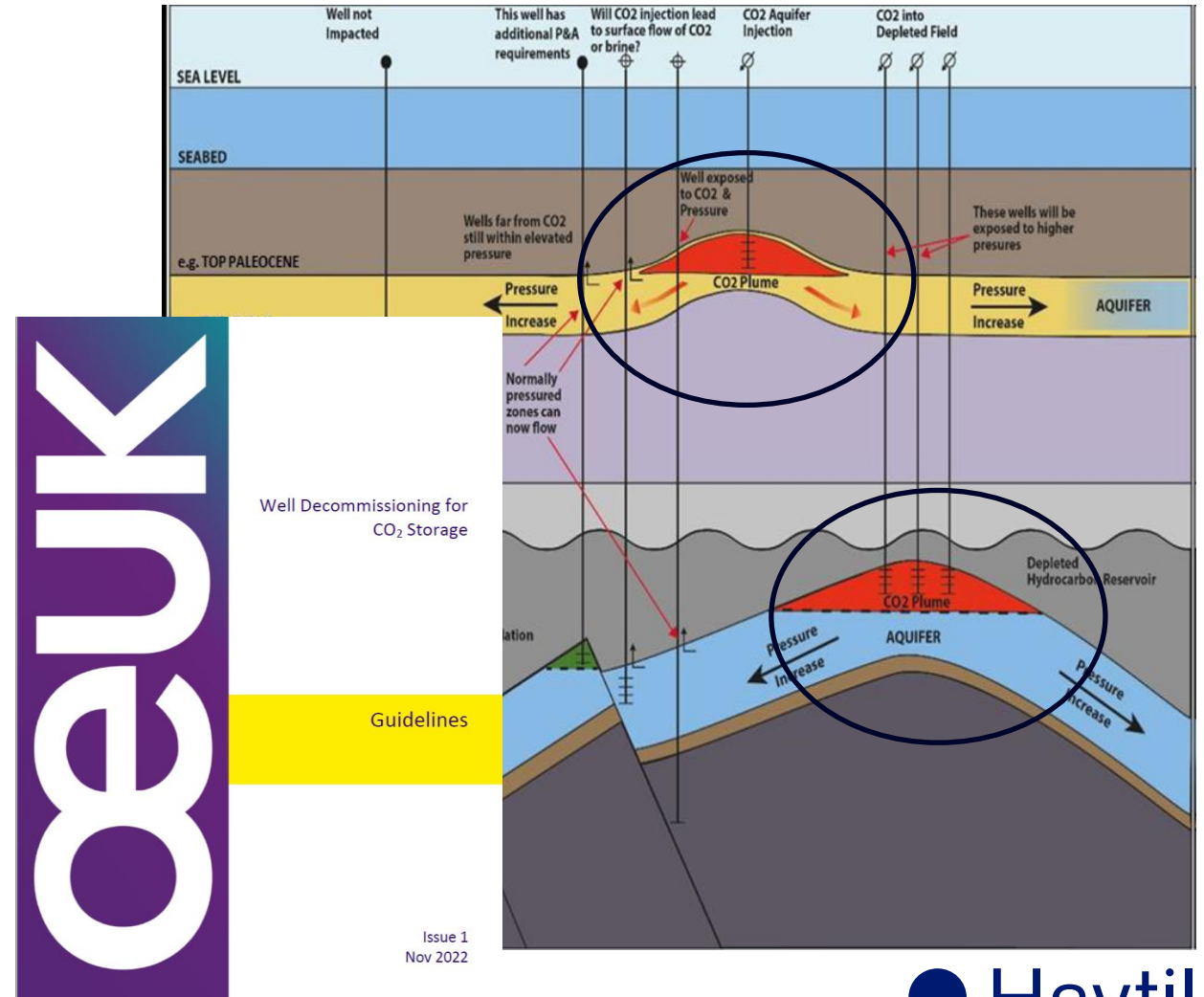
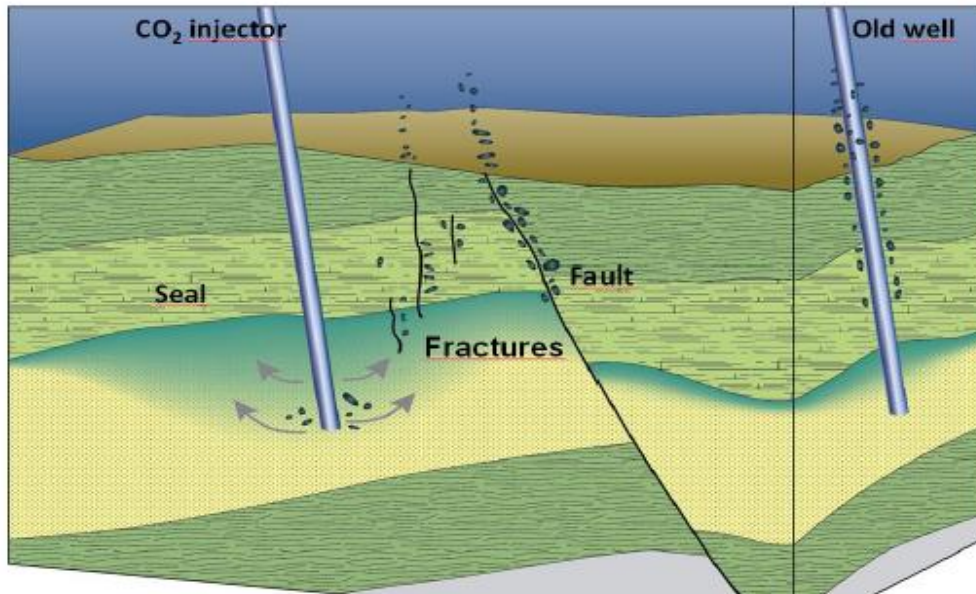
GUIDANCE LEVEL

- *By existing wells is meant wells that are in use and temporarily or permanently abandoned wells.*
- *To assess the well barriers to existing wells when storing CO₂, [DNVGL-RP-J203 Section 7](#)*
- *and [ISO 27914 Chapter 7.6](#) should be used.*

Assessment of wells in storage complex

Legacy wells*: A well that has already been decommissioned according to legacy standards and inherited by the CO2 storage operator.

Saline Aquifers: CO₂ storage in aquifers is likely to be accompanied by a long-term pressure increase, above initial formation fluid pressures.



(*OEUK – Guideline for Well Decommissioning for CO2 storage)

The European Commission Guidance Documents to the CCS Directive 2024

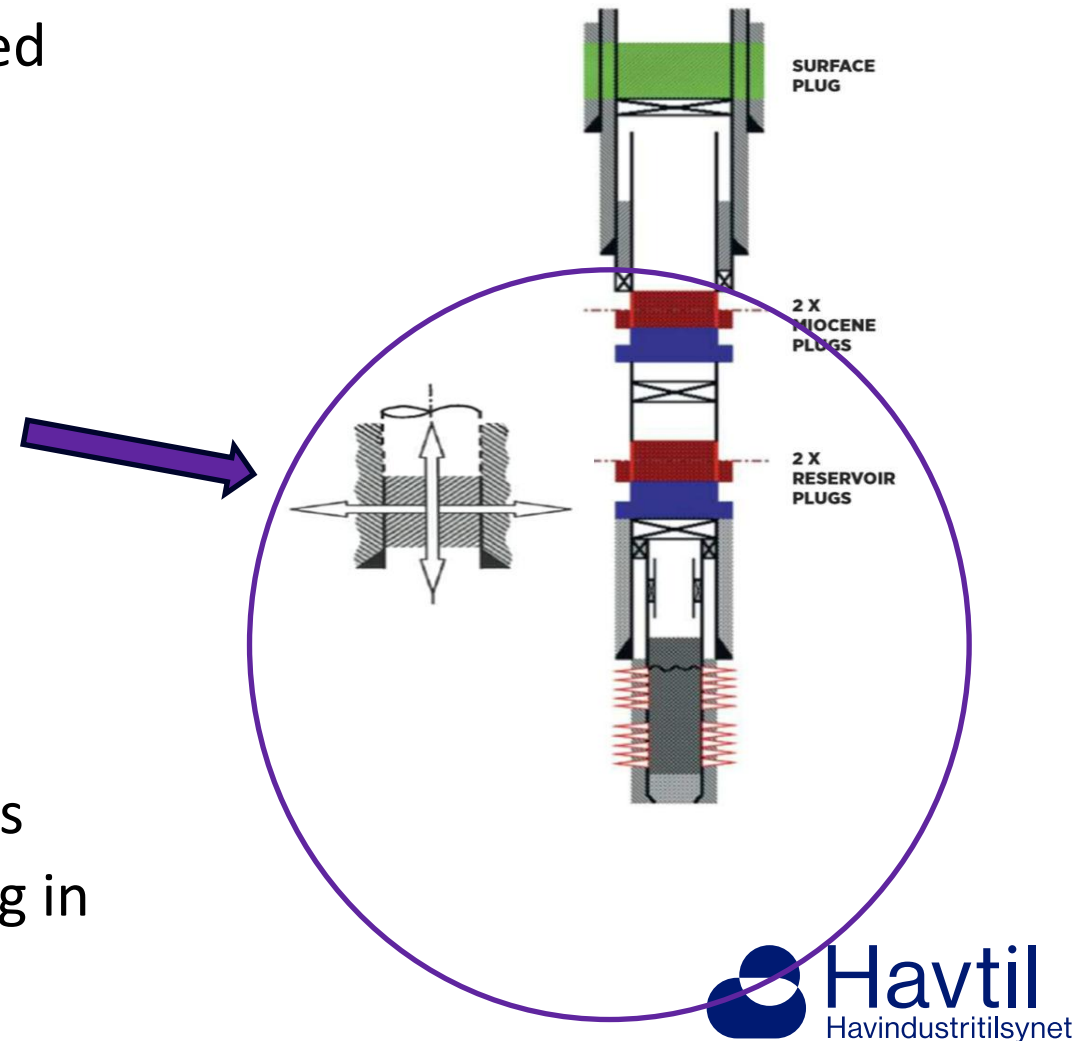
Guidance documents

- [Guidance Document 1](#) : CO₂ Storage Life Cycle and Risk Management Framework
- [Guidance Document 2](#) : Characterisation of the Storage Complex, CO₂ Stream Composition, Monitoring and Corrective Measures
- [Guidance Document 3](#) : Criteria for Transfer of Responsibility to the Competent Authority
- [Guidance Document 4](#) : Financial Security and Financial Contribution

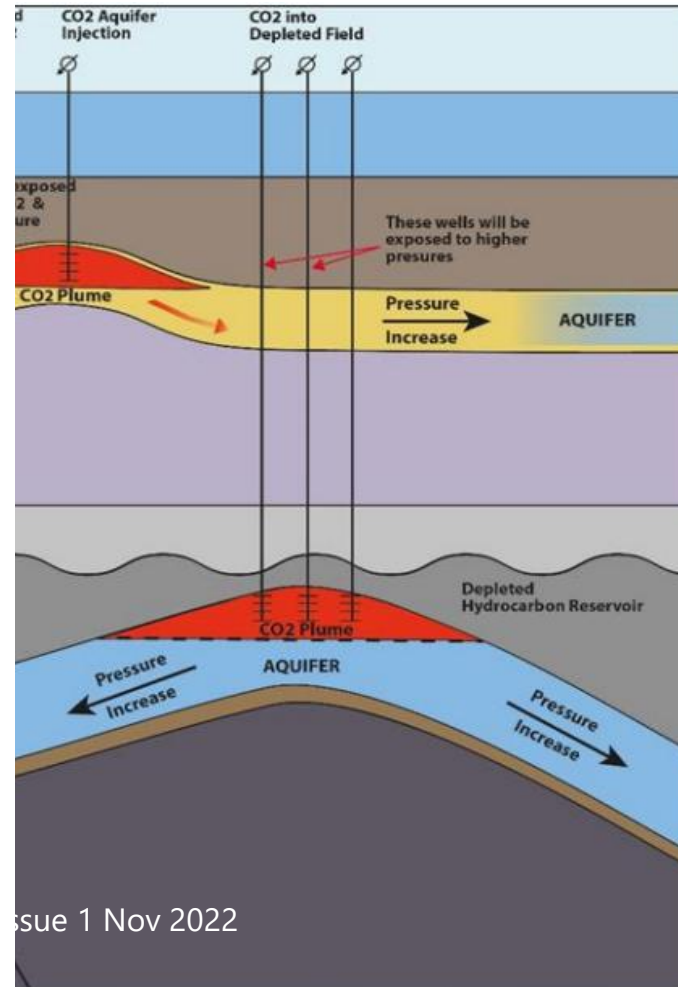
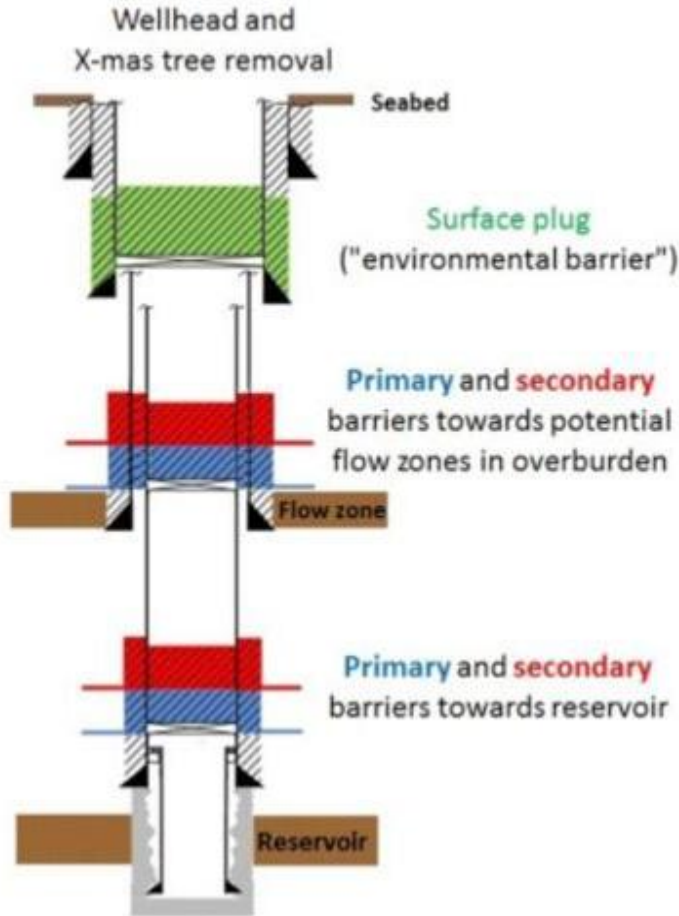


Legacy well assessment and CO2 exploration wells

- CO2 storage in aquifers is likely to be accompanied by a long-term pressure increase, above initial formation fluid pressures.
- Exploration well barriers that were designed assuming initial formation pressure should be evaluated carefully.
- Legacy well barriers will have to be located in competent formation.
- Well data across aquifers or geological formations without HC is typically limited (exploration drilling in overburden).



Legacy well assessment in storage complex



- Long term pressure increase, above initial formation fluid pressure
 - Minimum depth of integrity
- CO2 as supercritical fluid
 - Carbonic acid and corrosion in well materials and cement in aquifers
- Cyclic pressure and temperature effects can affect well integrity if discontinuous injection
- CO2 migration with time and trapping mechanisms to be evaluated

Collaboration with other authorities and industry partners is key



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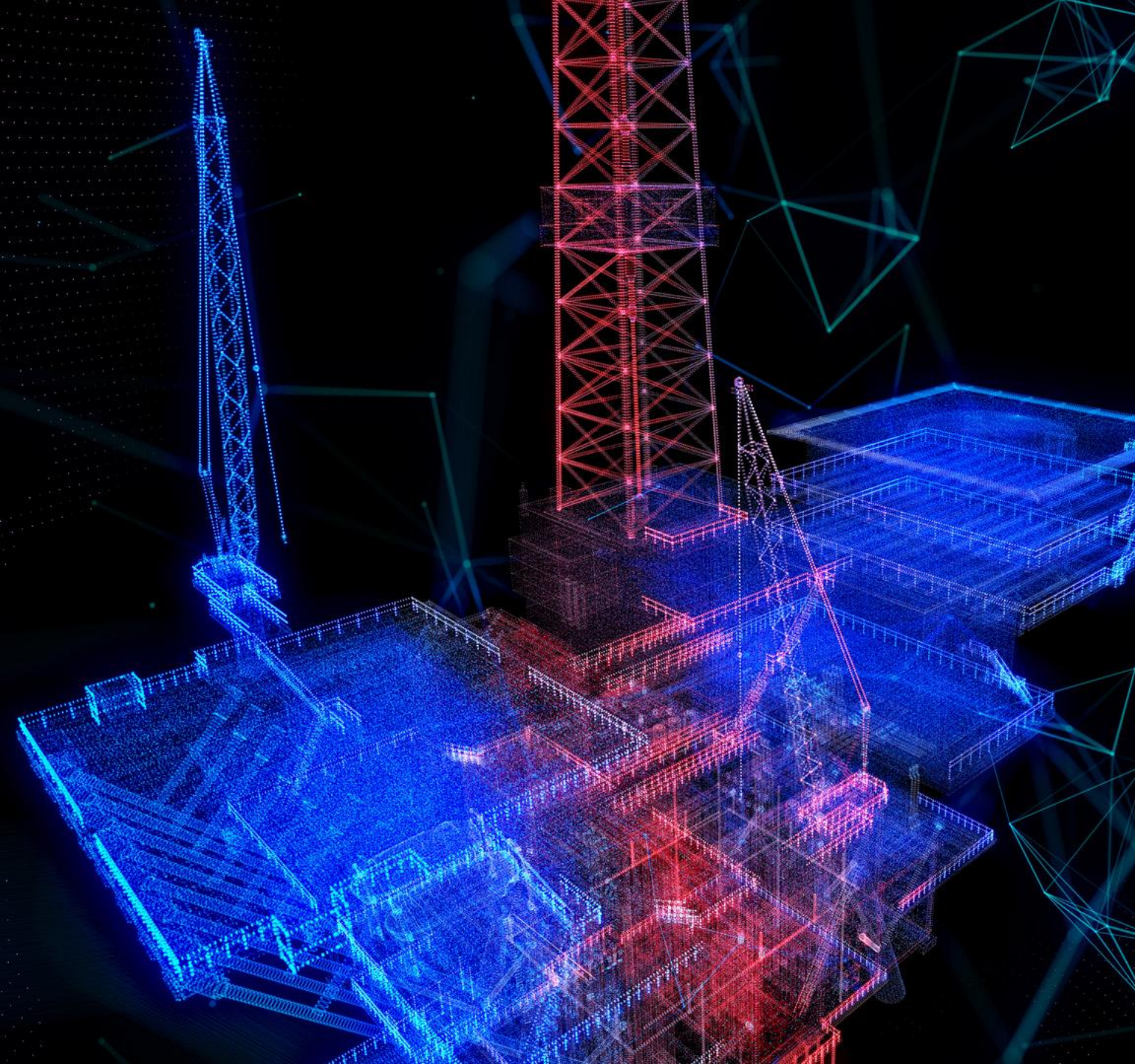


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