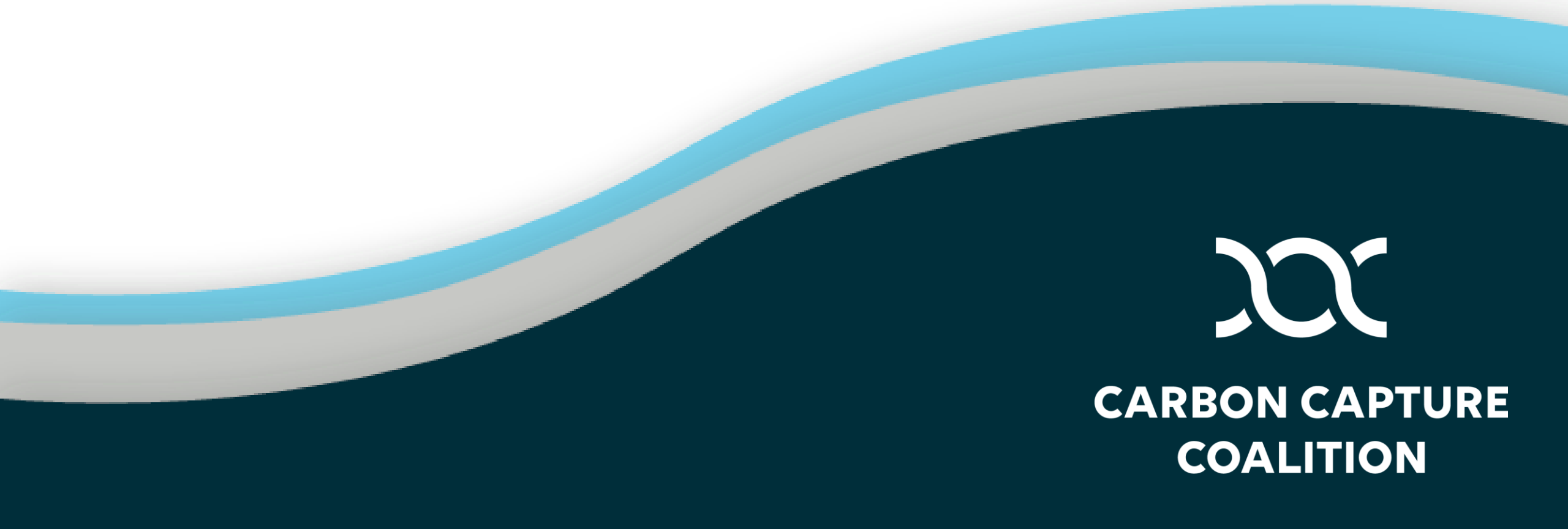
Reporting Mechanisms for 45Q in light of GHGRP Repeal



CARBON CAPTURE COALITION

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Agenda

Welcome / Housekeeping

- 2027 Federal Policy Blueprint: First Topic Meeting tomorrow, June 17

Background & Activities To-Date

- EPA's Proposed Rescission of the GHGRP
- Treasury Notice 2026-1

Presentation: Overview of ISO 27914, Comparison with established reporting mechanisms

- Bob Van Voorhees; Executive Director, Carbon Sequestration Council

Wrap-Up/Next Steps

- Anticipated timeline & next steps from Coalition

Housekeeping

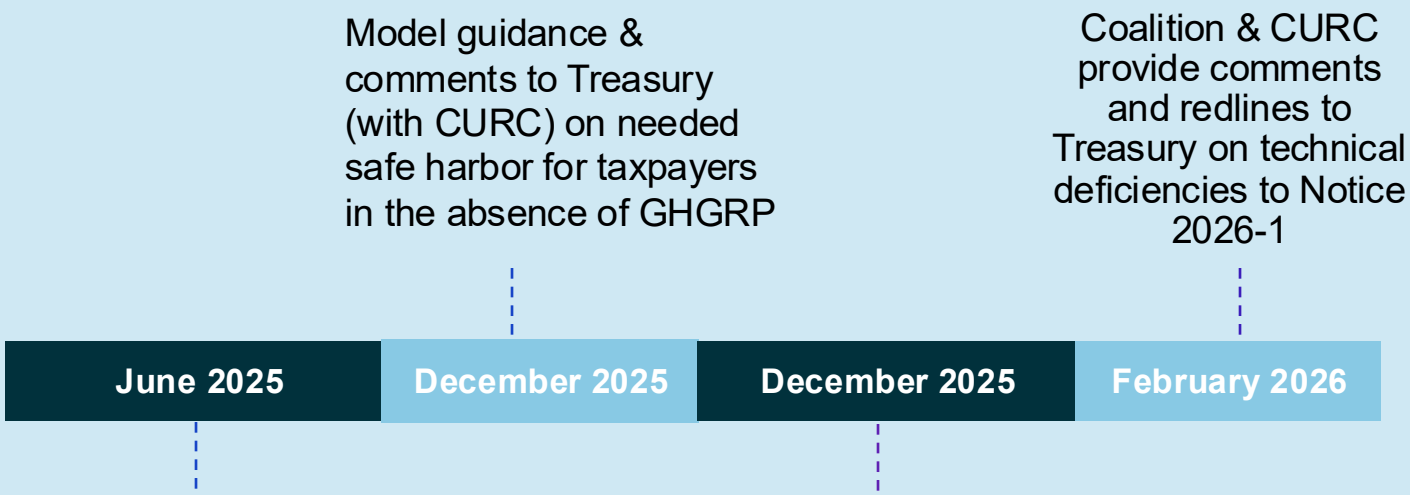
2027 Federal Policy Blueprint Work Group
First Topic Meeting on June 17
Transport and Storage Infrastructure

EPA's proposed rescission of the GHGRP

- Timeline
  - We expect the release of a final rule between the end of Summer into Fall
  - We still anticipate a full repeal of the GHGRP

- Coalition / Impact activities
  - Comments on the repeal of GHGRP to EPA
  - Coordination with stakeholder organizations (Coalition members, API, Carbon Leadership Council)
  - Congressional education on the impact of a full repeal
  - Congressional engagement on potential legislative solutions

Treasury regulations: timeline to-date



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Treasury – next steps

- **Treasury is working on sub-regulatory guidance on 45Q.**
  - Likely focus is on the potential expansion of the safe harbor guidance to EOR operators and extension of the covered timeline provided for calendar year 2025.

- **Treasury will not provide updated guidance on reporting mechanisms until EPA has officially published the rescission of the GHGRP**

- **Notice 2026-1 calls for regulations**
  - Will require notice and comment.
  - Anticipate that the needed guidance from OB3 and IRA could be addressed in these regulations.
  - Gives stakeholders multiple opportunities to engage (both pre- and post- regulations)

Bob Van Vorhees

Executive Director, Carbon Sequestration Council

45Q tax credit for capture and secure geological storage of CO_2

- Section 45Q tax credit is the foundational mechanism to promote carbon management technologies.
- EPA's Greenhouse Gas Reporting Program (GHGRP), underpins the Section 45Q tax credit.
- Following establishment of Class VI and the GHGRP Subpart RR for geologic storage, facilities capturing carbon dioxide (CO2) for geological storage in Class VI wells were required to report the amount of CO2 sequestered to the GHGRP to claim the 45Q tax credit.
- CO2 reported under GHGRP Subpart RR can be self-certified to the IRS for 45Q tax credit.

ISO-27916 Alternative for EOR

- Capture of CO2 for use in enhanced oil recovery (EOR) was also eligible for 45Q tax credit if EOR operators opted to report quantities under GHGRP Subpart RR.
- In 2019, the International Organization for Standardization (ISO) published ISO 27916 as an international voluntary standard for quantifying CO2 stored in association with EOR.
- In 2021, IRS adopted CSA/ANSI ISO 27916:2019 as an alternative means of quantifying CO2 stored for 45Q tax credit if certified by a professional geologist or professional engineer.
- EPA added GHGRP Subpart VV to provide reporting and transparency for ISO 27916 quantification like Subpart RR.

ISO 27914 Overview

ISO 27914 Background

- ISO published ISO 27914 in 2017 as an international standard for geologic storage of CO2 but did not include any provisions for quantifying stored CO2.
- ISO 27914 has been revised to include standard requirements for the quantification of stored CO2 using a mass balance approach like ISO 27916 for EOR and like GHGRP Subpart RR.
- Revised ISO 27914 will be published shortly and is being adopted by CSA/ANSI as an American standard.
- That process will be completed within months.

Scope of ISO 27914

- Requirements for geological storage of CO_2 streams to minimize losses
- Applies to both onshore and offshore geological storage
- Includes storage in hydrocarbon reservoirs where a CO_2 stream is not injected for enhanced recovery
- Requirements for site screening and feasibility investigation, characterization, design and development, operation of storage projects, and project termination
- Recognizes that geological characteristics, physical boundaries, management, intrinsic technical risk, and uncertainties will be unique for each project
- Provides for site-specific intrinsic technical risk and uncertainty management
- Quantification of the net mass of CO_2 stored

Site characterization & assessment

- Site characterization is required by the standard
  - General – obtain data needed to evaluate containment risk, project performance risk, and stakeholder risk
  - Geological and hydrogeological
  - Geophysical
  - Geochemical
  - Geomechanical
  - Project wells and legacy wells

Computational Modeling

- Standard requires computational modeling of the site and project operations
  - Geological static models to simulate the structural, stratigraphic and petrophysical framework of the subsurface as well as the baseline conditions of the storage complex and storage site.
  - Dynamic models to simulate the nature of subsurface fluid flow to estimate the movement of CO2 and formation fluids within the storage complex and potential for leakage or a release of formation fluids from the storage complex, as well as the potential effects on the geomechanical, geochemical, thermal and pressure regimes of the storage complex and storage site.
- Addresses potential leakage pathways
- Models are used to delineate an area of review like Class VI

Risk Management

- Required by the standard to be:
  - implemented at the start of the project, informed by the initial site screening, feasibility investigation, and characterization,
  - iteratively repeated in a transparent and traceable manner throughout the project life cycle
- Risk evaluation criteria
  - Appropriate elements of concern for the project shall be identified by the project operator.
  - Elements of concern shall include human health and safety, and the environment.
- Unacceptable risks shall be reduced by implementation of risk controls and evaluated as acceptable before the project proceeds.

Well infrastructure

- Materials of construction
- Design and construction
  - Risk mitigation
  - Wells, tubulars, cement and well barrier elements
  - Achieve hydraulic isolation across the primary confining and storage units
- Addresses recompletion and workovers
- Requirements for plugging and abandonment

Storage Site Operations

- Addresses operational activities specific to the injection of CO_2 for geological storage
- Relies on measurable key characteristics used to manage safe operation of storage complex and storage facility
- Uses operating limits for each parameter and each well
- Implemented through a required Operations Management Plan that is periodically reviewed and updated
  - Operating procedures
  - Safety plan
  - Shutdown and restart procedures
  - Maintenance procedures
  - Data acquisition, monitoring, and testing
- Includes required procedures and criteria for project termination

Monitoring and verification

Required M&V plan should be designed to serve the following objectives:

- support risk management
- provide information for decision support and stakeholder communication
- determine methods, locations, frequency and duration of monitoring activities;
- optimize storage project efficiency and safety
- continuously improve the M&V program and maintain data comparability
- support safe and effective management of CO2 stream injection operations
- provide necessary data for quantification calculations
- identify the subsurface distribution of the CO2 plume, to enable calibration and verification of models and demonstrate attainment of termination criteria

Quantification and verification

- **Mass balance equation**
  - *m*stored = *m*input – *m*loss operations – *m*loss storage complex
- **Quantification of operational loss**
  - loss of CO_2 from surface facilities
  - loss of CO_2 from venting or flaring
  - loss of CO_2 due to entrainment within produced water that is not captured and reinjected
  - loss of CO_2 due to any transfer of CO_2 outside project
- **Loss from the storage complex**
- **Verification approach identified and documented**

Questions?

Comparisons of ISO 27914 with Subpart RR, Class VI, 45Q and ISO 27916

Class VI Regulations & Subpart RR

- Designed to be complimentary and interactive
- Class VI does not provide for quantification of CO2 storage
- Subpart RR fills that gap plus public disclosure
- Subpart RR presumes compliance with Class VI requirements for non-EOR injection wells and compliance with Class II injection well requirements for EOR operations that elect to comply with Subpart RR to obtain 45Q tax credits

ISO 27914 and ISO 27916

- ISO 27916 does not address the full scope of EOR operations rather presuming the existence of standards and requirements for operation of EOR.
- Approach is like Subpart RR which acknowledges Class VI requirements and addresses quantification and public reporting absent from Class VI
- By contrast ISO 27914 covers the full range of geological storage operations, including quantification like the combination of Class VI and Subpart RR but without public reporting for transparency.

Leakage Pathway Assessment

- ISO 27914 requires this for risk assessment and mitigation to reduce to acceptable levels
- Subpart RR requires this for purposes of identifying means for measuring or estimating leakage mass but not for mitigation of leaks or risk
- 45Q regulations also require for subtracting leakage
- UIC Class VI regulations do not explicitly require leakage pathway assessment but do require assuring:
  - confining zone provides containment;
  - faults and fractures are not transmissible; and
  - legacy and project wells do not provide pathways

ISO 27914 vs. Class VI/Subpart RR Similarities

- Require site characterization of geology, hydrogeology, geomechanical, geochemical, confinement assurance
- Require computational model delineation of area of review and monitoring area to prevent unauthorized migration of injected or formation fluid
- Impose construction and operation requirements
- Site-specific testing and monitoring plans
- Emergency and remedial response planning
- Plugging and securing injection and monitor wells
- Post injection site care and closure
- Provide for quantification of CO_2 inputs, losses and storage through a mass balance approach
- Iterative updating of plans and AoR based on data collected

ISO 27914 vs. Class VI/Subpart RR Differences

- Class VI regulations prevent endangerment of underground sources of drinking water – ISO 27914 prevents CO2 emissions to atmosphere / surface water
- ISO 27914
  - Provides no public disclosure for transparency
  - Requires operation management plan
  - Requires information management plan,
  - Requires project information register
  - Requires additional modeling
  - Requires ongoing interactions with stakeholders

Verification

- ISO 27914 is a voluntary standard, and compliance can be verified in a variety of ways but must be declared:
  - Internal verification by quantifying party
  - External verification by independent verifier of government agency
- Subpart RR is mandatory and enforceable by EPA
- Class VI regulations and permit are enforceable by EPA
- 45Q tax credits require compliance with statute and regulations, and quantification can be self-certified under Subpart RR or certified by PG or PE for ISO 27916
- Safe Harbor uses Subpart RR quantification + PG or PE

Questions?

For more information:

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Next Steps from Carbon Capture Coalition

- **Educational convenings with Coalition membership:** June & July (bring your questions to the next meeting)
- **Discussion with CCC members on consensus-position:** July
- **Engagement with Treasury:** August
- **Timing for final GHGRP rule:** Fall
- **Timing for Treasury regulations:** Later this year