

August 3rd, 2020

CC:PA:LPD:PR (REG-112339-19)
Room 5203
Internal Revenue Service
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Submitted Electronically to Federal eRulemaking Portal: IRS-2020-0013-0001

Dear Secretary Mnuchin and Commissioner Rettig:

In addition to the joint comments on proposed regulations regarding the credit for carbon oxide sequestration under section 45Q of the Internal Revenue Code that Environmental Defense Fund is submitting today in conjunction with the Carbon Utilization Research Council, Clean Air Task Force, ClearPath, Oxy Low Carbon Ventures, Shell Oil Company and The Nature Conservancy (“Joint Comments”), EDF also submits these supplemental comments highlighting why it is important for IRS to protect the integrity of the 45Q tax credits. In particular, it is critical that IRS regulations incentivize taxpayers and their project partners to rigorously assure “adequate security measures for the geological storage of qualified carbon oxide...such that the qualified carbon oxide does not escape into the atmosphere,”¹ as required by statute.

Some commenters have suggested the risk of significant CO₂ leakage to the atmosphere is *inherently* low because of geologic trapping mechanisms and existing regulatory requirements. This line of argumentation is not supported by the best scientific evidence, and IRS should disregard it.

Instead, risks of significant leakage *can be made* low through appropriate site selection and characterization, using leading practices for well construction and maintenance, ensuring that no conduits will allow the migration of fluids outside of the storage complex, use of appropriate modelling, monitoring, reporting and verification protocols (including mass balance assessments), and proper closure techniques.² However, the underlying regulations at other

¹ 26 USC 45Q(f)(2).

² See Carbon Dioxide Capture and Storage, Intergovernmental Panel on Climate Change, 2005, Sec. 5.7.3.5, available at https://www.ipcc.ch/site/assets/uploads/2018/03/srccs_wholereport-1.pdf (“For large-scale operational CO₂ storage projects, assuming that sites are well selected, designed, operated and appropriately monitored, the balance of available evidence suggests the following:

- It is very likely the fraction of stored CO₂ retained is more than 99% over the first 100 years.
- It is likely the fraction of stored CO₂ retained is more than 99% over the first 1000 years.”)

The IPCC contemplates that the management that is necessary will include monitoring and verification activities that extend for the life of a project and potentially beyond; see B. Metz et al., *IPCC Special Report: Carbon Dioxide Capture and Storage*, Summary for Policy Makers and Technical Summary, Cambridge

agencies for these activities, on which IRS relies, do not ensure the above practices in every case.

As a result, where gaps exist, the practices that scientists believe are necessary to ensure secure geologic storage *must* be properly incentivized by IRS regulation, absent which CO2 leakage becomes a real possibility, harming the climate while undermining Congressional intent and public trust in the integrity of these tax credits. This is particularly true for projects subject to Class II that rely on CSA/ANSI ISO 27916:19 (“the ISO standard”), since Class II and Subpart UU alone are not sufficient to demonstrate secure geologic storage (as IRS has recognized in the proposed rule,³ and EPA has recognized in Subpart RR). Adherence to the ISO standard is not required by any other regulation unless IRS requires it.

IRS needs to fill this regulatory gap in two ways. First, IRS should focus on robust rules on recapture of credits in the case of leaks. Second, IRS should require annual, qualified independent, third party verification of conformance with the ISO standard for taxpayers electing to use the ISO standard. This is important because underlying regulations relating to that compliance pathway are not designed to prevent CO2 leakage and do not contain adequate reporting. If IRS does not deal robustly with these issues and other issues in our Joint Comments (such as reporting relating by taxpayers who choose the ISO standard option), EDF will withdraw its support for the ISO standard option.

The two issues just mentioned are partially addressed in the Notice of Proposed Rulemaking. EDF’s separately filed Joint Comments provide suggested revisions to help better effectuate the goal of ensuring secure geologic storage, focusing on additional conditions for limitations on credit recapture, reporting transparency, and qualifications for independent third-party certifiers. Building on those Joint Comments, these EDF supplemental comments cover three additional issue areas where IRS should take action: credit recapture period, long-term compliance with the chosen storage protocol, and chronic CO2 leakage.

- 1) EDF recommends that if IRS shortens its proposed five-year lookback period for recapture of credits in the event of qualified carbon oxide leaks to the atmosphere, it should not be shortened to less than three years as defined in our separately filed Joint Comments.

A lookback period sufficient to recover credits claimed and then lost to the atmosphere in catastrophic blowouts is necessary for IRS to meet its statutory duties under 45(Q). In our separately filed Joint Comments, we agree with our Joint Commenters that a three year lookback period (two years plus the year in which leakage occurs) is likely sufficient for this

University Press, New York (2005), *available at* <https://www.ipcc.ch/report/carbon-dioxide-capture-and-storage/>.

³ See generally IRS Proposed Rulemaking: IRS-2020-0013-0001, *Credit for Carbon Oxide Sequestration, Secure Geologic Storage*, 85 FR 34050, at 34054.

purpose, a position consistent with the National Petroleum Council recommendation on the subject.⁴

In the past, some commenters in this docket have advocated a lookback period as short as one year. Based on our reading of the scientific literature and on conversations with leading geoscientists who specialize in carbon sequestration, EDF believes that a recapture period of less than three years would create a material risk that IRS would not be able to recapture the entirety of credits from releases that could happen in a single year.

This review of the literature and those discussions were particularly informed by the Aliso Canyon underground gas storage incident, which can in a general way be considered an analogue for what might happen in a CO₂ storage reservoir. According to the literature, Aliso Canyon lost 6% of its working gas in storage in the space of only four months.⁵ EDF understands that, at the time the blowout was stopped, the rate of releases had not yet begun to decline in a meaningful way. This event should not be thought of as a worst-case scenario, but it provides some idea of how much CO₂ could leak to the atmosphere in the event of a blowout.

Catastrophic blowouts at the Aliso Canyon scale are less rare than one would like, and a circumstance where IRS could not recover credits claimed against carbon oxides released to the atmosphere under such circumstances would be intolerable. A three-year period as defined in EDF's Joint Comments is a reasonable compromise balancing the interests of environmental integrity and public perception against the interests of tax equity investors looking to derisk their assets.

- 2) EDF recommends, consistent with our Joint Comments and a recommendation by the National Petroleum Council, that IRS create an independent, free-standing duty, punishable by significant penalties for the taxpayer, to continue to comply with the ISO EOR Standard for as long as required by that protocol.⁶

In EDF's Joint Comments, we recommend that IRS adopt a provision modeled after recommendation #4 in a recent National Petroleum Council report on CCUS, which calls for conditioning limitations on credit recapture "provided that the taxpayer continues to comply, either directly or by contract, with a Treasury recognized method for demonstrating secure

⁴ National Petroleum Council, *Meeting the Dual Challenge: A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage*, 1 National Petroleum Council Report, Recommendation 4, at 40, available at https://dualchallenge.npc.org/files/CCUS_V1-FINAL.pdf.

⁵ Curtis M. Oldenburg, *Revisiting Underground Gas Storage as a Direct Analogue for Geologic Carbon Sequestration*, 8 Greenhouse Gases: Science and Technology, Feb. 2018, at 4. Available at <https://escholarship.org/content/qt1cm9k74r/qt1cm9k74r.pdf>.

⁶ We note that under the ISO standard, demonstration that storage is secure does not take place until proper termination under Sec 10.4, and in particular (b) provides for "compliance with all well decommissioning and plugging requirements for all CO₂-EOR project wells, that wells do not allow fluid movement out of the EOR complex, and that the CO₂-EOR project wells do not pose a leakage risk." CSA/ANSI ISO 27916:19 §10.4. The standard further provides that termination does not take place until the time that injections cease and wells are plugged. CSA/ANSI ISO 27916:19 §10.5.

geologic storage and has a plan to remediate leaks of CO₂ should they occur.”⁷ In those comments, we describe how IRS can effectuate this recommendation, explain why it is necessary, and describe an appropriate penalty structure for failure to comply.

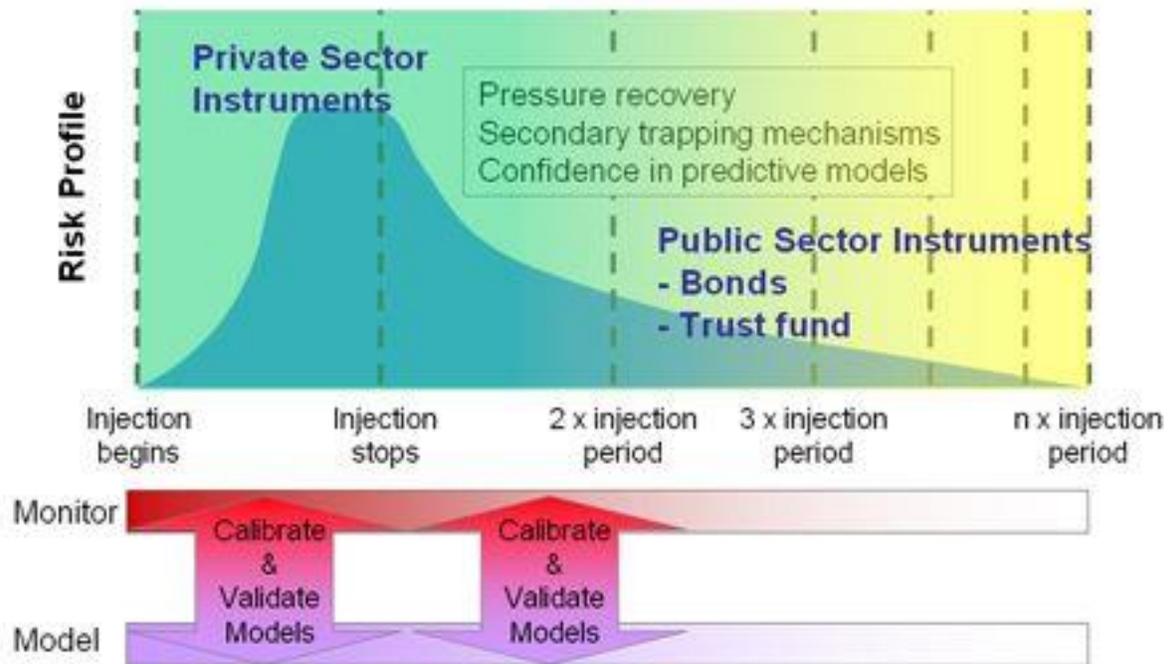
In addition to those Joint Comments, in these supplemental comments, EDF provides additional material for IRS consideration, focused on carbon oxide leakage risks posed by projects outside of the proposed credit reclamation period.

EDF believes such a provision is necessary because, despite the multidecadal lifespan of CCS projects, the proposed regulation only holds taxpayers accountable for leakage that occurs during the twelve years when credits can be claimed plus the length of the lookback period (a total of 17 years in the proposed regulation).⁸ The active lifespan of CCS projects, both saline and CO₂-EOR projects, can extend for decades or more – many of the very first CO₂-EOR projects that began in the 1970s are still in operation. Leakage of qualified carbon oxides for which credit has been claimed can occur outside of the seventeen-year time horizon currently envisaged by the proposed regulation.⁹

⁷ *Id.* at 4.

⁸ IRS Proposed Rulemaking: IRS-2020-0013-0001, *Credit for Carbon Oxide Sequestration*, Secure Geologic Storage. 85 FR 34050, at 34060.

⁹ A robust and longstanding body of literature exists on this topic: see, e.g., Stefan Bachu, *CO₂ Storage in Geological Media: Role, Means, Status and Barriers to Deployment*, 34 *Progress in Energy and Combustion Science*, at 254 (2008); Rick Chalaturnyk and William D. Gunter, *Geological storage of CO₂: Time frames, monitoring, and verification*, *Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies*, at 623 (2005); Jens Birkholzer et al., *Research Project on CO₂ Geological Storage and Groundwater Resources: Large-Scale Hydrological Evaluation and Modeling of the Impact on Groundwater Systems*, NETL Project Annual Report (2008); B. Metz et al., *IPCC Special Report: Carbon Dioxide Capture and Storage*, Summary for Policy Makers and Technical Summary, Cambridge University Press, New York (2005); U.S. EPA, *Vulnerability Evaluation Framework for Geologic Sequestration of Carbon Dioxide*, Technical Support Document, EPA430-R-08-009 (2008).



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In some cases, underlying regulations like Class VI or Class II accompanied by Subpart RR reporting can help control this risk, because these programs have their own independent penalty and enforcement structures for failure to comply. However, no such underlying protections exist for CO₂-EOR projects managed under the voluntary ISO standard unless a competent agency (in this case, the IRS) ensures that procedures for verifying secure storage are followed for as long as the applicable protocol may require.

Absent doing so, the IRS would create a moral hazard by permitting project operators to cease complying with their chosen storage protocol and thus eliminating protections against leakage of credited qualified carbon oxide.

- 3) Consistent with the above comment, EDF recommends that the IRS, in conjunction with DOE and EPA, study the risk of chronic, low-grade, long-term leakage with an eye toward the entire lifespan of projects, and that following such review IRS consider a much longer period in which to recapture credits that have ceased to be disposed of in secure geologic storage.

Existing evidence suggests that chronic, low-grade, long-term leakage of carbon dioxide from geologic sequestration projects, is potentially a material problem.¹¹ The illustrative diagram in

¹⁰ World Resources Institute, *Conceptual Risk Profile for Sequestration*, modified image from Sally Benson, *Addressing Long-Term Liability of Carbon Dioxide Capture and Geological Sequestration*, Workshop Summary, pp 1-10. Available at <https://www.wri.org/resources/charts-graphs/conceptual-risk-profile-sequestration>

¹¹ Stefan Bachu, *CO₂ Storage in Geological Media: Role, Means, Status and Barriers to Deployment*, 34 *Progress in Energy and Combustion Science*, at 254 (2008); Sally Benson et al., *Lessons Learned from Natural and Industrial Analogues for Storage of Carbon Dioxide in Deep Geological Formations*, E.O. Lawrence Berkeley

the previous section indicates that leakage risks run until the carbon dioxide plume is essentially stable, which can take hundreds of years in some cases.¹² Future regulatory action to address this type of leakage probably will be warranted – adjustments could include a significantly longer recapture period, adjusting the accounting protocol from LIFO to FIFO, and/or other appropriate measures.¹³

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EDF appreciates the opportunity to comment on this important docket. Implementing the recommendations in our Joint Comments and in these supplementary comments will help ensure the environmental integrity of tax credits claimed under this program.

Respectfully submitted,

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National Laboratory Earth Sciences Division (2002); A. Paulley *et al.*, *Hypothetical Impact Scenarios for CO2 Leakage from Storage Sites*, 37 *Energy Procedia*, pp 3495-3502 (2013); Julia M. West *et al.*, *Environmental Issues and the Geological Storage of CO2: A Discussion Document*, 15 *European Environment*, pp 250-259 (2005).

¹² *Id.* at 10.

¹³ See generally A. Scott Anderson, *Carbon Sequestration in Oil and Gas Fields (in Conjunction with EOR and Otherwise)*, White Paper for the MIT EOR and Carbon Sequestration Symposium (2010).