

Outer Continental Shelf Sub-Seabed CO₂ Sequestration Authorities and Research

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The Outer Continental Shelf Lands Act

- Under the Outer Continental Shelf Lands Act (OCSLA), the Department of the Interior (DOI), Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) have authority for authorizing and regulating the development of mineral resources and certain other energy and marine related uses on the Outer Continental Shelf (OCS).



The Outer Continental Shelf

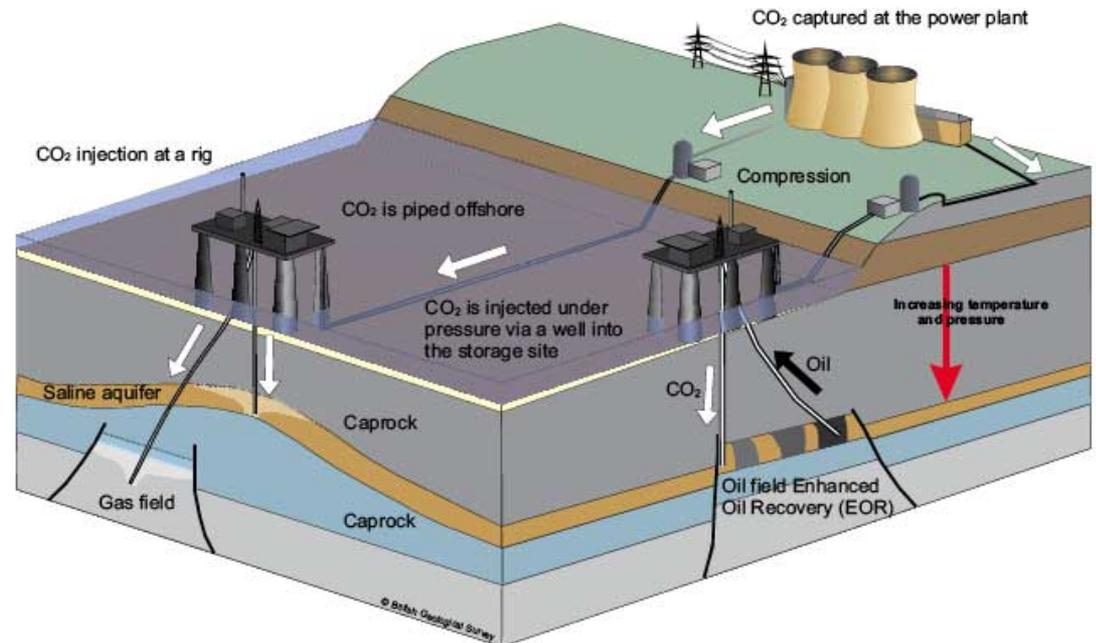
- The OCS includes an area consisting of 1.7 billion acres of submerged lands, subsoil, and seabed, lying between the seaward extent of the States' submerged lands and the seaward extent of Federal jurisdiction.
- For most areas, Federal jurisdiction begins 3 nautical miles from the shore baseline. However, for the State of Texas and the Gulf coast of Florida, Federal jurisdiction begins 9 nautical miles from the baseline and for the State of Louisiana Federal jurisdiction begins 3 imperial nautical miles from the baseline.



OCS Planning Areas

OCSLA and CO₂

- DOI has statutory authority under the OCSLA to permit the use and incidental sequestration of CO₂ for enhanced oil recovery (EOR) activities on existing OCS oil and gas leases.
- DOI has existing regulations for permitting EOR activities (which may include the use of CO₂) associated with existing OCS oil and gas operations.



<http://www.scotland.gov.uk/publications/2009/04/28114540/4>

OCSLA and CO₂

- Under Section 8(p)(1)(C) of the OCSLA (43 U.S.C. 1337)(p)(1)(C)), BOEM may issue leases, easements, and rights-of-way for activities that:
 - “**produce or support production, transportation, or transmission of energy from sources other than oil and gas**”
- In certain circumstances, Section 8(p)(1)(C) allows BOEM to issue leases for sub-seabed CO₂ sequestration...
 - Such as for the purpose of sub-seabed storage of CO₂ generated as a by-product of electricity production from an onshore coal-fired power plant.
 - BOEM was developing regulations prior to the Deepwater Horizon (DWH) Event for approving these types of projects; however, these regulations are currently low priority.
- Under Section 8(p)(1)(C), BOEM would not be able to issue OCS leases for the purpose of sequestering CO₂ emitted from refineries, natural gas power plants, and non-energy industries (e.g. steel or cement).

General Framework for Offshore CCS/CCUS

- With respect to sub-seabed CO₂ storage on the OCS from onshore sources under the OCSLA Section 8(p)(1)(c), the regulatory framework is anticipated to be a national framework (the same across the OCS regions).
- With respect to CO₂ EOR for OCS oil and gas operations, our existing 5-Year Program (2012-2017) is not allowing for new oil and gas leasing on the east or west coast OCS areas (Atlantic and Pacific).

Prospective OCS Sub-Seabed CO₂ CCUS and CCS Projects

- BOEM and BSEE are aware of potential interest in using CO₂ for EOR activities on existing OCS oil and gas leases.
- We have not received a formal application to use CO₂ for EOR activities on existing OCS oil and gas leases.
- BOEM has not received a formal application to permit sub-seabed CO₂ storage on the OCS from certain onshore sources under the OCSLA Section 8p(1)(c).

BOEM OCS CO₂ BMPs Study

- **BOEM is funding research to develop Best Management Practices (BMPs) for sub-sea CO₂ transport and sub-seabed sequestration on the OCS.**
 - May support potential future regulation development
 - University of Texas at Austin, Bureau of Economic Geology
 - FY 2010 – FY 2014
 - Conduct a worldwide literature and data survey regarding sub-sea CO₂ transport and sub-seabed sequestration:
 - Sources: Domestic and international private, academic, non-profit, and governmental sources
 - Information Type: Literature, regulations, guidelines, management frameworks, best management practices, “lessons-learned”, etc.
 - In addition to offshore information, identify information from onshore practices that may translate to the offshore environment. If onshore practices cannot be translated to offshore, explain why.
 - The survey results will be utilized to develop Best Management Practices (BMPs) that will address all aspects of sub-sea CO₂ transport and sub-seabed sequestration projects.

BOEM OCS CO₂ BMPs Study

- **The BMPs for sub-sea CO₂ transport and sub-seabed sequestration on the OCS will address the following:**
 1. Site Selection and Characterization (data collection, capacity/injectivity assessments, modeling, etc.)
 2. Risk Analysis
 3. Project Planning and Execution (design, construction, operation, and maintenance)
 4. Environmental Monitoring
 5. Mitigation
 6. Inspection and Auditing
 7. Reporting Requirements
 8. Emergency Response and Contingency Planning
 9. Decommissioning and Site Closure
 10. Legal Issues (liability, bonding, long-term stewardship)

Deliverables

- 1. Worldwide Annotated Literature and Data Survey Database:**
 - All literature and other materials, complete with annotations, compiled during the worldwide survey
- 2. Literature Synthesis and Data Gaps Analysis Report:**
 - Synthesis of the worldwide literature/data survey
 - Identify data gaps in the information and practices
 - Adaptive management framework that includes indicators and criteria for the development of mitigations and the incorporation of new information into the regulatory program where gaps exist
- 3. BMPs**

Deliverables

- **Worldwide Annotated Literature and Data Survey Database:**
 - Draft – Spring 2013
 - Final – July 2014
- **Literature Synthesis and Data Gaps Analysis Report:**
 - Draft – December 2013
 - Final – July 2014
- **BMPs:**
 - Draft – December 2013
 - Final – July 2014
- The final deliverables will be made available to the public.

Annotated Bibliography Database

[Show Empty Fields](#)

Bibliographic Fields:

Reference Type: Journal Article
Author: Goldberg, D. S. ; Kent, D. V. ; Olsen, P. E. 
Title: Potential on-shore and off-shore reservoirs for CO2 sequestration in Central Atlantic magmatic province basalts
Year: 2010
Journal: Proceedings of the National Academy of Sciences of the United States of America
Volume: 107
Issue: 4
Pages: 1327-1332

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► Attachments:

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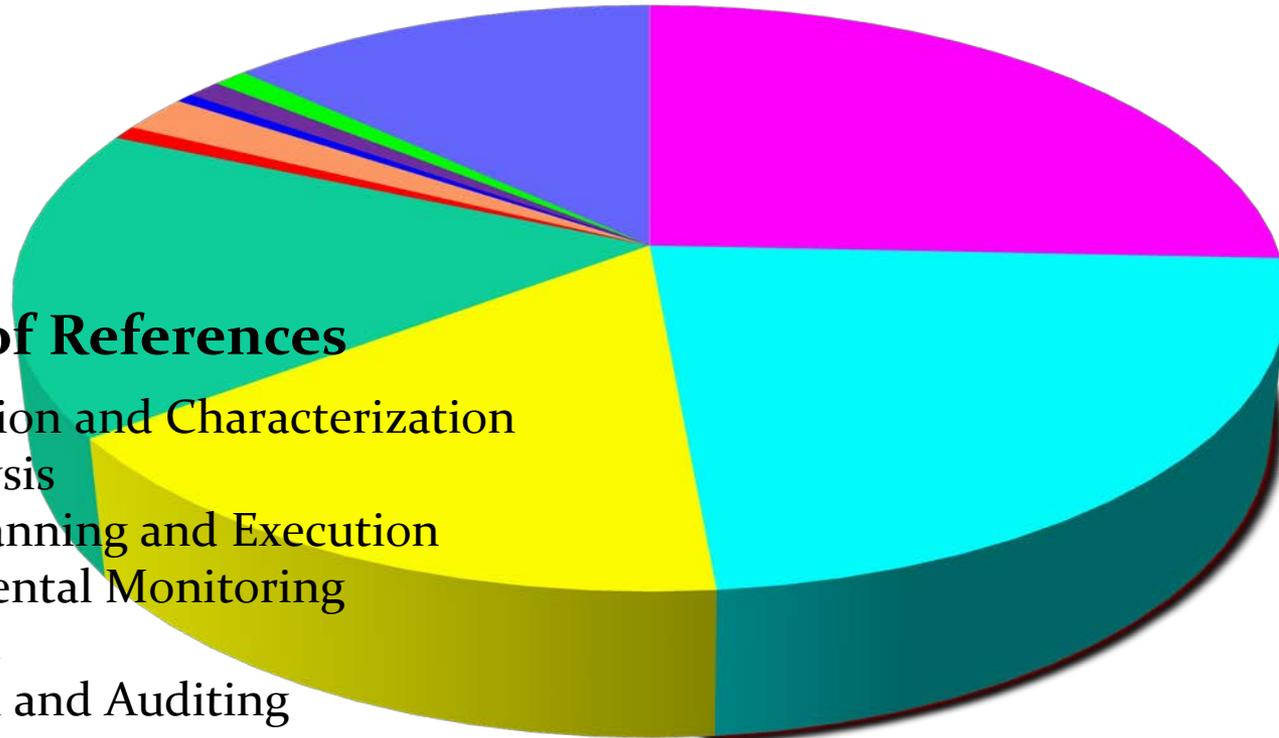
Abstract: Identifying locations for secure sequestration of CO2 in geological formations is one of our most pressing global scientific problems. Injection into basalt formations provides unique and significant advantages over other potential geological storage options, including large potential storage volumes and permanent fixation of carbon by mineralization. The Central Atlantic Magmatic Province basalt flows along the eastern seaboard of the United States may provide large and secure storage reservoirs both onshore and **offshore**. Sites in the South Georgia basin, the New York Bight basin, and the Sandy Hook basin offer promising basalt-hosted reservoirs with considerable potential for CO2 sequestration due to their proximity to major metropolitan centers, and thus to large industrial sources for CO2. Onshore sites are suggested for cost-effective characterization studies of these reservoirs, although **offshore** sites may offer larger potential capacity and additional long-term advantages for safe and secure CO2 sequestration.

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Accession Number: ISI:000273974600020
Keywords: eastern united states;greenhouse gas;jurassic;lavas;rift;carbon-dioxide;coastal-plain;rift basin;new-york;storage;disposal;beneath
URL: <Go to ISI>://000273974600020 →
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Rutgers State Univ, Piscataway, NJ 08854 USA
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Annotated Bibliography Database: Initial Results

Number of References

- Site Selection and Characterization
- Risk Analysis
- Project Planning and Execution
- Environmental Monitoring
- Mitigation
- Inspection and Auditing
- Reporting
- Emergency Response and Contingency Planning
- Decommissioning and Site Closure
- Legal Issues



Literature/Data Survey Initial Findings

Topic	Finding	Gaps?
Site Selection and Characterization	Many onshore methodologies can be applied to offshore	No Significant Gaps
Risk Analysis	Many similarities exist between risks associated with onshore and offshore CCS. Some aspects of risk may be less in the offshore environment	No Significant Gaps
Project Planning and Execution	Most relevant information for offshore CO ₂ transport and injection operations are associated with North Sea projects and planning done by European Union countries	Significant Knowledge Gaps Exist
Environmental Monitoring	Many onshore monitoring and CO ₂ accounting methodologies could be applicable to offshore settings	Some Knowledge Gaps Exist
Mitigation	Limited references associated with mitigation of offshore CO ₂ injection	Significant Knowledge Gaps Exist

Literature/Data Survey Initial Findings

Topic	Finding	Gaps?
Inspection and Auditing	Limited references specific to inspection and auditing associated with offshore CO ₂ transport and injection	Some Knowledge Gaps Exist
Reporting Requirements	Limited references specific to reporting requirements associated with offshore CO ₂ transport and injection	Significant Knowledge Gaps Exist
Emergency Response and Contingency Planning	Limited references specific to emergency response and contingency planning for offshore CO ₂ transport and injection	Significant Knowledge Gaps Exist
Decommissioning and Site Closure	Existing DOI regulations for decommissioning of offshore O&G facilities and site clearance may translate to offshore CO ₂ transport and injection facilities	Some Knowledge Gaps Exist
Legal Issues	Numerous legal issues regarding offshore injection of CO ₂ such as, long-term liability, ratification of the 1996 London Protocol, etc.	Significant Knowledge Gaps Exist

BOEM Costs and Benefits Analysis of CO₂ Sequestration on the OCS

- BOEM funded a study on the costs and benefits of CO₂ sequestration on the OCS, which concludes that the most favorable option for offshore CO₂ sequestration would be in the Gulf of Mexico where carbon gases are used for EOR operations.
- The final report, published in Fall 2012, is available at:
[http://www.boem.gov/uploadedFiles/BOEM/Oil and Gas Energy Program/Energy Economics/External Studies/OCS%20Sequestration%20Report.pdf](http://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Energy_Economics/External_Studies/OCS%20Sequestration%20Report.pdf)

Questions?

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