



CO₂ storage site risk – how can trust be built?

Cathrine Ringstad
Senior adviser CCS, Bellona

FORCE: CCS legacy wells seminar
Norwegian offshore directorate
Stavanger 19.11.2025

Industrial waste

O&G industry

CCS

1988

Bellona reveals one of the world's largest mercury discharge by Hydro, Hærøya



1991

Bellona digs up barrels of toxic waste at Hydro, Notodden



Industrial waste

O&G industry

CCS

1989

Bellona campaigned against oil drilling in the north for the first time



2004

Trying to prevent the oil platform Eirik Raude from going to the Barents Sea



Industrial waste
O&G industry
CCS

2020

Bellona reports oil leak at Mongstad



Photo: Equinor

Investigation report by Bellona: Fire at Melkøya



Photo: Bjørn Egil Jakobsen, Hammerfestingen.no

BELLONA

Granskningsrapport

Rapport	
Rapporttittel Hammerfest LNG Melkøya – Brann i turbin 28.09.2020	Dokumentnummer 000005102020
Gradering	
<input checked="" type="checkbox"/> Offentlig	<input type="checkbox"/> Begrenset
<input type="checkbox"/> Unntatt offentligheten	<input type="checkbox"/> Fortrolig
Status	
<input checked="" type="checkbox"/> Foreløpig versjon	<input type="checkbox"/> Endelig versjon

Figur 1 Foto: Bjørn Egil Jakobsen/ Hammerfestingen.no

Industrial waste
O&G industry
CCS

1997

Bellona ensures that CO₂ becomes part of the Pollution Act

Bellona skeptisk til saksbehandlingen

Mener at gasskraft-konsesjonen er ugyldig

Miljø-organisasjonene Bellona og Norges Naturvernforbund mener at konsesjonen for å bygge to gasskraftverk på Vestlandet er ugyldig.

Organisasjonene mener konsesjonsvedtaket er fattet på sviktende juridisk grunnlag, skriver Arbeiderbladet og Dagens Næringsliv.

Bellona hevder at verken Norges Vassdrags- og energiverk (NVE) eller Olje- og energidepartementet har lovhjemmel til å behandle spørsmål



Lovstridig vedtak.
Frederic Hauge.



Skandale.
Kristin Halvorsen.

om utslipp av CO₂. I et brev til energiminister Ranveig Frøiland skriver Bellona-leder Frederic Hauge at forurensnings-saker skal behandles av Statens forurensningstilsyn (SFT) og Miljøverndeparte-

mentet. – Konsekvensen av dette må nødvendigvis være at de vedtak som NVE fattet 30. oktober i fjor, må anses som ugyldige.

Vedtaket innebærer at det er gitt tillatelse til utslipp av CO₂ uten at det finnes noen hjemmel i energiloven som gir dekning for de vedtak NVE har gjort, sier Hauge til Arbeiderbladet.

Bellona får støtte av Norges Naturvernforbund.

SV-leder Kristin Halvorsen mener det er en skandale dersom Bellona har rett. Hun vil kontakte energiministeren for å få en redegjørelse i Stortinget om hvilken lovhjemmel som er brukt for å gi konsesjon. (NTB)

Aftenposten 22 May 1997

Gasskraft for retten?

Bellona vil vurdere rettslig prøving av dagens praksis som innebærer at det ikke er nødvendig å søke om utslippstillatelse for CO₂.



PROTESTER:
Frederic Hauge, Bellona



BEKREFTER:
SFT-direktør Håvard Holm



AVVISER:
NVE-direktør Erling Dinsen

HILDE HARBO

Striden om gasskraftverk fikk et nytt kapittel etter at Bellona i et brev til Olje- og energidepartementet hevdet at konsesjonene som i fjor høst ble gitt om gasskraftverk, ikke er gyldige. Bellona mener at Norges vassdrags- og energiverk i konsesjonen ga en «blanko-hålmakt» til CO₂-utslipp, og påpeker at NVE ikke har

Aftenposten 26 May 1997

Industrial waste
O&G industry
CCS

1999

Bellona report



Outlines how Norway can transition to be a major energy supplier that helps solve environmental problems instead of creating them.

- Suggests CO₂ capture on gas-fired power plants
- Points out possibilities for geological storage of CO₂ on the Norwegian continental shelf



CO₂ storage site risk – how can trust be built?

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Permits
Operations
Framework



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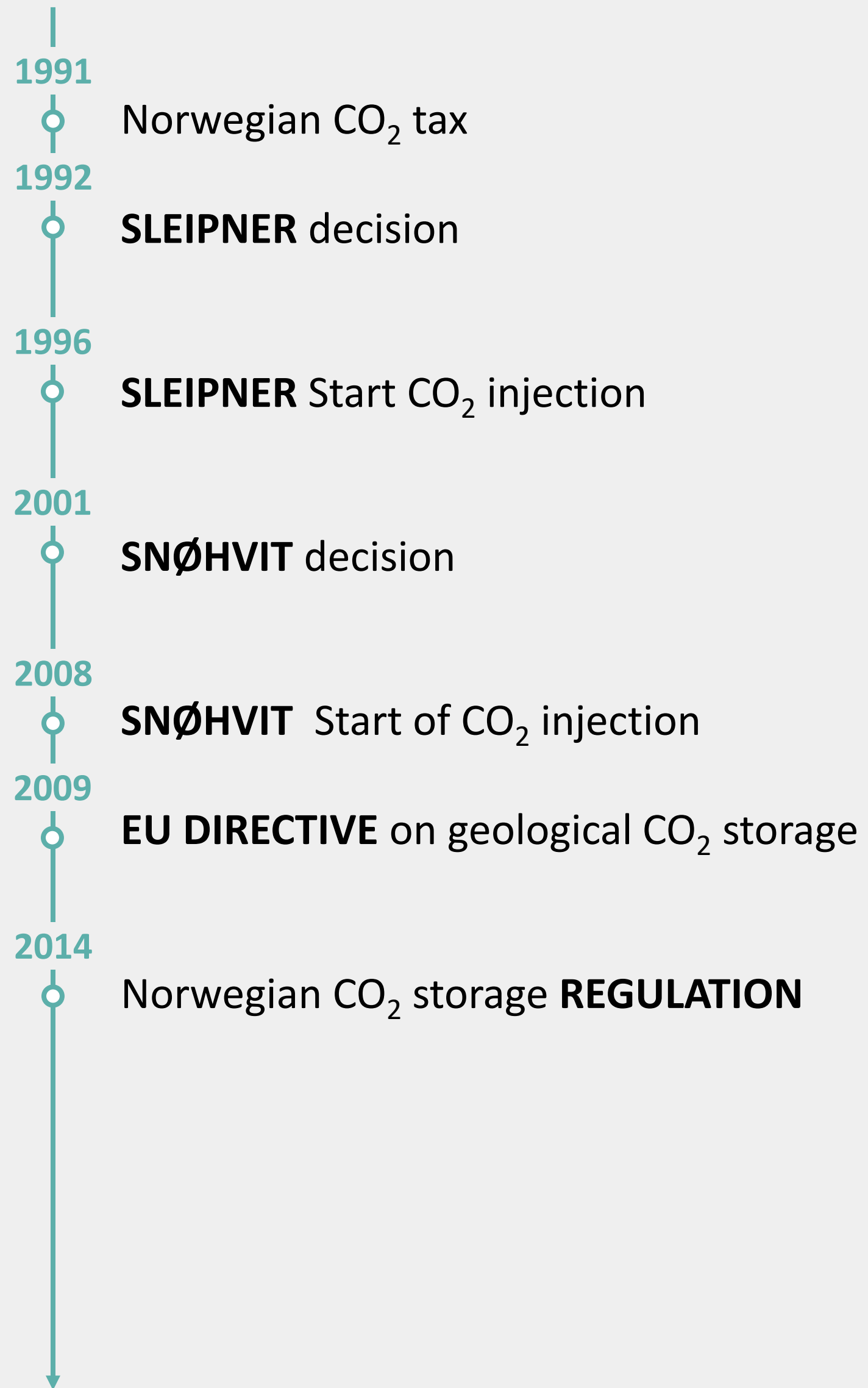
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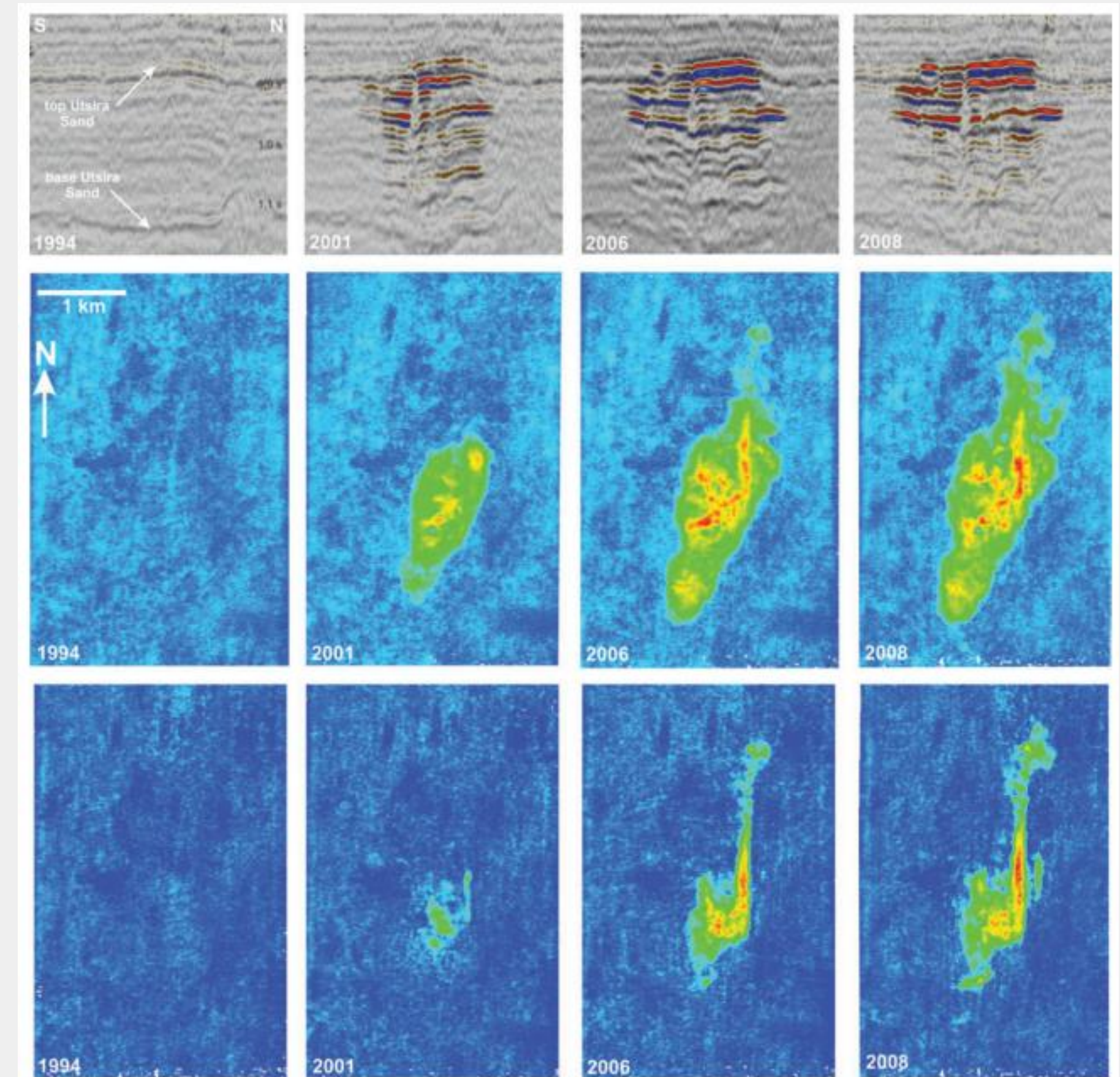
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SLEIPNER time-lapse seismics



Chadwick and Noy (2015)

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CO₂ storage regulation

LOVDATA

Søk etter lover, forskrifter, dommer, stortingsvedtak, tariffavtaler m.m.

Søk

Forskrift om utnyttelse av undersjøiske reservoarer på kontinentalsokkelen til lagring av CO₂og om transport av CO₂på ko

Innholdsfortegnelse

Gå til opprinnelig kunngjort versjon

Forskrift om utnyttelse av undersjøiske reservoarer på kontinentalsokkelen til lagring av CO₂ og om transport av CO₂ på kontinentalsokkelen

Dato	FOR-2014-12-05-1517
Departement	Energidepartementet
Publisert	I 2014 hefte 15
Ikrafttredelse	05.12.2014
Sist endret	FOR-2023-12-18-2278 fra 01.01.2024
Gjelder for	Norge
Hjemmel	LOV-1963-06-21-12-§3
Kunngjort	08.12.2014 kl. 15.30
Rettet	20.01.2015 (§ 6-2)
Korttittel	Forskrift om lagring og transport av CO ₂ på sokkelen

Hjemmel: Fastsatt ved kgl.res. 5. desember 2014 med hjemmel i lov 21. juni 1963 nr. 12 om vitenskapelig utforskning og undersøkelse etter og utnyttelse av andre undersjøiske naturforekomster enn petroleumsforekomster § 3. Fremmet av Olje- og energidepartementet.
EØS-henvisninger: EØS-avtalen vedlegg XX kap. III nr. 21 (direktiv 2009/31/EF).
Endret ved forskrifter 20 juni 2023 nr. 996 (i kraft 1 juli 2023, endret departementstilhørighet), 18 des 2023 nr. 2278 (i kraft 1 jan 2024).
Endres ved forskrift 27 mai 2025 nr. 870 (i kraft 17 jan 2026 iflg. meddelelse 7 nov 2025 nr. 2226).
Rettet 20.01.2015 (§ 6-2).

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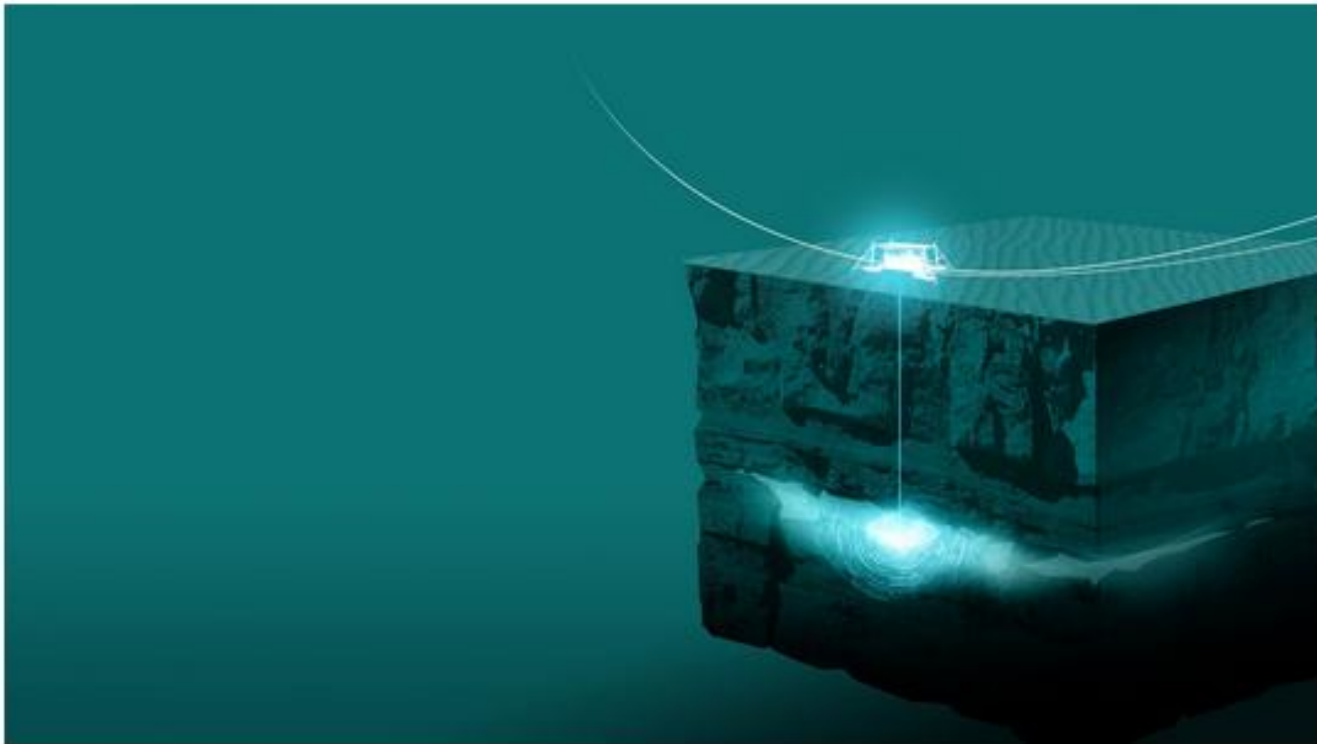
CO₂ storage regulation

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Postponed: Seminar on safe CO₂ storage



9/21/2023 The Petroleum Safety Authority (PSA), Norwegian Petroleum Directorate (NPD) and Norwegian Environment Agency (NEA) are postponing the planned seminar on safe CO₂ storage due to ongoing work on updating the CO₂ Storage Regulations.

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Public consultation

Regulations relating to documentation in connection with storage of CO₂ on the shelf

Deadline 1 December 2025

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Public consultation – proposed changes to two regulations



10/2/2025 The Norwegian Offshore Directorate is submitting proposed changes to the Resource Management Regulations and the Regulations relating to documentation in connection with storage of CO₂ on the shelf for public consultation.

All documents [can be found here](#).

The consultation deadline is 1 December 2025.

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Regulations

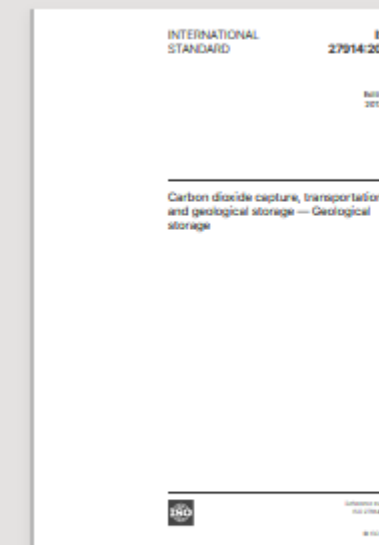
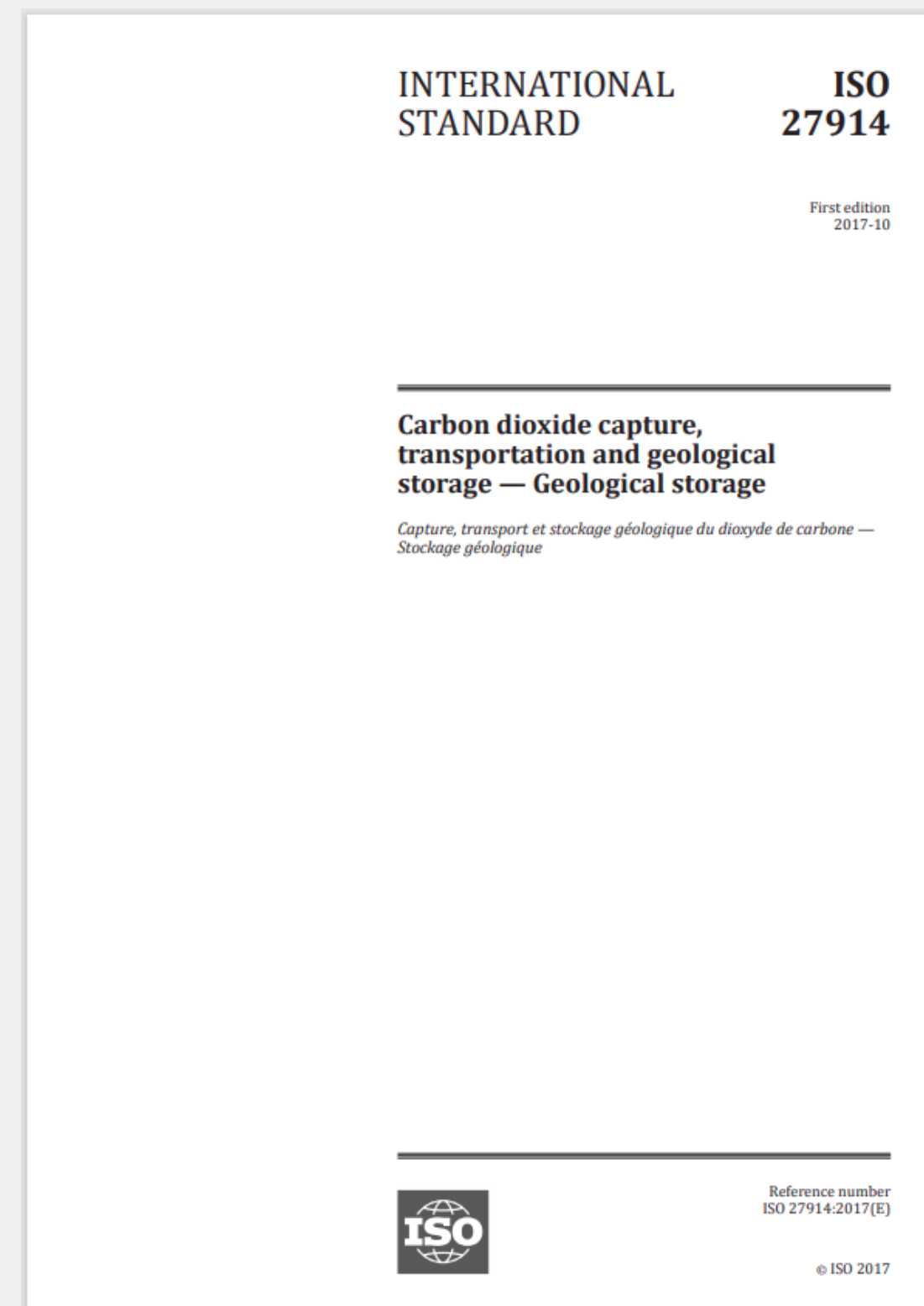
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International standards (ISO)



[Read sample](#)

ISO 27914:2017

Carbon dioxide capture, transportation and geological storage — Geological storage

Published (Edition 1, 2017)

→ Expected to be replaced by **ISO/FDIS 27914** within the coming months.



ISO/FDIS 27914

Carbon dioxide capture, transportation and geological storage — Geological storage

Under development

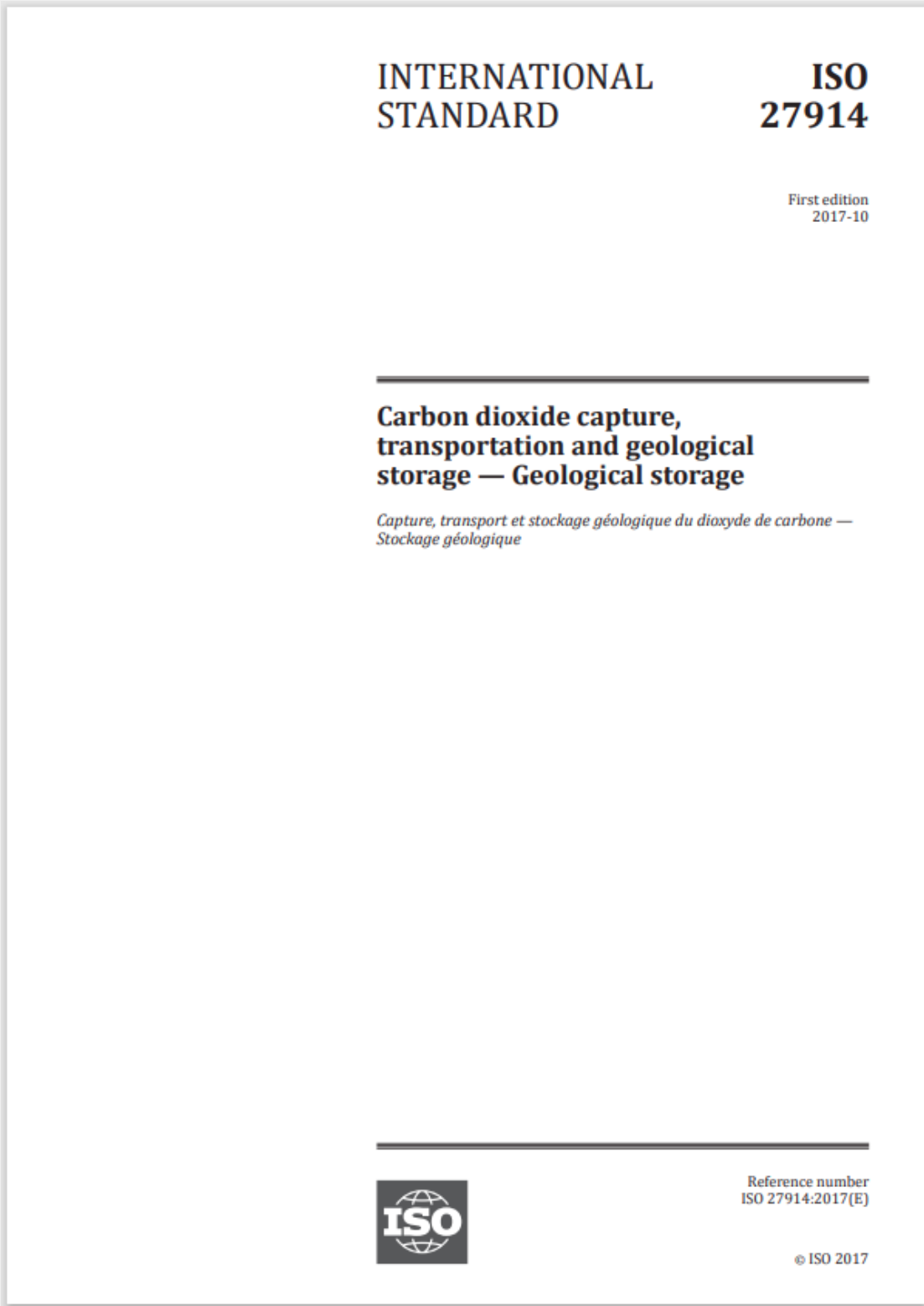
This draft is in the approval phase.

← Will replace **ISO 27914:2017**

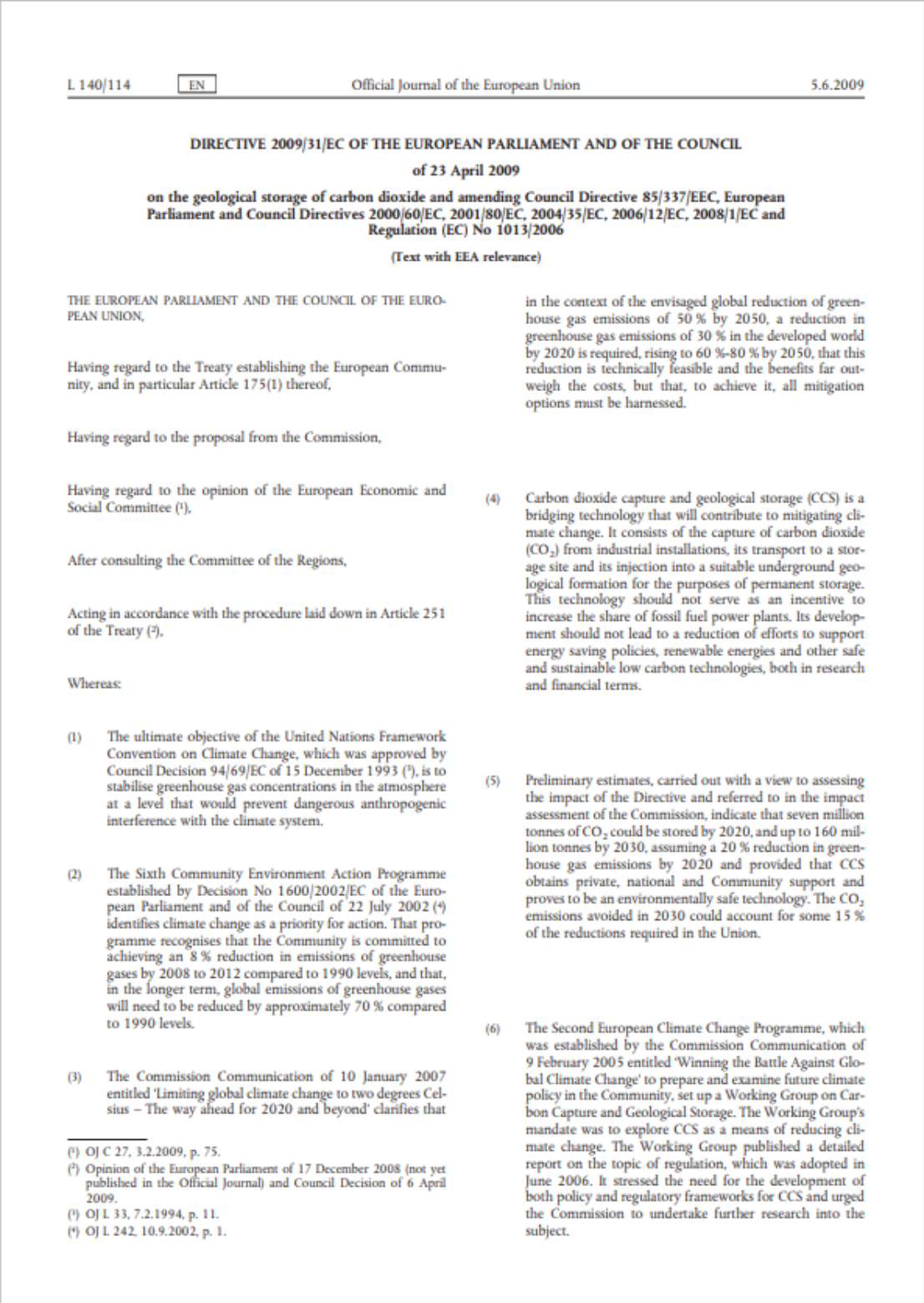
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European standards (CEN)



ISO standard on geological storage

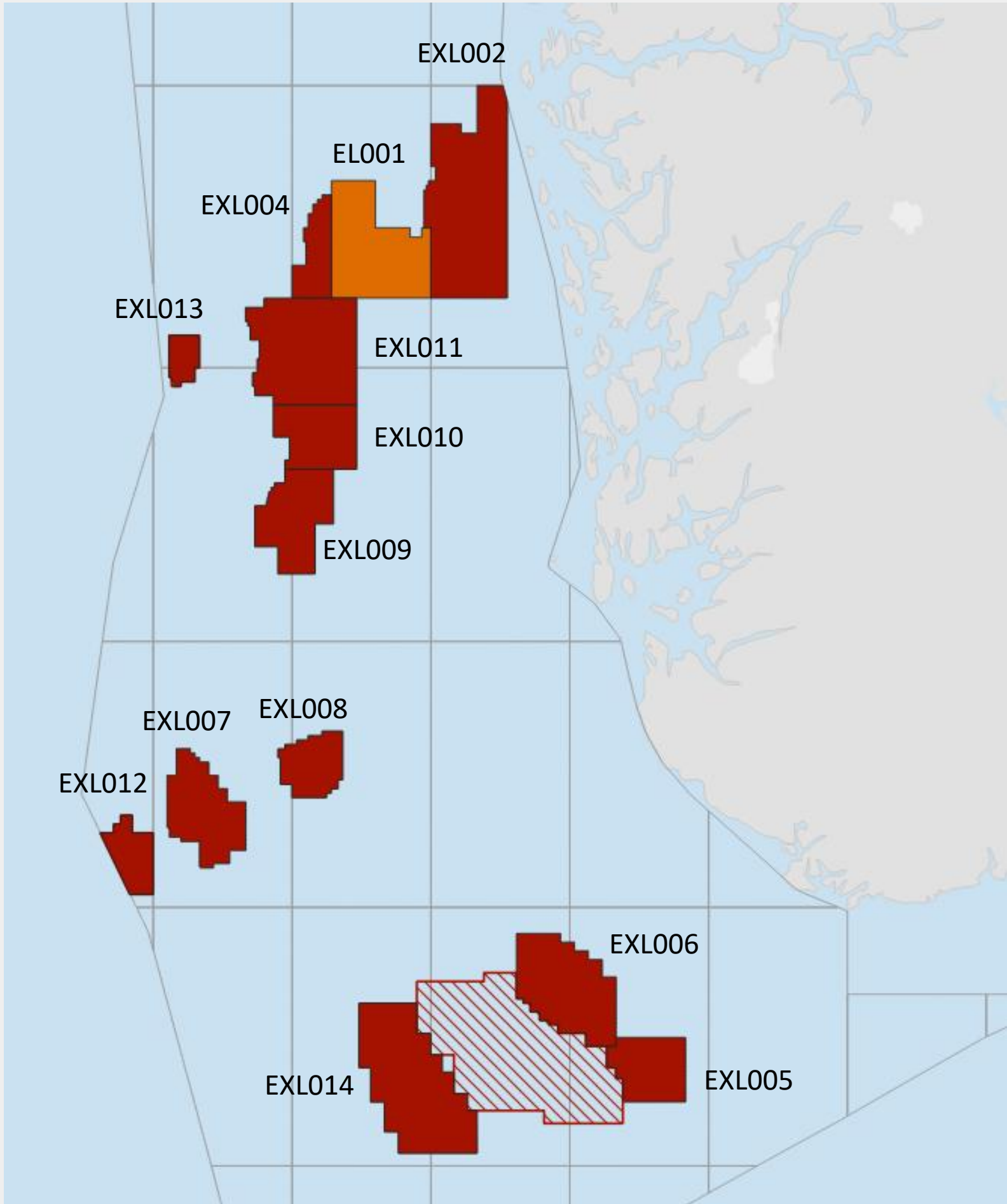


EU CO₂ storage directive

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17.11.2025 - 02:44

Attributes

Page view

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CO2 storage

9/6-1

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31/5-A-7 AH

31/5-C-1 H

32/4-4

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With ...

Statistics

Table view

Miscellaneous

9/6-1

HIDE DETAILS

Export: PDF

General information

Attribute	Value
Wellbore name ⓘ	9/6-1
Type ⓘ	EXPLORATION
Purpose ⓘ	WILDCAT-CCS
Status ⓘ	PLUGGED
Press release	link
Multilateral ⓘ	NO
Factmaps in new window	link
Main area ⓘ	NORTH SEA
Well name ⓘ	9/6-1
Drilling operator ⓘ	Harbour Energy Norge AS
Drill permit ⓘ	2026-L
Drilling facility ⓘ	DEEPSEA NORDKAPP
Drilling days ⓘ	40
Entered date ⓘ	06.04.2025
Completed date ⓘ	15.05.2025
Release date ⓘ	15.05.2027
Plugged date ⓘ	15.05.2025
Purpose - planned ⓘ	WILDCAT-CCS
Discovery wellbore ⓘ	NO
Kelly bushing elevation [m] ⓘ	32.7
Water depth [m] ⓘ	91.2
Total depth (MD) [m RKB] ⓘ	3393.0
Geodetic datum ⓘ	ED50
NS degrees ⓘ	57° 39' 26.51" N
EW degrees ⓘ	4° 57' 54.65" E
NS UTM [m] ⓘ	6392408.28
EW UTM [m] ⓘ	617263.72
UTM zone ⓘ	31
NPDID wellbore ⓘ	10259

Regulations

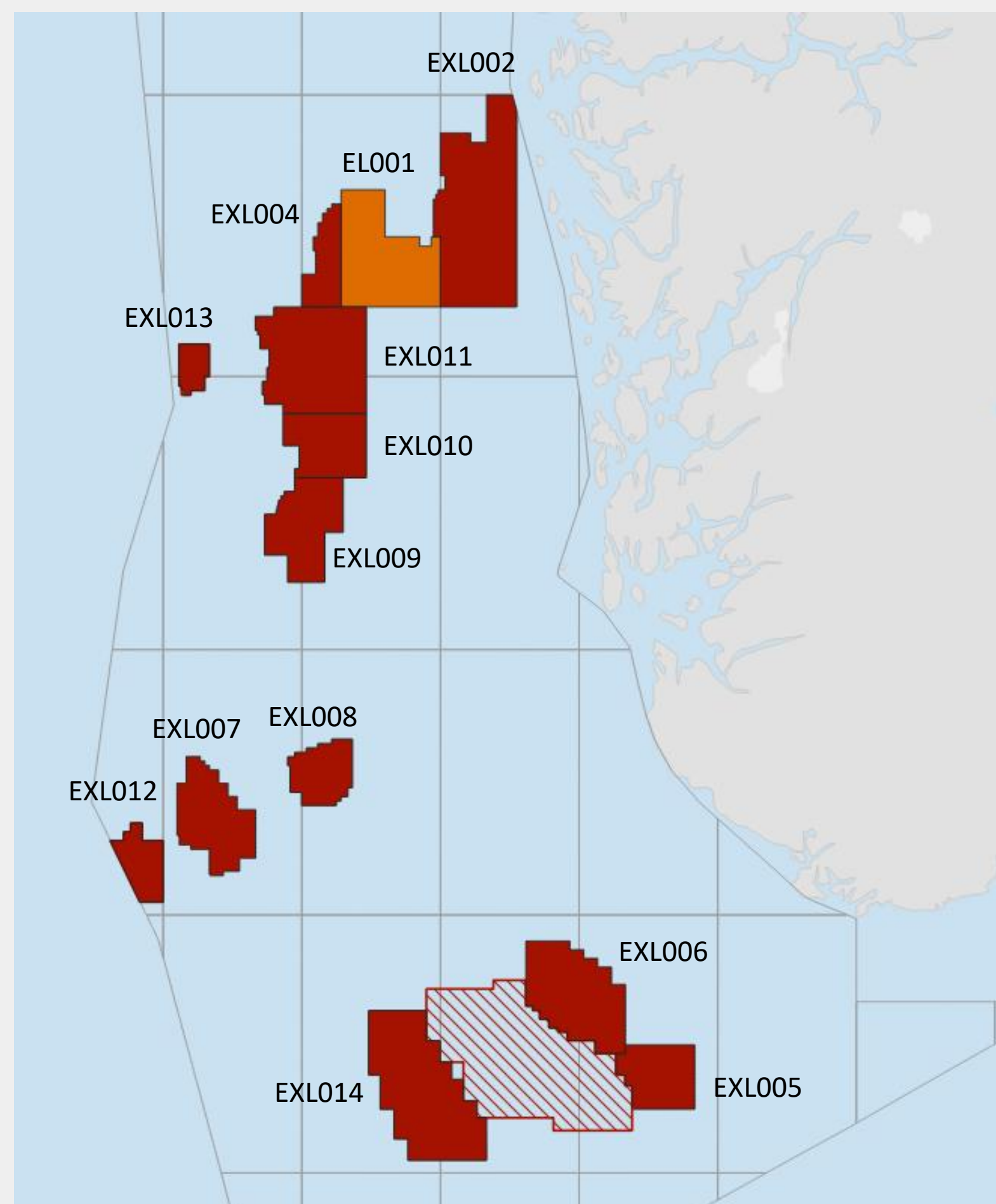
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CO₂ permits at the Norwegian Continental Shelf



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Proved suitable properties for CO₂ injection and storage (9/6-1)

The well was drilled using the Deepsea Nordkapp drilling rig. (Photo: Odfjell Drilling)

6/2/2025 A wildcat well drilled by Harbour Energy Norge and licensees in the "Havstjerne" storage project confirmed a reservoir that is suitable for injection and storage of carbon dioxide (CO₂).

Well 9/6-1 was drilled in the North Sea around 30 kilometres southeast of the Yme platform and around 120 kilometres southwest of Farsund – the DeepSea Nordkapp rig was used in the drilling operation.

Well 9/6-1 is the first well drilled in exploration licence (EXL 006), which was awarded in May 2023. This is the fourth well drilled to investigate potential commercial storage of CO₂ on the Norwegian continental shelf (NCS).

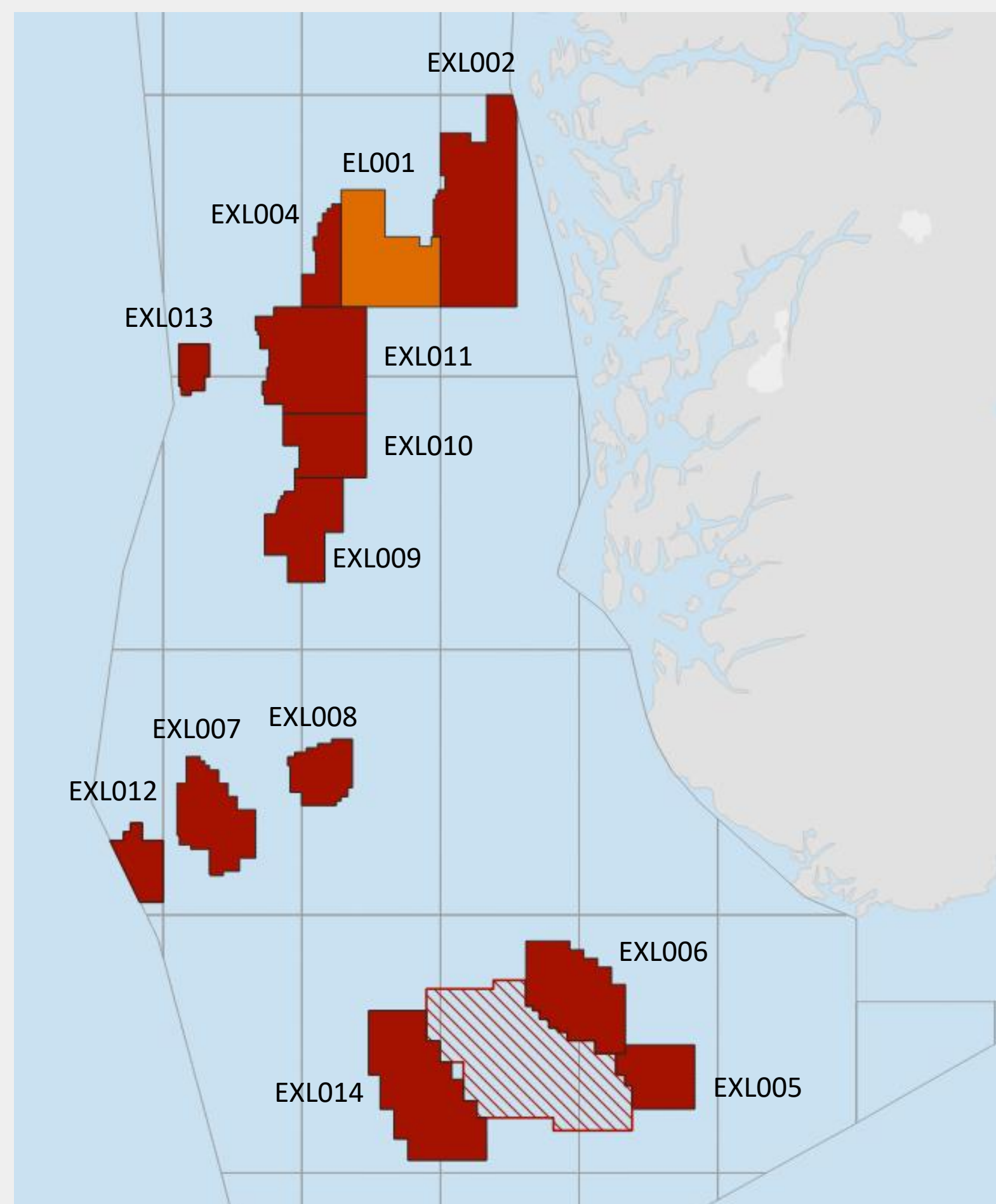
Geological information

The objective of well 9/6-1 was to investigate whether Middle Jurassic and Middle and Upper Triassic reservoir rocks in the Havstjerne project are suitable as a storage site for CO₂.

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Case


CO2 2024-1 - Tildeling - Tillatelse til injeksjon og lagring av CO2 etter lagringsforskriften - ED - Kgl res Kongelig resolusjon

Share

Case:

Case no.. 2024/956

There are 4 documents in this case

Organisation:

Norwegian Petroleum Directorate

Tel. 51 87 60 00

E-mail postboks@sodir.no

Address Postboks 600 4003 Stavanger

Documents

Title	Doc. no.	From/to	Doc. type	Document date	Journal date	Published	
EXL011 - Aker BP ASA - CO2 2024-1 - Tildeling av letetillatelse til injeksjon og lagring av CO2 etter lagringsforskriften - ED - Kgl res Kongelig resolusjon	4	From Energidepartementet	Incoming document	24.10.2024	24.10.2024	30.10.2024	<div>Order</div>
EXL010 - Equinor Low Carbon Solutions AS - CO2 2024-1 - Tildeling av letetillatelse til injeksjon og lagring av CO2 etter lagringsforskriften - ED - Kgl res Kongelig resolusjon	3	From Energidepartementet	Incoming document	24.10.2024	24.10.2024	30.10.2024	<div>Order</div>

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EU DIRECTIVE on the geological storage of carbon dioxide

L 140/114

EN

Official Journal of the European Union

5.6.2009

DIRECTIVE 2009/31/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 April 2009

on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee ⁽¹⁾,

After consulting the Committee of the Regions,

Acting in accordance with the procedure laid down in Article 251 of the Treaty ⁽²⁾,

Whereas:

(1) The ultimate objective of the United Nations Framework Convention on Climate Change, which was approved by Council Decision 94/69/EC of 15 December 1993 ⁽³⁾, is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

(2) The Sixth Community Environment Action Programme established by Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 ⁽⁴⁾ identifies climate change as a priority for action. That programme recognises that the Community is committed to achieving an 8 % reduction in emissions of greenhouse gases by 2008 to 2012 compared to 1990 levels, and that, in the longer term, global emissions of greenhouse gases will need to be reduced by approximately 70 % compared to 1990 levels.

(3) The Commission Communication of 10 January 2007 entitled 'Limiting global climate change to two degrees Celsius – The way ahead for 2020 and beyond' clarifies that

in the context of the envisaged global reduction of greenhouse gas emissions of 50 % by 2050, a reduction in greenhouse gas emissions of 30 % in the developed world by 2020 is required, rising to 60 %-80 % by 2050, that this reduction is technically feasible and the benefits far outweigh the costs, but that, to achieve it, all mitigation options must be harnessed.

(4) Carbon dioxide capture and geological storage (CCS) is a bridging technology that will contribute to mitigating climate change. It consists of the capture of carbon dioxide (CO₂) from industrial installations, its transport to a storage site and its injection into a suitable underground geological formation for the purposes of permanent storage. This technology should not serve as an incentive to increase the share of fossil fuel power plants. Its development should not lead to a reduction of efforts to support energy saving policies, renewable energies and other safe and sustainable low carbon technologies, both in research and financial terms.

(5) Preliminary estimates, carried out with a view to assessing the impact of the Directive and referred to in the impact assessment of the Commission, indicate that seven million tonnes of CO₂ could be stored by 2020, and up to 160 million tonnes by 2030, assuming a 20 % reduction in greenhouse gas emissions by 2020 and provided that CCS obtains private, national and Community support and proves to be an environmentally safe technology. The CO₂ emissions avoided in 2030 could account for some 15 % of the reductions required in the Union.

(6) The Second European Climate Change Programme, which was established by the Commission Communication of 9 February 2005 entitled 'Winning the Battle Against Global Climate Change' to prepare and examine future climate policy in the Community, set up a Working Group on Carbon Capture and Geological Storage. The Working Group's mandate was to explore CCS as a means of reducing climate change. The Working Group published a detailed report on the topic of regulation, which was adopted in June 2006. It stressed the need for the development of both policy and regulatory frameworks for CCS and urged the Commission to undertake further research into the subject.

⁽¹⁾ OJ C 27, 3.2.2009, p. 75.

⁽²⁾ Opinion of the European Parliament of 17 December 2008 (not yet published in the Official Journal) and Council Decision of 6 April 2009.

⁽³⁾ OJ L 33, 7.2.1994, p. 11.

⁽⁴⁾ OJ L 242, 10.9.2002, p. 1.

Article 14
Reporting by the operator

Article 15
Inspections

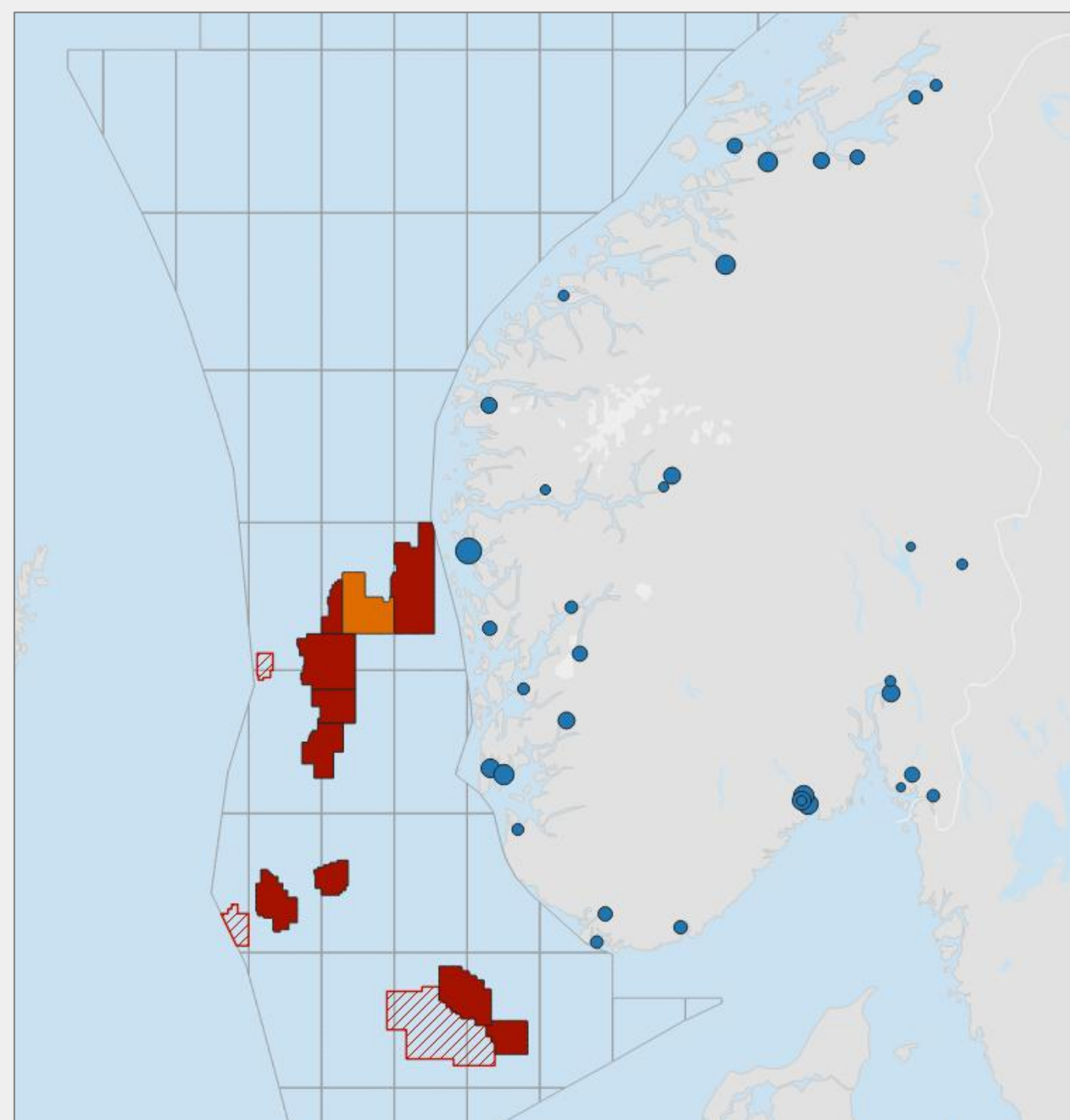
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NPF The Annual International Carbon Capture and Storage Conference – CCS 2024

Bellona's recommendation

- Support capture projects
- Coordinate transport and storage
- Clarify financial security



Gassnova

Roadmap for CO₂ management

Supplementary assignment letter
13 August 2024

Gassco

Holistic transport solutions

Letter to license partners
16 September 2024

To be added to the CO₂ storage regulation



Bellona om statsbudsjettet: – Dypt problematisk

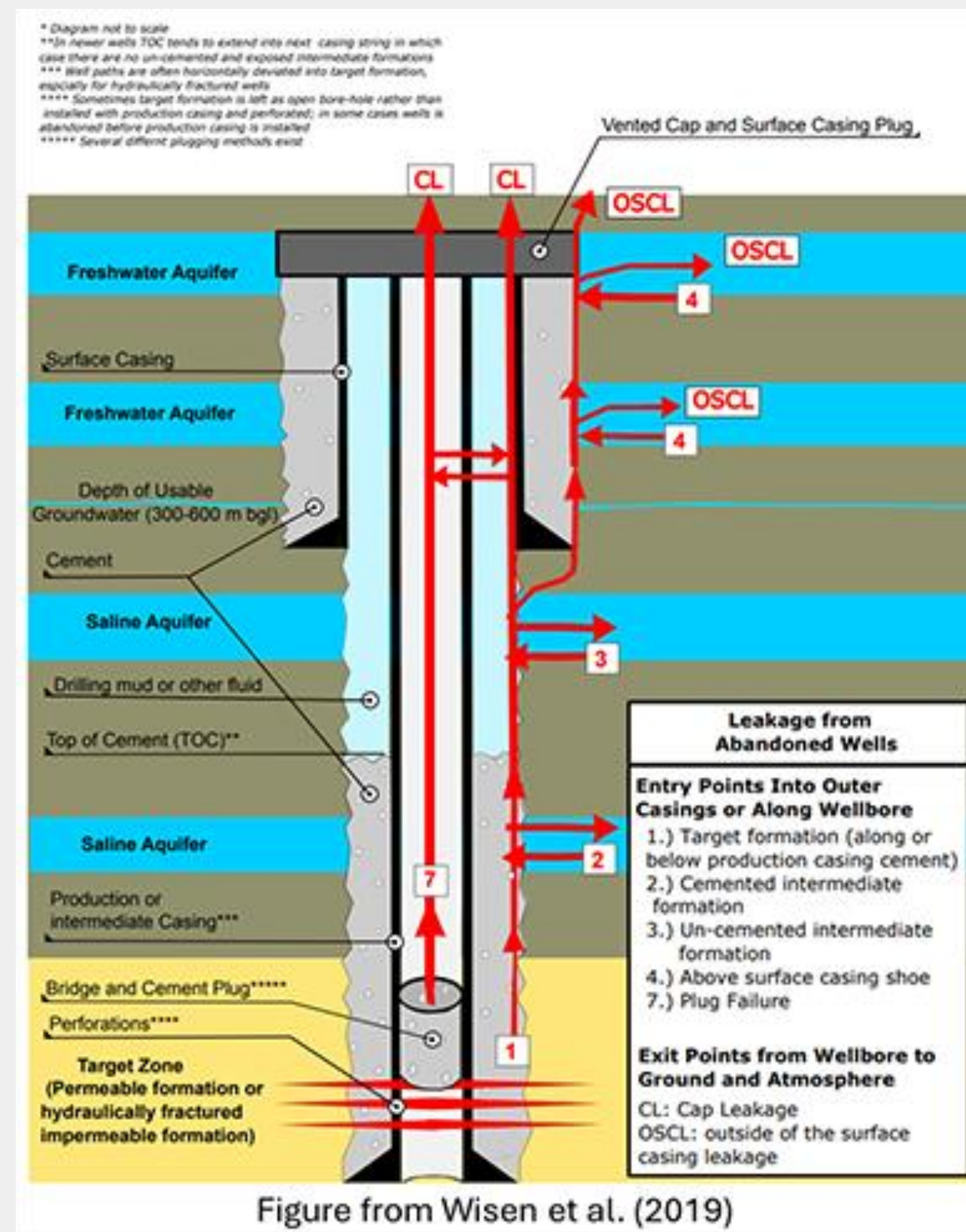
Statsbudsjettet som ble lagt frem i dag, blir omtalt som "ansvarlig" av finansminister Jens Stoltenberg. Fagsjef Christian Eriksen mener det er en fe...

15/10/2025

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FORCE CCS legacy wells seminar



Topics

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- Monitoring
- Case studies