

North Dakota Department of Mineral Resources



<http://www.oilgas.nd.gov>

<http://www.state.nd.us/ndgs>

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Carbon Dioxide Storage

TIMETABLE FOR ADOPTING RULES – YEAR 2009-2010

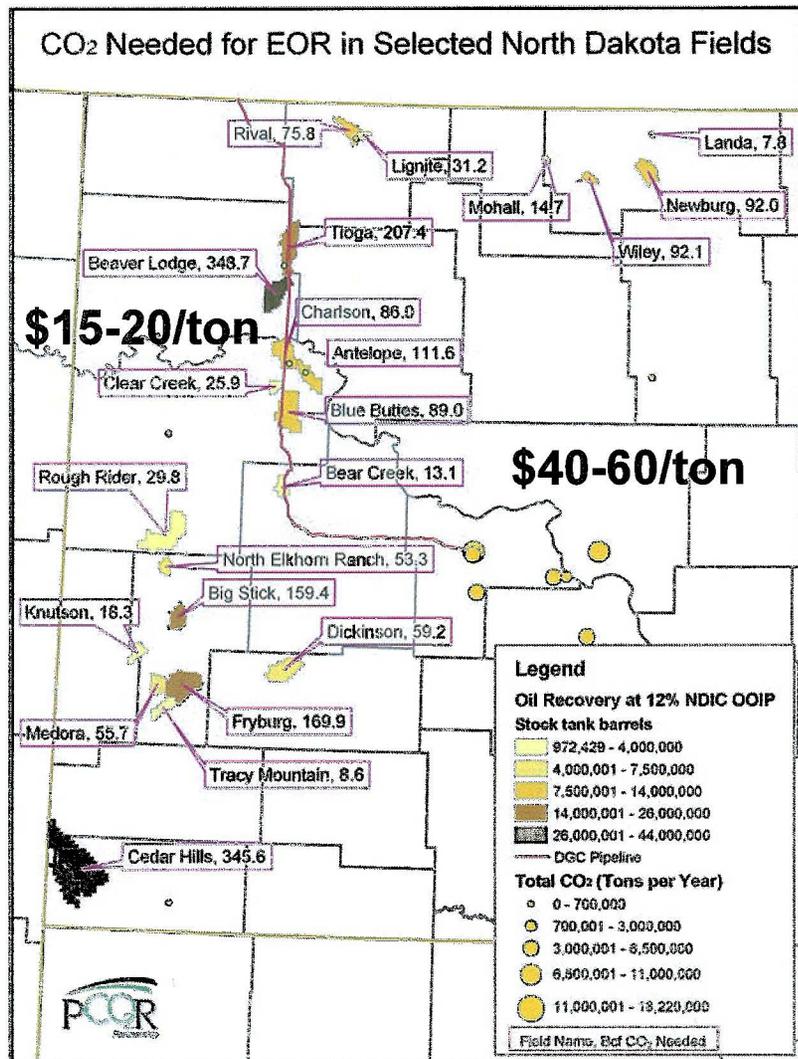
- Jun 30:** Receive interoffice comments on proposed rules
- Aug 10:** Met w/NDPC/NAIP to review proposed rule changes
- Sep 10:** IC meeting—receive approval to proceed with proposed rules
- Sep 11:** Send legal ad to North Dakota Newspaper Association for rules notice
(Notices to be published between Sep 18 – Sep 24)
- Sep 11:** File full notice + rules w/Leg Council (LC) via hand-delivery—LC sends out proposed rules notice to interested parties w/in 15 business days after receiving them
- Sep 11:** Write (before 1st published date) reg analysis f/rules impacting industry > \$50,000 (in 1yr)
- Sep 11:** Write small entity regulatory analysis and small entity impact statement
- Sep 24:** All papers (10 daily + 42 weekly) published proposed rules notice Sep 18 – Sep 24
(Hearing must be no sooner than 20 days from the date of last publication)
- Oct 15 or 20:** 9am Rules hearing @ OGD Conference Room (Case _____)
Ten-day comment period starts (to receive input on proposed rules)
- Oct 26 or 30:** End of ten-day comment period
- Nov 13:** Write responses to all comments rec'd (oral-hearing + written comments)
- Nov 16:** IC approved rules w/ICO # _____ (Case _____): Prepare Aff of mailing to all parties

Carbon Dioxide Storage

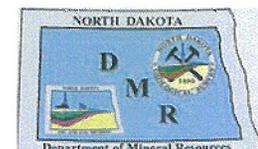
TIMETABLE FOR ADOPTING RULES – YEAR 2009-2010

- Nov 17:** Submit final rules to Attorney General (AG) for an opinion including:
1. rules approved by ICO # _____
 2. letter to LC indicating full notice & proposed rules were sent to them
 3. full and abbreviated rules notice
 4. documentation of sponsor notification
 5. proof of publication
 6. each comment and written record of the consideration of all comments
 7. reg analysis (w/date available) impacting regulated community > \$50,000
 8. small entity regulatory analysis
 9. small entity impact statement
 10. takings assessment
 11. billing code
- Dec 4:** Receive back opinion from AG's office (opinion dated Nov __)
- Dec 7:** File rules w/LC, along w/copy of AG's opinion
(Rules filed w/LC btn Aug 2-Nov 1 become effective Jan 1, 2010.)
(Rules filed w/LC btn Nov 2-Feb 1 become effective Apr 1, 2010.)
- 2010**
- Jan __:** Notify all interested parties (+ posted on web) of Adm Rules Comm hearing on Feb __
- Feb __:** Administrative Rules Committee Hearing (Notified all interested parties Jan __)
- Apr 1:** Final rules adopted—NDCC 28-32-07: must file w/Leg Council 9 mo. of statute change

EOR CO₂ Demand



- Estimated 1.6 trillion cubic feet or 93 million metric tons of CO₂ needed for maximum tertiary Enhanced Oil Recovery operations in 24 selected fields in North Dakota.
- Represents over 200 million barrels of incremental oil.
- Tax incentive = 1/3 of the gap
- Weyburn - 60 million metric tons
 - 130 million barrels
- Midale - 40 million metric tons
 - 85 million barrels



Carbon Dioxide Storage

43-02-04.1-10. Determining storage amounts.

(a) The commission, after notice and hearing shall issue an order determining the amount of injected carbon dioxide stored in a reservoir that has been or is being used for an enhanced oil or gas recovery project.

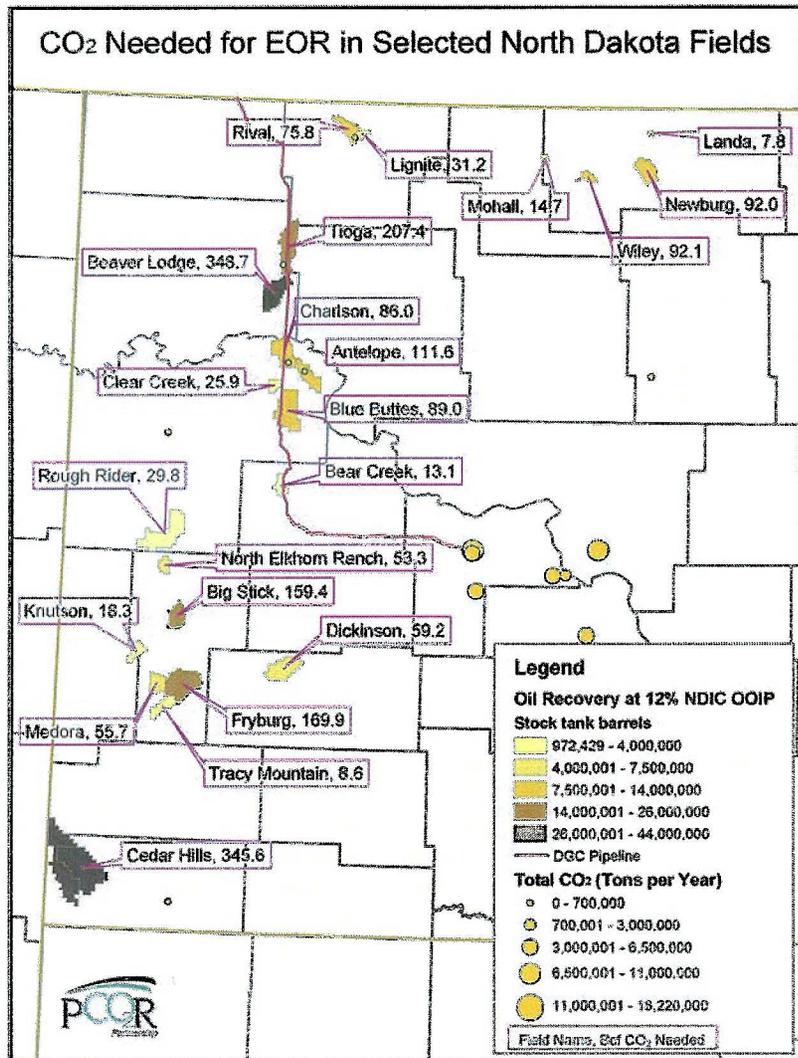
(b) Any person making application for a determination shall pay an application fee and a processing fee to be deposited in the carbon dioxide storage administration fund.

(1) **Application fee.** A nonrefundable filing fee of one hundred fifty dollars must be submitted with the permit application.

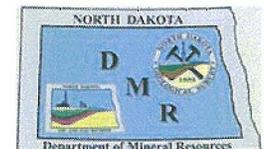
(2) **Processing fee.** The applicant shall pay a processing fee based on actual processing costs, including computer data processing costs, incurred by the commission the cost of which would exceed one hundred fifty dollars as determined by the commission. The following procedures and criteria will be utilized in establishing the fee:

- (i) A record of all permit processing costs incurred must be maintained by the commission.
- (ii) Upon request, the commission, in consultation with the applicant, will prepare an estimate of the processing fee and the billing schedule that will be utilized in processing the application. If the applicant chooses, the applicant may withdraw the application at this point without paying any processing fees.
- (iii) After final determinations on the application have been made, a final statement will be sent to the applicant containing the remaining actual processing costs incurred by the department.
- (iv) The applicant must pay the processing fee regardless of whether a permit is issued, denied, or withdrawn.

EOR Field CO₂ Storage Capacity



- Estimated 12.5 trillion cubic feet = 570 million metric tons of CO₂ storage capacity in selected EOR fields in North Dakota.
- 6 times the CO₂ needed to complete the EOR process



Carbon Dioxide Storage

43-02-04.1-04.1. CO2 Storage Project (CSP) Permit

(c) Any person establishing a new CSP or amending a CSP permit shall pay an application fee and a processing fee to be deposited in the carbon dioxide storage administration fund.

(1) Application fee. A nonrefundable filing fee of one hundred fifty dollars must be submitted with the permit application.

(2) Processing fee. The applicant shall pay a processing fee based on actual processing costs, including computer data processing costs, incurred by the commission the cost of which would exceed one hundred fifty dollars as determined by the commission. The following procedures and criteria will be utilized in establishing the fee:

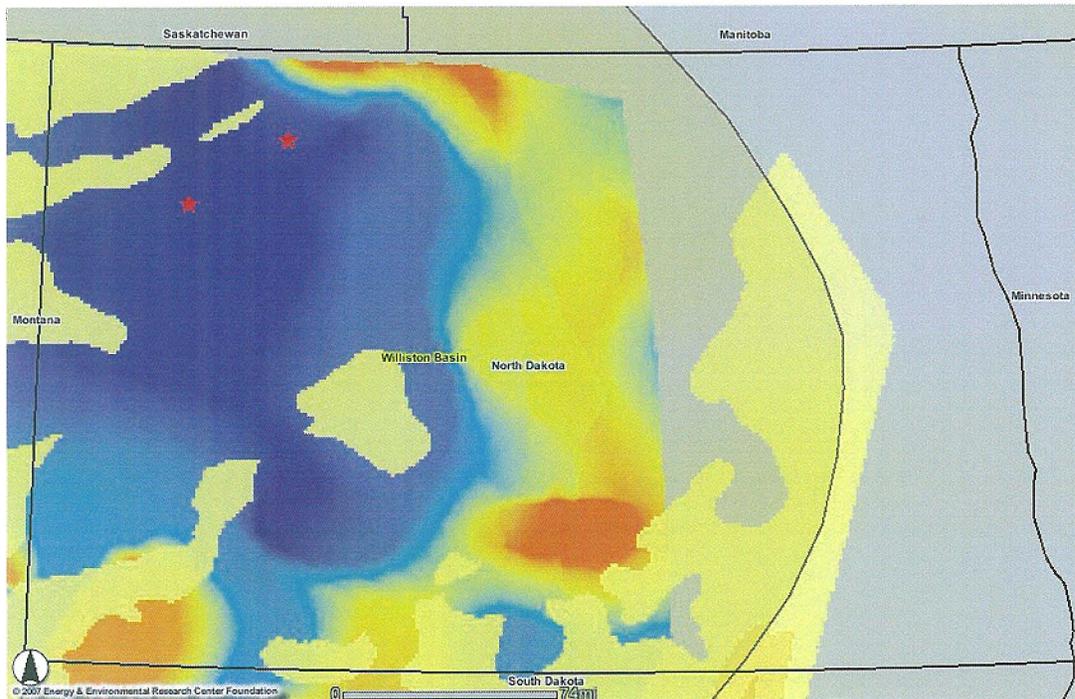
(i) A record of all permit processing costs incurred must be maintained by the commission.

(ii) Upon request, the commission, in consultation with the applicant, will prepare an estimate of the processing fee and the billing schedule that will be utilized in processing the application. If the applicant chooses, the applicant may withdraw the application at this point without paying any processing fees.

(iii) After final determinations on the application have been made, a final statement will be sent to the applicant containing the remaining actual processing costs incurred by the department.

(iv) The applicant must pay the processing fee regardless of whether a permit to construct is issued, denied, or withdrawn.

Saline Aquifer CO₂ Capacity



- Estimated 1068 trillion cubic feet = 37 giga-tons of CO₂ storage capacity in selected saline aquifers of North Dakota.



Carbon Dioxide Storage

43-02-04.1-07.2. CSP Other General Requirements

- (a) Each operator shall be required to conduct a corrosion monitoring and prevention program approved by the commission.
- (b) Identification signs shall be placed at each facility in a centralized location and at each well site and show the name of the operator, the facility name and the emergency response number to contact the operator.
- (c) Each storage operator shall pay the commission a fee of \$0.01 on each ton of carbon dioxide injected for storage, to be deposited in the carbon dioxide storage facility administrative fund.
- (d) Each storage operators shall pay the commission a fee of \$0.07 on each ton of carbon dioxide injected for storage, to be deposited in the carbon dioxide storage facility trust fund.

Carbon Dioxide Storage

Administrative fee

570,000,000	MMT CO2 stored in EOR reservoirs
93,000,000	MMT CO2 used for EOR
663,000,000	MMT CO2 EOR reservoirs total
50 years	
13,260,000	MMT CO2 per year
\$150,000	annual cost of a field inspector
\$0.01	\$/ton to pay for field inspector

Carbon Dioxide Storage

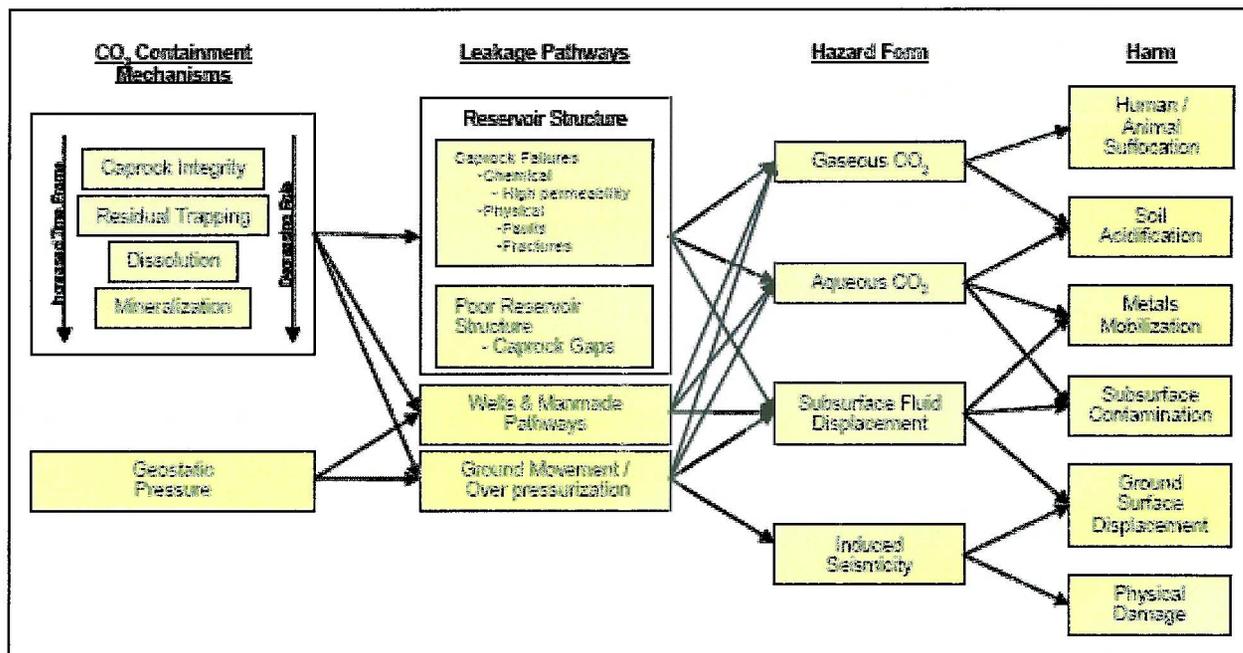


Figure 3-5: Linked Risk Elements of Geologic Storage

This figure illustrates the ways that GS can be a hazard. All of the risk elements are highly cross-linked, meaning they have multiple preceding and succeeding elements. This complicates efforts to accurately quantify the risk from the potential harms.

Carbon Dioxide Storage

Rating Scale			
Rating	Likelihood Definitions	Impact Definitions	Uncertainty Definitions
Low	Very Unlikely	<u>Damages:</u> 10's of thousands of dollars <u>Injuries:</u> No Loss of Life	75% Confidence in Estimates
Medium	Unlikely	<u>Damages:</u> 100's of thousands of dollars <u>Injuries:</u> Fewer than 5 Deaths	50% Confidence in Estimates
High	Somewhat Unlikely	<u>Damages:</u> 1 million dollars <u>Injuries:</u> Approximately 10 Deaths	25% Confidence in Estimates

Table 3-1: Risk Rating Scale for Geologic Storage

Harm	Likelihood	Impact	Uncertainty
Human/ Animal Suffocation	Low	Med	Moderate
Soil Acidification	Low	Low-Med	Moderate
Subsurface Contamination	Low-Med	Low-Med	Moderate
Ground Surface Displacement	Low	Low	Low
Physical Damage at Surface	Low	Low-Med	Low

Table 3-2: Risks Ratings of the Potential Harm of Geologic Storage

Carbon Dioxide Storage

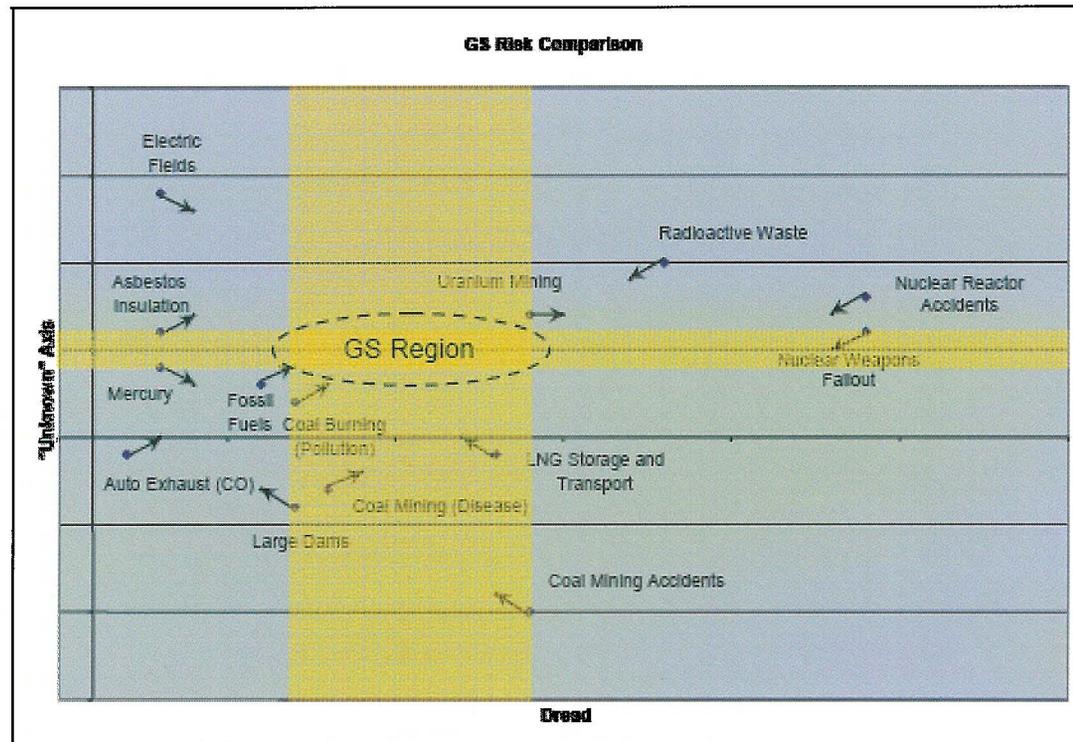


Figure 4-4: Overall Plot of Geologic Storage as Compared to other Hazards
This plot depicts where GS should be plotted on the psychometric framework based on comparisons to the other energy and environmental hazards. The shaded region in the dashed circle illustrates where GS is likely to be plotted. From a public perception standpoint this is similar to a number of existing technologies.

Carbon Dioxide Storage

Trust Fund fee

37,124,156	tons of ND coal power plant CO2 emissions 2006
40%	average reduction 2010 to 2050 under Waxman-Markey
14,849,662	tons of ND CO2 sequestered annually
\$7,000,000	failure mitigation cost per project (based on Charboneau spill)
\$49,746,783	total potential failure mitigation cost 2059 dollars (4% inflation)
50	years
\$994,936	annual mitigation funding requirement
\$0.07	per ton mitigation funding requirement
\$30,250,000	Mandan diesel remediation settlement