CARBON CAPTURE COALITION

November 21, 2018

Honorable David Kautter
Assistant Secretary (Tax Policy)
Department of the Treasury
1500 Pennsylvania Ave., N.W.
Washington, DC 20220

William M. Paul
Acting Chief Counsel
Internal Revenue Service
1111 Constitution Ave., NW
Washington, DC 20024

Re: Section 45Q Carbon Sequestration Credit

Dear Messrs. Kautter and Paul:

Section 41119 of the Bipartisan Budget Act of 2018, P.L. 115-123 (the "Act"), provided for enhancement of the carbon sequestration credit under section 45Q of the Internal Revenue Code of 1986, as amended (the "Code").[1] This letter considers the changes to section 45Q under the Act and makes suggestions for the Department of Treasury ("Treasury") and the Internal Revenue Service (the "IRS") to consider in issuing guidance. An example of interim guidance is enclosed as Appendix A.

We submit this letter on behalf of participants in the Carbon Capture Coalition, which brings together over 50 energy, industrial and technology companies, labor unions and environmental, clean energy and agricultural organizations.[2] The Coalition submits this model guidance to represent the views of its diverse stakeholders regarding the effective implementation of the enhanced section 45Q credits.

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[1] Except as otherwise indicated, all references to sections are to sections of the Code.

[2] A list of Coalition participants is enclosed with this letter. Glenrock Petroleum abstains from this submission.

I. Background

Section 45Q was originally enacted by section 115 of the Energy Improvement and Extension Act of 2008, Pub. L. No. 110-343, 122 Stat. 3829 (October 3, 2008), and amended by section 1131 of the American Recovery and Reinvestment Tax Act of 2009, Division B of Pub. L. 111-5, 123 Stat. 115 (Feb. 17, 2009) ("prior section 45Q"). Prior section 45Q(a) provided a credit for carbon dioxide ("CO_2") sequestration that was generally available to a taxpayer that captured qualified CO_2 at a qualified facility and disposed of the CO_2 in secure geological storage within the United States. Notice 2009-83, 2009-44 I.R.B. 588, modified by Notice 2011-25, 2011-14 I.R.B. 604, provided guidance to taxpayers on the application of prior section 45Q. Prior section 45Q(e) provided that, at such time as the IRS certified, in consultation with the EPA, that 75,000,000 metric tons of qualified CO_2 had been taken into account for purposes of section 45Q credit, the IRS would publicly announce that the section 45Q credit would cease to be available for the calendar year following such announcement (the "credit termination provision").

Congress expanded and extended the section 45Q credit in section 41119(a) of the Bipartisan Budget Act of 2018, P.L. 115-123 (Feb. 9, 2018) ("new section 45Q").[3] The 2018 amendments apply to taxable years beginning after December 31, 2017. *See* P.L. 115-123 section 41119(b). New section 45Q generally provides for a tax credit in an amount equal to a dollar value per metric ton of qualified carbon oxide captured by the taxpayer and disposed of in secure geological storage, used as a tertiary injectant in a qualified enhanced oil or natural gas recovery (EOR) project and disposed of in secure geological storage, or utilized in certain ways described in section 45Q(f)(5). In general, the credit termination provision no longer applies to carbon capture equipment placed in service on or after February 9, 2018. Instead, section 45Q credits are allowed during the 12-year period beginning on the date such carbon capture equipment was originally placed in service.

Section 45Q(f)(3) provides that, except as provided in regulations prescribed by the Secretary, the section 45Q credit is generally attributable as follows: (i) in the case of carbon capture equipment originally placed in service before February 9, 2018, to the person that captures and physically or contractually ensures the disposal, utilization, or use as a tertiary injectant of the qualified carbon oxide, and (ii) in the case of carbon capture equipment originally placed in service on or after February 9, 2018, to the person that owns the carbon capture equipment and physically or contractually ensures the capture and disposal, utilization, or use as a tertiary injectant of the qualified carbon oxide. In addition, new section 45Q added section 45Q(f)(3)(B), which provides that the taxpayer to whom the credit is attributable (as

[3] This letter references "new section 45Q" and "prior section 45Q" when necessary to distinguish between statutory provisions before and after the enactment of the Bipartisan Budget Act of 2018. Where such distinction is unnecessary, this notice references "section 45Q."

described in section 45Q(f)(3)(A)) may elect, in the time and manner as the Secretary may prescribe by regulations, to have the person that disposes of the qualified carbon oxide, utilizes the carbon oxide, or uses the carbon oxide as a tertiary injectant, claim the credit in lieu of having the owner of the carbon capture equipment claim the credit.

Section 45Q(h) provides that the Secretary of the Treasury (the "Secretary") may prescribe regulations and other guidance as may be necessary or appropriate to carry out section 45Q, including regulations or other guidance—(i) to ensure proper allocation under section 45Q(a) for qualified carbon oxide captured by a taxpayer during the taxable year ending after enactment (*i.e.*, February 9, 2018), and (ii) to determine whether a facility is a qualified facility during such year. Section 45Q(f)(2) provides that the Secretary, in consultation with the Administrator of the Environmental Protection Agency ("EPA"), the Secretary of the Department of Energy ("DOE"), and the Secretary of the Department of Interior ("DOI"), shall establish regulations for determining adequate security measures for the geological storage of qualified carbon oxide such that the carbon oxide does not escape into the atmosphere. Section 45Q(f)(4) provides that the Secretary shall, by regulations, provide for recapturing the benefit of any credit allowable under section 45Q(a) with respect to any qualified carbon oxide that ceases to be captured, disposed of, or used as a tertiary injectant in a manner consistent with the requirements of section 45Q.

II. Issues for Which Immediate Guidance is Needed

This part describes certain issues with respect to which immediate guidance is needed by taxpayers so that they may properly structure the carbon sequestration activities intended to be encouraged by the section 45Q credits and obtain financing for such activities. These issues are incorporated into the model guidance included in Appendix A. The Coalition has provided this model guidance in a form intended to facilitate the prompt issuance of interim guidance. The model guidance also includes a number of other housekeeping matters of importance to the Coalition that are not highlighted in this letter.

A. Persons Who Contractually Ensure Disposal, Use, or Utilization of Qualified Carbon Oxide

Paragraphs (1) through (4) of section 45Q(a), as amended by the Act, require that qualified carbon oxide be "disposed of by the taxpayer," "used by the taxpayer," or "utilized by the taxpayer" in order for a section 45Q credit to be claimed. This language, viewed in isolation, could be read as requiring that the taxpayer *physically* dispose of, use, or utilize carbon oxide. However, both prior section 45Q and the amendments made to new section 45Q clearly and expressly contemplate that a taxpayer claiming a section 45Q credit need not physically dispose of, use, or utilize qualified carbon oxide if the taxpayer "contractually ensures" that the qualified carbon oxide is disposed of, used, or utilized.

Under prior section 45Q(a), the amount of the section 45Q credit was equal to the sum of:

> (1) $20 per metric ton of qualified carbon dioxide which is—
>
> > (A) captured by the taxpayer at a qualified facility, and
> >
> > (B) *disposed of by the taxpayer* in secure geological storage and not used by the taxpayer as described in paragraph (2)(B), and
>
> (2) $10 per metric ton of qualified carbon dioxide which is—
>
> > (A) captured by the taxpayer at a qualified facility,
> >
> > (B) *used by the taxpayer* as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, and
> >
> > (C) *disposed of by the taxpayer* in secure geological storage. (emphasis added).

Nevertheless, prior section 45Q(d)(5) provided that any section 45Q credit "shall be attributable to the person that captures and *physically or contractually ensures* the disposal of or the use as a tertiary injectant of the qualified carbon dioxide, except to the extent provided in regulations prescribed by the Secretary." (emphasis added). Prior section 45Q(d)(5) clearly contemplated that a taxpayer who claimed section 45Q credits might not physically dispose of or use qualified CO_2, but instead might contractually ensure that another person physically disposed of or used the qualified CO_2. As a result, the phrases "disposed of by the taxpayer" and "used by the taxpayer" in prior section 45Q(a) must mean "physically or contractually disposed of by the taxpayer" and "physically or contractually used by the taxpayer," respectively (instead of "physically disposed of by the taxpayer" and "physically used by the taxpayer," respectively).

New section 45Q(f)(3)(A), as amended by the Act, similarly provides that a section 45Q credit is (in the absence of an election under section 45Q(f)(3)(B), discussed below) attributable to:

> (i) in the case of qualified carbon oxide captured using carbon capture equipment which is originally placed in service at a qualified facility before the date of the enactment of the Bipartisan Budget Act of 2018, the person that captures and *physically or contractually ensures* the disposal, utilization, or use as a tertiary injectant of such qualified carbon oxide, and
>
> (ii) in the case of qualified carbon oxide captured using carbon capture equipment which is originally placed in service at a qualified facility on or after the date of the enactment of the Bipartisan Budget Act of 2018, the person that owns the carbon capture equipment

> and *physically or contractually ensures* the capture and disposal, utilization, or use as a tertiary injectant of such qualified carbon oxide. (Emphasis added.)

In implementing the changes to section 45Q under the Act, Treasury and the IRS should clarify that a person need not physically carry out the specified activities (disposal, use, or utilization) in order to claim the credit, as long as such person contractually ensures that the specified activity is carried out.

Treasury and the IRS also could provide guidance regarding the meaning of the term "contractually ensure." For example, the guidance could provide a person is treated as contractually ensuring that a specified activity is carried out if: (i) such person enters into a contract with another person that requires either (A) such other person to carry out such activity, or (B) such other person to require a third person to carry out such activity; and (ii) such contract includes commercially reasonable terms to permit enforcement of such other party's obligation to carry out such activity. We recommend the use of "commercially reasonable terms" for enforcement, rather than a specified enforcement mechanism (e.g., specific enforcement or liquidated damages), because the enforcement provisions that are reasonable may vary from contract to contract.

B. Election under Section 45Q(f)(3)(B)

New section 45Q(f)(3)(B), as enacted by the Act, provides:

> If the person described in [section 45Q(f)(3)(A)] makes an election under this subparagraph in such time and manner as the Secretary may prescribe by regulations, the credit under this section—
>
> > (i) shall be allowable to the person that disposes of the qualified carbon oxide, utilizes the qualified carbon oxide, or uses the qualified carbon oxide as a tertiary injectant, and
> >
> > (ii) shall not be allowable to the person described in [section 45Q(f)(3)(A)].

This election represents a key new feature of the enhanced section 45Q credit. The election is critical in ensuring that taxpayers will have sufficient flexibility in structuring carbon capture and sequestration projects so that the tax credits will have the intended effect of providing an incentive for additional carbon sequestration. To this end, the election should be implemented in a manner that facilitates this enhanced flexibility for taxpayers.

Treasury and the IRS should provide guidance regarding the method by which a taxpayer may make this election. In particular, we recommend that the taxpayer may make this election with respect to a taxable year by attaching a statement to a timely filed (including extensions) income tax return for such taxable year.

In addition, guidance should clarify that the standards for a person who "contractually ensures" disposal, utilization, or use of qualified carbon oxide, described above, also apply to a person described in section 45Q(f)(3)(B)(i). As described above with section 45Q(a), when read in isolation, the phrase "the person that disposes of the qualified carbon oxide, utilizes the qualified carbon oxide, or uses the qualified carbon oxide as a tertiary injectant" could be read as requiring the person claiming the credit to physically dispose of, utilize, or use the qualified carbon oxide. However, the words "dispose of," "use," and "utilize" should be read consistently wherever they appear throughout section 45Q. Just as qualified carbon oxide should be treated as "disposed of by the taxpayer," "used by the taxpayer," or "utilized by the taxpayer" when the taxpayer physically or contractually disposes of, uses, or utilizes the qualified carbon oxide, so too should a person be treated as someone who "disposes of the qualified carbon oxide, utilizes the qualified carbon oxide, or uses the qualified carbon oxide as a tertiary injectant" when they physically or contractually perform the specified activities.

It is unclear whether the owner of carbon capture equipment described in section 45Q(f)(3)(A) is permitted to transfer only a portion of any section 45Q credit while retaining the remainder. Section 45Q does not explicitly contemplate this possibility, unlike section 45J (also amended by the Bipartisan Budget Act), which expressly permits a taxpayer to make a transfer election "with respect to all (or any portion specified in such election) of [the section 45J] credit." Nevertheless, section 45Q does not explicitly prohibit a partial transfer and Treasury should have the authority to permit a partial transfer as "necessary or appropriate" guidance under section 45Q(h); under section 45Q(f)(3)(B), the election is to be made "in such time and *manner* as the Secretary may prescribe" (emphasis added). Finally, a partial transfer is consistent with the increased flexibility of the section 45Q credit provided for by section 45Q(f)(3)(B). For this reason, we believe that Treasury and the IRS have the authority to provide for a partial transfer. We recommend that a taxpayer described in section 45Q(f)(3)(A) be permitted to elect to transfer a portion of the section 45Q credit to a person described section 45Q(f)(3)(B). The portion would be specified in the taxpayer's annual election, made on the tax return for the taxable year of the credit, as a percentage of the total credit claimed.

To illustrate these features, the guidance also could include the following example:

> Corporation A owns carbon capture equipment which is originally placed in service at a qualified facility on or after the date of the enactment of the Bipartisan Budget Act of 2018. Corporation A enters into an enforceable contract with Corporation B under which Corporation B will purchase qualified carbon oxide from Corporation A. The contract between Corporation A and Corporation B requires Corporation B to ensure that qualified carbon oxide purchased under the contract will be used as a tertiary injectant for enhanced oil or natural gas recovery. Corporation B, in turn, enters into an enforceable contract with Corporation C under which Corporation B sells qualified carbon oxide to Corporation C and requires Corporation C to use such qualified carbon oxide as a tertiary injectant for enhanced oil or natural gas recovery at a well owned by Corporation C.

In accordance with the terms of the contracts, Corporation C uses qualified carbon oxide as a tertiary injectant for enhanced oil or natural gas recovery and disposes of such qualified carbon oxide in secure geological storage in each of Years 1, 2, and 3.

In Year 1, Corporation A does not make any election under section 45Q(f)(3)(B). Because Corporation A contractually ensures that the qualified carbon oxide is used as a tertiary injectant, Corporation A is treated as using such qualified carbon oxide as a tertiary injectant for purposes of section 45Q. As a result, Corporation A may claim section 45Q credits in Year 1.

In Year 2, Corporation A makes an election under section 45Q(f)(3)(B) to allow Corporation B to claim section 45Q credits. Because Corporation B contractually ensures that the qualified carbon oxide is used as a tertiary injectant, Corporation B is treated as using such qualified carbon oxide as a tertiary injectant for purposes of section 45Q. As a result, Corporation A's election under section 45Q(f)(3)(B) is valid, and Corporation B may claim section 45Q credits in Year 2.

In Year 3, Corporation A makes an election under section 45Q(f)(3)(B) to allow Corporation C to claim section 45Q credits. Because Corporation C uses the qualified carbon oxide as a tertiary injectant, Corporation A's election under section 45Q(f)(3)(B) is valid, and Corporation C may claim section 45Q credits in Year 3.

C. Recapture

Section 45Q(f)(4) provides that the Secretary shall, by regulations, provide for recapturing the benefit of any credit allowable under section 45Q(a) with respect to any qualified carbon oxide that ceases to be captured, disposed of, or used as a tertiary injectant in a manner consistent with the requirements of section 45Q. Treasury and the IRS have not yet issued detailed guidance describing the circumstances under which a section 45Q credit may be recaptured.

The section 45Q recapture provision can raise a number of complex issues which may require consultation with the EPA. Nevertheless, the potential uncertainty created by the provision can be a significant barrier to obtaining financing for carbon capture and sequestration projects. Because of the anticipated increase in demand for the credit following the amendments made by the Bipartisan Budget Act, prompt guidance is needed.

To reduce the scope of uncertainty, while still allowing guidance to be provided in a timely fashion, we recommend that Treasury and the IRS adopt a safe harbor for credit claimants that physically or contractually ensure disposal of qualified carbon oxide through projects that comply with Subpart RR of Greenhouse Gas Reporting Program or an "Equivalent Program."

In order to satisfy the proposed safe harbor: (i) a credit claimant must either itself comply with Subpart RR or an Equivalent Program (a "Reporting Claimant") or, alternatively, contractually ensure that an owner or operator of a well or group of wells that injects CO_2 (a "Reporting Counterparty") complies with subpart RR or an Equivalent Program; (ii) the section 45Q credits claimed must be computed based on the total annual CO_2 mass sequestered in subsurface geologic formations, calculated in accordance with the procedure specified in Equation RR-11 or Equation RR-12 of 40 CFR 98.443, as applicable (or the corresponding provisions of an Equivalent Program), i.e., on a mass balance basis; and (iii) if a Reporting Counterparty receives carbon dioxide from multiple sources, including a credit claimant, then the credit claimant must contractually ensure that the Reporting Counterparty will meet certain allocation and reporting requirements. In general, the safe harbor would apply regardless of whether a Reporting Claimant or Reporting Counterparty injects carbon dioxide as a tertiary injectant for EOR at a Class II well that has opted into Subpart RR or injects carbon dioxide into a Class VI well that is required to comply with Subpart RR.

If a credit claimant satisfies the safe harbor, then recapture would be limited to certain circumstances. If the net amount of sequestered carbon dioxide calculated for a taxable year is negative, such amount would be subject to recapture, but only from the immediately prior taxable year of the credit claimant. Amounts subject to the safe harbor from years before the immediately prior taxable year would not be subject to recapture. Such period takes into account the general security of carbon sequestered through EOR over the past several decades and the process required by the EPA to approve a monitoring, reporting and verification (MRV) plan under Subpart RR. In addition, in the event that the EPA (or the administrator of an Equivalent Program) approves the cessation of MRV at the relevant facility, section 45Q credits subject to the safe harbor that were previously claimed with respect to such facility would no longer be subject to recapture (the lookback to the immediate prior taxable year would no longer apply). Finally, qualified carbon oxide that is reported by a Reporting Claimant as sequestered in subsurface geologic formations in accordance with Subpart RR (or an Equivalent Program) or allocated to the credit claimant by a Reporting Counterparty in accordance with the rules described above will be treated as disposed of in secure geological storage.

The proposed guidance allows a claimant to satisfy the safe harbor provision through compliance with Subpart RR of EPA's greenhouse gas reporting rule or an Equivalent Program that demonstrates secure geologic storage and quantifies the amount of carbon oxide sequestered. The Coalition did not reach consensus on standards to define an Equivalent Program. All Coalition members agree that the goal of any minimum criteria should be to maintain the integrity of the purpose of the section 45Q credit: ensuring that the claimant of the credit is, in fact, storing carbon oxide and assessing losses. Some Coalition members maintain that an Equivalent Program that demonstrates secure geologic storage and verifies credit integrity must be done through a mass-balance approach that includes sufficient site characterization and monitoring, reporting and verification methods, such as in Subpart RR of EPA's Greenhouse Gas Monitoring Rule. Though specific criteria for an Equivalent Program are not defined in the model guidance, this broad-based bipartisan coalition is working toward a set of

recommendations that ensure environmental safeguards, preserve taxpayer integrity, and encourage commercial development of carbon capture technologies.

Appendix B provides additional information supporting our conclusion that this recapture period should be sufficient to fulfill the purposes of the recapture provision.[4] The appendix explains how, taken together, physics and flow mechanics, experience with and tools for subsurface management of buoyant fluids, combined with regulatory requirements suggest that: (i) cases of loss of volumes of CO_2 that would approach the commercial volumes sequestered during a two-year period are highly improbable; and (ii) potential CO_2 losses occur principally during injection and/or early in a project, while a field is being actively monitored for injection pressures and conformance. The appendix also includes a detailed bibliography with citations to relevant technical literature.

Sincerely,

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[4] Dr. Bruce Hill, Chief Geoscientist, Clean Air Task Force was the principal author of Appendix B, which was also reviewed by several other leading experts in subsurface geologic storage of CO_2.

CARBON CAPTURE COALITION

Membership List

Participants

AFL-CIO
Air Liquide
Air Products
American Carbon Registry
ArcelorMittal
Arch Coal
Archer Daniels Midland Co.
Baker Hughes, a GE Company
Bipartisan Policy Center
Carbon180
Carbon Wrangler LLC
Clean Air Task Force
ClearPath Foundation
Cloud Peak Energy
Conestoga Energy Partners
Core Energy LLC
EBR Development LLC
EnergyBlue Project
Energy Innovation Reform Project
Glenrock Petroleum
Great River Energy
Greene Street Capital
Impact Natural Resources LLC
ION Engineering LLC
International Brotherhood of Boilermakers
International Brotherhood of Electrical Workers
Jackson Hole Center for Global Affairs
Jupiter Oxygen Corporation
Lake Charles Methanol
LanzaTech
Linde LLC
Mitsubishi Heavy Industries America, Inc.
National Audubon Society
National Farmers Union
NET Power
New Steel International, Inc.
NRG Energy
Occidental Petroleum Corporation
Peabody Energy
Prairie State Generating Company
Praxair, Inc.
Renewable Fuels Association
Shell
SMART Transportation Division (of the Sheet Metal, Air, Rail and Transportation Workers)
Summit Power Group
Tenaska Energy
The Nature Conservancy
Third Way
Thunderbolt Clean Energy LLC
United Mine Workers of America
United Steel Workers
Utility Workers Union of America
White Energy
Wyoming Outdoor Council

Observers

Cornerpost CO2 LLC
Enhanced Oil Recovery Institute, University of Wyoming
Interstate Oil and Gas Compact Commission
LI-COR Biosciences
Melzer Consulting
Tellus Operating Group

Appendix A: Model Interim 45Q Guidance Prepared by the Carbon Capture Coalition for Submission to the U.S. Department of the Treasury - 11/21/2018

Notice 2018-[ ]

SECTION 1. PURPOSE

This notice sets forth interim guidance, pending the issuance of regulations, relating to the credit for carbon oxide sequestration under section 45Q of the Internal Revenue Code. Specifically, this notice provides guidance on determining eligibility for the credit, the amount of the credit, certain elections related to the credit, the beginning of construction of carbon capture equipment, and the recapture of the credits. This notice also sets forth a separate reporting requirement. The Internal Revenue Service (Service) and Treasury Department (Treasury) expect that the regulations will incorporate the rules set forth in this notice.

SECTION 2. BACKGROUND

.01. Section 45Q was originally enacted by § 115 of the Energy Improvement and Extension Act of 2008, Pub. L. No. 110-343, 122 Stat. 3829 (October 3, 2008), and amended by § 1131 of the American Recovery and Reinvestment Tax Act of 2009, Division B of Pub. L. 111-5, 123 Stat. 115 (Feb. 17, 2009) (prior § 45Q). Prior § 45Q(a) provided a credit for carbon dioxide (CO_2) sequestration that was generally available to a taxpayer that captured qualified CO_2 at a qualified facility and disposed of the CO_2 in secure geological storage within the United States. Notice 2009-83, 2009-44 I.R.B. 588, modified by Notice 2011-25, 2011-14 I.R.B. 604, provided interim guidance to taxpayers on the application of prior § 45Q. Prior § 45Q(e) provided that, at such time as the Service certified, in consultation with the EPA, that 75,000,000 metric tons of qualified CO_2 had been taken into account for purposes of § 45Q credit, the Service would publicly announce that the § 45Q credit would cease to be available for the calendar year following such announcement (the credit termination provision).

.02. Congress expanded and extended the § 45Q credit in § 41119(a) of the Bipartisan Budget Act of 2018, P.L. 115-123 (Feb. 9, 2018) (new § 45Q).[1] The 2018 amendments apply to taxable years beginning after December 31, 2017. *See* P.L. 115-123 § 41119(b). New § 45Q generally provides for a tax credit in an amount equal to a dollar value per metric ton of qualified carbon oxide where a taxpayer physically or contractually ensures the capture of qualified carbon oxide and its disposal, use as a tertiary injectant in a qualified enhanced oil or natural gas recovery (EOR) project and disposal of in secure geological storage, or utilization in certain ways described in § 45Q(f)(5). Under new § 45Q, credits are allowed during the 12-year period beginning on the date such carbon capture equipment was originally placed in service, with certain limitations.

.03. Section 45Q(h) provides that the Secretary of the Treasury (Secretary) may prescribe regulations and other guidance as may be necessary or appropriate to carry out § 45Q, including regulations or other guidance to—(i) ensure proper allocation under § 45Q(a) for qualified carbon oxide captured by a taxpayer during the taxable year ending after enactment

[1] This notice references "new § 45Q" and "prior § 45Q" when necessary to distinguish between statutory provisions before and after the enactment of the Bipartisan Budget Act of 2018. Where such distinction is unnecessary, this notice references "§ 45Q."

(*i.e.*, February 9, 2018), and (ii) determine whether a facility is a qualified facility during such year.

.04. Section 45Q(f)(2) provides that the Secretary, in consultation with the Administrator of the Environmental Protection Agency (EPA), the Secretary of the Department of Energy (DOE), and the Secretary of the Department of Interior (DOI), shall establish regulations for determining adequate security measures for the geological storage of qualified carbon oxide such that the carbon oxide does not escape into the atmosphere.

.05. Section 45Q(f)(3) provides that, except as provided in regulations prescribed by the Secretary, the § 45Q credit is generally attributable as follows: (i) in the case of carbon capture equipment originally placed in service before February 9, 2018, to the person that captures and physically or contractually ensures the disposal, utilization, or use as a tertiary injectant of the qualified carbon oxide, and (ii) in the case of carbon capture equipment originally placed in service on or after February 9, 2018, to the person that owns the carbon capture equipment and physically or contractually ensures the capture and disposal, utilization, or use as a tertiary injectant of the qualified carbon oxide. In addition, § 45Q(f)(3)(B) provides that the taxpayer to whom the credit is attributable (as described in § 45Q(f)(3)(A) and section 5.01 of this notice) may elect, in the time and manner as the Secretary may prescribe by regulations, to have the person that disposes of the qualified carbon oxide, utilizes the carbon oxide, or uses the carbon oxide as a tertiary injectant, claim the credit in lieu of having the owner of the carbon capture equipment claim the credit.

.06. Section 45Q(f)(4) provides that the Secretary shall, by regulations, provide for recapturing the benefit of any credit allowable under § 45Q(a) with respect to any qualified carbon oxide that ceases to be captured, disposed of, or used as a tertiary injectant in a manner consistent with the requirements of § 45Q.

SECTION 3. TERMS AND DEFINITIONS

.01. Terms. For purposes of this notice,

(a) The term carbon oxide includes carbon dioxide (CO_2) and other carbon oxide,

(b) The terms disposal, storage, and sequestration are used interchangeably,

(c) The term credit refers to a tax credit and shall not be interpreted or construed as a carbon oxide allowance, permit, or any other carbon oxide emissions property right, and

(d) The term leakage refers to carbon oxide that ceases to be sequestered via escape or release to the atmosphere or ocean.

.02. Applicable Dollar Amount.

(a) Section 45Q(a)(3). Section 45Q(a)(3) generally provides a credit for qualified carbon oxide captured by the taxpayer using carbon capture equipment that is originally placed in service at a qualified facility on or after February 9, 2018, and disposed of by the taxpayer in

secure geological storage but that is neither (i) used by the taxpayer as a tertiary injectant in a qualified EOR project and disposed of by the taxpayer in secure geological storage, nor (ii) utilized by the taxpayer in a manner described § 45Q(f)(5). For purposes of § 45Q(a)(3), applicable dollar amount means (i) for any taxable year beginning in a calendar year after 2016 and before 2027, the dollar amount established by linear interpolation between $22.66 for 2017 and $50 for 2026 for each calendar year during such period, and (ii) for any taxable year beginning in a calendar year after 2026, an amount equal to the product of $50 and the inflation adjustment factor for such calendar year determined under § 43(b)(3)(B) for such calendar year, determined by substituting 2025 for 1990.

(b) Section 45Q(a)(4). Section 45Q(a)(4) generally provides a credit for qualified carbon oxide captured by the taxpayer using carbon capture equipment that is originally placed in service at a qualified facility on or after February 9, 2018, and is either (i) used by the taxpayer as a tertiary injectant in a qualified EOR project and disposed of by the taxpayer in secure geological storage, or (ii) utilized by the taxpayer in a manner described § 45Q(f)(5). For purposes of § 45Q(a)(4), applicable dollar amount means (i) for any taxable year beginning in a calendar year after 2016 and before 2027, the dollar amount established by linear interpolation between $12.83 for 2017 and $35 for 2026 for each calendar year during such period, and (ii) for any taxable year beginning in a calendar year after 2026, an amount equal to the product of $35 and the inflation adjustment factor for such calendar year determined under § 43(b)(3)(B) for such calendar year, determined by substituting 2025 for 1990.

.03. Industrial Facility.

(a) Industrial facility refers to a facility that produces a carbon oxide stream from a fuel combustion source, a manufacturing process, or a fugitive carbon oxide emission source that, absent capture, injection and disposal or utilization, would otherwise be released into the atmosphere as industrial emission of greenhouse gas (GHG) or lead to such release.

(b) An industrial facility does not include a facility that produces carbon oxide from carbon oxide production wells at natural carbon-oxide-bearing formations.

.04. Direct Air Capture Facility. Direct air capture facility means any facility that uses carbon capture equipment to capture CO_2 directly from the ambient air, but not including any facility that captures CO_2 (i) that is deliberately released from naturally occurring subsurface springs or (ii) using natural photosynthesis.

.05. Qualified Carbon Oxide. Qualified carbon oxide means:

> (a) For carbon capture equipment placed in service before February 9, 2018, CO_2 that is (i) captured from an industrial facility by such carbon capture equipment, (ii) would otherwise be released into the atmosphere as an industrial emission of GHG or lead to such release, and (iii) is measured at the source of capture and verified at the point of disposal, injection, or utilization;

(b) For carbon capture equipment placed in service on or after February 9, 2018, any carbon oxide that is (i) captured from an industrial facility by such carbon capture equipment, (ii) would otherwise be released into the atmosphere as an industrial emission of GHG or lead to such release, and (iii) is measured at the source of capture and verified at the point of disposal, injection, or utilization; or

(c) in the case of a direct air capture facility, any CO_2 that is (i) captured directly from the ambient air, and (ii) is measured at the source of capture and verified at the point of disposal, injection, or utilization.

Qualified carbon oxide includes the initial deposit of captured carbon oxide used as a tertiary injectant, but it does not include carbon oxide that is recaptured, recycled, and re-injected as part of the qualified EOR process.

.06. Qualified EOR Project. Qualified EOR project has the same meaning given the term "qualified enhanced oil recovery project" under § 43(c)(2) by substituting "crude oil or natural gas" for "crude oil" in § 43(c)(2)(A)(i).

.07. Qualified Facility.

(a) Qualified facility means an industrial facility or direct air capture facility:

(i) the construction of which begins before January 1, 2024, and

(A) construction of carbon capture equipment begins before such date, or

(B) the original planning and design for such facility includes installation of carbon capture equipment; and

(ii) which

(A) in the case of a facility which emits not more than 500,000 metric tons of carbon oxide into the atmosphere during the taxable year, captures not less than 25,000 metric tons of qualified carbon oxide during the taxable year which is utilized through fixation or chemical conversion and measured as described in section 6 of this notice,

(B) in the case of an electricity generating facility not described in paragraph (A), above, captures not less than 500,000 metric tons of qualified carbon oxide during the taxable year, or

(C) in the case of a direct air capture facility, or any facility not described in paragraph (A) or (B), above, captures not less than 100,000 metric tons of qualified carbon oxide during the taxable year. *See* § 45Q(f)(5)(A) and (B).

(b) Beginning of Construction. For purposes of § 45Q(d)(1) and section 3.07(a)(i) of this notice, a taxpayer may establish the beginning of construction by starting physical work

of a significant nature (Physical Work Test). Alternatively, a taxpayer may establish the beginning of construction by meeting a safe harbor based on having paid or incurred five percent or more of the total cost of the industrial facility or direct air capture facility (Five Percent Safe Harbor). Both methods require that a taxpayer make continuous progress towards completion once construction has begun (Continuity Requirement). *See* Notice 2017-4, 2017-4 I.R.B. 541; Notice 2018-59, 2018-28 I.R.B. 196.

(c) Under new § 45Q(d), a qualified facility need not be owned by the taxpayer claiming the credit. *See* § 45Q(a) and (d) and (f)(3).

.08. Tertiary Injectant. Tertiary injectant has the same meaning as when used within § 193(b) and Treas. Reg. § 1.193-1(b).

.09. Disposal, Utilization, and Use.

(a) In General. As described in section 5 of this notice, in general, the § 45Q credit is attributable to a person who captures qualified carbon oxide and physically or contractually ensures its disposal, utilization, or use as a tertiary injectant. A person need not physically carry out these specified activities in order to claim the credit, as long as such person contractually ensures that the specified activity is carried out.

(b) Contractual Assurance. A person is treated as contractually ensuring that a specified activity is carried out if: (i) such person enters into a contract with another person that requires either (A) such other person to carry out such activity, or (B) such other person to require a third person to carry out such activity; and (ii) such contract includes commercially reasonable terms to enforce such other party's obligation to carry out such activity. For a description of information that must be retained and made available for inspection by each contractual counterparty, see section 9.02 of this notice.

(c) Capture. A person captures qualified carbon oxide when such person physically or contractually ensures the capture of such qualified carbon oxide that would otherwise be released into the atmosphere, or would lead to such release.

(d) Disposal. A person disposes of qualified carbon oxide in secure geological storage when such person physically or contractually disposes of such qualified carbon oxide in secure geological storage using adequate security measures under the provisions of section 5 of Notice 2009-83 (with the term "CO_2" replaced by "carbon oxide" throughout) or under such standards as may be set forth in future published guidance.

(e) Utilization. A person utilizes qualified carbon oxide when such person physically or contractually (i) fixes such qualified carbon oxide through photosynthesis or chemosynthesis, such as through the growing of algae or bacteria, (ii) chemically converts such qualified carbon oxide to a material or chemical compound in which such qualified carbon oxide is securely stored, or (iii) uses such qualified carbon oxide for any other purpose for which a commercial market exists (with the exception of use as a tertiary injectant in a qualified EOR project), as prescribed in future published guidance.

(f) Use. A person uses qualified carbon oxide as a tertiary injectant in a qualified EOR project and disposes of such qualified carbon oxide in secure geological storage when such person physically or contractually ensures the use of such qualified carbon oxide as a tertiary injectant in a qualified EOR project and physically or contractually disposes of such qualified carbon oxide in secure geological storage.

.10. Applicable Facility. Applicable facility under § 45Q(f)(6)(B) means a qualified facility (i) which was placed in service before February 9, 2018, and (ii) for which no taxpayer claimed a § 45Q credit for any taxable year ending before February 9, 2018.

SECTION 4. APPLICATION OF SECTION 45Q CREDIT

.01. In General. For facilities placed in service prior to February 9, 2018, taxpayers who capture qualified carbon oxide from a qualified facility in a taxable year beginning after October 3, 2008, and meet all of the other requirements of § 45Q are eligible to claim the credit. For qualified facilities placed in service after February 8, 2018, the credit is available to the persons who own the carbon capture equipment and meet all of the other requirements of § 45Q.

.02. Section 45Q Credit Amount. The scope and amount of the new § 45Q credit depends on when carbon capture equipment is placed in service, the method of use, and the method of disposal of the qualified carbon oxide.

(a) For carbon capture equipment originally placed in service at a qualified facility before February 9, 2018,

(i) the credit amount is either,

(A) $20 per metric ton of qualified carbon oxide that is CO_2 and is captured by the taxpayer, disposed of by the taxpayer in secure geological storage, and neither (1) used by the taxpayer as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, nor (2) utilized by the taxpayer in a manner described in § 45Q(f)(5), or

(B) $10 per metric ton of qualified carbon oxide that is CO_2 and is captured by the taxpayer, used by the taxpayer as a tertiary injectant in a qualified EOR project, and either (1) used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, or (2) utilized by the taxpayer in a manner described in § 45Q(f)(5); and

(ii) For any taxable year beginning in a calendar year after 2009, § 45Q(f)(7) provides for an amount equal to the product of credit amount stated in section 4.02(a)(i) of this notice and the inflation adjustment factor for such calendar year determined under § 43(b)(3)(B) for such calendar year, determined by substituting 2008 for 1990. *See, e.g.*, Notice 2018-40 § 3, 2018-20 I.R.B. 583 (May 11, 2018)

(announcing inflation adjustment factor for 2017), *clarified by* Announcement 2018-9 2018-24 I.R.B. 752.

(b) For carbon capture equipment originally placed in service at a qualified facility on or after February 9, 2018,

(i) § 45Q(a)(3) allows a credit of the applicable dollar amount per metric ton of qualified carbon oxide captured by the taxpayer, disposed of in secure geological storage, and neither (A) used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, nor (B) utilized by the taxpayer in a manner described in § 45Q(f)(5). For purposes of § 45Q(a)(3), applicable dollar amount means (A) for any taxable year beginning in a calendar year after 2016 and before 2027,

Calendar year beginning in	Applicable dollar amount for year
2017	$22.66
2018	$25.70
2019	$28.74
2020	$31.77
2021	$34.81
2022	$37.85
2023	$40.89
2024	$43.92
2025	$46.96
2026	$50.00

and (B) for any taxable year beginning in a calendar year after 2026, an amount equal to the product of $50 and the inflation adjustment factor for such calendar year determined under section 43(b)(3)(B) for such calendar year, determined by substituting 2025 for 1990.

(ii) § 45Q(a)(4) allows a credit of the applicable dollar amount per metric ton of qualified carbon oxide captured by the taxpayer, disposed of in secure geological storage, and either (A) used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, or (B) utilized by the taxpayer in a manner described in § 45Q(f)(5). For purposes of § 45Q(a)(4), applicable dollar amount means (A) for any taxable year beginning in a calendar year after 2016 and before 2027,

Calendar year beginning in	Applicable dollar amount for year
2017	$12.83
2018	$15.29
2019	$17.76
2020	$20.22
2021	$22.68
2022	$25.15
2023	$27.61
2024	$30.07
2025	$32.54
2026	$35.00

and (B) for any taxable year beginning in a calendar year after 2026, an amount equal to the product of $35 and the inflation adjustment factor for such calendar year determined under section 43(b)(3)(B) for such calendar year, determined by substituting 2025 for 1990.

.03. Election to Use Alternative Credit Amount. Under § 45Q(b)(3), a taxpayer may elect to have the dollar amounts applicable under § 45Q(a)(1) or (2) apply in lieu of the dollar amounts applicable under § 45Q(a)(3) or (4), respectively, for each metric ton of qualified carbon oxide that is captured by the taxpayer using carbon capture equipment that is originally placed in service at a qualified facility on or after February 9, 2018. An eligible

taxpayer may make such election by including a statement that the taxpayer is making an election under § 45Q(b)(3) on the income tax return of such taxpayer on which the § 45Q credits are claimed.

.04. Election for Applicable Facilities.

(a) Under § 45Q(f)(6), in the case of an applicable facility (as defined in section 3.10 of this notice), for any taxable year in which such facility captures not less than 500,000 metric tons of qualified carbon oxide during the taxable year, the person that owns the carbon capture equipment and physically or contractually ensures the capture and disposal, utilization, or use as a tertiary injectant of the qualified carbon oxide may elect to have such facility, and any carbon capture equipment placed in service at such facility, deemed as having been placed in service on February 9, 2018. If so elected, the credit amount under § 45Q(a)(3) or (4) would apply to such facility.

(b) An eligible person may make such election:

(i) In the case of a person who claims the § 45Q credits attributable to the applicable facility, by including a statement that the person is making an election under § 45Q(f)(6) on the income tax return of such person on which the § 45Q credits are claimed.

(ii) In any other case, by providing a certification, under penalties of perjury, to each taxpayer that is allowed to claim all or a portion of any § 45Q credits attributable to the applicable facility that such person is making an election under § 45Q(f)(6). Any person claiming all or a portion of any § 45Q credits attributable to the applicable facility shall include a statement that an election under § 45Q(f)(6) has been made on the income tax return of such person on which the § 45Q credits are claimed.

(c) An election under § 45Q(f)(6), once made, shall apply for the taxable year for which it is made and for all subsequent taxable years and may be revoked only with the consent of the Secretary.

.05. Credit Termination; Credit Period.

(a) For carbon capture equipment placed in service before February 9, 2018, § 45Q(g) provides that the § 45Q credit shall apply with respect to qualified carbon oxide that is CO_2 and is captured using such equipment before the end of the calendar year in which the Secretary, in consultation with the EPA, certifies that, during the period beginning after October 3, 2008, a total of 75,000,000 metric tons of such CO_2 have been taken into account in accordance with (i) § 45Q(a), as in effect on February 8, 2018, and (ii) § 45Q(a)(1) and (2). The Service provides annual updates on the amount of qualified carbon oxide taken into account under this provision. *See, e.g.*, Notice 2018-40 § 4 (update on tax credit utilization).

At the time of such certification, the Service will publicly announce that the credit available under prior § 45Q will cease to be available for the calendar year following such announcement. Where § 45Q credits are disallowed by the Service, they shall not be taken into account for purposes of the 75,000,000 metric ton limit.

(b) For carbon capture equipment placed in service on or after February 9, 2018, § 45Q(a)(3) and (4) provide that the § 45Q credit shall be available with respect to qualified carbon oxide captured by the taxpayer during the 12-year period beginning on the date the equipment was originally placed in service.

(c) In the event that:

(i) there is an interruption of the capture, disposal, use as a tertiary injectant, or utilization of qualified carbon dioxide attributable to carbon capture equipment;

(ii) such interruption results from an event of force majeure (including an act of God, war, strike, or other similar event beyond the control of the taxpayer);

(iii) the taxpayer makes commercially reasonable efforts to cause the capture, disposal, use as a tertiary injectant, or utilization of such qualified carbon oxide to resume; and

(iv) such interruption persists for at least twenty-one calendar days,

then the 12-year credit period, described in section 4.05(b) of this notice, with respect to such carbon capture equipment shall be tolled until such time as one of the conditions described in clauses (i) through (iii) above is no longer met. In addition, the 25,000, 100,000, and 500,000 metric ton thresholds described in section 3.07 of this notice shall be adjusted, on a pro rata basis, to account for any period during which the 12-year credit period is tolled under this section 4.05(c).

.06. Carbon Oxide Measured by Mass.

(a) Under § 45Q(c)(1), to claim a § 45Q credit, the mass (weight) of qualified carbon oxide must be measured at the source of capture and must be verified at the point of disposal in secure geological storage, at the point of use as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, or point of utilization. The amount of qualified carbon oxide for purposes of the § 45Q credit is presumed to be the lesser of the mass measured at the point of capture and the mass verified at the point of disposal, injection, or utilization, unless the taxpayer can establish to the satisfaction of the Service that the greater amount is the correct amount.

(b) For the purpose of calculating the § 45Q credit, a metric ton of carbon oxide includes only the contained mass of carbon oxide. The mass of any other substance, such as water or impurities, is not included in the calculation. For example, if a metric ton of a substance that is bought and sold as "carbon oxide" is 95 percent pure carbon oxide by mass, for purposes of the § 45Q credit, 1.0526 tons (equivalent to 1 divided by 0.95) of the 95 percent pure substance is considered to be one metric ton of carbon oxide.

.07. Captured and Disposed of or Used within the United States. The § 45Q credit applies only to qualified carbon oxide the capture and disposal, use, or utilization of which is within the United States (as defined in § 638(1)) or a possession of the United States (as defined in § 638(2)).

.08. Allocation of § 45Q Credit Among Qualified Facility Owners. Eligibility for the § 45Q credit is based on the total amount of qualified carbon oxide captured at a qualified facility and disposed of in secure geological storage, used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage, or utilized during a taxable year subject to the following:

(a) If the qualified facility is owned by a partnership that has not made a valid election under § 761(a), the partnership will be considered the taxpayer for purposes of this notice. In such cases, the § 45Q credit must be allocated in accordance with § 1.704-1(b)(4)(ii).

(b) If the qualified facility is owned by a partnership that has made a valid § 761(a) election, then each partner in the partnership will be considered the taxpayer for purposes of this notice. In such case, the taxpayer may claim the § 45Q credit in accordance with its portion of the total amount of qualified carbon oxide that is commensurate with its undivided ownership of the qualified facility.

SECTION 5. CREDIT ATTRIBUTABLE TO TAXPAYER

.01. In General. Under § 45Q(f)(3), and except as provided in section 5.02 of this notice, any § 45Q credit shall be attributable to—

(a) in the case of qualified carbon oxide captured using carbon capture equipment which is originally placed in service at a qualified facility before February 9, 2018, the person that captures and physically or contractually ensures the disposal, utilization, or use of the qualified carbon oxide, within the meaning of section 3.09 of this notice, and

(b) in the case of qualified carbon oxide captured using carbon capture equipment which is originally placed in service at a qualified facility on or after February 9, 2018, the person that (i) owns the carbon capture equipment, (ii) physically or contractually ensures the capture of qualified carbon dioxide, and (iii) physically or contractually ensures the disposal, utilization, or use of the qualified carbon oxide, within the meaning of section 3.09 of this notice (in either case, a Default Claimant).

.02. Election.

(a) Effect of Election. If a Default Claimant makes an election under this section 5.02 for a taxable year, then the § 45Q credit for such taxable year (or a portion thereof as specified in the statement described in section 5.02(b) of this notice)—(i) shall be allowable to a person that physically or contractually ensures the capture of and disposes, utilizes, or uses the qualified

carbon oxide, within the meaning of section 3.09 of this notice (an Alternative Claimant), and (ii) shall not be allowable to the Default Claimant.

(b) Manner of Making Election. A Default Claimant may make an election under this section 5.02 for a taxable year by attaching a statement to such Default Claimant's timely filed (including extensions) federal income tax return for such taxable year that includes the following information:

(i) the name, address, and taxpayer identification number of the Default Claimant;

(ii) the name, address, and taxpayer identification number of the Alternative Claimant who will claim § 45Q credits under section 5.02(a) of this notice;

(iii) the mass (in metric tons) of qualified carbon oxide captured and disposed of, used, or utilized, within the meaning of section 3.09 of this notice, in the taxable year by the Default Claimant; and

(iv) the portion of the qualified carbon oxide described in clause (iii), above, to which the election under this section 5.02 will apply.

(c) Other Requirements. The election described in this section 5.02 for a taxable year shall only be effective if the following requirements are met:

(i) the Alternative Claimant must provide a statement, under penalties of perjury, to the Default Claimant, certifying that the Alternative Claimant has physically or contractually ensured the capture of or disposed of, used, or utilized (within the meaning of section 3.09 of this notice) an amount of qualified carbon oxide in the taxable year that is not less than the portion of qualified carbon oxide described in section 5.02(b)(iv) of this notice; and

(ii) the Alternative Claimant must attach a statement to the Alternative Claimant's timely filed (including extensions) federal income tax return for the taxable year that includes the information described in section 5.02(b) of this notice.

SECTION 6. UTILIZATION OF CARBON OXIDE

.01. Measurement.

(a) In General. For purposes of § 45Q(a)(2)(B)(ii) or (4)(B)(ii), the amount of qualified carbon oxide utilized by the taxpayer in the taxable year shall be equal to the mass of qualified carbon oxide which the taxpayer demonstrates, based upon an analysis of lifecycle greenhouse gas emissions and subject to such requirements as the Secretary, in consultation with DOE and EPA, determines appropriate, were—(i) captured and permanently isolated from the atmosphere, or (ii) displaced from being emitted into the atmosphere, through use of fixation, chemical conversion, or another process as described in section 3.09(e) of this notice.

(b) Lifecycle Greenhouse Gas Emissions. For purposes of section 6.02(a) of this notice, the term "lifecycle greenhouse gas emissions" has the same meaning given such term under subparagraph (H) of section 211(o)(1) of the Clean Air Act (42 U.S.C. § 7545(o)(1)), as in effect on February 9, 2018, except that "product" shall be substituted for "fuel" each place it appears in such subparagraph.

SECTION 7. RECAPTURE

.01. In General. When qualified carbon oxide for which a credit has been allowed under § 45Q(a) ceases to be disposed of in secure geological storage, or used as a tertiary injectant and disposed of in secure geological storage, in a manner consistent with the requirements of § 45Q, the credit is subject to recapture under § 45Q(f)(4). Recapture of the credit is limited, and may only arise in the year of the leakage or other event that causes the qualified carbon oxide no longer to be disposed of in secure geological storage, or used as a tertiary injectant and disposed of in secure geological storage, in a manner consistent with the requirements of § 45Q.

.02. Safe Harbor.

(a) In General. This section 7.02 provides a safe harbor for certain carbon oxide sequestered in compliance with subpart RR of the EPA Mandatory Greenhouse Gas Reporting Standards (40 C.F.R. pt. 98) ("Subpart RR") or a program that has been approved by the EPA that demonstrates secure geologic storage and quantifies the amount of carbon oxide that is sequestered (an "Equivalent Program").

(b) Requirements to Satisfy Safe Harbor. To meet the requirements of the safe harbor described in this section 7.02:

(i) Either (A) the credit claimant (whether a Default Claimant or Alternative Claimant) must comply with Subpart RR or an Equivalent Program (a "Reporting Claimant"), or (B) the credit claimant must contractually ensure that an owner or operator of a well or group of wells that injects CO_2 complies with Subpart RR or an Equivalent Program (a "Reporting Counterparty");

(ii) The § 45Q credits claimed by the credit claimant must be computed based on the total annual CO_2 mass sequestered in subsurface geologic formations, calculated in accordance with the procedure specified in Equation RR-11 or Equation RR-12 of 40 C.F.R. § 98.443, as applicable (or the corresponding provisions of an Equivalent Program that compute CO_2 mass sequestered on a net mass-balance basis);

(iii) If a Reporting Counterparty receives CO_2 from multiple sources, including from the credit claimant, then the credit claimant must contractually ensure that:

(A) The Reporting Counterparty will allocate the CO_2 mass sequestered in subsurface geologic formations at the facility of the Reporting

Counterparty in a reporting year in proportion to the mass of CO_2 received from the credit claimant. This may be expressed as a formula:

$$CO_{2S,t} = CO_{2R,t} / CO_{2R} * CO_{2S}.$$

Where:

- $CO_{2S,t}$ is the mass of sequestered CO_2 allocated to the credit claimant for the reporting year,
- $CO_{2R,t}$ is the total mass of CO_2 received from the credit claimant in the reporting year,
- CO_{2R} is the total mass of CO_2 received by the Reporting Counterparty in the reporting year (calculated using Equations RR-1 to RR-3 of 40 C.F.R. § 98.443 or the corresponding amounts calculated under an Equivalent Program) from the credit claimant and all other sources,
- CO_{2S} is the total annual CO_2 mass treated as sequestered in subsurface geologic formations at the facility of the Reporting Counterparty in the reporting year (calculated using Equation RR-11 or RR-12 of 40 C.F.R. § 98.443 or the corresponding amounts calculated under an Equivalent Program).

(B) The Reporting Counterparty will maintain records supporting this allocation.

(C) The Reporting Counterparty will provide the credit claimant with a certification of the amount of such credit claimant's allocation of the CO_2 mass sequestered in subsurface geologic formations at the facility of the Reporting Counterparty.

(c) Effect of Safe Harbor. If a person claiming § 45Q credits satisfies the requirements described in section 7.02(b) of this notice, then:

(i) Qualified carbon oxide that is reported by a Reporting Claimant as sequestered in subsurface geologic formations in accordance with Subpart RR (or an Equivalent Program) or allocated to the credit claimant by a Reporting Counterparty in accordance with the rules described in section 7.02(b)(iii)(A) of this notice shall be treated as disposed of in secure geological storage.

(ii) If the net amount of sequestered CO_2 calculated for a given taxable year is negative, such amount shall be subject to recapture, but only from the immediately prior taxable year. Amounts of sequestered CO_2 that met the requirements of the safe harbor in any taxable years before the immediately prior taxable year shall not be subject to recapture.

(iii) In the event that the EPA (or the administrator of an Equivalent Program) approves the cessation of monitoring, verification, and reporting at the facility at which CO_2 that met the requirements of the safe harbor was sequestered, the § 45Q credits that were previously claimed with respect to such facility and met the requirements of the safe harbor shall no longer be subject to recapture.

SECTION 8. REPORTING REQUIREMENTS

.01. Annual Reports. A taxpayer that has claimed the § 45Q credit on a tax return must submit an annual report to the Service containing the following information:

(a) The name, address, and taxpayer identification number of the reporting taxpayer, and any parties with which the taxpayer contractually ensures the capture, disposal, utilization, or use of the qualified carbon oxide, within the meaning of section 3.09 of this notice;

(b) The name and location of the qualified facilities at which the carbon oxide was captured;

(c) The mass (in metric tons) of qualified carbon oxide for the taxable year that has been taken into account for purposes of claiming the § 45Q credit, as measured at the source of capture and verified at the point of disposal, injection, or utilization;

(d) Any changes in the information included in prior annual reports submitted under section 8.01 of this notice, including adjustments to the mass (in metric tons) of qualified carbon oxide taken into account for purposes of the § 45Q credit in prior taxable years;

(e) The mass of any qualified carbon oxide previously taken into account for purposes of § 45Q(a) which leaked or ceased to be disposed of in secure geological storage, utilized, or used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage during the taxable year; and

(f) A declaration, applicable to the report and any accompanying documents, signed by a person currently authorized to bind the taxpayer in these matters, in the following form:

> Under penalties of perjury, I declare that I have examined this report, including accompanying documents, and to the best of my knowledge and belief, the facts presented in support of this report are true, correct, and complete.

.02. Time for Filing Reports. The annual report described in section 8.01 of this notice must be filed with the Service at the following address not later than the last day of the second calendar month following the month during which the tax return on which the § 45Q credit is claimed was due (including extensions):

> Internal Revenue Service

Attn: CC:PSI:6, Room 5116
P.O. Box 14095
Benjamin Franklin Station
Washington, D.C. 20044

SECTION 9. RECORDKEEPING REQUIREMENT

.01. In General. A taxpayer is not required to attach documentation to the return on which the credit is claimed. However, § 6001 provides that every person liable for any tax imposed by the Code, or for the collection thereof, must keep such records, render such statements, make such returns, and comply with such rules and regulations as the Secretary may from time to time prescribe. *See* Treas. Reg. § 1.6001-1(e).

.02. Information Must Be Available for Inspection. The taxpayer must retain in its records documentation establishing that the taxpayer qualifies for the § 45Q credit. The taxpayer must, upon request, make such documentation available for inspection by the Service regardless of whether the taxpayer physically or contractually ensures capture, disposal in secure geological storage, utilization, or use as a tertiary injectant followed by disposal in secure geological storage. Such necessary documentation includes, but is not limited to, the following:

(a) Methodology, inputs, and equations used to measure the amount of carbon oxide at the source of capture and verify the amount at the point of disposal or injection.

(b) Evidence of disposal, utilization, or use of qualified carbon oxide, within the meaning of section 3.09 of this notice.

(c) Methodology, inputs, and equations used to calculate the amount of carbon oxide that was once but has ceased to be disposed of in secure geological storage, utilized, or used as a tertiary injectant in a qualified EOR project and disposed of in secure geological storage.

(d) All contracts entered into by the taxpayer and any contracting party that contractually ensures the capture, disposal, utilization, or use of qualified carbon oxide, within the meaning of section 3.09 of this notice.

A taxpayer that contractually ensures the capture, disposal, utilization, or use of qualified carbon oxide, within the meaning of section 3.09 of this notice, must also contractually ensure that their counterparty will: (i) retain in its records documentation establishing such capture, disposal, utilization, or use of qualified carbon oxide, including, but not limited to, the documents specified in this section 9.02; and (ii) upon request, make such documentation available for inspection by the Service.

Appendix B: Characterizing Retention and Loss of CO_2 from Geologic Carbon Storage Projects

This document was prepared to accompany the Coalition's model guidance in order to provide technical background for the proposed safe harbor in the guidance to address the financial risk of credit recapture.

Inherent characteristics of deep geologic carbon storage, accompanied by regulatory requirements for injected and stored CO_2, suggest that the probability of the leakage of CO_2 to the atmosphere, in volumes significant relative to the large commercial volumes injected, is low. Evidence that large CO_2 losses from unexpected project leakage would be limited comes from: 1) physics of geologic trapping of injected CO_2, 2) decades of experience with injection of CO_2 and other buoyant gas analogs and 3) existing regulatory requirements for selecting and operating CO_2 injection and storage sites, including requirements for injection well construction and mechanical integrity.

1. Physics of trapping injected CO_2

We know from oil and gas experience that accidental production (i.e., release) or loss of CO_2 is limited by physics. A blowout with its self-sustaining production will also be self-limited by progressive formation pressure decrease and by CO_2 trapping in rock pores such that the flow to the surface diminishes quickly. In CO_2 EOR production this means that continued production from a depleted reservoir must commonly be augmented by pumping because reservoir driving forces are reduced over time by: 1) pressure depletion, and 2) reduced CO_2 saturation near the well. As reservoir fluids are produced, pressure is decreased in the reservoir and flow will naturally diminish over time to the point where reservoir pressure plus CO_2 buoyancy drive are not sufficient to push fluids from the subsurface to the top of the well, at which point artificial lift (e.g., pumping) is required. This means that in a leakage scenario, the forces driving the CO_2 loss will progressively diminish to zero. Moreover, CO_2 has lower viscosity than the formation water and will flow more easily and be produced faster than brine, such that the CO_2 near the well that could escape will likely do so only over a limited time. As a result, any self-sustaining leakage of CO_2 will be limited. Another mechanism that works to limit CO_2 flow to the surface during this process is the trapping of bubbles of CO_2 that are not able to overcome capillary forces as needed for them to flow from pore to pore through the reservoir and out to the surface. Other factors such as dissolution of CO_2 into brine and in some settings, mineral trapping can also decrease the possibility of accidental losses.

2. Experience with injection of CO_2 and other buoyant gas analogs

The 50-plus-year track record of the EOR industry is informative for geologic storage and provides strong evidence of the low probability of significant losses of CO_2 from leakage events.[1,2] Approximately 65 million tons of CO_2 are currently transported through about 4,500 miles of pipelines linking sources and projects and EOR projects in the U.S. today.[3] Today's EOR operators treat CO_2 as a valuable commodity by working to eliminate loss of CO_2 through leak prevention, by recapture and recycle processes, by tracking CO_2 flooding in the subsurface, and by employing telemetry that immediately alerts central operations of injection and production problems so that they can be immediately remedied. In saline storage, surface facilities such as these are unnecessary and therefore CO_2 handling is minimal and as a result leakage pathways are even fewer.

Historical data on well blowouts from EOR projects are informative relative to the potential for large volume leakage from geologic carbon storage sites. In practice, well blowouts in EOR have been small in number relative to the total numbers of existing active and inactive wells. Note that in most cases, despite the vivid images of black geysers, a blow-out represents a very rare instance of well failure--not to diminish the direct environmental damage that may ensue from such an event. Porse et. al. (2014) describe a frequency in Texas oil and gas (including CO_2 EOR) of about 0.1%—one in one thousand wells.[4,5] Wells actively undergoing steam injection recovery in California between 1991 and 2004 had a frequency of one in ten thousand. Moreover, the authors of the California study report that the rate of blowouts declined substantially over the study period—most likely as a result of increasing experience, technology, or safety culture, and noted only one poorly located (legacy) well that indicated blow-out over a century of oil drilling and production. A follow-up to the California study suggested that blowouts were most likely early in flooding as the plume edge reaches abandoned legacy wells.[6] As a result, any leakage from abandoned legacy wells is likely to be detected—and resolved—long before the end of the section 45Q credit period or the monitoring, reporting and verification period. Several significant abandoned (legacy) well failures have been reported in the press over the past decade, e.g., Mississippi (2007, 2011), and Texas (2015).[7,8] Although significant environmental damage resulted from the eruption of CO_2-carrying oil brines to the ground surface, no large

volumetric losses of CO_2 were publicly reported. These reported incidents have led to increased industry awareness of poorly plugged legacy wells, and of those that were stripped of their casing to meet World War II demands for scrap iron. One important conclusion from these studies is that blowouts and attendant potential CO_2 losses are greatest and occur principally during injection and/or early in a project, while a field is being actively monitored for injection pressures and conformance.[9]

Natural gas storage safety has been studied extensively and also informs blowout risk. While a partial analog for carbon storage, natural gas storage is different in that the natural gas is commonly injected in the gaseous phase into a cavern or a dry formation—one that does not contain a brine.[10] Typically, CO_2 is easier to extract from a dry formation than from water and the working gas flowing up the well during natural gas withdrawal is not hindered by slow process of desorption from the reservoir or ebullition. Furthermore, many natural gas storage wells were constructed prior to 1980 and were allowed in many regulatory jurisdictions to inject and produce with risky single point loss protection and well construction without redundant gas loss barriers. As a result, injection and storage of CO_2 under UIC Class II or UIC Class VI and using current techniques is substantially less risky than natural gas storage. Furthermore, although the natural gas is not dissolved in the reservoir formation water like CO_2 and the gas may flow much more easily, not all of the previously injected and stored gas can be recovered. It is also important to note that natural gas has intrinsic gaseous properties that make it easier to extract from reservoir rock than supercritical dense phase CO_2, which expands if it is depressurized. Natural gas storage incidents with large volume product loss are very rare.[11] Estimates of well failure probability found in the literature suggest they as uncommon as 10 in a million.[12] In one study, the statistical probability for a major incident from a well failure was found to be 2 in 100,000 per well per year, or once every 49,000 years of well site operation.[13] Only one U.S. incidence since 2009 was found to represent a high level of severity in depleted gas field (Aliso Canyon).[14] A 2017 study modeled the potential loss of CO_2, based on the 2015 Aliso Canyon incident, one of the worst recorded natural gas storage blow-outs in U.S. history, which took 111 days to contain. When modeled as a CO_2 blowout, 57,000 tons of CO_2 would have been lost--less than one-half of one percent of the stored gas. (For context, this is about 5 percent of a 1 million-ton annual injection for a small commercial scale carbon storage project.)[15]

3. Regulatory requirements for selecting and operating a CO_2 injection and storage site

Federal and some state regulatory requirements (e.g., Texas, California, North Dakota)[16,17,18] govern injection of CO_2. Under the Safe Drinking Water Act's Underground Injection and Control Rules, Class II (EOR) and Class VI (saline), injected fluids must be isolated from an underground source of drinking water (USDW) (and therefore isolated from reaching the surface) by a demonstrated geologic confining system.[19] Confining systems are typically made up of thick rock sequences characterized by low-permeability mudrock and shale, salt deposits, or low-permeability carbonate rocks. Confining systems are multi-layered, often with multiple non-transmissive zones. The integrity of the confining system in the area of elevated pressure or buoyant CO_2 must be proven by assessment of any potential leakage paths, such as flawed existing "legacy" wells (where storage is in depleted oil fields) or natural conduits such as transmissive fractures or faults.

Monitoring and verification requirements for projects opting in to storage under the Greenhouse Gas Reporting Program (GHGRP) subpart RR, provide additional assurance that CO2 injected for storage is secure in the subsurface. Current CO_2 utilization and storage projects (suppliers, injectors, and geologic storage operators) reporting under the GHGRP, may be found at: https://www.epa.gov/ghgreporting/capture-supply-and-underground-injection-carbon-dioxide.

In EOR projects, injected CO_2 is produced with oil, captured at a separation and recycle plant and re-injected. Subsurface pressure and CO_2 plume areas are managed by fluid withdrawal during production. Injection wells are surrounded with multiple production wells (e.g., a "five-spot" is an injector well surrounded by four producers at the corners of a square). This means that the "drive" in the subsurface is typically artificially induced and can be shut off by the EOR operator when a pressure drop in the system is reported by the field monitoring system, thereby allowing for well reentry and repair and therefore limiting CO_2 loss and damage to resources. However, heterogeneity in the subsurface formation rock properties can result in transgression of CO_2 outside of the injection and production pattern. Such out-of-pattern migration can result in production of CO_2 by wells in conventional production and lead to loss of CO_2. Out-of-pattern migration may represent an upper bound for loss in EOR geologic storage, because

wells are being actively pumped and pressure maintained by continuous injection. Documentation of such accidental production is not usually available but are well–known and aggressively managed by operators. Several management strategies are used: 1) all the wells in a reservoir are co-operated as a unit, so that no losses will go undetected, and 2) water curtains, a row of water injection wells at project boundaries will limit the movement of the injected CO_2 to within the unit.

Taken together, physics and flow mechanics, experience with and tools for subsurface management of buoyant fluids, combined with regulatory requirements suggest that cases of loss of volumes of CO_2 that would approach the commercial volumes sequestered during a two-year period are highly improbable.

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