



CENTER FOR CLIMATE  
AND ENERGY SOLUTIONS

# **MIKE M<sup>c</sup>CORMICK**

## **CO<sub>2</sub> EOR & Storage Regulatory Update**

Presented at the 17<sup>th</sup> Annual CO<sub>2</sub> Flooding Conference

December 8-9, 2011

Midland, Texas



# C2ES – THE *NEW* PEW CENTER ON GLOBAL CLIMATE CHANGE

- As of Nov 9, the Pew Center on Global Climate Change has a new name and refreshed mission
- C2ES will continue to be:
  - **a reliable source** of information and analysis
  - **a catalyst** for innovative solutions and concrete actions to address our climate and energy challenges
  - **a convener** of business, the environmental community, other stakeholders and policymakers

# NATIONAL EOR INITIATIVE

- **Mission:** Accelerate commercial deployment of enhanced oil recovery using CO<sub>2</sub> from fossil, renewable and industrial sources.
- **Collaborative stakeholders:** oil and gas companies, industries supplying CO<sub>2</sub>; state officials, legislators and regulators; regional and national environmental NGOs.
- **Convening organizations:** Center for Climate and Energy Solutions and Great Plains Institute.

# EOR INITIATIVE – PARTICIPANTS

## **Oil and Gas**

- Chaparral Energy
- Chevron Corporation
- Continental Resources
- Core Energy
- Denbury Resources
- Encana
- Occidental Petroleum

## **Coal and Coal-Based Generation**

- Arch Coal
- Basin Electric Power Cooperative
- Leucadia
- Southern Company
- Summit Power Group
- Tenaska Energy

## **Industrial Suppliers of CO<sub>2</sub>/Technology Vendors**

- Air Products
- Archer Daniels Midland
- GE Energy

## **Environmental NGOs**

- Clean Air Task Force
- Natural Resources Defense Council
- Ohio Environmental Council
- Wyoming Outdoor Council

## **Labor**

- AFL-CIO
- United Transportation Union

## **Other Institutions**

- Enhanced Oil Recovery Institute (University of WY)
- Interstate Oil and Gas Compact Commission
- North American Carbon Capture and Storage Association
- Southern States Energy Board

## **State Officials**

- California, Illinois, Indiana, Michigan, Mississippi, Montana, New Mexico, Texas and West Virginia

# EOR INITIATIVE – KEY ELEMENTS

- Prepare key analyses to inform and support incentive policies for anthropogenic CO<sub>2</sub>-EOR
- Recommend and advocate for incentives and other policies to support commercial CO<sub>2</sub>-EOR deployment that ensure net fiscal benefit and sustainability of incentives over time through revenues from additional incremental oil production
- Increase policy-maker, media and public awareness of the CO<sub>2</sub>-EOR, its benefits and need for deployment incentives.

## Timeline:

- Produce incentive recommendations and supporting material by early 2012

# CO<sub>2</sub> STORAGE PERMITTING & EMISSIONS REPORTING FRAMEWORK

Two main objectives of this presentation:

- A. Distinguish *Underground Injection Control* (UIC) from *Greenhouse Gas Reporting Program* (GHGRP) regulations.
- B. Comment on regulatory path forward

# DOMAIN OF GHG REPORTING AND UIC REGULATIONS

## GHG Reporting

Air side emissions

Rules to account for and report emissions to the atmosphere

## Underground Injection Control

Subsurface groundwater protection

Regulations to protect underground sources of drinking water

# CO<sub>2</sub>-EOR REGULATORY PATHWAY OPTIONS

## 1. CO<sub>2</sub> Geologic Storage

“The owner or operator injects the CO<sub>2</sub> stream for long-term containment in subsurface geologic formations”

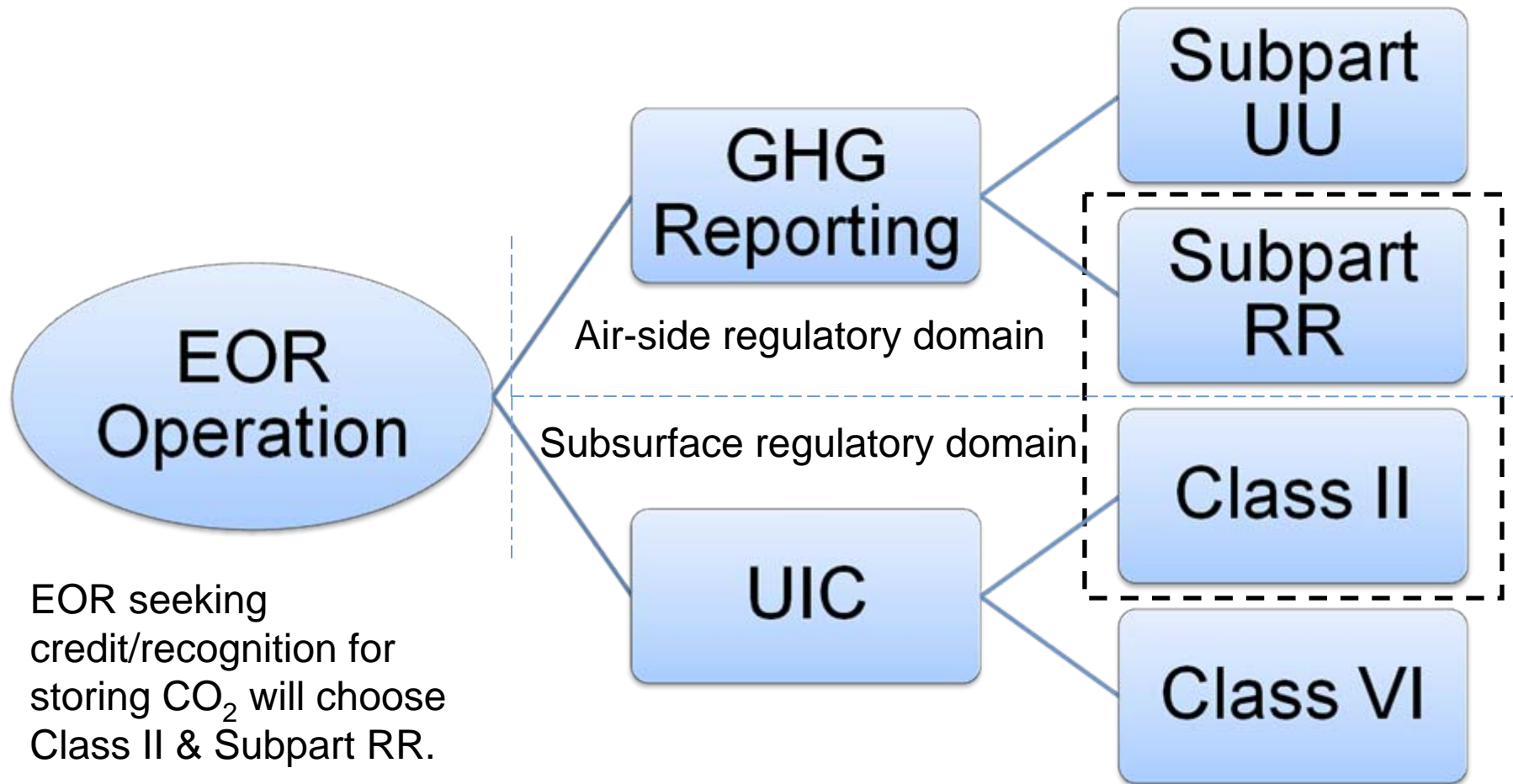
(CFR §98.440(c)(1))

## 2. CO<sub>2</sub> “Incidental Storage”

“...comprises any well or group of wells that inject a CO<sub>2</sub> stream into the subsurface.”

(CFR §98.470(a))

# REGULATORY PATHWAY – CO<sub>2</sub> GEOLOGIC STORAGE

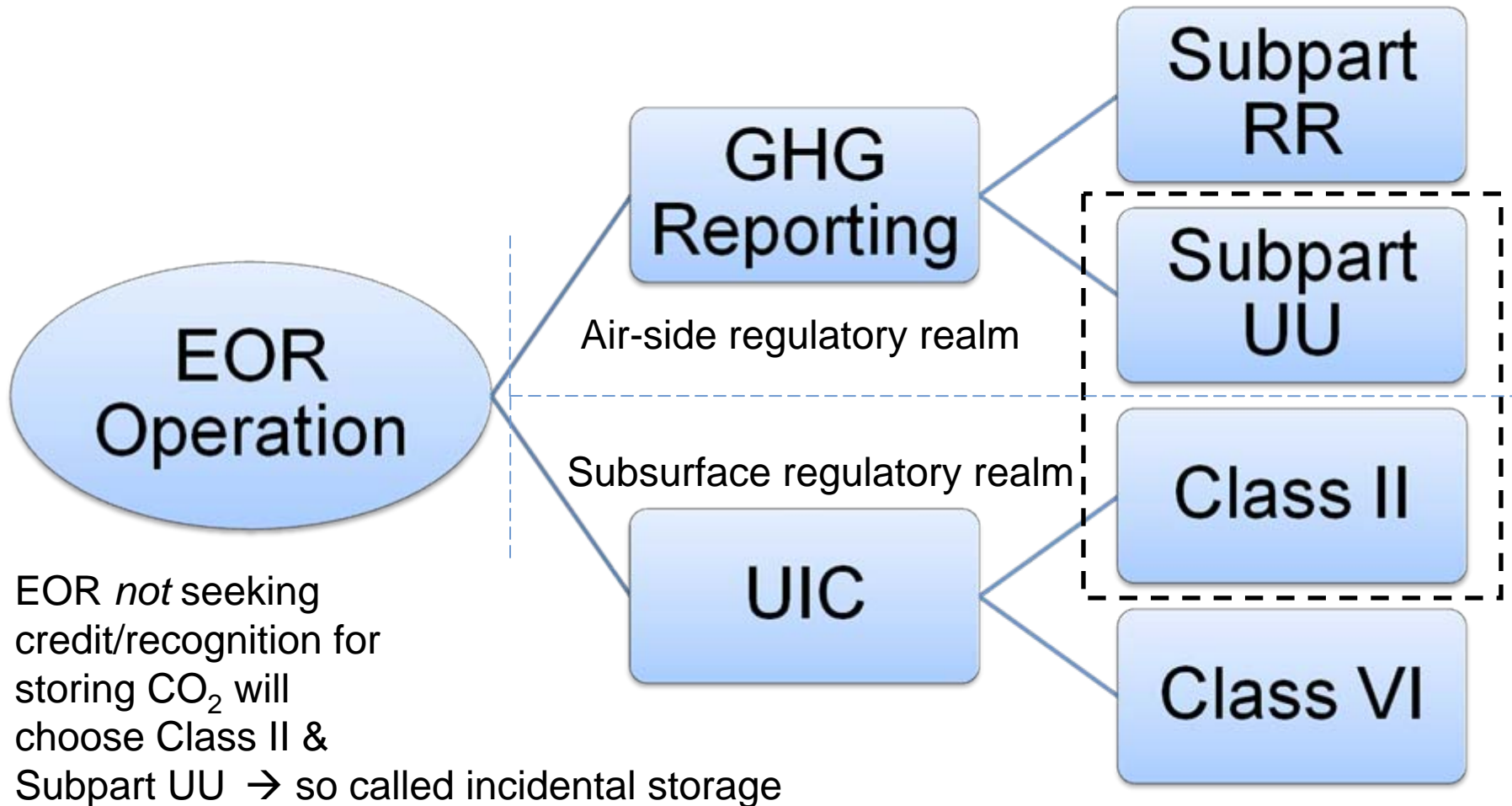


# SUBPART RR – GEOLOGIC SEQUESTRATION OF CO<sub>2</sub>

## § 98.440 Definition of source category

- (a) ...comprises any well or group of wells that inject a CO<sub>2</sub> stream *for long-term containment* in subsurface geologic formations.
- (c) does not include ...enhance[d] recovery of oil or natural gas unless one of the following applies:
- (1) The owner or operator injects the CO<sub>2</sub> stream *for long-term containment* in subsurface geologic formations and *has chosen to submit a proposed monitoring, reporting, and verification (MRV) plan* to EPA and received an approved plan from EPA.
  - (2) The well is permitted as Class VI under the Underground Injection Control program.

# REGULATORY PATHWAY – CO<sub>2</sub> “INCIDENTAL STORAGE”



# SUBPART UU – INJECTION OF CO<sub>2</sub>

## § 98.470 Definition of the source category

(a) ...comprises any well or group of wells that inject a CO<sub>2</sub> stream into the subsurface.

(b) If you report under subpart RR of this part for a well or group of wells, you are not required to report under this subpart for that well or group of wells.

# GHG REPORTING MRV

- Monitoring CO<sub>2</sub> injection and storage under Subpart RR to EPA's GHG reporting program requires the development of a monitoring, reporting, and verification (MRV) plan that includes, at a minimum the following components (§ 98.448):
  - Delineation of monitoring areas,
  - Identification and assessment of potential surface leakage pathways,
  - Strategy for detecting and quantifying surface leakage of CO<sub>2</sub> if leakage occurs,
  - Approach for establishing the expected baselines, and
  - Summary of considerations for calculating site-specific variables for the mass balance equation.

# FINAL THOUGHTS

- Current situation: No regulatory-based program to “credit” CO<sub>2</sub> storage.
- Looking forward: Substantiate that UIC-GHG Reporting framework (Class II + RR) is sufficient to provide confidence that CO<sub>2</sub> will remain out of the atmosphere.



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