



August 3, 2019

**VIA ELECTRONIC SUBMISSION**

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Docket: IRS REG-112339-19

**Re: Credit for Carbon Oxide Sequestration under section 45Q of the Internal Revenue Code**

The Corn Refiners Association (CRA) is pleased to submit these comments in response to the proposed rule issued by the Department of Treasury (“Treasury”) and the Internal Revenue Service (“IRS”) titled *Credit for Carbon Oxide Sequestration*. The corn refining sector has significant capacity to capture, store and utilize carbon dioxide from fermentation and other processes, and welcomes clear tax guidance to incentivize economic investment in carbon capture utilization and storage (“CCUS”) technologies and projects.

A version of these comments was submitted last July when Treasury and the IRS requested initial public comment on amendments to Section 45A of the Internal Revenue Code. The proposed rule does not address or reflect some of the key points included in that submission, so CRA welcomes the opportunity resubmit these comments for consideration as part of the final rule.

**About CRA**

The Corn Refiners Association is the national trade association representing the corn refining industry of the United States. CRA consists of five leading member companies with 27 domestic processing plants located in ten different states.<sup>1</sup> CRA members process approximately 13% of the United States’ corn supply, resulting in \$9.33 billion in value-added revenue. This accounts for 8,000 jobs and impacts an additional 259,000 jobs, with an annual economic impact of \$54 billion. Corn refining is today’s leading example of value-added agriculture. Corn refiners produce sweeteners, starch, bioproducts, corn oil, and feed products from corn components such as starch, protein, and fiber. CRA and its predecessors have served this important segment of American agribusiness since 1913.

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<sup>1</sup> CRA consists of the following member companies: Archer Daniels Midland Company; Cargill, Incorporated; Grain Processing Corporation; Ingredion Incorporated; Roquette America, Inc.; and Tate & Lyle Americas.



## **About Corn Refining**

The corn refining sector utilizes various fermentation processes to convert harvested corn into starch, sugars and a vast array of plant-based products ranging from foods and food ingredients to pharmaceuticals, manufacturing intermediates, and renewable fuels. The use of plant-based products can significantly reduce environmental impacts associated with the use of petrochemical feedstocks. By using more renewable, plant-based materials as building blocks, these products become part of the circular bioeconomy – ultimately returning to the earth’s soil as healthy compost. Taken together, these steps reduce carbon emissions, improve water quality, and curtail solid waste destined for landfills.<sup>2</sup>

The biological processes employed in the fermentation process produce considerable volumes of “biogenic” carbon dioxide from the natural respiration of micro-organisms that convert the grains into starches, oils and sugars. Depending on the particular fermentation unit, by using emissions control equipment and process adjustments, biogenic CO<sub>2</sub> can be captured from some industrial processes and made available for utilization in a variety of end uses. For example, Archer Daniels Midland, a charter CRA member, sponsored the Illinois Basin Decatur Project (“IBDP”) to capture 1,000,000 tons of carbon dioxide from a fermentation process similar to corn refining, and successfully demonstrated the ability to safely sequester the carbon dioxide in geological formations.<sup>3</sup> Carbon dioxide from the corn refining fermentation process produces the same biogenic CO<sub>2</sub>, which can be used in sequestration, enhanced oil recovery or a variety of commercial end-use applications.

Compounding the benefits of CO<sub>2</sub> capture, the biogenic CO<sub>2</sub> from fermentation of agricultural feedstocks such as corn and grains is itself carbon neutral, since the carbon in the agricultural product was captured from the atmosphere through photosynthesis just months earlier when the farmer grew the crop. Accordingly, when biogenic CO<sub>2</sub> is captured from the corn refining process, it actually has a double environmental benefit – the feedstock itself is “negative” carbon because of the natural capture from the

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<sup>2</sup> For more information on the benefits of bioproducts, please visit the Plant Based Products Council website at <https://pbpc.com/>. The Plant Based Products Council is a group of organizations working to guide the global economy toward more sustainable and responsible consumer products and packaging through greater use of plant-based materials. The PBPC also supports and advocates for programs that support the circular bioeconomy.

<sup>3</sup> The IBDP was a collaborative initiative of Archer Daniels Midland Company, the U.S. Department of Energy Office of Fossil Energy, the National Energy Technology Laboratory, the Illinois Industrial Carbon Capture & Storage Project, and Schlumberger Carbon Services.



atmosphere, and when the CO<sub>2</sub> is captured a second time at the industrial facility and either geologically sequestered or beneficially used, the environmental benefit is doubled.

Accordingly, the potential of the corn refining sector to capture and sequester or utilize CO<sub>2</sub> is significant and is exactly the type of greenhouse gas reduction that Congress intended to incentivize with the enhancement to the section 45Q tax credit program. The CRA encourages IRS to adopt clear, timely rules to ensure that Congress' intention to incentive investment in CCUS is fulfilled.

## **I. Background**

Section 45Q was originally enacted by section 115 of the Energy Improvement and Extension Act of 2008, Pub. L. 110-343, 122 Stat. 3829 (Oct. 3, 2008), and amended by section 1131 of the American Recovery and Reinvestment Tax Act of 2009, Pub. L. 111-5, 123 Stat. 306 (Feb. 17, 2009) (“prior section 45Q”). Prior section 45Q(a) provided a credit for carbon dioxide sequestration that was generally available to a taxpayer that captured qualified CO<sub>2</sub> at a qualified facility and disposed of the CO<sub>2</sub> in secure geological storage within the United States. *See* Notice 2009-83, 2009-44 I.R.B. 588, modified by Notice 2011-25, 2011-14 I.R.B. 604. Prior section 45Q(e) limited the tax credit to the period until EPA certified that 75 million metric tons of qualified CO<sub>2</sub> had been taken into account for purposes of the section 45Q credit (the “sunset” provision).

The Bipartisan Budget Act expanded the section 45Q incentive (“new section 45Q”) for taxable years beginning after December 31, 2017. New section 45Q generally provides a tax credit equal to one dollar 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 75 million-ton sunset provision no longer applies to carbon capture equipment placed in service on or after February 9, 2018; instead, section 45Q credits are allowed during a 12-year period.

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

Section 45Q(h) provides that the Secretary of the Treasury 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 the 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 regulation, 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. General Comments on Section 45Q Tax Credit Implementation**

### **A. Need for Certainty**

As noted, some facilities in the corn refining sector may have significant capacity to capture and sequester or beneficially utilize biogenic CO<sub>2</sub>, which creates environmental benefits. However, the investment necessary for carbon capture equipment is considerable, and requires some degree of certainty with respect to eligibility for the section 45Q tax credit.

### **B. New Equipment**

Section 45Q(b)(2), added by the 2018 amendments, establishes different treatment for carbon oxide captured by existing carbon capture equipment, which generally is subject to the pre-2018 tax rules (including the 75-million ton sunset provision), compared to carbon captured by new equipment which is eligible for the tax credit for 12 years.<sup>4</sup> CRA suggests that IRS should adopt a bright-line test to determine when equipment is existing or new, and to apportion the captured CO<sub>2</sub> between existing and new equipment for purposes of the section 45Q credit.<sup>5</sup> The regulations should address scenarios in which additional equipment is added or reconfigured so as to increase carbon capture capacity at a qualified



section 45Q facility. The test should also be applicable to scenarios in which old equipment is removed or replaced by new equipment which may not add capacity, but could extend equipment life, improve capture efficiency, or produce carbon oxide for different commercial uses. In some situations, capture equipment may be rebuilt to an extent that the entire unit could be considered newly placed into service.

One workable approach would be the “80/20” test borrowed from the section 45 renewable energy tax credit program, which has served for many years to define new electric generating equipment for purposes of a similar tax credit program. Under the 80/20 test, equipment is considered newly placed into service if the fair market value of the existing equipment is 20% or less of the total value of the existing and new equipment together. The IRS has issued guidance in Rev. Rul. 94-31, 1994-1 C.B. 16, which provides in key part:

A facility would also qualify as originally placed in service even though it contains some used property, provided the fair market value of the used property is not more than 20 percent of the facility's total value (the cost of the new property plus the value of the used property). Cf. Rev. Rul. 68-111, 1968-1 C.B. 29 (holding that a railroad locomotive was new section 38 property where the cost of used materials and parts was not more than 20 percent of the total cost of materials and parts used in constructing it).

This approach would work equally well in application to section 45Q capture equipment, and would provide needed bright-line clarity that could guide investment decisions and tax accounting associated with carbon oxide capture equipment. For clarity, the implementing regulations should also specify that the total cost should be the cost of the capture equipment only, not the cost of the primary fermentation process equipment or corn refining facility as a whole.<sup>4</sup>

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<sup>4</sup> The most recent IRS Notice 2019-31 states that 62,740,171 MT have been claimed so far; accordingly, it is anticipated that the sunset cap will be reached in fewer than two years.

<sup>5</sup> I.R.C. § 45Q(b) provides in pertinent part (emphasis and annotations added):

“§ 45Q. Credit for carbon oxide sequestration  
\* \* \*

(b) Applicable dollar amount; additional equipment; election. --  
\* \* \*

(2) Installation of additional carbon capture equipment on existing qualified facility. -- In the case of a qualified facility placed in service before the date [Feb. 9, 2018] of the enactment of the Bipartisan Budget Act of 2018 for which additional carbon capture equipment is placed in service on or after the date of the enactment of such Act, the amount of qualified carbon oxide which is captured by the taxpayer shall be equal to—



As an alternative approach for facilities that could not meet the 80/20 test, IRS should allow facilities to allocate captured carbon oxide according to the ratio of old and new equipment that constitutes the capture equipment process (the “pro-rata approach”). Applied to a hypothetical carbon capture project, if there were 10 assets valued at \$1 million that were used to capture carbon and four of the assets with an original cost of \$400,000 were placed in service after the Bipartisan Budget Act of 2018 and six of the assets with an original cost of \$600,000 were placed in service prior to the Bipartisan Budget Act of 2018, then 40% of the carbon captured would be eligible for the new credit computation (*i.e.*, not subject to the sunset cap) and 60% of the carbon captured would be eligible for the old credit computation (subject to the sunset cap).

### C. Definition of Commercial Market

Congress intended section 45Q to incentivize deployment of carbon capture, utilization and storage (CCUS) projects. The credit enables taxpayers to recoup some of the investment for adding carbon capture equipment to their manufacturing processes. New subsection 45Q(f)(5)(A) expands the allowable uses of captured carbon oxide to include “the use of such qualified carbon oxide for any other purpose for which a commercial market exists [except EOR], as determined by the Secretary.”<sup>7</sup> The phrase “commercial market” is not defined in section 45Q, but given the congressional intent to incentivize a broad range of CO<sub>2</sub> uses, IRS should recognize that CO<sub>2</sub> has many existing and potential uses in commercial markets, such as for building products, food production and refrigeration. The Department of Energy has identified

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- (A) for purposes of paragraphs (1)(A) and (2)(A) [capped credits] of subsection (a), the lesser of— (i) the total amount of qualified carbon oxide captured at such facility for the taxable year, or (ii) the total amount of the carbon dioxide capture capacity of the carbon capture equipment in service at such facility on the day before the date of the enactment of the Bipartisan Budget Act of 2018, and
  - (B) for purposes of paragraphs (3)(A) and (4)(A) [uncapped credits] of such subsection, an amount [*i.e.*, headroom over preexisting capture] (not less than zero) equal to the excess of—
    - (i) the amount described in clause (i) [total capture] of subparagraph (A), over
    - (ii) the amount described in clause (ii) [preexisting capture] of such subparagraph.”

<sup>4</sup> As an example, IRS Notice 2008-60, 2008-2 C.B. 178, applied the 80/20 rule in the context of the biomass tax credit, as follows: “Example. A power plant using fossil fuel was originally placed in service before October 22, 2004. The power plant consists of a burner, a boiler, a steam header, a turbine, and a generator. After October 22, 2004, one new burner and boiler using open-loop biomass are added to the power plant. The new burner and boiler are connected to the existing steam header, turbine, and generator in the power plant. Under section 3.01(1) of this notice, the open-loop biomass facility consists of the entire power plant that is operated as a separate integrated unit and includes both the existing power plant and the new burner and boiler. The fair market value of the existing power plant on the date the new burner and boiler are placed in service exceeds 20 percent of the facility’s total value (the cost of the new burner and boiler plus the value of the used property). Under section 3.01(3) of this notice, the facility will not be treated as originally placed in service after October 22, 2004.”



a constellation of CO<sub>2</sub> uses in the following illustrative diagram, and IRS should recognize each of these uses as a valid “use for which a commercial market exists” for purposes of section 45Q without requiring each taxpayer to seek a separate ruling on each particular use.

<sup>7</sup> I.R.C. § 45Q(f)(5) provides in pertinent part (emphasis and annotations added):

“(f) Special rules.

\* \* \*

(5) Utilization of qualified carbon oxide.

(A) In general. For purposes of this section, utilization of qualified carbon oxide means—

- (i) the fixation of such qualified carbon oxide through photosynthesis or chemosynthesis, such as through the growing of algae or bacteria,
- (ii) the chemical conversion of such qualified carbon oxide to a material or chemical compound in which such qualified carbon oxide is securely stored, or
- (iii) the use of 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 enhanced oil or natural gas recovery project), as determined by the Secretary.”

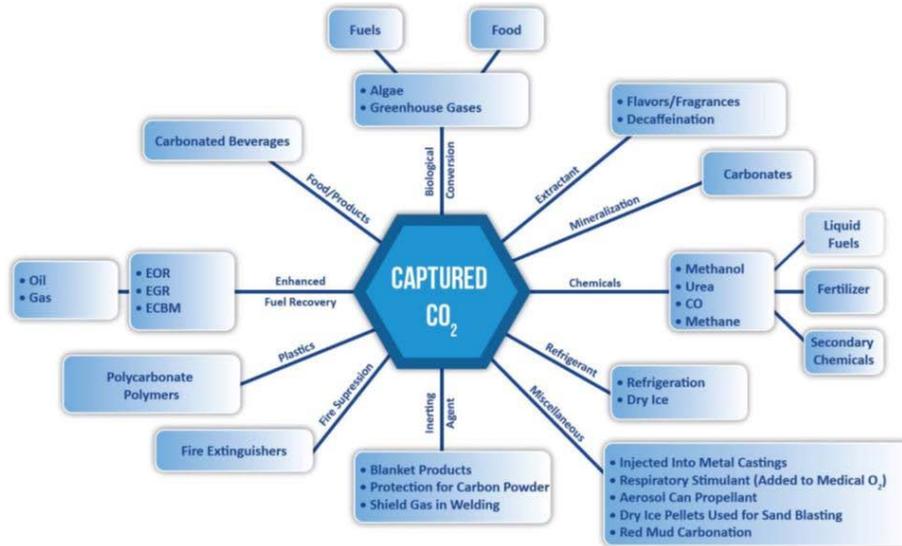


Figure 1 - Congressional Research Service report “Carbon Capture and Sequestration (CCS) in the United States” Fig. 5 (p. 11) (Aug. 9, 2018); citing source: U.S. DOE, National Energy Technology Laboratory, CO<sub>2</sub> Utilization Focus Area, at <https://www.netl.doe.gov/research/coal/carbon-storage/research-and-development/CO2-utilization>.

As one example, a CRA member has a fermentation facility in which the company has installed equipment including CO<sub>2</sub> scrubbers, blowers, and related piping to capture and remove pollutants and impurities from the CO<sub>2</sub>. The pure CO<sub>2</sub> is then piped to the input side of nearby third-party facility which operates a dry ice manufacturing plant. Dry ice is manufactured by compressing the captured CO<sub>2</sub> gas with refrigeration equipment to make dry ice products, which are sold in commercial markets. Gas flow meters are located on the pipes between the fermentation plant’s scrubbers and the refrigeration facility. The meters are connected to a control room and daily reports are generated to monitor the amount of CO<sub>2</sub> being produced and sold to the refrigeration facility. If the refrigeration facility did not use the CO<sub>2</sub> captured from the fermentation facility, the refrigeration facility would have to purchase “natural CO<sub>2</sub>” (that is, carbon dioxide mined from geological formations and newly introduced to the atmosphere) rather than the captured and recycled CO<sub>2</sub> provided by the CRA member.

Using captured CO<sub>2</sub> to displace natural CO<sub>2</sub> used to manufacture dry ice is squarely within Congress’ intent in expanding the credit to commercial uses. This use would seem to qualify as utilization under the section 45Q(f)(5) special rules (*i.e.*, use of qualified CO<sub>2</sub> for a commercial market purpose) based on the measurement rules in section 45Q(f)(5)(B)(i)(II), which expressly recognize displacement of CO<sub>2</sub>. However, there is an interpretative wrinkle in that the measurement rules in section



45Q(f)(5)(B)(i)(II) refer to “qualified carbon oxide [that is] displaced from being emitted into the atmosphere.” While the term “displaced” would seem to refer to other non-captured CO<sub>2</sub> that was displaced by utilization of the captured CO<sub>2</sub>, this provision uses the defined phrase “qualified carbon oxide” which is itself defined in section 45Q(c) as CO<sub>2</sub> that is “captured from an industrial source by carbon capture equipment.” Thus section 45Q(f)(5) can be read as requiring that captured CO<sub>2</sub> (rather than other CO<sub>2</sub>) be displaced – this overly literal reading would create a tautology that does not reflect the intent to incentivize displacement of non-captured CO<sub>2</sub> in commercial uses (*e.g.*, such as using captured CO<sub>2</sub> in cement products to displace kiln process emissions). The IRS should clarify that, when read as a whole in the context of clear Congressional intent, the section 45Q tax credit is available to taxpayers that capture CO<sub>2</sub> from an industrial process and recycle the CO<sub>2</sub> by selling it to commercial end users such as dry ice manufacturing or other commercial market uses in which non-recycled forms of CO<sub>2</sub> are displaced. Similarly, consistent with the statutory language, the regulations should clarify that a ‘capturer’ is entitled to claim a credit even if it is not the ‘commercial user’ of the CO<sub>2</sub> as in the fact pattern presented above.

#### D. Recapture and Displacement

The section 45Q(f)(4) recapture provision requires IRS to clarify by regulation when the incentive must be recaptured where carbon oxide “ceases to be captured, disposed of, or used.”<sup>8</sup> The regulations should clarify that the recapture provisions are not triggered if carbon oxide is subsequently released into the atmosphere in connection with a commercial use in which the captured carbon oxide has displaced the use of natural carbon oxide and provided net environmental benefits as calculated in a lifecycle analysis.

For example, in the case of dry ice manufacturing using CO<sub>2</sub> captured from an industrial fermentation process, the captured CO<sub>2</sub> is eventually released when the dry ice product melts in the normal course of its commercial market use. However, from a lifecycle perspective, less carbon reaches the atmosphere because the dry ice manufacturer would otherwise have used naturally sourced CO<sub>2</sub> from geological reservoirs which would not normally reach the atmosphere if it had not been mined for use in

<sup>8</sup> I.R.C. § 45Q(f)(4) provides in relevant part (emphasis added):

“(f) Special rules.

\* \* \*

(4) Recapture. The Secretary shall, by regulations, provide for recapturing the benefit of any credit allowable under subsection (a) with respect to any qualified carbon oxide which **ceases to be captured, disposed of, or used as a tertiary injectant** in a manner consistent with the requirements of this section.”



the particular commercial product. The overall result of recycling the captured CO<sub>2</sub> ‘byproduct’ at a qualified facility in this environmentally friendly manner is a decrease in global CO<sub>2</sub> emissions, which is precisely the intent of the section 45Q tax credit. In the dry ice example, if the CO<sub>2</sub> from the fermentation process was not recycled, it would be emitted to the atmosphere by the corn refining facility, and at the same time, the dry ice manufacturer would be using geological CO<sub>2</sub> which would also be emitted to the atmosphere when the dry ice evaporated – thus the greenhouse gas emissions would be doubled in a non-recycling scenario. The regulations implementing the section 45Q(f)(4) recapture provisions must recognize this scientific reality.

The Bipartisan Budget Act amendments implicitly recognize this calculation by requiring a lifecycle analysis in section 45Q(f)(5)(B) (amount of credit “based upon an analysis of lifecycle greenhouse gas emissions”).<sup>9</sup> Although congressional intent seems clear, IRS should reinforce the principle that, consistent with Congress’ intent, recapture does not apply to commercial use situations where recycled CO<sub>2</sub> in a commercial product eventually is released but from a lifecycle analysis there is nonetheless a net environmental benefit.

From an interpretative perspective, the section 45Q language is consistent with this reading for two reasons. First, section 45Q(f)(4) applies by its terms only to situations where CO<sub>2</sub> “ceases to be . . . used” when the CO<sub>2</sub> was first used “as a tertiary injectant” in an EOR operation; this clause would not apply literally where the CO<sub>2</sub> was used in a commercial product regardless of whether the CO<sub>2</sub> ultimately ceased to be used since it was not used in EOR. Second, even if recycled CO<sub>2</sub> that is used in a commercial product is eventually released, the CO<sub>2</sub> has still been “used” initially in making the commercial product which displaces other natural CO<sub>2</sub> that would otherwise have been used in the product. Thus, the

<sup>9</sup> I.R.C. § 45Q(f)(5)(B) provides in relevant part (emphasis and annotations added):

“(f) Special rules.

\* \* \*

(5) Utilization of qualified carbon oxide. \*

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(B) Measurement.

(i) In general. For purposes of determining the amount of qualified carbon oxide utilized by the taxpayer under paragraph (2)(B)(ii) or (4)(B)(ii) of subsection (a), such amount shall be equal to the metric tons 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 the Secretary of Energy and the Administrator of the Environmental Protection Agency, determines appropriate, were— (I) captured and permanently isolated from the atmosphere, or (II) **displaced from being emitted into the atmosphere**, through use of a process described in subparagraph (A).”



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language employed by Congress is fully consistent with the intent to promote the use of recycled CO<sub>2</sub> in commercial products. This reading is also consistent with the lifecycle measurement of displacement in section 45Q(f)(5)(B)(i)(II), which indicates that a net displacement of CO<sub>2</sub> from non-captured sources forecloses application of the section 45Q(f)(4) recapture rule.

E. Minimum Quantities.

Section 45Q(d)(2) establishes certain rules for a “qualified facility” by reference to the amount of carbon oxide emitted from the facility.<sup>10</sup> This section identifies three categories of qualified facility: (1) industrial facilities generally that emit less than 500,000 tons; (2) large electric generating facilities; and (3) direct air capture facilities. The provision does not, however, expressly recognize large industrial facilities that emit greater than 500,000 tons. There does not seem to be any policy reason that would exclude large industrial facilities, and the thrust of section 45Q(d)(2) appears to be to require minimum volumes of carbon oxide capture from various facilities, not to exclude any categories of industrial facilities. The IRS regulations should clarify that large industrial facilities are a “qualified facility” for purposes of section 45Q consistent with Congress’ intent to promote carbon capture and utilization, notwithstanding the somewhat obtuse statutory language.

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The Corn Refiners Association, on behalf of its members in the corn refining sector, greatly appreciates this opportunity to comment on these important issues. If you have any questions, please contact me at (202) 331-1634 or JBode@corn.org.

Respectfully submitted,

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