

Analysis of Avenues for Reducing Undepreciated Fossil- Fuel Generation Assets at Retirement



November 30, 2021

Table of Contents

1 Introduction..... 3

2 Forecasted Net Book Values for Baseload Fossil Generating Units..... 4

3 Carbon Capture Technology & Geologic Storage Potential 9

4 Section 45Q Tax Incentives 10

5 Implications of CCS and Section 45Q Tax Incentives..... 12

1 Introduction

On June 30, 2021, the Kentucky Public Service Commission issued orders in Case Nos. 2020-00349 and 2020-00350 with the following requirement for Kentucky Utilities Company (“KU”) and Louisville Gas and Electric Company (“LG&E”) (collectively, the “Companies”):

KU and LG&E shall file by November 30, 2021, a report of KU’s and LG&E’s analysis of the future of LG&E and KU’s fossil-fuel generation, including but not limited to an analysis of avenues to reduce undepreciated assets to protect ratepayers; 45Q tax incentives; and any other government-approved incentives regarding carbon capture, storage and utilization.

The Companies’ analysis is provided in the following sections. In summary, if depreciation rates are adjusted gradually over time consistent with projected retirement dates, the level of undepreciated generation assets at retirement should reflect the cost to remove the assets less salvage value. As they do currently, the Companies will continue to consider planned retirement dates when evaluating future investments to ensure the investments are prudent.¹

Carbon capture and underground storage is not a viable alternative for continuing to operate the Companies’ generation portfolio in its current manner because of the limited amount of geologic storage located near the Companies’ generating stations. Absent a federal mandate to reduce carbon dioxide (“CO₂”) emissions from existing units or a CO₂ tax, carbon capture without storage will only be considered if there is an economic use for a unit’s CO₂ emissions.

Numerous commercial uses exist for CO₂ and section 45Q tax incentives support the economics of capturing and transporting CO₂ to a third party for commercial use. The economics of these activities are very similar to the economics of coal combustion residual (“CCR”) disposal and beneficial use. The Companies are open to commercial opportunities involving CO₂ and have negotiated and managed contracts involving tax incentives. However, given the high cost of carbon capture for coal units, economics likely will not support carbon capture for coal even with tax incentives or regulations requiring the reduction of CO₂ emissions.

¹ For additional information regarding planned unit retirements and potential replacement generation, see the Companies’ 2021 Integrated Resource Plan (Case No. 2021-00393).

2 Forecasted Net Book Values for Baseload Fossil Generating Units

This study includes each of the Companies' baseload fossil generating units. For each of these units, Table 1 lists the unit's planned retirement date, the end of the unit's book depreciation life, and the unit's net book value as of August 31, 2021. In total, the net book value for these units is \$6.4 billion as of August 31, 2021.

Table 1: End of Book Lives for Baseload Fossil Generating Units²

Unit	Planned Retirement Date	End of Book Life	Net Book Value as of August 31, 2021 (\$M) ³
Mill Creek 1 ("MC1")	2024	2032	145
Mill Creek 2 ("MC2")	2028	2034	296
Brown 3 ("BR3")	2028	2035	681
Ghent 1 ("GH1")	2034	2034	367
Ghent 2 ("GH2")	2034	2034	222
Ghent 3 ("GH3")	2037	2037	365
Ghent 4 ("GH4")	2037	2037	1,033
Mill Creek 3 ("MC3")	2039	2039	390
Mill Creek 4 ("MC4")	2039	2039	874
Trimble County 1 ("TC1")	2045	2045	368
Cane Run 7 ("CR7")	2055	2055	461
Trimble County 2 ("TC2")	2066	2066	1,220
Total			6,422

Table 2 contains a forecast of the capital investments necessary to operate each of the units in Table 1 through their planned retirement date. Consistent with the retirements of the Cane Run and Green River coal units, the need for capital investments is assumed to taper in the years immediately prior to a unit's retirement. To recover these investments, depreciation rates will need to be increased gradually over time consistent with the units' projected retirement dates. Table 3 shows the forecasted net book value of the generating units through their planned retirement date with the capital investments in Table 2 and with the assumption that depreciation rates are increased incrementally every five years with no change to projected retirement dates.

² See Exhibit LEB-2 in Case Nos. 2020-00349 and 2020-00350.

³ Net book values include Construction Work in Progress ("CWIP"). However, net book values do not include costs to remove the assets after retirement.

Table 2: Forecasted Capital Investments for Baseload Generating Units (\$M)

Year	MC1	MC2	BR3	GH1	GH2	GH3	GH4	MC3	MC4	TC1	CR7	TC2	Total
2022	0.1	0.3	3.1	7.6	0.8	5.4	68.4	3.8	49.8	3.2	10.6	43.6	196.7
2023	0.0	0.8	1.3	5.3	5.4	14.8	43.3	11.6	18.8	17.0	4.5	26.3	149.1
2024	0.0	0.5	4.9	8.2	11.1	8.2	23.4	3.1	34.0	4.2	35.2	19.3	152.0
2025		0.3	3.3	17.4	2.1	16.8	11.2	12.3	6.7	15.8	12.4	27.5	126.0
2026		0.1	1.6	7.4	10.1	23.2	8.4	9.4	21.8	3.4	13.5	54.3	153.3
2027		0.2	1.3	7.3	32.9	3.8	19.0	30.4	11.4	17.1	1.8	11.6	136.8
2028		0.0	0.0	10.6	2.6	7.0	41.6	3.7	17.3	5.4	29.0	25.1	142.2
2029				21.8	2.9	8.5	25.0	9.4	8.7	31.9	1.2	14.9	124.2
2030				2.0	11.7	8.4	11.3	2.5	28.6	18.9	11.1	33.1	127.6
2031				3.9	3.2	2.6	5.4	11.2	7.8	6.1	2.7	0.8	43.6
2032				0.7	0.4	11.8	10.4	7.7	18.1	13.1	12.8	17.5	92.5
2033				0.2	0.1	10.7	9.4	5.6	13.2	18.2	13.1	17.8	88.3
2034				0.0	0.0	20.0	3.8	5.4	12.7	13.6	13.3	38.9	107.8
2035						1.1	1.0	25.3	11.4	13.9	13.6	18.5	84.9
2036						0.4	0.3	2.0	4.7	14.2	13.9	18.9	54.3
2037						0.0	0.0	0.5	1.2	14.5	14.1	19.3	49.6
2038								0.2	0.4	14.8	14.4	19.7	49.5
2039								0.0	0.0	10.8	14.7	20.1	45.5
2040										10.3	15.0	20.5	45.8
2041										13.6	15.3	20.9	49.8
2042										3.8	15.6	45.6	65.0
2043										1.0	15.9	21.7	38.6
2044										0.3	16.3	22.1	38.7
2045										0.0	16.6	22.6	39.2
2046											16.9	23.0	40.0
2047											17.2	23.5	40.7
2048											17.6	24.0	41.6
2049											12.8	24.5	37.3
2050											12.3	53.4	65.7
2051											11.1	25.4	36.6
2052											4.5	25.9	30.5
2053											1.2	26.5	27.6
2054											0.4	27.0	27.4
2055											0.0	27.5	27.5
2056												28.1	28.1
2057												28.6	28.6
2058												62.6	62.6
2059												29.8	29.8
2060												21.7	21.7
2061												20.9	20.9
2062												18.8	18.8
2063												7.7	7.7
2064												2.0	2.0
2065												0.7	0.7
2066												0.0	0.0

Table 3: End of Year Net Book Value Forecast (\$M)⁴

Year	MC1	MC2	BR3	GH1	GH2	GH3	GH4	MC3	MC4	TC1	CR7	TC2	Total
2021	140	289	666	366	220	360	1,048	391	882	378	459	1,234	6,433
2022	126	265	623	344	201	339	1,046	369	892	361	453	1,243	6,262
2023	111	241	573	320	187	328	1,016	356	855	358	440	1,233	6,017
2024	98	218	526	298	179	310	965	333	835	341	461	1,215	5,777
2025		194	478	287	162	301	899	320	784	336	454	1,205	5,420
2026		170	427	261	152	297	825	304	745	319	450	1,223	5,173
2027		145	377	232	164	271	757	310	693	315	434	1,199	4,898
2028		134	353	204	147	249	716	286	648	300	450	1,188	4,676
2029				190	126	228	653	269	592	311	433	1,167	3,969
2030				152	116	207	574	244	557	308	427	1,164	3,749
2031				109	88	176	481	225	495	289	410	1,127	3,401
2032				55	51	149	387	199	439	276	402	1,106	3,063
2033				0	13	121	290	170	376	268	395	1,084	2,718
2034				(25)	(4)	101	188	141	313	254	387	1,083	2,438
2035						62	82	131	248	240	379	1,062	2,204
2036						8	(35)	91	166	223	370	1,039	1,863
2037						(24)	(95)	45	72	203	361	1,015	1,578
2038								(2)	(23)	182	351	992	1,500
2039								(23)	(67)	157	341	968	1,376
2040										131	331	945	1,407
2041										102	319	920	1,342
2042										57	306	918	1,281
2043										9	293	892	1,193
2044										(40)	279	866	1,104
2045										(63)	265	839	1,041
2046											248	811	1,059
2047											228	780	1,008
2048											207	750	957
2049											181	719	901
2050											154	716	871
2051											119	682	801
2052											70	644	714
2053											17	606	623
2054											(37)	568	531
2055											(62)	530	468
2056												486	486
2057												437	437
2058												420	420
2059												369	369
2060												308	308
2061												233	233
2062												142	142
2063												40	40
2064												(69)	(69)
2065												(179)	(179)
2066												(230)	(230)

Table 4 lists the net book value for each generating unit at the unit’s planned retirement date. Mill Creek 1, Mill Creek 2, and Brown 3 are expected to retire before the end of their book depreciation lives. Consistent with the settlement agreement and the Commission’s orders in Case Nos. 2020-00349 and 2020-00350, the remaining book value for these units will be recovered through the Retired Asset Recovery Rider. For the remaining units, if depreciation rates are adjusted over time to collect future capital required to operate the units through their retirement dates, the net book value for these units at retirement should reflect the cost to remove the assets.⁵

Table 4: Net Book Value at End of Book Lives (\$M)⁴

Unit	Net Book Value at End of Book Life
Mill Creek 1	98
Mill Creek 2	134
Brown 3	353
Ghent 1	-25
Ghent 2	-4
Ghent 3	-24
Ghent 4	-95
Mill Creek 3	-23
Mill Creek 4	-67
Trimble County 1	-63
Cane Run 7	-62
Trimble County 2	-230
Total	-9

The Companies will continue to consider a unit’s planned retirement date when evaluating capital investments to ensure the investments are prudent. As depreciation rates change in the future due to the passage of time and other changes, future capital investments will be evaluated using those updated depreciation rates. For clarity, the Companies’ current practice when evaluating capital investments for Mill Creek 1, Mill Creek 2, and Brown 3 is to use the depreciation rates included in the Companies’ 2020 rate case applications, which reflect shorter service lives than those reflected in the depreciation rates that were ultimately approved in conjunction with the approval of the Retired Asset Recovery Rider.⁶

Section 3 provides an update on carbon capture technology and the potential for geologic CO₂ storage in Kentucky. Section 4 provides a summary of tax incentives available to utilities for storing CO₂ or utilizing CO₂ in commercial markets. Section 5 discusses carbon capture and storage (“CCS”)

⁴ Net book values include CWIP. However, net book values do not include costs to remove the assets after retirement or salvage value.

⁵ Depreciation rates account for a unit’s net book value as well as the cost to dismantle the unit.

⁶ See Case Nos. 2020-00349 and 2020-00350.

and CO₂ tax incentives as means of reducing costs for customers and potentially extending a baseload unit's economic life.

3 Carbon Capture Technology & Geologic Storage Potential

In 2006, LG&E and KU helped found the Carbon Management Resource Group (“CMRG”) at the University of Kentucky to study CCS technology. The research was split into two focus areas: capture and geologic storage. Carbon capture research, which focuses on the chemical process of isolating CO₂, is led by the University of Kentucky Center for Applied Energy Research (“CAER”) with a pilot-scale carbon capture system at E.W. Brown, one of two such systems in operation at power plants in the United States today. Geologic CO₂ storage research is led by the Kentucky Geologic Survey (“KGS”), which is also led by the University of Kentucky.

In 2013, KGS published a detailed report that identified the potential for up to 19 million tons of permanent geologic CO₂ storage near LG&E and KU generating stations.⁷ Because 19 million tons is less than one year of current LG&E and KU CO₂ emissions, geologic storage is not a viable storage alternative for continuing to operate the Companies’ generation portfolio in its current manner. However, geologic storage may be a viable storage alternative for a portfolio with natural gas generation and significant amounts of renewables where natural gas is used to provide power only when solar and wind generation are not available.

Researchers at the University of Kentucky CAER have used the carbon capture system at E.W. Brown to run tests for U.S. Department of Energy-funded research projects. Their work has generated 118 publications and 17 U.S. patents with another four patents pending. One of the current research projects establishes a method of producing hydrogen as a beneficial byproduct from the carbon capture that could in turn be used as fuel for combustion.

Because a natural gas unit emits no sulfur dioxide and has less than half the CO₂ emissions of a coal unit, carbon capture for a natural gas unit requires less capture infrastructure and has much lower parasitic loads. The Electric Power Research Institute (“EPRI”) has deemphasized research on carbon capture for a coal unit because it costs approximately 50% more than carbon capture for a natural gas unit on a dollar per MWh basis. According to EPRI, the cost of carbon capture for a natural gas unit is approximately \$53 per metric ton, and the cost to transport the carbon to a geologic formation or third-party site for commercial use is between \$3 and \$10 per metric ton depending on the transport distance.⁸ Therefore, a reasonable estimate for the cost of carbon capture and transportation is around \$60 per metric ton.

⁷ The 2013 KGS report is located at https://kgs.uky.edu/kgsweb/olops/pub/kgs/CNR1_12.pdf.

⁸ Electric Power Research Institute (EPRI). (2021). (tech.). *Carbon Capture, Transportation, and Storage Cost Study*. Retrieved from <https://www.epri.com/research/products/000000003002022302>.

4 Section 45Q Tax Incentives

Internal Revenue Code (“IRC”) section 45Q allows taxpayers to claim a federal income tax credit based on the amount of qualified carbon oxides (“CO/CO₂”) captured from a qualified facility over a 12-year period that would otherwise be emitted into the atmosphere. Construction on the qualified facility must begin before January 1, 2026, and the 12-year period begins on the date the facility is placed in service. To qualify, the taxpayer must “complete the cycle” of the credit requirements by physically or contractually ensuring the disposal, injection, or utilization of at least 500,000 metric tons of captured CO/CO₂ in a taxable year:

- Disposal: Disposed of in secure geologic storage (e.g., deep saline formations, oil and gas reservoirs, un-minable coal seams);
- Injection: Used as a tertiary injectant in an enhanced oil recovery or natural gas recovery (“EOR”) project, and disposed of in secure geologic storage; or
- Utilization: Utilized in a manner consistent with IRC section 45Q(f)(5), including photosynthesis or chemosynthesis, chemical conversion, or use for any other purpose for which a market exists.

Figure 1 provides a summary of current and potential uses for CO₂. The 45Q tax credit is available for each metric ton of carbon oxide that is captured and secured over the 12-year period. The credit rate increases over time and varies depending on how the taxpayer disposes of the carbon oxides.

Figure 1: Current and Potential CO₂ Uses

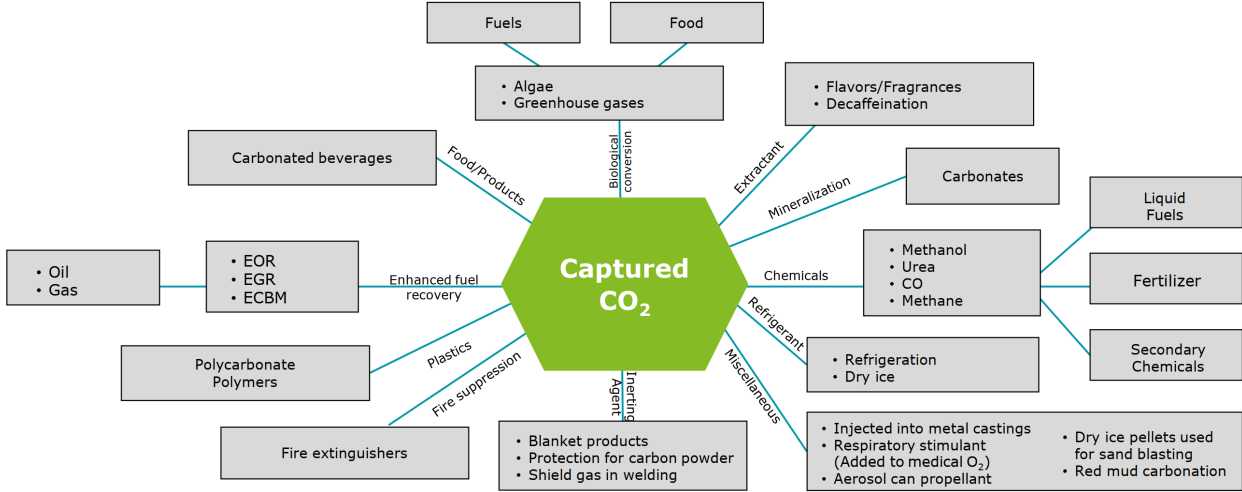


Table 5 contains the annual 45Q tax credits, which were published by the IRS through 2026 in Notice 2018-93. Credits are higher for CO/CO₂ disposed in secure geologic storage than for CO/CO₂ used as an injectant or in a commercial market. Beyond 2026, tax credits will be adjusted for inflation.

Table 5: 45Q Tax Credits (\$/metric ton of CO/CO₂)

Tax Year	CO/CO₂ Disposal in Secure Geologic Storage	CO/CO₂ Used as Injectant or Utilized for Commercial Market
2021	\$34.81	\$22.68
2022	\$37.85	\$25.15
2023	\$40.89	\$27.61
2024	\$43.92	\$30.07
2025	\$46.96	\$32.54
2026	\$50.00	\$35.00

Although, as with other tax credits historically, the tax credits associated with IRC section 45Q could change over time or be extended, certainty in the ability to utilize the tax incentive is necessary before significant investment is undertaken. The Companies will continue to monitor such changes to ensure energy is supplied to customers in the most economical manner. IRC section 45Q and related regulations are discussed in more detail in Appendix A.

5 Implications of CCS and Section 45Q Tax Incentives on Investment Decisions

As discussed previously, disposing of CO₂ in geologic storage is not a viable alternative for continuing to operate the Companies' generation portfolio in its current manner due to the limited amount of geologic storage located near the Companies' generating stations. Absent a federal mandate to reduce CO₂ emissions from existing units or a CO₂ tax, carbon capture without storage will only be considered if there is an economic use for a unit's CO₂ emissions. Numerous commercial uses exist today for CO₂ (see Figure 1), and section 45Q tax incentives reduce the cost of supplying CO₂ to a third party for commercial use. In general terms, to make CCS viable and reduce costs for customers, a third party would have to offer the Companies at least the difference between (a) the cost of carbon capture and transport (approximately \$60 per metric ton for a natural gas unit and more for a coal unit) and (b) the section 45Q tax incentive for carbon captured and used as an injectant or for another commercial use (e.g., \$35 per metric ton in 2026). In many respects, the economics of capturing and transporting CO₂ to a third party for commercial use are similar to the economics of CCR disposal and beneficial use.

The Companies have multiple CCR beneficial use contracts with third parties that use the CCR (e.g., gypsum) to produce other products (e.g., wallboard). In these contracts, a third party pays for the CCR as means of reducing their raw material costs and thereby eliminates the Companies' cost of storing the CCR in an onsite landfill.⁹ Similarly, an agreement involving the beneficial use of CO₂ would likely require a significant investment by a third-party (e.g., fire extinguisher manufacturing facility), and the price paid for CO₂ by the third party considering applicable tax incentives would have to reduce costs for customers. The Companies are open to commercial opportunities like these and have experience with commercial opportunities involving tax credits.¹⁰ However, given the high cost of carbon capture for coal units, economics likely will not support carbon capture for coal even with tax incentives or regulations requiring the reduction of CO₂ emissions.

As an example, Trimble County 2 is the Companies' newest coal unit and is designed for baseload operation with limited load following capabilities. According to the 2013 report by the Kentucky Geologic Survey, approximately 3,500,000 tons of CO₂ could be stored in the 2,192-acre underground geologic formation accessible from the Trimble County Station. Geologic CO₂ storage is not a viable alternative for continuing to operate Trimble County 2 because this volume is less than one year of its CO₂ emissions (~11,600 tons per day). To justify carbon capture for Trimble County 2, a third party would have to invest in facilities capable of utilizing the unit's CO₂ emissions, and the economics of installing carbon capture technology would have to be favorable to other environmental compliance alternatives.

The Companies will continue to monitor and evaluate changes in technology associated with carbon capture to allow for continued operation of the Companies' newer baseload units economically for the benefit of all customers.

⁹ Customers receive all net proceeds from CCR beneficial use contracts.

¹⁰ See discussion of refined coal facilities in Case No. 2015-00264.

§45Q Credit for carbon oxide sequestration.

Internal Revenue Code (RIA)

Internal Revenue Code

§ 45Q Credit for carbon oxide sequestration.

(a) General rule.

For purposes of section 38, the carbon oxide sequestration credit for any taxable year is an amount equal to the sum of-

(1)

\$20 per metric ton of qualified carbon oxide which is-

(A) captured by the taxpayer 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, and

(B) disposed of by the taxpayer in secure geological storage and not used by the taxpayer as described in paragraph (2)(B),

(2)

\$10 per metric ton of qualified carbon oxide which is-

(A) captured by the taxpayer 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, and

(B)

(i) used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and disposed of by the taxpayer in secure geological storage, or

(ii) utilized by the taxpayer in a manner described in subsection (f)(5),

(3)

the applicable dollar amount (as determined under subsection (b)(1)) per metric ton of qualified carbon oxide which is-

(A) captured by the taxpayer 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, during the 12-year period beginning on the date the equipment was originally placed in service, and

(B) disposed of by the taxpayer in secure geological storage and not used by the taxpayer as described in paragraph (4)(B), and

(4)

the applicable dollar amount (as determined under subsection (b)(1)) per metric ton of qualified carbon oxide which is-

(A) captured by the taxpayer 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, during the 12-year period beginning on the date the equipment was originally placed in service, and

(B)

(i) used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and disposed of by the taxpayer in secure geological storage, or

(ii) utilized by the taxpayer in a manner described in subsection (f)(5).

(b) Applicable dollar amount; additional equipment; election.

(1) Applicable dollar amount.

(A) In general. The applicable dollar amount shall be an amount equal to-

(i) for any taxable year beginning in a calendar year after 2016 and before 2027-

(I) for purposes of paragraph (3) of subsection (a), the dollar amount established by linear interpolation between \$22.66 and \$50 for each calendar year during such period, and

(II) for purposes of paragraph (4) of such subsection, the dollar amount established by linear interpolation between \$12.83 and \$35 for each calendar year during such period, and

(ii) for any taxable year beginning in a calendar year after 2026-

(I) for purposes of paragraph (3) of subsection (a) , 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", and

(II) for purposes of paragraph (4) of such subsection, 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".

(B) Rounding. The applicable dollar amount determined under subparagraph (A) shall be rounded to the nearest cent.

(2) Installation of additional carbon capture equipment on existing qualified facility.

In the case of a qualified facility placed in service before the date 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-

(A) for purposes of paragraphs (1)(A) and (2)(A) 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) of such subsection, an amount (not less than zero) equal to the excess of-

(i) the amount described in clause (i) of subparagraph (A), over

(ii) the amount described in clause (ii) of such subparagraph.

(3) Election.

For purposes of determining the carbon oxide sequestration credit under this section, a taxpayer may elect to have the dollar amounts applicable under paragraph (1) or (2) of subsection (a) apply in lieu of the dollar amounts applicable under paragraph (3) or (4) of such subsection for each metric ton of qualified carbon oxide which is captured by the taxpayer 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.

(c) Qualified carbon oxide.

For purposes of this section-

(1) In general.

The term "qualified carbon oxide" means-

(A) any carbon dioxide which-

(i) is captured from an industrial source by carbon capture equipment which is originally placed in service before the date of the enactment of the Bipartisan Budget Act of 2018,

(ii) would otherwise be released into the atmosphere as industrial emission of greenhouse gas 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) any carbon dioxide or other carbon oxide which-

(i) is captured from an industrial source by carbon capture equipment which is originally placed in service on or after the date of the enactment of the Bipartisan Budget Act of 2018,

(ii) would otherwise be released into the atmosphere as industrial emission of greenhouse gas 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 carbon dioxide which-

(i) is 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.

(2) Recycled carbon oxide.

The term "qualified carbon oxide" includes the initial deposit of captured carbon oxide used as a tertiary injectant.

Such term does not include carbon oxide that is recaptured, recycled, and re-injected as part of the enhanced oil and natural gas recovery process.

(d) Qualified facility.

For purposes of this section, the term "qualified facility" means any industrial facility or direct air capture facility-

(1)

the construction of which begins before January 1, 2026, 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

(2)

which captures-

(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, not less than 25,000 metric tons of qualified carbon oxide during the taxable year which is utilized in a manner described in subsection (f)(5),

(B) in the case of an electricity generating facility which is not described in subparagraph (A), 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 subparagraph (A) or (B), not less than 100,000 metric tons of qualified carbon oxide during the taxable year.

(e) Definitions.

For purposes of this section-

(1) Direct air capture facility.

(A) In general. Subject to subparagraph (B), the term "direct air capture facility" means any facility which uses carbon capture equipment to capture carbon dioxide directly from the ambient air.

(B) exception. The term "direct air capture facility" shall not include any facility which captures carbon dioxide-

(i) which is deliberately released from naturally occurring subsurface springs, or

(ii) using natural photosynthesis.

(2) Qualified enhanced oil or natural gas recovery project.

The term "qualified enhanced oil or natural gas recovery project" has the meaning given the term "qualified enhanced oil recovery project" by section 43(c)(2), by substituting "crude oil or natural gas" for "crude oil" in subparagraph (A)(i) thereof.

(3) Tertiary injectant.

The term "tertiary injectant" has the same meaning as when used within section 193(b)(1).

(f) special rules.

(1) Only qualified carbon oxide captured and disposed of or used within the United States taken into account.

The credit under this section shall apply only with respect to qualified carbon oxide the capture and disposal, use, or utilization of which is within-

(A) the United States (within the meaning of section 638(1)), or

(B) a possession of the United States within the meaning of section 638(2)).

(2) Secure geological storage.

The Secretary, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, and the Secretary of the Interior, shall establish regulations for determining adequate security measures for the geological storage of qualified carbon oxide under subsection (a) such that the qualified carbon oxide does not escape into the atmosphere. Such term shall include storage at deep saline formations, oil and gas reservoirs, and unminable coal seams under such conditions as the Secretary may determine under such regulations.

(3) Credit attributable to taxpayer.

(A) In general. Except as provided in subparagraph (B) or in any regulations prescribed by the Secretary, any credit under this section shall be 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.

(B) Election. If the person described in subparagraph (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 subparagraph (A).

Caution: Ed. Note: HR9684, d.o.e., added an additional para. (f)(3) to Code Sec. 45Q, effective for obligations issued after 12/31/2021. See below.

(3) Credit reduced for certain tax-exempt bonds.

The amount of the credit determined under subsection (a) with respect to any project for any taxable year shall be reduced by the amount which is the product of the amount so determined for such year and the lesser of $\frac{1}{2}$ or a fraction-

(A) the numerator of which is the sum, for the taxable year and all prior taxable years, of the proceeds from an issue described in section 142(a)(17) used to provide financing for the project the interest on which is exempt from tax under section 103 , and

(B) the denominator of which is the aggregate amount of additions to the capital account for the project for the taxable year and all prior taxable years.

The amounts under the preceding sentence for any taxable year shall be determined as of the close of the taxable year.

(4) Recapture.

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.

(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.

(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).

(ii) Lifecycle greenhouse gas emissions. For purposes of clause (i), 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 the date of the enactment of the Bipartisan Budget Act of 2018, except that "product" shall be substituted for "fuel" each place it appears in such subparagraph.

(6) Election for applicable facilities.

(A) In general. For purposes of this section, in the case of an applicable facility, 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 described in paragraph (3)(A)(ii) 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 the date of the enactment of the Bipartisan Budget Act of 2018.

(B) Applicable facility. For purposes of this paragraph, the term "applicable facility" means a qualified facility-

(i) which was placed in service before the date of the enactment of the Bipartisan Budget Act of 2018, and

(ii) for which no taxpayer claimed a credit under this section in regards to such facility for any taxable year ending before the date of the enactment of such Act.

(7) Inflation adjustment.

In the case of any taxable year beginning in a calendar year after 2009, there shall be substituted for

each dollar amount contained in paragraphs (1) and (2) of subsection (a) an amount equal to the product of-

(A) such dollar amount, multiplied by

(B) the inflation adjustment factor for such calendar year determined under section 43(b)(3)(B) for such calendar year, determined by substituting "2008" for "1990".

(g) Application of section for certain carbon capture equipment.

In the case of any carbon capture equipment placed in service before the date of the enactment of the Bipartisan Budget Act of 2018, the credit under this section shall apply with respect to qualified carbon oxide captured using such equipment before the end of the calendar year in which the Secretary, in consultation with the Administrator of the Environmental Protection Agency, certifies that, during the period beginning after October 3, 2008, a total of 75,000,000 metric tons of qualified carbon oxide have been taken into account in accordance with-

(1)

subsection (a) of this section, as in effect on the day before the date of the enactment of the Bipartisan Budget Act of 2018, and

(2)

paragraphs (1) and (2) of subsection (a) of this section.

(h) Regulations.

The Secretary may prescribe such regulations and other guidance as may be necessary or appropriate to carry out this section, including regulations or other guidance to-

(1)

ensure proper allocation under subsection (a) for qualified carbon oxide captured by a taxpayer during the taxable year ending after the date of the enactment of the Bipartisan Budget Act of 2018, and

(2)

determine whether a facility satisfies the requirements under subsection (d)(1) during such taxable year.

(Reg Caution) Reg §1.45Q-0 Table of Contents.

Final, Temporary & Proposed Treasury Regulations (RIA)

Federal Regulations

Reg § 1.45Q-0. Table of Contents.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

This section lists the captions contained in §§1.45Q-1 through 1.45Q-5.

§1.45Q-1 Credit for Carbon Oxide Sequestration.

(a) In general.

(b) Credit amount for carbon capture equipment originally placed in service before February 9, 2018.

(1) In general.

(2) Inflation adjustment.

(c) Credit amount for carbon capture equipment originally placed in service on or after February 9, 2018.

(d) Applicable dollar amount.

(1) Applicable dollar amount for any taxable year beginning in a calendar year after 2016 and before 2027 for qualified carbon oxide not used as a tertiary injectant or utilized.

(2) Applicable dollar amount for any taxable year beginning in a calendar year after 2026 for qualified carbon oxide not used as a tertiary injectant or utilized.

(3) Applicable dollar amount for any taxable year beginning in a calendar year after 2016 and before 2027 for qualified carbon oxide used as a tertiary injectant or utilized.

(4) Applicable dollar amount for any taxable year beginning in a calendar year after 2026 for qualified carbon oxide used as a tertiary injectant or utilized.

(e) Election to apply the \$10 and \$20 credit amounts in lieu of the applicable dollar amounts.

(f) Application of section 45Q for certain carbon capture equipment placed in service before February 9, 2018.

(g) Installation of additional carbon capture equipment.

(1) Allocation of section 45Q credits for facilities installing additional carbon capture equipment.

(2) Additional carbon capture equipment.

(3) New carbon capture equipment.

(4) Examples.

(i) Example 1.

(ii) Example 2.

(iii) Example 3.

(h) Eligibility for the section 45Q credit.

(1) Person to whom the section 45Q credit is attributable.

(i) Equipment placed in service before February 9, 2018.

(ii) Equipment placed in service on or after February 9, 2018.

(iii) Reporting.

(2) Contractually ensuring capture and disposal, injection, or utilization of qualified carbon oxide.

(i) Binding written contract.

(ii) Multiple binding written contracts permitted.

(iii) Contract provisions.

(iv) Pre-existing contracts.

(v) Reporting of contract information.

(vi) Relationship with election to allow section 45Q credit.

(3) Election to allow the section 45Q credit to another taxpayer.

(i) Example.

(ii) Time and manner of making election.

(iii) Annual election.

(iv) Required information.

(v) Requirements for section 45Q credit claimant.

(vi) Failure to satisfy reporting requirements.

(i) Applicability date.

§1.45Q-2 Definitions for Purposes of §§1.45Q-1 through 1.45Q-5.

(a) Qualified carbon oxide.

(b) Recycled carbon oxide.

(c) Carbon capture equipment.

(1) Use of carbon capture equipment.

(2) Carbon capture equipment components.

(3) Single process train.

(d) Industrial facility.

(1) Exclusion.

(2) Industrial source.

(3) Manufacturing process.

(4) Examples.

(i) Example 1.

(ii) Example 2.

(e) Electricity generating facility.

(f) Direct air capture facility.

(g) Qualified facility.

(1) Emissions and capture requirements.

(2) Examples.

(i) Example 1.

(ii) Example 2.

(iii) Example 3.

(iv) Example 4.

(v) Example 5.

(3) Annualization of first-year and last-year qualified carbon oxide emission and/or capture amounts.

(i) In general.

(ii) Calculation.

(iii) Consequences.

(4) Election for applicable facilities.

(i) Applicable facility.

(ii) Time and manner of making election.

(iii) Retroactive credit revocations.

(5) Retrofitted qualified facility or carbon capture equipment (80/20 Rule).

(h) Qualified enhanced oil or natural gas recovery project.

(1) Application of §§1.43-2 and 1.43-3.

(2) Required certification.

(3) Natural gas.

(4) Timely filing of petroleum engineer's certification.

(5) Carbon oxide injected in oil reservoir.

(6) Tertiary injectant.

(i) Section 45Q credit.

(j) Form 8933.

(k) Applicability date.

§1.45Q-3 Secure Geological Storage.

(a) In general.

(b) Requirements for secure geological storage.

(c) Documentation.

(d) Certification.

(e) Failure to submit complete documentation or certification.

(f) Applicability date.

§1.45Q-4 Utilization of Qualified Carbon Oxide.

(a) In general.

(b) Amount utilized.

(1) In general.

(2) Limitation.

(c) Lifecycle greenhouse gas emissions and lifecycle analysis
(LCA).

(1) In general.

(2) LCA verification.

(3) Standards of adequate lifecycle analysis.

(4) Third-party independent review of LCA.

(5) Submission of the LCA.

(6) LCA review.

(d) Commercial market.

(e) Applicability date.

§1.45Q-5 Recapture of Credit.

(a) Recapture event.

(b) Ceases to be disposed of in secure geological storage or used as a tertiary injectant.

(c) Leaked amount of qualified carbon oxide.

(d) Qualified carbon oxide subject to recapture.

(e) Recapture amount.

(f) Recapture period.

(g) Application of recapture.

- (1) In general.
- (2) Calculation.
- (3) Multiple units.
- (4) Multiple taxpayers.
 - (i) In general.
 - (ii) Partnerships.
 - (A) General rule.
 - (B) Terminated partnerships.
 - (5) Reporting.
 - (6) Examples.
 - (i) Example 1.
 - (ii) Example 2.
 - (iii) Example 3.
 - (iv) Example 4.
 - (v) Example 5.
 - (vi) Example 6.
 - (h) Recapture in the event of deliberate removal from storage.
- (1) In general.
- (2) Recycled qualified carbon oxide.
 - (i) Limited exceptions.
 - (j) Applicability date.

T.D. 9944, 1/13/2021 .

(Reg Caution) Reg §1.45Q-1 Credit for Carbon Oxide Sequestration.

Final, Temporary & Proposed Treasury Regulations (RIA)

Federal Regulations

Reg § 1.45Q-1. Credit for Carbon Oxide Sequestration.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

(a) In general. For purposes of section 38 of the Internal Revenue Code (Code), the carbon oxide sequestration credit is determined under section 45Q of the Code and this section (section 45Q credit). Generally, the amount of the section 45Q credit and the party that is eligible to claim the credit depend on whether the taxpayer captures qualified carbon oxide using carbon capture equipment originally placed in service at a qualified facility before February 9, 2018, or on or after February 9, 2018, and whether the taxpayer disposes of the qualified carbon oxide in secure geological storage without using it as a tertiary injectant in a qualified enhanced oil or natural gas recovery project (disposal), uses it as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and disposes of it in secure geological storage (injection), or utilizes it in a manner described in section 45Q(f)(5) and §1.45Q-4 (utilization). The section 45Q credit applies only with respect to qualified carbon oxide the capture and disposal, injection, or utilization of which is within the United States (within the meaning of section 638(1) of the Code) or a possession of the United States (within the meaning of section 638(2)).

(b) Credit amount for carbon capture equipment originally placed in service before February 9, 2018.

(1) In general. For carbon capture equipment originally placed in service at a qualified facility before February 9, 2018, the amount of credit determined under section 45Q(a) and this section is the sum of-

(i) \$20 per metric ton of qualified carbon oxide that is-

(A) Captured by the taxpayer at the qualified facility and disposed of by the taxpayer in secure geological storage, and

(B) Not used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project or utilized by the taxpayer in a manner described in section 45Q(f)(5) and §1.45Q-4, and

(ii) \$10 per metric ton of qualified carbon oxide that is--

(A) Captured by the taxpayer at the qualified facility and used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, and disposed of by the taxpayer in secure geological storage, or

(B) Captured by the taxpayer at the qualified facility and utilized by the taxpayer in a manner described in section 45Q(f)(5) and §1.45Q-4.

(2) *Inflation adjustment.* In the case of any taxable year beginning in a calendar year after 2009, there is substituted for each dollar amount contained in paragraphs (b)(1)(i) and (ii) of this section an amount equal to the product of--

(i) Such dollar amount, multiplied by

(ii) The inflation adjustment factor for such calendar year determined under section 43(b)(3)(B) for such calendar year, determined by substituting "2008" for "1990."

(c) Credit amount for carbon capture equipment originally placed in service on or after February 9, 2018. For carbon capture equipment originally placed in service at a qualified facility on or after February 9, 2018, the amount of credit determined under section 45Q(a)(3) and (4) and this section is the sum of--

(1) The applicable dollar amount (as determined under paragraph (d)(1) and (2) of this section) per metric ton of qualified carbon oxide that is captured during the 12-year period beginning on the date the equipment was originally placed in service, and is--

(i) Disposed of by the taxpayer in secure geological storage, and

(ii) Not used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project or utilized by the taxpayer in a manner described in section 45Q(f)(5) and §1.45Q-4; and

(2) The applicable dollar amount (as determined under paragraph (d)(3) and (4) of this section) per metric ton of qualified carbon oxide that is captured during the 12-year period beginning on the date the equipment was originally placed in service and is--

(i) Used by the taxpayer as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and disposed of by the taxpayer in secure geological storage, or

(ii) Utilized by the taxpayer in a manner described in section 45Q(f)(5) and §1.45Q-4.

(d) Applicable dollar amount. In general, the applicable dollar amount depends on whether section 45Q(a)(3) and paragraph (c)(1) of this section applies or section 45Q(a)(4) and paragraph (c)(2) of this section applies, and the calendar year in which the taxable year begins.

(1) Applicable dollar amount for any taxable year beginning in a calendar year after 2016 and before 2027 for qualified carbon oxide not used as a tertiary injectant or utilized. For purposes of section 45Q(a)(3) and paragraph (c)(1) of this section, the applicable dollar amount for each taxable year beginning in a calendar year after 2016 and before 2027 is:

Table 1 to Paragraph (d)(1)

Year	Applicable dollar amount
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

(2) Applicable dollar amount for any taxable year beginning in a calendar year after 2026 for qualified carbon oxide not used as a tertiary injectant or utilized. For purposes of section 45Q(a)(3) and paragraph (c)(1) of this section, the applicable dollar amount for any taxable year beginning in any calendar year after 2026 is an amount equal to the product of \$50 and the inflation adjustment factor for the calendar year determined under section 43(b)(3)(B) for the calendar year, determined by substituting "2025" for "1990."

(3) *Applicable dollar amount for any taxable year beginning in a calendar year after 2016 and before 2027 for qualified carbon oxide used as a tertiary injectant or utilized.* For purposes of section 45Q(a)(4) and paragraph (c)(2) of this section, the applicable dollar amount for each taxable year beginning in a calendar year after 2016 and before 2027 is:

Table 2 to Paragraph (d)(3)

Year	Applicable dollar amount
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

(4) *Applicable dollar amount for any taxable year beginning in a calendar year after 2026 for qualified carbon oxide used as a tertiary injectant or utilized.* For purposes of section 45Q(a)(4) and paragraph (c)(2) of this section, the applicable dollar amount for any taxable year beginning in any calendar year after 2026, is 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."

(e) Election to apply the \$10 and \$20 credit amounts in lieu of the applicable dollar amounts. For purposes of determining the carbon oxide sequestration credit under this section, a taxpayer may elect to have the dollar amounts applicable under section 45Q(a)(1) or (2) and paragraph (b) of this section apply in lieu of the dollar amounts applicable under section 45Q(a)(3) or (4) and paragraph (d) of this section for each metric ton of qualified carbon oxide which is captured by the taxpayer using carbon capture equipment which is originally placed in service at a qualified facility on or after February 9, 2018. The election must be made on a Form 8933 (as defined in §1.45Q-2(j)), and applies to all metric tons of qualified carbon oxide captured by the taxpayer using carbon capture equipment which is originally placed in service at the qualified facility throughout the full 12-year credit period.

(f) Application of section 45Q for certain carbon capture equipment placed in service before February 9, 2018. In the case of any carbon capture equipment placed in service before February 9, 2018, the credits under section 45Q(a)(1) and (2) and paragraph (b)(1)(i) and (ii) of this section apply with respect to qualified carbon oxide captured using such equipment before the end of the calendar year in which the Secretary of the Treasury or his delegate, in consultation with the Administrator of the Environmental Protection Agency (EPA), certifies that, during the period beginning after October 3, 2008, a total of 75,000,000 metric tons of qualified carbon oxide have been taken into account in accordance with section 45Q(a), as in effect on February 8, 2018, and section 45Q(a)(1) and (2). In general, a taxpayer may not claim credits under section 45Q(a)(1) and (2) in taxable years after the year in which the 75,000,000 metric ton limit is certified with respect to carbon capture equipment placed in service before February 9, 2018. However, see §1.45Q-2(g)(4) regarding the election for applicable facilities to treat certain carbon capture equipment as having been placed in service on February 9, 2018 (section 45Q(f)(6) election).

(g) Installation of additional carbon capture equipment. In general, the credit amounts for property placed in service before February 9, 2018, apply to a qualified facility at which carbon capture equipment was placed in service before February 9, 2018, subject to the limitations under paragraph (f) of this section. The same qualified facility may place additional carbon capture equipment in service on or after February 9, 2018. The additional carbon capture equipment is eligible to qualify for the section 45Q credit amounts for equipment placed in service on or after February 9, 2018.

(1) Allocation of section 45Q credits for facilities installing additional carbon capture equipment. In the case of a qualified facility placed in service before February 9, 2018, for which additional carbon capture equipment is placed in service on or after February 9, 2018, the amount of qualified carbon oxide which is captured by the taxpayer is equal to--

(i) For purposes of section 45Q(a)(1)(A) and (2)(A), and paragraphs (b)(1)(i) and (ii) of this section, the lesser of the total amount of qualified carbon oxide captured at such facility for the taxable year, or the total amount of the carbon dioxide capture capacity of the carbon capture equipment in service at such facility on February 8, 2018, and

(ii) For purposes of section 45Q(a)(3)(A) and (4)(A), and paragraphs (c)(1) and (2) of this section, an amount (not less than zero) equal to the excess of the total amount of qualified carbon oxide captured at such facility for the taxable year, over the total amount of the carbon dioxide capture capacity of the carbon capture equipment in service at such facility on February 8, 2018.

(2) Additional carbon capture equipment. A physical modification or equipment addition that results in an increase in the carbon dioxide capture capacity of existing carbon capture equipment constitutes the installation of additional carbon capture equipment. Increasing the amount of carbon dioxide

captured without physically modifying existing carbon capture equipment or adding new equipment, for example, by merely operating the existing carbon capture equipment above the carbon dioxide capture capacity, does not constitute the installation of additional carbon capture equipment. For purposes of this section, the term carbon dioxide capture capacity means capture design capacity. Section 45Q credits attributable to qualified carbon oxide captured by additional carbon capture equipment that is placed in service on or after February 9, 2018, are not subject to the 75,000,000 metric ton limitation described in section 45Q(g) and paragraph (f) of this section.

(3) *New carbon capture equipment.* A physical modification or equipment addition with a cost that satisfies the 80/20 Rule provided in §1.45Q-2(g)(5) constitutes the installation of new carbon capture equipment rather than the installation of additional carbon capture equipment.

(4) *Examples.* The following examples illustrate the rules of this paragraph (g):

(i)

Example (1). Taxpayer X owns qualified facility QF. In 2017, X placed in service three units of carbon capture equipment-CC1, CC2, and CC3-to capture carbon dioxide emitted by QF. Each of CC1, CC2, and CC3 are capable of capturing 50,000 metric tons of carbon dioxide. In 2017, X entered into a binding written contract with Y to provide 80,000 metric tons of carbon dioxide annually for Y to dispose of in secure geological storage. X operates CC1 and CC2 to capture carbon dioxide pursuant to the binding written contract with Y, leaving CC3 idle. In 2020, X enters into a binding written contract with Z to provide 40,000 metric tons of carbon dioxide annually for Z to dispose of in secure geological storage. X operates CC3 to capture carbon dioxide pursuant to the binding written contract with Z. CC3 is not additional carbon capture equipment under paragraph (g)(2) of this section simply because it began operating CC3 in 2020. X merely increased the amount of carbon dioxide captured by existing carbon capture equipment. As a result, any section 45Q credits attributable to the carbon dioxide captured by CC3 and disposed of by Z are calculated under section 45Q(a)(1) and paragraph (b)(1)(i) of this section, and are subject to the 75,000,000 metric ton limitation described in section 45Q(g) and paragraph (f) of this section.

(ii)

Example (2). Assume the same facts as in Example 1, except that in 2019, X physically modified CC3 to enable CC3 to capture 100,000 metric tons of carbon dioxide. The physical modification to upgrade CC3 does not satisfy the 80/20 Rule in §1.45Q-2(g)(5). In 2020 X enters into a binding written contract with Z to provide 80,000 metric tons of carbon dioxide annually for Z to dispose of in secure geological storage. X operates CC3 to capture carbon dioxide pursuant to the binding written contract with Z. Because the physical modification to upgrade CC3 does not satisfy the 80/20 Rule, the physical modification to upgrade CC3 is considered the installation of additional carbon capture equipment under paragraph (g)(2) of this section, rather than new carbon capture equipment under

paragraph (g)(3) of this section. As a result, any section 45Q credits attributable to the first 50,000 metric tons of carbon dioxide captured by CC3 and disposed of by Z are calculated under section 45Q(a)(1) and paragraph (b)(1)(i) of this section, and are subject to the 75,000,000 metric ton limitation described in section 45Q(g) and paragraph (f) of this section. Any section 45Q credits attributable to additional carbon dioxide captured by CC3 and disposed of by Z in excess of those first 50,000 metric tons are calculated under section 45Q(a)(4) and paragraph (c)(2) of this section, and are not subject to the 75,000,000 metric ton limitation described in section 45Q(g) and paragraph (f) of this section.

(iii)

Example (3). Assume the same facts as in Example 2, except that the physical modification to CC3 satisfies the 80/20 Rule in §1.45Q-2(g)(5). The physical modification to CC3 is considered the installation of new carbon capture equipment under paragraph (g)(3) of this section. As a result, any section 45Q credits attributable to carbon dioxide captured by CC3 and disposed of by Z are calculated under section 45Q(a)(4) and paragraph (c)(2) of this section, and are not subject to the 75,000,000 metric ton limitation described in section 45Q(g) and paragraph (f) of this section.

(h) Eligibility for the section 45Q credit. The following rules determine who may claim the section 45Q credit.

(1) Person to whom the section 45Q credit is attributable. In general, the person to whom the credit is attributable is the person who may claim the credit. Except as provided in paragraph (h)(3) of this section, the section 45Q credit is attributable to the following persons -

(i) Equipment placed in service before February 9, 2018. In the case of qualified carbon oxide captured using carbon capture equipment that is originally placed in service at a qualified facility before February 9, 2018, the section 45Q credit is attributable to the person that captures and physically or contractually ensures the disposal, injection, or utilization of such qualified carbon oxide.

(ii) Equipment placed in service on or after February 9, 2018. In the case of qualified carbon oxide captured using carbon capture equipment that is originally placed in service at a qualified facility on or after February 9, 2018, the section 45Q credit is attributable to the person that owns the carbon capture equipment and physically or contractually ensures the capture and disposal, injection, or utilization of such qualified carbon oxide. For each single process train of carbon capture equipment (as described in §1.45Q-2(c)(3)), only one taxpayer will be considered the person to whom the credit is attributable under this paragraph (h)(1)(ii). That person will be the taxpayer who either physically ensures the capture and disposal, injection, or utilization of such qualified carbon oxide or contracts with others to capture and dispose, inject, or utilize such qualified carbon oxide.

(iii) Reporting. The taxpayer described in this paragraph (h)(1) as eligible to claim the section 45Q credit must claim the credit on a Form 8933, "Carbon Dioxide Sequestration Credit," with the taxpayer's Federal income tax return or Form 1065, "U.S. Return of Partnership Income," for each taxable year for which the taxpayer is eligible. The taxpayer must provide the name and location of the qualified facilities at which the qualified carbon oxide was captured. If the taxpayer is claiming the section 45Q credit on an amended Federal income tax return, an amended Form 1065, or an administrative adjustment request under section 6227 (AAR), as applicable, the taxpayer must state AMENDED RETURN FOR SECTION 45Q CREDIT at the top of the amended Federal income tax return, the amended Form 1065, or the AAR, as applicable. The amended Federal income tax return or the amended Form 1065 must be filed, in any event, not later than the applicable period of limitations on filing an amended Federal income tax return or Form 1065 is being filed. A BBA partnership may make a late election by filing an AAR on or before October 15, 2021, but in any event, not later than the period of limitations on filing an AAR under section 6227(c).

(2) Contractually ensuring capture and disposal, injection, or utilization of qualified carbon oxide. 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, a taxpayer is not required to physically carry out the capture and disposal, injection, or utilization of qualified carbon oxide to claim the section 45Q credit if the taxpayer contractually ensures in a binding written contract that the party that physically carries out the capture, disposal, injection, or utilization of the qualified carbon oxide does so in the manner required under section 45Q, this section and §§1.45Q-2, 1.45Q-3, 1.45Q-4, and 1.45Q-5. A taxpayer may enter into a binding written contract with a general contractor that hires subcontractors to physically carry out the capture, disposal, injection, or utilization of the qualified carbon oxide, but the contract must bind the subcontractors to the requirements of this paragraph (h)(2). 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, a taxpayer that contractually ensures the capture of the qualified carbon oxide is not eligible for the section 45Q credit. However, the taxpayer is not required to physically carry out the disposal, injection, or utilization of qualified carbon oxide to claim the section 45Q credit if the taxpayer contractually ensures in a binding written contract that the party that physically carries out the disposal, injection, or utilization of the qualified carbon oxide does so in the manner required under section 45Q, this section, and §§1.45Q-2, 1.45Q-3, 1.45Q-4, and 1.45Q-5.

(i) Binding written contract. A written contract is binding only if it is enforceable under State law against both the taxpayer and the party that physically carries out the capture, disposal, injection, or utilization of the qualified carbon oxide, or a predecessor or successor of either, and does not limit damages to a specified amount (for example, by use of a liquidated damages provision). For this purpose, a contractual provision that limits damages to an amount equal to at least five percent of the total contract price will not be treated as limiting damages to a specified amount. For additional guidance regarding the definition of a binding written contract, see §1.168(k)-1(b)(4)(ii)(A)-(D).

(ii) Multiple binding written contracts permitted. A taxpayer may enter into multiple binding written contracts with multiple parties for the capture, disposal, injection, or utilization of qualified carbon oxide. A party that physically carries out the capture, disposal, injection, or utilization of qualified carbon oxide may enter into multiple binding written contracts with multiple parties that own carbon capture equipment or capture or contractually ensure the capture of qualified carbon oxide.

(iii) Contract provisions. Contracts ensuring the capture, disposal, injection, or utilization of qualified carbon oxide -

(A) Must include commercially reasonable terms and provide for enforcement of the party's obligation to perform the capture, disposal, injection, or utilization of the qualified carbon oxide;

(B) May, but are not required to, include long-term liability provisions, indemnity provisions, penalties for breach of contract, or liquidated damages provisions;

(C) May, but are not required to, include information including how many metric tons of qualified carbon oxide the parties agree to dispose of, inject, or utilize;

(D) May, but are not required to, include minimum quantities that the parties agree to dispose of, inject, or utilize;

(E) Must, in the case of qualified carbon oxide that is intended to be disposed of in secure geological storage and not used as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, obligate the disposing party to comply with §§1.45Q-3(b)(1) and (c), and, in the case of a recapture event, promptly inform the capturing party of all information that is pertinent to the recapture (e.g., location of leak, leaked amount of qualified carbon oxide, dollar value of section 45Q credit attributable to leaked qualified carbon oxide);

(F) Must, for qualified carbon oxide that is intended to be used as a tertiary injectant in a qualified enhanced oil or natural gas recovery, obligate the disposing party to comply with §1.45Q-3(b)(2) and (c), and in the case of a recapture event, promptly inform the capturing party of all information that is pertinent to recapture of the section 45Q credit as listed in §1.45Q-5; and

(G) Must, for qualified carbon oxide that is intended to be utilized in a manner specified in §1.45Q-4, obligate the utilizing party to comply with §1.45Q-4.

(iv) Pre-existing contracts. If a taxpayer entered into a contract for the capture, disposal, injection, or

utilization of qualified carbon oxide prior to January 13, 2021, and that contract does not satisfy all of the requirements of this paragraph (h)(2), the taxpayer must amend its existing contract or execute a new contract that satisfies all of the requirements of this paragraph (h)(2) by July 12,

(v) Reporting of contract information. The existence of each contract and the parties involved must be reported to the IRS annually. Each party to a contract must complete a signed Form 8933 (as defined in §1.45-2(j)) and provide information required by the instructions to Form 8933. The party that contracts with the taxpayer claiming the credit must also provide that taxpayer with a signed Form 8933 in accordance with the instructions to Form 8933. The taxpayer claiming the credit must attach and file all other signed Forms 8933 received by each other party to the contract to its own signed Form 8933. Failure of the taxpayer claiming the credit to satisfy this reporting requirement in a taxable year will result in the inability of that taxpayer to claim the credit with respect to any qualified carbon oxide that is disposed of, injected, or utilized in that taxable year pursuant to that particular contract. In addition to any information stated as required on Form 8933, the report must include the following information-

(A) The name and taxpayer identification number of the taxpayer to whom the credit is attributable;

(B) The name and taxpayer identification number of each party with whom the taxpayer has entered into a contract to ensure the disposal, injection, or utilization of qualified carbon oxide;

(C) The date each contract to ensure the disposal, injection, or utilization of qualified carbon oxide was entered into;

(D) The number of metric tons of qualified carbon oxide each contracting party disposes of, injects, or utilizes on behalf of the contracting taxpayer each taxable year for reporting to the IRS; and

(E) For contracts for the disposal of qualified carbon oxide in secure geological storage or the use of qualified carbon oxide as a tertiary injectant in enhanced oil or natural gas recovery, the name of the operator, the field, unit, and reservoir, location by county and state, and identification number assigned to the facility by the EPA's electronic Greenhouse Gas Reporting Tool (e-GGRT ID number) for submission of the facility's 40 CFR Part 98 annual reports.

(vi) Relationship with election to allow section 45Q credit. A taxpayer does not elect to allow all or a portion of the credit to any of the contracting parties merely by contracting with that party to ensure the disposal, injection, or utilization of qualified carbon oxide. Any election to allow all or a portion of the credit to be claimed by another party must be made separately pursuant to paragraph (h)(3) of this section.

(3) *Election to allow the section 45Q credit to another taxpayer.* The taxpayer described in paragraph (h)(1) of this section as the person to whom the section 45Q credit is attributable (electing taxpayer) may elect to allow the person that enters into a contract with the electing taxpayer to dispose of the qualified carbon oxide (disposer), utilize the qualified carbon oxide (utilizer), or use the qualified carbon oxide as a tertiary injectant (injector) to claim the credit (credit claimant) (section 45Q(f)(3)(B) election). However, the electing taxpayer may not elect or otherwise allow the section 45Q credit to a contractor or subcontractor that physically captures carbon oxide on behalf of the taxpayer. For purposes of this paragraph (h)(3), the disposer or injector that is eligible to be a credit claimant is the party that obtains the permit to dispose of the qualified carbon oxide in secure geological storage. In the case of an injector that is itself a joint venture (not a federal tax partnership), only those taxpayers that hold a working interest in the joint venture may be credit claimants. A credit claimant may not allow the section 45Q credit to a subcontractor that performs the disposal, utilization, or injection for the credit claimant. The electing taxpayer may not claim any section 45Q credits that are allowable to a credit claimant. An electing taxpayer may elect to allow a credit claimant to claim the full amount or a partial amount of section 45Q credits arising during the taxable year. An electing taxpayer may elect to allow a single credit claimant or multiple credit claimants to claim section 45Q credits in the same taxable year. If an electing taxpayer elects to allow multiple credit claimants to claim section 45Q credits, the maximum amount of section 45Q credits allowable to each credit claimant is proportional to the amount of qualified carbon oxide disposed of, utilized, or used as a tertiary injectant by the credit claimant. A credit claimant may receive allowances of section 45Q credits from multiple electing taxpayers in the same taxable year. In the case of an electing taxpayer with multiple qualified facilities, the electing taxpayer must make a separate election for each qualified facility.

(i)

Example. Electing Taxpayer, E, captures 1,000,000 metric tons of qualified carbon oxide with carbon capture equipment that was placed in service in 2020. In 2021, E contracts with two companies, A and B, for the disposal of the qualified carbon oxide. E is eligible for a section 45Q credit at a rate of \$22.68 per metric ton, for a total section 45Q credit of \$22,680,000. E contractually ensures that A will dispose of 300,000 metric tons of qualified carbon oxide and that B will dispose of 700,000 metric tons of qualified carbon oxide. E may make a section 45Q(f)(3)(B) election to allow up to \$6,804,000 of section 45Q credit to A and up to \$15,876,000 of section 45Q credit to B, equal to the value of the number of metric tons each party has contracted to ensure disposal, multiplied by the credit value of the metric tons disposed of.

(ii) *Time and manner of making election.* The electing taxpayer makes a section 45Q(f)(3)(B) election by filing a statement of election containing the information described in paragraph (h)(3)(iv) of this section with the taxpayer's Federal income tax return or Form 1065 for each taxable year in which the credit arises. The section 45Q(f)(3)(B) election must be made in accordance with Form 8933 no

later than the time prescribed by law (including extensions) for filing the Federal income tax return or Form 1065 for the year in which the credit arises. The election may not be filed with an amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, after the prescribed date (including extensions) for filing the original Federal income tax return or Form 1065 for the year, with the exception of amended Federal income tax returns, amended Forms 1065, or AARs, as applicable, for any taxable year ending after February 9, 2018, and beginning on or before January 13, 2021. The amended Federal income tax return or the amended Form 1065 must be filed, in any event, not later than the applicable period of limitations on assessment for the taxable year for which the amended Federal income tax return or Form 1065 is being filed. A BBA partnership may make a late election by filing an AAR on or before October 15, 2021, but in any event, not later than the period of limitations on filing an AAR under section 6227(c).

(iii) Annual election. A section 45(Q)(f)(3)(B) election is only effective for the taxable year for which it is made. A new section 45(Q)(f)(3)(B) election must be made for each taxable year for which an electing taxpayer wishes to allow section 45Q credits to a credit claimant.

(iv) Required information. For the section 45(Q)(f)(3)(B) election to be valid under paragraph (h)(3)(ii) of this section, the election statement of the electing taxpayer must be made on Form 8933 and must indicate that an election is being made under section 45(Q)(f)(3)(B). The electing taxpayer must provide each credit claimant with a copy of the electing taxpayer's Form 8933. The electing taxpayer must, in addition to any information required on Form 8933 set forth the following information--

(A) The electing taxpayer's name, address, taxpayer identification number, location, and e-GGRT ID number(s) (if available) of each qualified facility where qualified carbon oxide was captured;

(B) The full amount of credit attributable to the taxpayer prior to the election and the corresponding metric tons of qualified carbon oxide;

(C) The name, address, and taxpayer identification number of each credit claimant, and the name and location and e-GGRT ID number(s) (if available) of:

(i) Each secure geological storage site where the qualified carbon oxide is disposed of or injected,
or

(ii) Each site where the qualified carbon oxide is utilized;

(D) The dollar amount of section 45Q credits the taxpayer is allowing each credit claimant to claim and the corresponding metric tons of qualified carbon oxide; and

(E) The dollar amount of section 45Q credits retained by the electing taxpayer and the corresponding metric tons of qualified carbon oxide.

(v) Requirements for section 45Q credit claimant. For a section 45Q(f)(3)(B) election to be valid, the section 45Q credit claimant must include the following information on Form 8933--

(A) The name, address, taxpayer identification number of the credit claimant;

(B) The name, address, and taxpayer identification number of each taxpayer making an election under section 45Q(f)(3)(B) to allow the credit to the credit claimant;

(C) The name and location and e-GGRT ID number(s) (if available) of each qualified facility where qualified carbon oxide was captured;

(D) The name and location and e-GGRT ID number(s) (if available) of:

(i) Each secure geological storage site where the qualified carbon oxide is disposed of or injected,
or

(ii) Each site where the qualified carbon oxide is utilized.

(E) The full dollar amount of section 45Q credits attributable to each electing taxpayer prior to the election and the corresponding metric tons of qualified carbon oxide;

(F) The dollar amount of section 45Q credits that each electing taxpayer is allowing the credit claimant to claim and the corresponding metric tons of qualified carbon oxide; and

(G) A copy of the electing taxpayer's Form 8933. The credit claimant must include this Form 8933 with its timely filed Federal income tax return or Form 1065 (including extensions). The election may not be filed with an amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, after the prescribed date (including extensions) for filing the original Federal income tax return or Form 1065 for the year, with the exception of amended Federal income tax returns, amended Forms 1065, or AARs, as applicable, for any taxable year ending after February 9, 2018, and beginning on or before January 13, 2021. The amended Federal income tax return or the amended Form 1065 must be filed, in any event, not later than the applicable period of limitations on filing an amended Federal income tax return or Form 1065. In the case of a BBA partnership, the BBA partnership may make a late election by filing an AAR on or before October 15, 2021, but in

any event, not later than the period of limitations on filing an AAR under section 6227(c).

(vi) Failure to satisfy reporting requirements. With respect to any section 45Q(f)(3)(B) election, the failure of an electing taxpayer or a credit claimant to satisfy the requirements in paragraph (h)(3)(iv) or (v) in a taxable year will result in the inability to claim the credit with respect to any qualified carbon oxide that is disposed of, injected, or utilized in that taxable year pursuant to that particular election.

(i) Applicability date. This section applies to taxable years beginning on or after January 13, 2021. Taxpayers may choose to apply this section for taxable years beginning on or after January 1, 2018, provided the taxpayer applies this section and §§1.45Q-2, 1.45Q-3, 1.45Q-4, and 1.45Q-5 in their entirety and in a consistent manner.

T.D. 9944, 1/13/2021 .

(Reg Caution) Reg §1.45Q-2 Definitions for Purposes of §§1.45Q-1 through 1.45Q-5.

Income (USTR)

Federal Regulations

Reg § 1.45Q-2. Definitions for Purposes of §§1.45Q-1 through 1.45Q-5.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

(a) Qualified carbon oxide. The term qualified carbon oxide means-

(1) Any carbon dioxide which-

(i) Is captured from an industrial source by carbon capture equipment which is originally placed in service before February 9, 2018,

(ii) Would otherwise be released into the atmosphere as industrial emission of greenhouse gas 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

(2) Any carbon dioxide or other carbon oxide which-

(i) Is captured from an industrial source by carbon capture equipment which is originally placed in service on or after February 9, 2018,

(ii) Would otherwise be released into the atmosphere as industrial emission of greenhouse gas 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

(3) In the case of a direct air capture facility, any carbon dioxide that is captured directly from the

ambient air and is measured at the source of capture and verified at the point of disposal, injection, or utilization.

(b) Recycled carbon oxide. The term qualified carbon oxide includes the initial deposit of captured carbon oxide used as a tertiary injectant. Qualified carbon oxide does not include carbon oxide that is recaptured, recycled, and re-injected as part of the enhanced oil or natural gas recovery process.

(c) Carbon capture equipment. In general, carbon capture equipment includes all components of property that are used to capture or process carbon oxide until the carbon oxide is transported for disposal, injection, or utilization. Except as described in paragraph (c)(2) of this section, carbon capture equipment generally does not include components of property used for transporting qualified carbon oxide for disposal, injection, or utilization. Carbon capture equipment that is originally placed in service at a qualified facility on or after February 9, 2018, may be owned by a taxpayer other than the taxpayer that owns the industrial facility at which the carbon capture equipment is placed in service.

(1) Use of carbon capture equipment. Carbon capture equipment is equipment used for the purpose of-

- (i) Separating, purifying, drying, and/or capturing carbon oxide that would otherwise be released into the atmosphere from an industrial facility;
- (ii) Removing carbon oxide from the atmosphere via direct air capture; or
- (iii) Compressing or otherwise increasing the pressure of carbon oxide.

(2) Carbon capture equipment components. Carbon capture equipment generally includes components of property necessary to compress, treat, process, liquefy, pump or perform some other physical action to capture qualified carbon oxide. For purposes of this paragraph (c), carbon capture equipment includes a system of gathering and distribution lines that collect carbon oxide captured from a qualified facility or multiple qualified facilities that constitute a single project (as described in section 8.01 of Notice 2020-12, 2020-11 I.R.B. 495 (see §601.601(d)(1) and (2)(ii) of this chapter)) for the purpose of transporting that carbon oxide away from the qualified facility or single project to a pipeline used to transport carbon oxide to or from one or more taxpayers and projects.

(3) Single process train. All components that make up an independently functioning process train capable of capturing, processing, and preparing carbon oxide for transport will be treated as a single unit of carbon capture equipment.

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

(1) Exclusion. An industrial facility does not include a facility that produces carbon dioxide from carbon dioxide production wells at natural carbon dioxide-bearing formations or a naturally occurring subsurface spring. For purposes of section 45Q, a carbon dioxide production well at natural carbon dioxide-bearing formations or a naturally occurring subsurface spring means a well that contains 90 percent or greater carbon dioxide by volume (90 percent test).

(2) Exception for wells at natural carbon dioxide-bearing formations or a naturally occurring subsurface spring that contain a product other than carbon dioxide. A well meeting the 90 percent test will not be treated as a carbon dioxide production well at natural carbon dioxide-bearing formations or a naturally occurring subsurface spring if:

- (i) The deposit contains a product, other than carbon oxide, that is commercially viable to extract and sell without taking into account the availability of a commercial market for the carbon oxide that is extracted or any section 45Q tax credit that might be available;
- (ii) The taxpayer provides an attestation to paragraph (d)(2)(i) of this section from an independent registered engineer with experience in feasibility studies for extraction of gases from the subsurface;
- (iii) A direct air capture facility (defined in section 45Q(e)(1)(A)) is not used to capture carbon oxide from the gas stream; and
- (iv) Any carbon oxide extracted from the deposit is used as tertiary injectant in an enhanced oil or natural gas recovery project or as feedstock of a utilization project.

(2 [sic 3]) Industrial source. An industrial source is an emission of carbon oxide from an industrial facility.

(3 [sic 4]) Manufacturing process. A manufacturing process is a process involving the manufacture of one or more products, other than carbon oxide, that are intended to be sold at a profit, or are used for a commercial purpose (other than producing carbon oxide). All facts and circumstances with respect to the process and products are to be taken into account.

(4 [sic 5]) *Examples.* The following examples illustrate the rules of paragraph (d) of this section:

(i)

Example (1). A natural underground reservoir contains a gas that is comprised of 50 percent carbon dioxide and 50 percent methane by volume. The raw gas is not usable without the application of a separation process to create two gases that are primarily carbon dioxide and methane. Taxpayer B constructs processing equipment that separates the raw gas into carbon oxide and methane. The carbon dioxide is sold to a third party for use in a qualified enhanced oil recovery project. Some of the methane is used as fuel to power the processing equipment. The remainder of the methane is injected into the reservoir. The injection will increase the ultimate recovery of carbon dioxide. The injected methane can be produced later from the reservoir. At the end of the taxable year Taxpayer B has not secured a contract to sell methane and does not have any plans to use the methane for a commercial purpose other than producing carbon oxide. Because carbon dioxide is the only product manufactured that is intended to be sold at a profit or used for a commercial purpose, the separation process applied to the gases is not a manufacturing process within the meaning of paragraph (d)(3) of this section. The carbon dioxide captured by the process is not qualified carbon oxide.

(ii)

Example (2).

(A) A natural underground reservoir contains a gas that is comprised of 95 percent carbon dioxide and 5 percent helium by volume. The raw gas is not usable without the application of a separation process to create two gases that are primarily carbon dioxide and helium. Taxpayer C determines that the extraction of helium is economically viable even if there were no commercial market for carbon dioxide or any section 45Q credit. An independent registered engineer attests to Taxpayer C's determination. Taxpayer C constructs processing equipment that separates the raw gas into carbon dioxide and helium. The helium is sold to various customers for use in commercial and industrial applications. The carbon dioxide is sold to a third party for use in a qualified enhanced oil recovery project. Any carbon dioxide which the third party cannot accept is returned to the reservoir or vented in accordance with applicable permits.

(B) Because the extraction of helium is economically viable even if there were no commercial market for carbon dioxide or any section 45Q credit, the reservoir will not be considered a natural carbon dioxide-bearing formation or a naturally occurring subsurface spring within the meaning of paragraph (d)(1) and the separation process applied to the gases is a manufacturing process within the meaning of paragraph (d)(3). Taxpayer C may claim the section 45Q credit with respect to the carbon dioxide sold to the third party and which the third party uses in a qualified enhanced oil recovery project during the taxable year. Taxpayer C may not claim the section 45Q credit with respect to the carbon dioxide that is returned to the reservoir or vented.

(e) Electricity generating facility. An electricity generating facility is a facility described in section 45Q(d)(2)(A) or (B) of the Internal Revenue Code (Code) that is subject to depreciation under MACRS Asset Class 49.11 (Electric Utility Hydraulic Production Plant), 49.12 (Electric Utility Nuclear Production Plant), 49.13 (Electric Utility Steam Production Plant), or 49.15 (Electric Utility Combustion Turbine Production Plant).

(f) Direct air capture facility. A direct air capture facility means any facility that uses carbon capture equipment to capture carbon oxide directly from the ambient air. It does not include any facility that captures carbon dioxide (1) that is deliberately released from naturally occurring subsurface springs or (2) using natural photosynthesis.

(g) Qualified facility. A qualified facility means any industrial facility or direct air capture facility, the construction of which begins before January 1, 2026, and either at which construction of carbon capture equipment begins before that date, or the original planning and design for which includes installation of carbon capture equipment, and at which carbon capture equipment is placed in service that captures the requisite annual thresholds of carbon oxide described in paragraph (g)(1) of this section. See Notice 2020-12 (see §601.601(d)(1) and (2)(ii) of this chapter), for guidance on the determination of when construction has begun on a qualified facility or on carbon capture equipment. For purposes of whether a facility satisfies the requisite annual carbon oxide capture thresholds described in paragraph (g)(1) of this section, a taxpayer may apply the rules of section 8.01 of Notice 2020-12 (see §601.601(d)(1) and (2)(ii) of this chapter) to treat multiple facilities as a single facility.

(1) Emissions and capture requirements. The carbon capture equipment placed in service at the qualified facility must capture--

(i) In the case of a facility, other than a direct air capture facility, which emits not more than 500,000 metric tons of carbon oxide into the atmosphere during the taxable year, at least 25,000 metric tons of qualified carbon oxide during the taxable year which is utilized in a manner consistent with section 45Q(f)(5) and §1.45Q-4 (section 45Q(d)(2)(A) facility);

(ii) In the case of an electricity generating facility which is not a section 45Q(d)(2)(A) facility (section 45Q(d)(2)(B) facility), not less than 500,000 metric tons of qualified carbon oxide during the taxable year; and

(iii) In the case of a direct air capture facility or other facility that is not a section 45Q(d)(2)(A) facility or a section 45Q(d)(2)(B) facility, at least 100,000 metric tons of qualified carbon oxide during the taxable year.

(2) *Examples.* The following examples illustrate the rules of paragraph (g) of this section:

(i)

Example (1). During the taxable year, an ethanol plant emits 200,000 metric tons of carbon dioxide. Carbon capture equipment located at the facility captures 35,000 metric tons of carbon dioxide, all of which are utilized in a manner consistent with section 45Q(f)(5) and §1.45Q-4. The ethanol plant is a qualified facility under section 45Q(d)(2)(C) and §1.45Q-2(g)(1)(i) during the taxable year because it met the requirement to capture at least 25,000 metric tons of qualified carbon oxide during the taxable year which were utilized in a manner consistent with section 45Q(f)(5) and §1.45Q-4.

(ii)

Example (2). During the taxable year, an electricity generating facility emits 600,000 metric tons of carbon dioxide. Carbon capture equipment located at the facility captures a total of 450,000 metric tons of carbon dioxide. 50,000 metric tons of the captured carbon dioxide are utilized in a manner consistent with section 45Q(f)(5) and §1.45Q-4, and 400,000 metric tons of the carbon dioxide are disposed of in secure geological storage. The electricity generating facility is not a qualified facility under section 45Q(d)(2)(B) during the taxable year because it did not capture at least 500,000 metric tons of qualified carbon oxide during the taxable year. Further, because the electricity generating facility emitted greater than 500,000 metric tons of carbon dioxide during the taxable year, but only captured 450,000 metric tons, it is not a qualified facility under section 45Q(d)(2)(A) and §1.45Q-2(g)(1)(ii).

(iii)

Example (3). During the taxable year, a cement manufacturing plant emits 110,000 metric tons of carbon dioxide. Carbon capture equipment located at the plant captures 100,000 metric tons of carbon dioxide. 10,000 metric tons of the amount captured are utilized in a manner consistent with section 45Q(f)(5) and §1.45Q-4, and 90,000 metric tons of carbon dioxide, are disposed of in secure geological storage. The cement manufacturing plant is a qualified facility during the taxable year because the carbon capture equipment located at the plant met the requirement under section 45Q(d)(2)(C) and §1.45Q-2(g)(1)(i) to capture at least 100,000 metric tons of qualified carbon oxide during the taxable year.

(iv)

Example (4). Taxpayer X owns and operates three natural gas processing facilities (A, B, and C) that separate carbon dioxide from natural gas. A, B, and C are all located within several miles of each other. X installed carbon capture equipment by A, B, and C. Carbon dioxide captured by A, B, and C

is collected via a single system of gathering and distribution lines for delivery to a transportation pipeline. X contracts with third-party Z for the use of carbon dioxide captured by A, B, and C as a tertiary injectant pursuant to a single contract. During the taxable year, equipment at A captures 30,000 metric tons of carbon dioxide, equipment at B captures 40,000 metric tons of carbon dioxide, and equipment at C captures 50,000 tons of carbon dioxide. All other factors listed in the single project rule in section 8.01 of Notice 2020-12 support the conclusion that A, B and C are a single facility. X may treat A, B, and C as a single facility under the rules of section 8.01 of Notice 2020-12 for purposes of determining whether the requirement under section 45Q(d)(2)(C) and §1.45Q-2(g)(1)(i), to capture at least 100,000 metric tons of qualified carbon oxide during the taxable year is satisfied. If X treats A, B, and C as a single facility, the minimum capture requirement will be satisfied for the taxable year.

(3) Annualization of first-year and last-year qualified carbon oxide emission and/or capture amounts.

(i) In general. For both the taxable year in which carbon capture equipment is placed in service at a qualified facility and the taxable year in which the 12-year period described in sections 45Q(a)(3)(A) and (4)(A) and §1.45Q-1(c)(1) and (2) ends, annualization of the amount of qualified carbon oxide emitted and captured (or captured directly from the ambient air in the case of a direct air capture facility) is permitted to determine if the threshold requirements under paragraph (g)(1) of this section are satisfied. Such annualization may result in a facility being deemed to satisfy the threshold requirements under paragraph (g)(1) of this section for the year and may permit a taxpayer to claim section 45Q credits even though the amount of qualified carbon oxide emitted or captured in the first year or last year of the 12-year period is less than the threshold requirements under paragraph (g)(1) of this section.

(ii) Calculation. Annualization is only available for the taxable year in which the carbon capture equipment is placed in service at the qualified facility and the taxable year in which the 12-year period described in sections 45Q(a)(3)(A) and (4)(A) and §1.45Q-1(c)(1) and (2) ends. Annualized amounts must be calculated by-

(A) Determining the amount of qualified carbon oxide emitted and captured (or captured directly from the ambient air in the case of a direct air capture facility) during the taxable year in which the carbon capture equipment was placed in service at the qualified facility or the taxable year in which the 12-year period described in sections 45Q(a)(3)(A) and (4)(A) and §1.45Q-1(c)(1) and (2) ends,

(B) Dividing the amount of qualified carbon determined under paragraph (g)(3)(ii)(A) of this section by the number of days in the period either (I) beginning with the date on which the carbon capture equipment was placed in service at the qualified facility and ending with the last day of the taxable year containing that date, or (II) beginning with the first day of the taxable year in which the 12-year period described in sections 45Q(a)(3)(A) and (4)(A) and §1.45Q-1(c)(1) and (2) ends and ending

with the last day of that 12-year period; and

(C) Multiplying by 365.

(iii) Consequences. If the annualized amounts of qualified carbon oxide emitted and captured (or captured directly from the ambient air in the case of a direct air capture facility) as calculated under this formula meet the threshold requirements under paragraph (g)(1) of this section, the threshold requirements under paragraph (g)(1) of this section are deemed satisfied for the taxable year in which the carbon capture equipment was placed in service at the qualified facility or the taxable year in which the 12-year period described in sections 45Q(a)(3)(A) and (4)(A) and §1.45Q-1(c)(1) and (2) ends. The taxpayer may be eligible for a section 45Q credit for that taxable year but must calculate the credit based on actual amounts of qualified carbon oxide captured and disposed of, injected, or utilized during the taxable year.

(4) Election for applicable facilities. In the case of an applicable facility, for any taxable year during which such facility captures not less than 500,000 metric tons of qualified carbon oxide, the taxpayer described in section 45Q(f)(3)(A)(ii) and §1.45Q-1(h)(1)(ii) (that is, the person that owns the carbon capture equipment and physically or contractually ensures the capture and disposal, injection or utilization of such 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 (section 45Q(f)(6) election). For purposes of whether a facility satisfies the 500,000 metric ton qualified carbon oxide capture threshold, a taxpayer may apply the rules of section 8.01 of Notice 2020-12 to treat multiple facilities as a single facility.

(i) Applicable facility. An applicable facility means a qualified facility described in section 45Q(f)(6)(B) and §1.45Q-2(g) that was placed in service before February 9, 2018, for which no taxpayer claimed a section 45Q credit for qualified carbon oxide captured at the facility for any taxable year ending before February 9, 2018.

(ii) Time and manner of making election. The taxpayer described §1.45Q-1(h)(1) makes a section 45Q(f)(6) election by filing a statement of election with the taxpayer's income tax return for each taxable year in which the credit arises. The section 45Q(f)(6) election must be made in accordance with Form 8933 filed with the taxpayer's Federal income tax return for each taxable year in which the taxpayer makes the section 45Q(f)(6) election. The statement of election must, in addition to any information required on Form 8933, set forth the electing taxpayer's name, address, taxpayer identification number, location, and e-GGRT ID number(s) (if available) of the applicable facility.

(iii) Retroactive credit revocations. A taxpayer may not file an amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, for any taxable year ending before February 9, 2018,

to revoke a prior claim of section 45Q credits.

(5) Retrofitted qualified facility or carbon capture equipment (80/20 Rule). A qualified facility or carbon capture equipment may qualify as originally placed in service even if it contains some used components of property, provided the fair market value of the used components of property is not more than 20 percent of the qualified facility or carbon capture equipment's total value (that is, the cost of the new components of property plus the value of the used components of property) (80/20 Rule). In determining the value of the used components of property as compared to the new components, the general principles of Revenue Ruling 94-31 (see §601.601(d)(2)(i)(a) and (ii) of this chapter), will apply. The relevant unit of retrofitted carbon capture equipment for purposes of the 80/20 Rule is an independently functioning process train. For purposes of the 80/20 Rule, the cost of a new qualified facility or carbon capture equipment includes all properly capitalized costs of the new qualified facility or carbon capture equipment. Solely for purposes of the 80/20 Rule, properly capitalized costs of a new qualified facility or carbon capture equipment may, at the option of the taxpayer, include the cost of new equipment for a pipeline (the cost of equipment for a new pipeline, not equipment used to repair an existing pipeline) owned and used exclusively by that taxpayer to transport carbon oxides captured by that taxpayer's qualified facility or carbon capture equipment that would otherwise be emitted into the atmosphere.

(h) Qualified enhanced oil or natural gas recovery project. The term qualified enhanced oil or natural gas recovery project has the same meaning as a qualified enhanced oil recovery project under section 43(c)(2) of the Code and §1.43-2, by substituting crude oil or natural gas for crude oil in section 43(c)(2)(A)(i) and §§1.43-2 and 1.43-3.

(1) Application of §§1.43-2 and 1.43-3. For purposes of applying §§1.43-2 and 1.43-3 with respect to a qualified enhanced oil or natural gas recovery project, the term enhanced oil or natural gas recovery is substituted for enhanced oil recovery, and the term oil or natural gas is substituted for oil.

(2) Required certification. The qualified enhanced oil or natural gas recovery project must be certified under §1.43-3, even if no credit related to enhanced oil or natural gas recovery is claimed for the taxable year. For purposes of a natural gas project-

(i) The petroleum engineer's certification under §1.43-3(a)(3) and the operator's continued certification of a project under §1.43-3(b)(3) must include an additional statement that the certification is for purposes of the section 45Q carbon oxide sequestration tax credit;

(ii) The petroleum engineer's certification must be attached to a Form 8933 and filed not later than the last date prescribed by law (including extensions) for filing the operator's or designated owner's Federal income tax return or Form 1065 for the first taxable year in which qualified carbon oxide is

injected into the reservoir; and

(iii) The operator's continued certification of a project must be attached to a Form 8933 and filed not later than the last date prescribed by law (including extensions) for filing the operator's or designated owner's Federal income tax return or Form 1065 for taxable years after the taxable year for which the petroleum engineer's certification is filed but not after the taxable year in which injection activity ceases and all injection wells are plugged and abandoned.

(3) *Natural gas.* Natural gas has the same meaning as under section 613A(e)(2) of the Code.

(4) *Timely filing of petroleum engineer's certification.* For purposes of this paragraph (h), if a section 45Q credit is claimed on an amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, the petroleum engineer's certification for a natural gas project will be treated as filed timely if it is attached to a Form 8933 that is submitted with such amended Federal income tax return, amended Form 1065, or AAR. With respect to a section 45Q credit that is claimed on a timely filed Federal income tax return or Form 1065 for a taxable year ending after December 31, 2017, and beginning on or before January 13, 2021, for which the petroleum engineer's certification for a natural gas project was not submitted, the petroleum engineer's certification for a natural gas project will be treated as filed timely if it is attached to an amended Form 8933 for such taxable year.

(5) *Carbon oxide injected in oil reservoir.* Carbon oxide that is injected into an oil reservoir that is not a qualified enhanced oil recovery project under section 43(c)(2) due to circumstances such as the first injection of a tertiary injectant occurring before 1991, or because a petroleum engineer's certification was not timely filed, cannot be treated as qualified carbon oxide, disposed of in secure geological storage, or utilized in a manner described in section 45Q(f)(5). This rule will not apply to an oil reservoir if-

(i) The reservoir has permanently ceased oil production;

(ii) The operator has obtained an Underground Injection Control Class VI permit; and

(iii) The operator complies with 40 CFR part 98 subpart RR.

(6) *Tertiary Injectant.* For purposes of section 45Q, a tertiary injectant is qualified carbon oxide that is injected into and stored in a qualified enhanced oil or natural gas recovery project and contributes to the extraction of crude oil or natural gas. The term tertiary injectant has the same meaning as used in section 193(b)(1) of the Code.

(i) Section 45Q credit. The term section 45Q credit means the carbon oxide sequestration credit determined under section 45Q of the Internal Revenue Code and §1.45Q-1.

(j) Form 8933. The term Form 8933 means Form 8933, Carbon Oxide Sequestration Credit, any successor form(s), pursuant to instructions to any of the foregoing (see §601.602 of this chapter), or other guidance. This definition of Form 8933 applies to this section and to §§1.45Q-1, 1.45Q-3, 1.45Q-4, and 1.45Q-5.

(k) Applicability date. This section applies to taxable years beginning on or after January 13, 2021. Taxpayers may choose to apply this section for taxable years beginning on or after January 1, 2018, provided the taxpayer applies this section and §§1.45Q-1, 1.45Q-3, 1.45Q-4, and 1.45Q-5 in their entirety and in a consistent manner.

T.D. 9944, 1/13/2021 .

(Reg Caution) Reg §1.45Q-3 Secure Geological Storage.

Final, Temporary & Proposed Treasury Regulations (RIA)

Federal Regulations

Reg § 1.45Q-3. Secure Geological Storage.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

(a) In general. To qualify for the section 45Q credit, a taxpayer must either physically or contractually dispose of captured qualified carbon oxide in secure geological storage in the manner provided in paragraph (b) of this section, or utilize qualified carbon oxide in a manner conforming with section 45Q(f)(5) of the Internal Revenue Code and §1.45Q-4. Secure geological storage includes, but is not limited to, storage at deep saline formations, oil and gas reservoirs, and unminable coal seams.

(b) Requirements for secure geological storage. For purposes of the section 45Q credit, qualified carbon oxide is considered disposed of by the taxpayer in secure geological storage such that the qualified carbon oxide does not escape into the atmosphere if the qualified carbon oxide is-

(1) Injected into a well that

- (i) Complies with applicable Underground Injection Control or other regulations, located onshore or offshore under submerged lands within the territorial jurisdiction of States or federal waters, and
- (ii) Is not used as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, in compliance with applicable requirements under 40 CFR part 98 subpart RR; or

(2) Injected into a well that

- (i) Complies with applicable Underground Injection Control or other regulations, is located onshore or offshore under submerged lands within the territorial jurisdiction of States or federal waters, and
- (ii) Is used as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and stored in compliance with applicable requirements under 40 CFR part 98 subpart RR, or the International Organization for Standardization (ISO) standards endorsed by the American National Standards Institute (ANSI) under CSA/ANSI ISO 27916:2019, Carbon dioxide capture, transportation and

geological storage-Carbon dioxide storage using enhanced oil recovery (CO₂-EOR) (CSA/ANSI ISO 27916:2019).

(c) Documentation. Documentation must be filed in accordance with Form 8933.

(d) Certification. For qualified enhanced oil or natural gas recovery projects in which the taxpayer reported volumes of carbon oxide to the Environmental Protection Agency pursuant to 40 CFR part 98 subpart RR, the taxpayer may self-certify the volume of qualified carbon oxide claimed for purposes of section 45Q. For qualified enhanced oil or natural gas recovery projects in which the taxpayer determined volumes pursuant to CSA/ANSI ISO 27916:2019, a taxpayer may prepare documentation as outlined in CSA/ANSI ISO 27916:2019 internally, but all such documentation must be provided to a qualified independent engineer or geologist, who then must certify that the documentation provided, including the mass balance calculations as well as information regarding monitoring and containment assurance, is accurate and complete. The qualified independent engineer or geologist certifying a project must be duly registered or certified in any State. The certification must contain an affidavit from the certifying engineer or geologist stating that he or she is independent from the taxpayer (and if a section 45Q(f)(3)(B) election has been made, the affidavit must state that he or she is independent from both the electing taxpayer and the credit claimant). Certifications must be made annually and under penalties of perjury. For any leaked amount of qualified carbon oxide (as defined in §1.45Q-5(c)) that is determined pursuant to CSA/ANSI ISO 27916:2019, the certification must also include a statement that the quantity was determined in accordance with sound engineering principles. Taxpayers that capture qualified carbon oxide giving rise to the section 45Q credit must file Form 8933 with a timely filed Federal income tax return or Form 1065, including extensions or for the purpose of this rule, amendments to Federal income tax returns, Forms 1065, or on AARs, as applicable. Taxpayers that dispose of, inject, or utilize qualified carbon oxide must also file Form 8933 with a timely filed Federal income tax return or Form 1065, including extensions or for the purpose of this rule, amendments to Federal income tax returns, Forms 1065, or on AARs, as applicable. If the volume of carbon oxide certified and reported is a negative amount, see §1.45Q-5 for rules regarding recapture.

(e) Failure to submit complete documentation or certification. No section 45Q credit is allowed for any taxable year for which the taxpayer (including credit claimants) has failed to timely submit complete documentation and certification that is required by this regulation or Form 8933. The credit will be allowed only for a taxable year for which complete documentation and certification has been timely submitted. Certifications for each taxable year must be submitted by the due date of the federal income tax return or Form 1065 on which the section 45Q credit is claimed, including extensions. However, if a section 45Q credit is claimed on an amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, certifications may also be submitted with such amended Federal income tax return, amended Form 1065, or AAR. Further, if a section 45Q credit was claimed on a timely filed Federal income tax return or Form 1065 for a taxable year ending on or after January 1, 2018, and beginning

on or before e January 13, 2021, for which certifications were not submitted, such certifications may be submitted with a timely filed amended Federal income tax return, an amended Form 1065, or an AAR, as applicable, for such taxable year.

(f) Applicability date. This section applies to taxable years beginning on or after e January 13, 2021. Taxpayers may choose to apply this section for taxable years beginning on or after January 1, 2018, provided the taxpayer applies this section and §§1.45Q-1, 1.45Q-2, 1.45Q-4, and 1.45Q-5 in their entirety and in a consistent manner.

T.D. 9944, 1/13/2021 .

(Reg Caution) Reg §1.45Q-4 Utilization of Qualified Carbon Oxide.

Final, Temporary & Proposed Treasury Regulations (RIA)

Federal Regulations

Reg § 1.45Q-4. Utilization of Qualified Carbon Oxide.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

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

(1) The fixation of such qualified carbon oxide through photosynthesis or chemosynthesis, such as through the growing of algae or bacteria,

(2) The chemical conversion of such qualified carbon oxide to a material or chemical compound in which such qualified carbon oxide is securely stored, or

(3) 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 described in paragraph (d) of this section.

(b) Amount utilized.

(1) *In general.* For purposes of §1.45Q-1(b) (ii) and (c)(2)(ii), the amount of qualified carbon oxide utilized by the taxpayer is equal to the metric tons of qualified carbon oxide which the taxpayer demonstrates, based upon an analysis of lifecycle greenhouse gas emissions (LCA), were-

(i) Captured and permanently isolated from the atmosphere through use of a process described in paragraph (a) of this section, or

(ii) Displaced from being emitted into the atmosphere through use of a process described in paragraph (a) of this section.

(2) *Limitation.* The amount determined under paragraph (b)(1) of this section cannot exceed the amount of qualified carbon oxide measured at the source of capture.

(c) Lifecycle greenhouse gas emissions and lifecycle analysis (LCA).

(1) *In general.* For purposes of paragraph (b) of this section, the term lifecycle greenhouse gas emissions means the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) related to the full product lifecycle, including all stages of product and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished product to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential according to Table A-1 of 40 CFR part 98 subpart A. Such emissions are expressed in carbon dioxide equivalent (CO₂-e).

(2) *LCA verification.* The taxpayer verifies the amount of qualified carbon oxide utilized through an LCA. The LCA must demonstrate that the proposed process results in a net reduction of carbon dioxide equivalents when compared to a comparison system. The results of the LCA must be documented in a written LCA report.

(3) *Standards of adequate lifecycle analysis.* The LCA report must be prepared in conformity with and contain documentation that conforms with International Organization for Standardization (ISO) 14040:2006, Environmental management-Life cycle assessment-Principles and framework and ISO 14044:2006, Environmental management-Life cycle assessment-Requirements and guidelines. The LCA may consist of direct and indirect data in conformity with ISO 14040:2006 and 14044:2006.

(4) *Third-party independent review of LCA.* The LCA report must be performed or verified by an independent third party. The LCA report must provide a statement documenting the qualifications of the independent third party, including proof of appropriate U.S. or foreign professional license, an affidavit from the third party stating that it is independent from the taxpayer (if a section 45Q(f)(3)(B) election has been made, the affidavit must state that the third party is independent from both the electing taxpayer and the credit claimant), and the statement must be made under penalties of perjury. If an independent third-party review is conducted, then it must include an assessment of the model and supporting data.

(5) *Submission of the LCA.* The taxpayer must submit the LCA report and third-party independent statement required by paragraph (c) of this section to the IRS and the Department of Energy. The taxpayer must also submit the model if the LCA is not verified by an independent third-party review.

(6) *LCA review.* The LCA report will be subject to a technical review by the DOE. The IRS will determine whether to approve the LCA and will notify the taxpayer. The taxpayer must receive approval of its LCA prior to claiming the section 45Q credits for such taxable year on any federal

income tax return. In addition to receiving approval of its LCA, the taxpayer must satisfy all other requirements of section 45Q and §§1.45Q-1, 1.45Q-2, and this section in order to be eligible to claim section 45Q credits.

(d) Commercial market. A commercial market means a market in which a product, process, or service that utilizes carbon oxide is sold or transacted on commercial terms. A taxpayer must submit a statement attached to its Form 8933 substantiating that a commercial market exists for its particular product, process, or service.

(e) Applicability date. This section applies to taxable years beginning on or after January 13, 2021. Taxpayers may choose to apply this section for taxable years beginning on or after January 1, 2018, provided the taxpayer applies this section and §§1.45Q-1, 1.45Q-2, 1.45Q-3, and 1.45Q-5 in their entirety and in a consistent manner.

T.D. 9944, 1/13/2021 .

(Reg Caution) Reg §1.45Q-5 Recapture of Credit.

Final, Temporary & Proposed Treasury Regulations (RIA)

Federal Regulations

Reg § 1.45Q-5. Recapture of Credit.



Effective: January 13, 2021. For dates of applicability, see §§1.45Q-1(i), 1.45Q-2(j), 1.45Q-3(f), 1.45Q-4(e), and 1.45Q-5(j).

(a) Recapture event. A recapture event occurs when qualified carbon oxide for which a section 45Q credit has been previously claimed ceases to be disposed of in secure geological storage (as described in §1.45Q-3(b)), or used as a tertiary injectant during the recapture period. Recapture events are determined separately for each project involving the disposal or use of qualified carbon oxide as a tertiary injectant. A recapture event does not occur if some portion of qualified carbon oxide disposed of in the current year does not remain in secure storage at the end of the year. The amount of such carbon oxide that is securely stored in the current year is determined according to the applicable requirements of 40 CFR part 98 subpart RR or CSA/ANSI ISO 27916:2019.

(b) Ceases to be disposed of in secure geological storage or used as a tertiary injectant.

Qualified carbon oxide for which a section 45Q credit has been previously claimed ceases to be disposed of in secure geological storage (as described in §1.45Q-3(b)), or used as a tertiary injectant, if the leaked amount of qualified carbon oxide in the taxable year exceeds the amount of qualified carbon oxide securely stored in that same taxable year.

(c) Leaked amount of qualified carbon oxide. When a taxpayer that claimed a section 45Q credit with respect to qualified carbon oxide stored at a secure storage site, operator of the secure storage site, or regulatory agency with jurisdiction over the site determines that the qualified carbon oxide that was disposed of in secure geological storage has leaked to the atmosphere, the taxpayer or the party with whom the taxpayer contracted to ensure the secure geological storage of the qualified carbon oxide must quantify the metric tons of qualified carbon oxide that has leaked to the atmosphere pursuant to the requirements of 40 CFR part 98 subpart RR or CSA/ANSI ISO 27916:2019. The quantity determined pursuant to CSA/ANSI ISO 27916:2019 must be certified by a qualified independent engineer or geologist, including a statement that the quantity was determined in accordance with sound engineering principles in the same manner as required in §1.45Q-3. The IRS will consider all available facts and circumstances, and may consult with the relevant regulatory agency with jurisdiction over such site, in verifying the amount of qualified carbon oxide that has leaked to the atmosphere. The verified amount is the leaked amount of qualified carbon oxide.

(d) Qualified carbon oxide subject to recapture. The quantity of recaptured qualified carbon oxide (in metric tons) subject to recapture is the amount by which the leaked amount of qualified carbon oxide exceeds the amount of qualified carbon oxide securely stored in the taxable year. The leaked amount of qualified carbon oxide shall be subtracted from the amount of qualified carbon oxide that is securely stored in the taxable year. If the leaked amount does not exceed the amount of qualified carbon oxide that is securely stored in the taxable year, then the taxpayer is entitled to a credit equal to the amount of qualified carbon oxide securely stored less the leaked amount in the taxable year, multiplied by the appropriate statutory credit rate.

(e) Recapture amount. The recapture amount is equal to the product of the quantity of recaptured qualified carbon oxide (in metric tons) subject to recapture and the appropriate statutory credit rate.

(f) Recapture period. The recapture period begins on the date of first injection of qualified carbon oxide for disposal in secure geological storage or use as a tertiary injectant for which a section 45Q credit was claimed. The recapture period ends on the earlier of three years after the last taxable year in which the taxpayer claimed a section 45Q credit or was eligible to claim a credit that it elected to carry forward or the date monitoring ends under the requirements of the standards described in §1.45Q-3(b)(1) or (2).

(g) Application of recapture

(1) In general. Any recapture amount must be taken into account in the taxable year in which it is identified and reported. If the leaked amount of qualified carbon oxide does not exceed the amount of qualified carbon oxide securely stored in the taxable year reported, there is no recapture amount and no further adjustments to prior taxable years are needed. If the leaked amount of qualified carbon oxide does exceed the amount of qualified carbon oxide securely stored in the taxable year reported, then the taxpayer must add the recapture amount to the amount of tax due in the taxable year in which the recapture event occurs.

(2) Calculation. Recapture amounts are calculated on a last-in-first-out basis (LIFO), such that the leaked amount of qualified carbon oxide that exceeds the amount of qualified carbon oxide securely stored in the current taxable year will be deemed attributable first to the prior taxable year, then to taxable year before that, and then up to a maximum of the third preceding year.

(3) Multiple units. In the event of a recapture event in which the leaked amount of qualified carbon oxide had been captured from multiple units of carbon capture equipment that were not under common ownership, the recapture amount must be allocated on a pro rata basis among the multiple units of carbon capture equipment. All taxpayers that claimed a section 45Q credit with respect to one

or more of such units of carbon capture equipment are responsible for adding the recapture amount to their amount of tax due in the taxable year in which the recapture event occurs.

(4) Multiple taxpayers.

(i) In general. In the event of a recapture event involving a leaked amount of qualified carbon oxide that is deemed attributable to qualified carbon oxide for which multiple taxpayers claimed section 45Q credits (for example, if ownership of the carbon capture equipment was transferred, or if a taxpayer made an election under section 45Q(f)(3)(B) to allow one or more credit claimants to claim a portion of the section 45Q credit), the recapture amount must be allocated on a pro rata basis among the taxpayers that claimed the section 45Q credits.

(ii) Partnerships.

(A) General rule. For purposes of paragraph (g)(4)(i) of this section, if a partnership is one of the multiple taxpayers that claimed section 45Q credit amounts, the partnership and not its partners will be the taxpayer to which the pro rata recapture amount must be allocated. The partnership must allocate its pro rata recapture amount among its partners under §1.704-1(b)(4)(ii).

(B) Terminated partnerships. If a partnership described in paragraph (g)(4)(ii)(A) of this section terminates under section 708(b)(1) prior to a recapture event, the partners of that terminated partnership at the time the section 45Q credit was claimed will be the taxpayers to which the pro rata recapture amount must be allocated.

(5) Reporting. If a recapture event occurs during a project's recapture period, any taxpayer that claimed a section 45Q credit for that project must report the following information on a Form 8933 filed with that taxpayer's Federal income tax return or Form 1065 for the taxable year for which the recapture event occurred-

(A) The recapture amount (as defined in §1.45Q-5(e));

(B) The leaked amount of qualified carbon oxide (in metric tons) (as defined in §1.45Q-5(c));

(C) The statutory credit rate(s) at which the section 45Q credits were previously calculated; and

(D) A statement that describes how the taxpayer became aware of the recapture event, how the leaked amount was determined, and the identity and involvement of any regulatory agencies.

(6) *Examples.* The following examples illustrate the principles of this paragraph (g):

(i)

Example (1).

(A) A owns direct air capture Facility X. No other taxpayer has owned Facility X, and A has never allowed another taxpayer to claim any section 45Q credits with respect to qualified carbon oxide captured by Facility X. Facility X captured 100,000 metric tons of carbon dioxide in each of 2021, 2022, and 2023. All captured carbon dioxide was sold to B for use a tertiary injectant in a qualified enhanced oil recovery project. B provided contractual assurance that the carbon dioxide would be disposed of in secure geological storage. A claimed section 45Q credit amounts of \$2,268,000 in 2021, \$2,515,000 in 2022, and \$2,761,000 in 2023 using the statutory rates in §1.45Q-1(d)(3). In 2024, A captured and sold another 100,000 metric tons of carbon dioxide to B, which B used as a tertiary injectant in a qualified enhanced oil recovery project. In late 2024, B determined that 10,000 metric tons of qualified carbon dioxide injected during 2021 had leaked from the containment area of the reservoir and were released into the atmosphere.

(B) Because the leakage determined in 2024 (10,000 metric tons) did not exceed the presumed amount stored in 2024 (100,000 metric tons), a recapture event did not occur in 2024. B's actual storage in 2024 is 90,000 metric tons of qualified carbon oxide. A's section 45Q credit for 2024 is \$2,706,300 (net 90,000 metric tons of qualified carbon oxide captured, disposed of in secure geological storage, and used as a tertiary injectant multiplied by the statutory credit rate for 2024 of \$30.07).

(ii)

Example (2).

(A) Assume same facts as in Example 1. Additionally, in 2025, B determines that 190,000 metric tons of qualified carbon dioxide injected in 2021 and 2022 had leaked and were released into the atmosphere. No injection of carbon dioxide takes place in 2025.

(B) Because the leakage determined in 2025 (190,000 metric tons) exceeds the amount stored in 2025 (0 metric tons), a recapture event occurred in 2025. A's credit for 2025 is \$0 because the net amount of carbon dioxide captured, disposed of in secure geological storage, and used as a tertiary injectant in 2025 was 0 metric tons. The 2025 recapture amount is calculated by multiplying the 190,000 metric tons of recaptured qualified carbon oxide by the appropriate statutory credit rate using the LIFO method. The first 90,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2024, and is recaptured at the 2024 statutory rate of \$30.07 per metric ton. The remaining 100,000 metric tons of recaptured qualified carbon oxide are deemed attributable to 2023. The credits attributable to 2023 are recaptured at the 2023 statutory rate of \$27.61 per metric ton.

Thus, the total recapture amount is \$5,467,300, and is added to A's tax due for 2025.

(iii)

Example (3).

(A) Assume the same facts as in Example 2, except that A sells Facility X to C on January 1, 2024. C sells 100,000 metric tons of carbon dioxide captured by Facility X to B for use as a tertiary injectant in a qualified enhanced oil recovery project. C claims a section 45Q credit in 2024 of \$2,706,300 (net 90,000 metric tons of qualified carbon oxide captured, disposed of in secure geological storage, and used as a tertiary injectant multiplied by the statutory credit rate for 2024 of \$30.07).

(B) The total recapture amount in 2025 is the same \$5,467,300 as in Example 2, but is allocated between A and C. The first 90,000 metric tons of recaptured qualified carbon oxide are deemed attributable to 2024. The credits that are attributable to 2024 are recaptured at the 2024 statutory rate of \$30.07 per ton (for a recapture amount of \$2,706,300). Because C claimed that amount of section 45Q credit in 2024, a recapture amount of \$2,706,300 is added to C's tax due for 2025. The remaining 100,000 metric 184 tons of recaptured qualified carbon oxide are deemed attributable to 2023. The credits that are attributable to 2023 are recaptured at the 2023 statutory rate of \$27.61 per ton (for a recapture amount of \$2,761,000). Because A claimed that amount of section 45Q credit in 2023, a recapture amount of \$2,761,000 is added to A's tax due for 2025.

(iv)

Example (4).

(A) Assume the same facts as in Example 2, except that in 2023, A made a section 45Q(f)(3)(B) election to allow B to claim one-half of the section 45Q credit for 2023. A and B each claimed \$1,380,500 of section 45Q credit in 2023 (50,000 metric tons each multiplied by the 2023 statutory rate of \$27.61).

(B) The total recapture amount in 2025 is the same \$5,467,300 as in Example 2, but is allocated among A and B. The first 90,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2024. The section 45Q credit amounts attributable to 2024 are recaptured at the 2024 statutory rate of \$30.07 per ton (for a recapture amount of \$2,706,300). Because A claimed that amount of section 45Q credit in 2024, \$2,706,300 is added to A's tax due for 2025. The remaining 100,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2023. The section 45Q credit amounts attributable to 2023 are recaptured at the 2023 statutory rate of \$27.61 per ton (for a recapture amount of \$2,761,000). Because A and B each claimed half of that amount (\$1,380,500) of section 45Q credit in 2023, \$1,380,500 is added to both A's and B's tax due for 2025. Thus, a recapture amount of \$4,086,800 is added to A's tax due for 2025, and a recapture amount of \$1,380,500 is added to B's tax due for 2025.

(v)

Example (5).

(A) Assume the same facts as in Example 2, except that the 100,000 metric tons of carbon dioxide sold to B in 2021, 2022, 2023, and 2024 for use as a tertiary injectant in a qualified enhanced oil recovery project were captured equally (50,000 metric tons per year) from qualified facilities owned by J and K. Neither J nor K made a section 45Q(f)(3)(B) election to allow B to claim the credit.

(B) Because the leakage determined in 2024 (10,000 metric tons) did not exceed the presumed amount stored in 2024 (100,000 metric tons) a recapture event did not occur in 2024. The total amount of section 45Q credit for 2024 is \$2,706,300 (net 90,000 metric tons of qualified carbon oxide captured, disposed of in secure geological storage, and used as a tertiary injectant multiplied by the statutory credit rate for 2024 of \$30.07). J and K may each claim half of this amount of section 45Q credit (\$1,353,150) in 2024.

(C) The total recapture amount in 2025 is the same \$5,467,300 as in Example 2, but is allocated between J and K. The section 45Q credit amounts relating to the first 90,000 metric tons of recaptured qualified carbon oxide are deemed attributable to 2024 and are recaptured at the 2024 statutory rate of \$30.07 per ton (for a recapture amount of \$2,706,300). Because J and K each claimed half of that amount (\$1,353,150) of section 45Q credit in 2024, \$1,353,150 is added to both J's and K's tax due for 2025. The section 45Q credit amounts relating to the remaining 100,000 metric tons of recaptured qualified carbon oxide are deemed attributable to 2023 and are recaptured at the 2023 statutory rate of \$27.61 per ton (for a recapture amount of \$2,761,000). Because J and K each claimed half of that amount (\$1,380,500) of section 45Q credit in 2023, an additional \$1,380,500 is added to both J's and K's tax due for 2025. Thus, a total recapture amount of \$2,733,650 is added to both J's and K's tax due for 2025.

(vi)

Example (6).

(A) M owns Industrial Facility Z. No other taxpayer has ever owned Z, and M has never allowed another taxpayer to claim any section 45Q credits with respect to qualified carbon oxide captured from Z. M captured 1,000,000 metric tons of carbon dioxide annually in each of 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, and 2025. All captured carbon dioxide was sold to N for use a tertiary injectant in a qualified enhanced oil recovery project. N provided contractual assurance that the carbon dioxide would be sequestered in secure geological storage. M claimed section 45Q credit amounts of \$12,830,000 in 2017, \$15,209,000 in 2018, \$17,760,000 in 2019, \$20,220,000 in 2020, \$22,680,000 in 2021, \$25,150,000 in 2022, \$27,610,000 in 2023, \$30,070,000 in 2024, and \$32,540,000 in 2025 using the statutory rates in §1.45Q-1(d)(3). No injection of carbon oxides takes place in 2026. In 2026, N determined that 6,200,000 metric tons of qualified carbon dioxide

previously injected had leaked from the containment area of the reservoir and were released into the atmosphere.

(B) Because the leakage determined in 2025 (6,200,000 metric tons) exceed the amount stored in 2026 (0 metric tons) a recapture event occurred in 2026. A's credit for 2026 is \$0 because the net amount of carbon dioxide captured and used as a tertiary injectant in 2026 was 0 metric tons. The 2026 recapture amount is calculated by multiplying the 6,200,000 metric tons of recaptured qualified carbon oxide by the appropriate statutory credit rate using the LIFO method. The first 1,000,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2025, and is recaptured at the 2025 statutory rate of \$32.54 per metric ton. The next 1,000,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2024, and is recaptured at the 2024 statutory rate of \$30.07 per metric ton. The next 1,000,000 metric tons of recaptured qualified carbon oxide is deemed attributable to 2023, and is recaptured at the 2023 statutory rate of \$27.16 per metric ton. The remaining 3,200,000 metric tons are not subject to recapture because of the three-year lookback limit in §1.45Q-1(g)(2). Thus, the total recapture amount is \$89,770,000, and is added to A's tax due for 2026.

(h) Recapture in the event of deliberate removal from storage.

(1) In general. If qualified carbon oxide for which a credit has been claimed is deliberately removed from a secure geological storage site, then a recapture event would occur in the year in which the qualified carbon oxide is removed from the storage site pursuant to §1.45Q-5(a).

(2) Recycled qualified carbon oxide. If qualified carbon oxide for which a credit has been claimed is recaptured, recycled, and reinjected as part of the enhanced oil and natural gas recovery project, that qualified carbon oxide will be considered recycled carbon oxide under section 45Q(c)(2). If recycled carbon oxide is reinjected into the same qualified enhanced oil or natural gas recovery project it was originally injected into, it will not be considered deliberately removed from a secure geological storage site for purposes of paragraph (h)(1) of this section. If recycled carbon oxide is reinjected into a different qualified enhanced oil or natural gas recovery project from the one it was initially injected into, or used for any other purpose, that qualified carbon oxide will be considered deliberately removed from a secure geological storage site for purposes of paragraph (h)(1) of this section.

(i) Limited exceptions. A recapture event is not triggered in the event of a loss of containment of qualified carbon oxide resulting from actions not related to the selection, operation, or maintenance of the storage facility, such as volcanic activity or terrorist attack.

(j) Applicability date. This section applies to taxable years beginning on or after January 13, 2021. Taxpayers may choose to apply this section for taxable years beginning on or after January 1, 2018,

provided the taxpayer applies this section and §§1.45Q-1, 1.45Q-2, 1.45Q-3, and 1.45Q-4 in their entirety and in a consistent manner.

T.D. 9944, 1/13/2021 .