

DEPARTMENT OF AGRICULTURE**Office of Energy and Environmental Policy****7 CFR Part 2100****[Docket No. USDA–2024–0003]****RIN 0503–AA82****Technical Guidelines for the Production of Regenerative Agricultural Biofuel Feedstocks**

AGENCY: Office of Energy and Environmental Policy (OEEP), Office of the Chief Economist (OCE), U.S. Department of Agriculture (USDA).

ACTION: Final rule.

SUMMARY: This final rule revises technical guidelines for quantifying, reporting, and verifying the carbon intensity of agricultural commodity crops used in the production of biofuels relative to an estimated national average that were established by a prior January 2025 interim rule. Specifically, the January 2025 interim rule established guidelines for the implementation, reporting, verification, and quantification of carbon intensity (CI) of certain agricultural commodities at the field-scale. This final rule makes revisions to the January 2025 interim rule that were requested by commenters or that are otherwise necessary because of intervening Executive action. The revised guidelines articulate an approach for farm producers to quantify the change in net emissions associated with crops produced using one or more authorized practices. The revised guidelines also articulate a framework for how information regarding emissions, resulting from the production of biofuel feedstock commodity crops, could be reported and tracked throughout the supply chain.

DATES: *Effective date:* July 29, 2026.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:**Background**

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill (Pub. L. 110–246)), § 2709, (16 U.S.C. 3845)

authorizes the Secretary of Agriculture to establish technical guidelines that outline science-based methods to measure the environmental services benefits from conservation and land management activities to facilitate the participation of farm producers, ranchers, and forest landowners in emerging environmental services markets and to give priority to the establishment of guidelines related to farmer, rancher, and forest landowner participation in carbon markets. It further directs the Secretary to establish verification guidelines, including the role of third parties in conducting independent verification of farming practices used for environmental services markets and other functions. Regulations to implement the programs of Chapter 58 of Title 16 of the U.S. Code, as specified in 16 U.S.C. 3846, and the administration of those programs are to be made as an interim rule effective on publication, with an opportunity for notice and comment.

Pursuant to the authority, USDA is issuing this final rule to revise guidelines established by a prior interim rule (90 FR 5497–5519, Docket No. USDA–2024–0003, referred to below as the January 2025 interim rule) for the quantification, reporting, and verification of greenhouse gas (GHG) reduction benefits resulting from implementation of low-carbon practices in the production of commodities that are used as biofuel feedstocks in the context of environmental services markets. Low-carbon practices are agricultural management practices, systems, and technologies that have been demonstrated to generally reduce GHG emissions or increase soil carbon sequestration. Greater adoption of low-carbon practices could lower overall GHG emissions associated with biofuel production and provide other environmental benefits, such as improved water quality and soil health.

These technical guidelines are intended to support reduced-CI biofuels production. USDA's authority allows for the establishment of guidelines related to emerging environmental services markets. At this time, the biofuel market represents a clear market opportunity for agricultural commodities produced with a reduced CI. Producing a carbon offset is a different policy context that would require a different set of standards. These guidelines do not constitute a carbon offset protocol.

The net GHG emissions associated with a defined set of low-carbon practices and nutrient application rates are quantified as explained below in the Methodology for Calculating Carbon Intensities used in USDA Feedstock

Carbon Intensity Calculator (USDA FD–CIC) section.

In order to assess emissions associated with crop feedstocks, Argonne National Laboratory (ANL) developed the original version of the Feedstock Carbon Intensity Calculator (FD–CIC) as a research and development tool. For the purposes of this rule, USDA developed USDA FD–CIC, which builds on and updates ANL's FD–CIC according to the methodology below.

Crop production generates GHG emissions, including nitrous oxide (N₂O) emissions resulting from fertilizer use and potentially changes in soil carbon flux as a result of tillage, as well as emissions from on-farm fuel use for field operations. When these crops are used as feedstocks to produce biofuels, the GHG emissions associated with their production contribute a significant percentage of the overall GHG emissions associated with crop-based biofuel production. For instance, feedstock crop production emissions account for over 50 percent of the direct emissions (not including land use change or other market-mediated effects) from producing corn ethanol and approximately half of the direct emissions from producing soybean biodiesel. The GHG emissions associated with feedstock crop production can be reduced through low-carbon practices and nutrient management, in turn reducing the lifecycle GHG emissions associated with biofuel production. To date, most existing programs have relied on assumptions about average or typical farming practices to estimate emissions associated with biofuel feedstock production. To capture the effects of low-carbon agriculture practices on net GHG emissions, and to quantify net GHG emissions reductions specifically attributed to those feedstocks grown with low-carbon agriculture practices, USDA developed the January 2025 interim rule to establish technical guidelines for reduced-CI crops used as biofuel feedstocks. This final rule allows for the differentiation and quantification of CIs associated with the production of reduced-CI crops used as biofuel feedstocks, through the use of USDA FD–CIC.

USDA took public comment on the January 2025 interim rule for 60 days, ending March 18, 2025. USDA received 114 comments by the close of the comment period. The top sources of comments were from farmers/farms (19), fuels industry groups (19), crop commodity/farm groups (18), agricultural industry (12),

environmental groups (12), and private citizens (10). Other groups submitting comments included academia, private companies, advocacy organizations, organizations involved in carbon markets, one international government, and anonymous commenters. The comments received are categorized and summarized by topic below.

Methodology for Calculating Carbon Intensities Used in USDA FD-CIC

This section explains the methodology that is used to calculate values included in USDA FD-CIC. Over the past year, USDA has worked with academic institutions and experts to develop USDA FD-CIC, which provides users with a crop-specific, per-bushel CI associated with biofuel feedstock crops using one or more low-carbon practices.

In general, USDA FD-CIC quantifies the CI (in CO₂e emissions per bushel) of four domestic feedstock crops (field corn, soybeans, sorghum, and spring canola) based on user-supplied nutrient management data and user-supplied checklists of low-carbon practices. The calculated CI does not include impacts of land use change or other market-mediated effects. USDA FD-CIC is separate and distinct from methodologies specific to other programs or incentives and the values calculated by USDA FD-CIC may not be representative of values generated by or applicable to other program- or incentive-specific methodologies. The USDA FD-CIC feedstock CI estimates reflect nutrient management practices as well as the adoption of specified low-carbon practices. Nutrient management and low-carbon practices may lead to changes in:

- soil organic carbon (SOC) storage,
- direct and indirect N₂O emissions,
- upstream emissions from fertilizer production, and
- carbon dioxide (CO₂) and upstream GHG emissions from on-farm energy consumption.

The effectiveness of nutrient management and low-carbon practices in reducing the CI of feedstocks varies by region. The underlying analysis was conducted using the USDA Natural Resource Conservation Service's (NRCS) Major Land Resource Areas (MLRAs). The U.S. has 278 MLRAs, each with its own unique soil and growing conditions. MLRAs generally do not follow state or county lines. USDA FD-CIC estimates feedstock CIs based on user location, user supplied nutrient management information, and, if applicable, the impact of one or more low-carbon practices. Impacts of low-carbon practices on SOC and N₂O

represent MLRA averages mapped to U.S. counties.

The impacts of soil health practices on soil organic carbon are quantified based on a 30-year modeling timeframe, where rotations of practices are modeled over 30 years on individual fields. Rotations of practices are modeled on a 30-year timeframe in order to adequately capture weather variability. To reflect the potential for reversals in adoption of no-till, the no-till practice is simulated using four years of no-till and one year of tillage, repeated for 30 years. Impacts are then divided by 30 to provide a one-year estimate of SOC change under that practice. These estimates may over or under estimate SOC change in any given year of participation in a program. While the simulation modeling reflects the potential for short-term reversion to more intensive tillage and the resulting SOC impacts, the estimate does not attempt to estimate the SOC impacts that could arise from long-term changes in land-use or disadoption of the practice over time.

DayCent, the model used to generate values in USDA FD-CIC, is one of the world's most well-known and rigorously peer reviewed biogeochemical models, extensively vetted across several decades for use in scientific research and policy applications. Further, the methods used by DayCent to estimate changes in soil carbon and nitrous oxide emissions were also published in USDA's Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory.¹ The second edition of the USDA entity-scale methods report, published in 2024, went through an extensive public, scientific, and interagency peer-review process which adhered to the U.S. Office of Management and Budget (OMB) guidelines "Final Information Quality bulletin for Peer Review," which was published on January 14, 2005 (70 FR 2664–2677), and this document has been designated by OMB as a highly influential scientific assessment. The methods for quantifying changes in soil carbon stocks and N₂O emissions from agricultural soils are described in USDA FD-CIC documentation.

USDA provided the public with early access to the beta version of USDA FD-CIC in January 2025 as part of the interim final rule comment process, allowing the public to evaluate the

methodology and provide feedback that USDA could use to inform improvements to the final, operative version of USDA FD-CIC. In response to public feedback, USDA has made several changes to the methodology, which include expanding the number of feedstocks and management practices, and developing a new functionality that allows users to directly input field-specific nitrogen application and yield information as part of the CI calculation.

USDA will shortly publish USDA FD-CIC on its website at <https://www.usda.gov/usda-fdcic> for public use along with a user guide, full methodology documents, and peer review report.

Summary of Comments and Changes

This final rule responds to the comments received by the public comment deadline and makes clarifying and related changes.

A high-level summary of changes made to each subpart of the rule are below followed by a more detailed summary of comments and responses by topics.

Summary of Changes to Subpart A: General Provisions

The final rule makes changes to the stated purpose to clarify that the rule is intended to support the quantification, reporting, and verification of carbon intensity.

This final rule updates the definitions in 7 CFR 2100.002 to remove the terms "climate smart agriculture (CSA) crop," and "climate smart agriculture (CSA) practices." Instead, the rule now defines "low-carbon agriculture (low-carbon) practices" and modifies the definition of "reduced-carbon intensity (reduced-CI) crop" to reflect updated terminology and to be more precise in specifying the CI of biofuel feedstock crops. Additionally, this final rule removes the term "Soil Tillage Intensity Rating (STIR)" and defines "Tillage Disturbance Index for Soil Carbon (T-DISC)" to reflect a change from using STIR as a measure of tillage focused on soil erosion to T-DISC as a measure of disturbance and potential for soil carbon loss to better align with what was modeled to develop USDA FD-CIC.

In addition, this final rule adds several definitions in response to public comment. These definitions include "spring canola," as spring canola was added as an eligible feedstock in response to comments. This final rule now defines "manure," which is included as a source of nitrogen that is accounted for in USDA FD-CIC.

This final rule also modifies several definitions to clarify and align with the

¹ See <https://www.usda.gov/about-usda/general-information/staff-offices/office-chief-economist/office-energy-and-environmental-policy/climate-change/greenhouse-gas-inventory-and-assessment-program/quantifying-greenhouse-gas-fluxes-methods-entity-scale-inventory>.

updated requirements as requested by commenters. For example, the updated definition of “Agricultural Expert” now clarifies that Agricultural Experts must be approved by the Federal Crop Insurance Corporation. In addition, the definition of “conventional crop” was updated to reflect the change in terminology from “climate-smart” to “low-carbon.” The definition of “crop interval” was updated to clarify that the covered time period includes the production of a cover crop. The definition of “management unit” was updated to clarify that fields in a management unit must include the same management. The definition of “reduced-carbon intensity (reduced-CI) processed product” was updated to clarify that it refers to products derived from reduced-CI crops between the farm and first biofuel refiner used for the production of biofuel. The definition of “intensive tillage,” “no-till,” and “reduced till” were updated to reflect a change from using STIR as a measure of tillage focused on soil erosion to T-DISC as a measure of disturbance and potential for soil carbon loss.

Summary of Changes to Subpart B: Applicability

In response to public comment, this final rule includes spring canola as defined in subpart B in § 2100.011 for which a reduced-CI could be quantified using USDA FD-CIC. Spring canola is a prominent biofuel feedstock and is designated by the USDA National Agricultural Statistics Service (NASS) as a principal crop with millions of acres of annual production in the United States. In addition, USDA was able to model the impact of low-carbon agriculture practices on spring canola production, given sufficient data available.

This final rule updates terminology, replacing “climate smart agriculture (CSA),” with “low-carbon” and “reduced carbon-intensity” to define practices which reduce GHG emissions relative to a business-as-usual baseline, and crops produced using those practices. Crops produced using certain low-carbon practices are referred to as reduced-CI crops and are defined in § 2100.011. Crops produced without the use of low-carbon practices are referred to as conventional crops. Reduced-CI crops generally have a reduced CI compared to a conventional crop of the same type and produced in the same location. Depending on the specific crop being produced, reduced-CI crops defined in this rule are grown using either nutrient management or nutrient management with one or more of the

following practices: no-till, reduced till, and cover crops.

In response to public comment, this final rule alters the approach to nutrient management, moving to a nitrogen use efficiency (NUE) approach. Previously, specific nutrient management practices were included in USDA FD-CIC (for example, split-application of nitrogen, and shifting from fall to spring application of nitrogen), and assumptions were made about the implications of those practices for nitrogen application and the resulting GHG changes. Instead, this final rule requires USDA FD-CIC users to input their actual nitrogen applied per year, in addition to their actual and expected yield, in order to more precisely capture the impacts of nitrogen management on nitrogen application, without specifying particular practices, and on the resulting GHG emissions estimates. Commenters requested this change to allow for both a more accurate estimate of the GHG emissions resulting from nutrient management, and to allow flexibility in which nutrient management practices were applied. In addition, where the nutrient management practices were optional in the interim rule, all participants are now required to enter their nitrogen applied, actual, and expected yield, in order for these factors to contribute to the final CI score associated with a given field or management unit. Since this calculation is implicit in every CI score awarded to a participating field or management unit, implementation requirements, recordkeeping requirements, and verification requirements associated with nutrient management apply to every farm producer utilizing this rule.

In addition to the revised nitrogen approach, this final rule also allows for the application of nitrification inhibitors and manure as nutrient management practices in response to public comment. Commenters requested the addition of these practices, as they are commonly used in nutrient management strategies. Accounting for these impacts in USDA FD-CIC allows for a more location and practice-specific estimate of biofuel feedstock CI, while also providing additional implementation flexibility for farm producers. USDA FD-CIC users now specify the fraction of nitrogen applied using nitrification inhibitors, allowing for flexibility in how inhibitors are applied. USDA FD-CIC users also specify the source and type of manure applied (if applicable). Each of these nutrient management practices contribute to biofuel feedstock crops’ CI score.

This final rule also maintains the ability for farm producers to implement

low-carbon agriculture practices toward the CI score of biofuel feedstock crops, including no-till, reduced tillage, and cover crops. These practices were chosen because they can be used in the production of field corn, soybeans, sorghum, and spring canola and because scientific evidence demonstrates their effectiveness at reducing GHG emissions or sequestering additional carbon. This rule only includes practices which are used on-field and excludes those practices that occur on field edges or farm borders, in order to associate emissions reductions with the production of commodities on a per acre or per output (for example, bushels) basis.

In response to public comments, this final rule accounts for reduced-CI crops at the field scale rather than the farm scale. This allows for more specific accounting of reduced-CI crops, where farm producers may wish to produce reduced-CI crops on specific fields or management units rather than creating one average CI for the entire farm.

Summary of Changes to Subpart C: Quantification of Field-Level Crop-Specific Carbon Intensity

This rule establishes voluntary technical guidelines for quantifying CIs of biofuel feedstocks. CIs are quantified for a specific crop at the field or management unit level on an annual basis.

Example 1: A Farm (Farm A) With One Relevant Biofuel Feedstock Crop and Multiple Fields

Consider a farm that grows only corn harvested in 2025 and has 5 fields. Field 1 does not implement any low-carbon practices. Field 2 and 5 both implement no-till, cover crops, and apply the same nutrient management practices (same amount and type of N applied per acre). Field 3 and 4 both implement no-till and cover crops, but Field 3 adds a nitrification inhibitor and Field 4 does not. Farm A would calculate 4 CIs: one CI for Field 1, one CI for Field 2 and 5, one CI for Field 3, and one CI for Field 4. Fields 2 and 5 would be able to calculate one CI score because it falls under the definition of a management unit and would input into USDA FD-CIC the average yield per acre across both fields.

Example 2: A Farm (Farm B) With Multiple Biofuel Feedstock Crops and Uniform Management Practices

Consider a farm that grows corn and soybeans harvested in 2025. All fields growing corn utilize the same management practices and all fields growing soybeans utilize the same

management practices. All fields growing corn would be considered one management unit and could be entered into USDA FD–CIC as one management unit and all fields growing soybeans would also be considered one management unit. Farm B would have 2 CIs: one CI for all soybeans and one CI for all corn.

Example 3: A Farm (Farm C) With a Double Crop of a Biofuel Feedstock Crop and a Non-Feedstock Crop and Varied Management Practices

Consider a farm that plants sorghum following winter wheat, with all fields using the same rotation but with different management practices. The sorghum crop is an eligible feedstock in USDA FD–CIC while wheat is not an eligible feedstock, nor a cover crop as it was harvested. All fields growing sorghum would be considered one management unit and could be entered into USDA FD–CIC as one management unit. Farm C would have one CI for all its sorghum. Farm C must enter all forms of applied synthetic nitrogen and manure nitrogen applied across the entire sorghum crop interval when calculating the CI of its sorghum. Further, Farm C must select the tillage scenario that is associated with the highest T–DISC value across the crop interval. The emissions effects of the double-cropped system will be reflected in the yield and nitrogen application rates for the sorghum crop. The estimates of soil organic carbon stock changes for biofuel crops were developed assuming that some acres were double-cropped.

Example 4: A Farm (Farm D) With a Double Crop of Biofuel Feedstock Crops and Uniform Management Practices

Consider a farm that plants soy after corn in the same growing season, with all fields using the same rotation and management practices, including the same tillage intensity on both corn and soy crop intervals. Both corn and soy are eligible feedstocks in USDA FD–CIC. All double-cropped acres would include two crop intervals in a year, one for corn and another for soy, that extend from the harvest of the prior crop through harvest of the subsequent crop. Farm D would have one CI for all its corn and another CI for all its soybeans. The emissions effects of the double-cropped system will be reflected in the yield and nitrogen application rates for both the corn and soybean crops. All nitrogen applied during cultivation of an individual feedstock crop (e.g., corn) should be attributed to that feedstock crop. Nitrogen applied during the crop interval of the subsequent feedstock

crop, including nitrogen applied after harvest of the previous feedstock crop and before planting of the subsequent feedstock crop, should be attributed to the subsequent crop that is planted. If a cover crop is grown during the winter preceding the spring planting year, the benefits of the cover crop would be accounted for by the first crop in the spring season—in this case, corn. The following soy crop does not have a cover crop in its crop interval and can not claim the benefits of a cover crop. In general, double-cropped corn-soy would be expected to yield less of each crop than a single-crop system but would be expected to yield more biomass per acre than the single-crop system.

Example 5: A Farm (Farm E) With a Double Crop of Biofuel Feedstock Crops and Varied Tillage Practices Across Crops

Consider a farm that plants soy after corn in the same growing season, with all fields using the same rotation and management practices but with reduced till on corn and no-till on soy. Similar to Farm D, Farm E would have one CI for all its corn and another CI for all its soybeans. However, if a feedstock crop claims a no-till practice, the rule requires that the entire rotation use a no-till practice. Therefore, Farm D may not claim no-till for its corn or soy production but would claim reduced till on production of each.

This rule outlines the steps to quantify a field-level crop-specific CI. CIs for feedstocks eligible in this rule are quantified using USDA FD–CIC. To quantify CIs for eligible crops under this rule, a farm producer must input field-level management information into USDA FD–CIC. This rule updates inputs required for USDA FD–CIC based on the revised approach described above. Necessary input information includes farm location (county and state); crop type produced; total field or management unit acres; nitrogen application (including synthetic fertilizer, use of a nitrification inhibitor, and application of manure; yield information; nitrification inhibitor usage; the use of low-carbon practices, such as no-till or reduced till; and use of a cover crop. USDA also updated language in the final rule to require that the actual yield be adjusted to standard moisture contents (15.5% for field corn, 13% for soybeans, 14% for sorghum, and 8.5% for spring canola). USDA FD–CIC output is a field-level CI for the crop produced using the specified practices at the farm location. When assigning multiple CIs for eligible biofuel feedstock crops grown on different

management units or fields with different management scenarios, this step must be repeated for each field or management unit. Further information on USDA FD–CIC, information requirements and how it is used can be found here: <https://www.usda.gov/usda-fdcic>.

Summary of Changes to Subpart D: Chain of Custody Standards

General Recordkeeping and Reporting Standards

In response to public comment, and to clarify recordkeeping associated with participation in markets for reduced-CI biofuels in addition to other sustainability programs, this final rule modifies recordkeeping and reporting standards.

The final rule requires that entities participating in multiple sustainability certification programs must now provide a third-party verifier with documentation related to their participation in those programs, in addition to programs associated with reduced-CI feedstocks, in order to ensure that environmental benefits (i.e., GHG emissions reductions) are not accounted for in multiple programs. This provides certainty that the environmental benefits associated with the practices are transferred with the crop and cannot be sold into other markets. This update ensures the integrity of the market for reduced-CI feedstock, where the CI benefits must remain associated with the feedstock.

Farm Recordkeeping and Reporting Standards

This final rule updates farm-level recordkeeping and reporting standards to reflect changes in how USDA FD–CIC calculates a feedstock's CI using applied nitrogen and yield. In particular, these changes necessitate additional farm-level recordkeeping requirements documenting expected yield and requiring an attestation under penalty of perjury in the Biofuel Feedstock Report. For farm producers who purchase crop insurance covering the reduced-CI feedstock crop during the current crop interval, farm producers must maintain records demonstrating the expected yield used as part of their crop insurance policy. For farm producers who do not purchase crop insurance, farm producers must maintain records demonstrating the appropriate transitional yield² as published by

² USDA RMA Insurance Offer Transitional Yields/Revenues, <https://webapp.rma.usda.gov/apps/RIRS/InsuranceOfferTransitionalYieldsRevenues.aspx>.

USDA Risk Management Agency (RMA) (for example, screenshots or printouts from the RMA tool utilized to determine the transitional yield) or the appropriate Agriculture Risk Coverage (ARC)-County Benchmark yield³ published by the USDA Farm Services Agency (FSA).

In addition, this rule updates recordkeeping requirements for farm producers to ensure that nutrient management practices are implemented in accordance with subpart G, related to the application of nitrogen and manure. The final rule also requires farm producers to provide records on moisture content of the reduced-CI crop and be able to provide records demonstrating that the actual yield input into USDA FD-CIC is adjusted to the moisture content stated in the rule.

This final rule updates requirements to chain of custody and verification standards for first points of aggregation and intermediary entities; entities that process, sell, or purchase processed products derived from reduced-CI crops; mass balance recordkeeping standards; and biofuel refiner recordkeeping standards. For example, this final rule requires that the moisture content of low-CI crops be documented to ensure that low-CI crop yields are properly adjusted to standard moisture content. It also requires the Biofuel Feedstock Report to be passed through the entire supply chain, ending at the biofuel refiner, to assist in recordkeeping for low-CI crops. In addition, the attestation required by the first point of aggregation and intermediary entities must now be signed under penalty of perjury. Finally, this rule specifies that mass balance equations must be completed using dry weights.

Summary of Changes to Subpart E: Audits and Verification

This final rule updates requirements in § 2100.040 to direct verifiers to verify that the actual yield and expected yield used for the quantification of CI is accurate to reflect changes to this rule related to the move to field-level CI scores and updated inputs required for USDA FD-CIC based on public comments. A more comprehensive summary of public comments related to this are in the Summary of Comments below. Additionally, this rule updates audit standards to add language about entities participating in multiple sustainability markets in response to comments asking to clarify how this rule interacts with other sustainability

markets. Any entity that participates in multiple sustainability markets must comply with additional audit standards to ensure that the amount of reduced-CI feedstock or reduced-CI processed product is not double counted and that sustainability characteristics have not been claimed in multiple markets. A more comprehensive summary of public comments related to this are in the Summary of Comments below. Additionally, language on how the third-party verifier selects farms as part of a sample was updated for clarity.

The final rule updates third-party verifier requirements in § 2100.041 to include that a third-party verifier should not have conflicts of interest and also requires that the verification team include an Agricultural Expert. USDA defines Agricultural Expert to align with RMA's crop insurance program requirements for Approved Agricultural Experts as defined in the Good Farming Practice Determination Standards Handbook.⁴

Summary of Changes to Subpart F: Low-Carbon Agriculture Practice Standards

The final rule removes nutrient management from this subpart and moves these requirements into a separate subpart to reflect changes to this rule related to changing from a nutrient management practice-based approach to a revised approach that allows farm producers to specify their nitrogen use based on public comment.

In addition to specifying the implementation standards for each low-carbon practice, this rule also establishes recordkeeping standards for each low-carbon practice. Required records are necessary to provide evidence that farm producers implemented low-carbon practices according to the rule. Records must be retained for five years and made available to third-party verifiers to conduct audits. The rule, in some cases, does not specify the type or origin of required records; instead, the rule lists examples of record types such as physical documentation (for example, paper forms, invoices, receipts, seed tags), digital files (including from farm management software), data generated by farm equipment (for example, precision agriculture equipment), remote sensing data, georeferenced and timestamped photographs, and data and records used for participation in USDA programs. The range of allowable record

options is designed to increase flexibility and minimize the transaction costs for farm producers, who may already maintain various types of records depending on their preferences, participation in government or private programs, or previous low-carbon practice implementation. However, the records must be sufficient for the third-party verifier to verify compliance with the relevant practice standard for the specified time period.

Low-Carbon Agriculture Practice Standards: Tillage Management

The practice of reduced till manages the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round while reducing the frequency and intensity of soil disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting. The final rule changes the requirements for reduced till and no-till to reflect a T-DISC rating rather than a STIR rating. This change was made to better align the practice requirements for reduced till and no-till with the quantification of tillage impact used in the DayCent model used to develop USDA FD-CIC. The T-DISC rating may be obtained by using USDA's T-DISC calculator or a similar tool using USDA's T-DISC methodology and underlying parameters which produces results equivalent to those produced by USDA's T-DISC calculator. USDA will publish on its website <https://www.usda.gov/t-disc> the T-DISC calculator for public use with a user guide.

The practice of reduced till increases SOC as a result of decreased soil disturbance and can impact N₂O emissions due to changes in the soil environment, when compared to intensive till.⁵ To qualify as reduced tillage under this rule, field(s) or management unit(s) are permitted to use tillage methods where the entire soil surface is disturbed by tillage operations such as chisel plowing, field cultivating, tandem disking, vertical tillage, or ridge tillage, provided that the T-DISC value of the tillage system is no greater than 0.252.

⁵ See USDA NRCS, *Conservation Practice Standard Residue and Tillage Management, Reduced Till*, September 2016, https://www.nrcs.usda.gov/sites/default/files/2022-09/Residue_And_Tillage_Management_Reduced_Till_345_CPS.pdf.

See also: NRCS, *Conservation Practices and Greenhouse Gas Mitigation Information dashboard*, https://publicdashboards.dl.usda.gov/t/FPAC_PUB/views/NRCSConservationPracticesandGreenhouseGasMitigation/MitigationSummaries?%3Aembed=y&%3AisGuestRedirectFromVizportal=y#3.

³ USDA FSA Agriculture Risk Coverage (ARC) & Price Loss Coverage (PLC) Data, <https://www.fsa.usda.gov/resources/programs/arc-plc/program-data>.

⁴ See USDA RMA, *Good Farming Practice Determination Standards Handbook*, November 2023, <https://www.rma.usda.gov/sites/default/files/topics/2024-14060-Good-Farming-Practice-Determination-Standards.pdf>.

The residue and tillage management practice of no-till limits soil disturbance to manage the amount, orientation and distribution of crop and plant residue on the soil surface year-round. The practice of no-till increases SOC as a result of decreased soil disturbance and decreases N₂O emissions due to changes in the soil environment when compared to both reduced till and conventional till.⁶

To be considered as no-till under this rule, full-width soil disturbance must not be performed, from the time immediately following harvest or termination of one cash crop through harvest or termination of the next cash crop in the rotation, regardless of the depth of the tillage operation. Strip tillage and fertilizer injection are permitted, provided that the T-DISC value of the tillage system is no greater than 0.075.

This final rule updates language in § 2100.051 to clarify that residue must not be harvested and clarify language related to removing residue from the crop planting row based on public comment requesting clarification. Additionally, language is updated to clarify that records must be kept for five years. A requirement to indicate the total bushels produced was removed. This is because this requirement was related to the farm-level weighted average CI that was proposed in the interim final rule, which is updated to a field-level CI in the final rule based on public comment.

Low-Carbon Agriculture Practice Standards: Cover Crop Management

This final rule updates requirements to allow for grazing of cover crops and to remove the requirement that cover crops may not be fertilized based on public comment. Additionally, language was edited to clarify that records must be kept for five years and to add a record requirement if grazing cover crops. Additionally, remote video conferencing was removed as a way to verify establishment of cover crops.

Addition of Subpart G: Nutrient Management Standards

As described in the Summary of Changes to Subpart B: Applicability, the final rule alters the approach to nutrient

management and moves from a practice-based nutrient management approach to a revised approach that allows farm producers to specify nutrient applications. As a result, this final rule removes the section in subpart F on nutrient management standards and creates subpart G to contain the updated standards. This subpart outlines: general nutrient management standards that must be followed for all fields or management units producing reduced-CI crop; the requirements for any fields or management units using nitrification inhibitors or applying manure; recordkeeping requirements; and verification requirements.

Every field or management unit that participates in this program and quantifies a CI score using USDA FD-CIC must follow the nutrient management standards in subpart G. For each field or management unit, the farm producer must develop and document a planned nutrient budget, yield goal, and applications of nitrogen, phosphorus, and potassium (N-P-K) in pounds per acre prior to implementation. The nutrient budget must account for all known measurable sources and removals of N-P-K. The farm producer must base the nutrient budget on current soil test results or the professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or other persons approved by the Federal Crop Insurance Corporation (FCIC),⁷ whose research or occupation is related to the specific crop or practice for which such expertise is sought. If employing an Agricultural Expert, the Agricultural Expert must not have conflicts of interest or relationship with the farm producer seeking the Agricultural Expert's services.

Nitrification Inhibitor Standards

A nitrification inhibitor is a chemical compound that slows down the conversion of ammonia to nitrate in soil, a process called nitrification. Nitrification inhibitors are added to fertilizers and can help reduce N₂O emissions.⁸ To include the use of

nitrification inhibitors in the calculation of the carbon-intensity of the reduced-CI crop, nitrification inhibitors must be defined by the Association of American Plant Food Control Officers (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.

Manure Application Standards

Farm producers applying solid or liquid manure may not exceed application rates stated in their nutrient budget and also must get a manure test for each type of manure applied. The manure test must be collected during the current crop interval and provide information on nitrogen and phosphorus content of the manure.

Nutrient Management Recordkeeping Standards

The following records must be maintained related to nutrient management:

- details on the source and type of nutrients applied;
- date, method, and location of nutrient applications;
- planting-seeding date for each field or management unit where reduced-CI crop was produced; and
- the total acreage within each field or management unit where the reduced-CI crop was produced.

Additionally, the producer must provide a nutrient budget that demonstrates all crop nutrient needs for N-P-K, which may include a soil test dated within 2 years of the development of the nutrient budget or professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or other persons approved by the FCIC, whose research or occupation is related to the specific crop or practice for which such expertise is sought. Given that nutrient needs vary greatly across crops, fields, and management units, a tailored nutrient budget is necessary to assess the nutrient needs of each crop grown on each field. Evaluation of the nutrient budget can inform the crop-specific and geography-specific rates and types of nutrient management that may result in a GHG benefit.

For farm producers applying manure, they must maintain records for each type of manure applied including:

- the date of the sample taken for the manure test, the animal waste type, and

www.usda.gov/sites/default/files/documents/GHG_Mitigation_Options.pdf

⁶ See USDA NRCS, *Conservation Practice Standard Residue and Tillage Management, No Till*, September 2016, https://www.nrcs.usda.gov/sites/default/files/2022-09/Residue_And_Tillage_Management_No_Till_329_CPS_0.pdf.

See also NRCS *Conservation Practices and Greenhouse Gas Mitigation Information dashboard*, https://publicdashboards.dl.usda.gov/t/FPAC_PUB/views/NRCSConservationPracticesandGreenhouseGasMitigation/MitigationSummaries?%3Aembed=y&%3AisGuestRedirectFromVizportal=y#3.

⁷ See USDA RMA, *Good Farming Practice Determination Standards Handbook*, <https://www.rma.usda.gov/sites/default/files/2024-12/2025-14060-Good-Farming-Practice-Determination-Standards.pdf>

⁸ See Li T, Zhang W et al., *Enhanced-efficiency fertilizers are not a panacea for resolving the nitrogen problem*, *Glob Chang Biol*, Feb 2018 Feb, 24(2):e511-e521, doi: 10.1111/gcb.13918. Epub 2017 Nov 2. PMID: 28973790. See also: ICF International. *Greenhouse Gas Mitigation Options and Costs for Agricultural Land and Animal Production within the United States*. Prepared for USDA Climate Change Program Office, February 2013. <https://>

the location of the sample taken (for example, waste storage pond, collected during irrigation or application, separated solids stack, barn compost at cleanout, etc.);

- results of the manure test; and
- records demonstrating the amount of manure applied.

The records required to be kept for manure are to help a verifier verify that the amount of manure applied and input for quantification purposes is aligned with how much manure is either acquired or produced on farm. For manure originating from outside the farm, receipts demonstrating either the sale of manure or payment to take manure that document the date, quantity, type, and location of the manure source are required. For manure produced on the same operation, records must demonstrate the number of animals producing the manure. For farms that participate in a livestock insurance program, insurance records with the number of head or flock size are required. These livestock insurance programs can include, but are not limited to, the Livestock Risk Program (LRP), Livestock Gross Margin (LGM), or Dairy Revenue Protection (DRP). For farms that do not participate in a livestock insurance program, records must demonstrate the number of livestock head on the operation that year. These include records such as receipts of livestock or livestock products sold, permits demonstrating the number of livestock on the operation, or program enrollment documents.

Nutrient Management Verification

When auditing nutrient management implementation, a verifier must verify that the development of a nutrient budget accounts for all known nutrient sources, that the nutrient budget was developed based on soil test or professional opinion of an Agricultural Expert, and that nutrient application and yield matches the Biofuel Feedstock Report. A verifier must also verify that any additional nitrification inhibitor or manure requirements were followed when relevant.

Summary of Comments

The interim rule 60-day comment period ended March 18, 2025. USDA received 114 comments in response to the rule. USDA reviewed these 114 comments and categorized and summarized them according to the topics identified below. The topics that generated the greatest response were on qualifying practices, qualifying feedstocks, quantification, soil carbon and baseline, verifier qualification, and

general comments. The comments have been organized in alphabetic order within each topic. The topics include:

- **Qualifying Practices**—Conservation Crop Rotation, Conservation Land Management, Consideration of Non-GHG Benefits, Cover Crop Implementation, Enhanced Efficiency Fertilizer and Biofertilizer, Manure, No-Till Implementation, Practice Clarification, Process for Adding More Practices, Reduced Nitrogen Rate, Soil Amendments, Split and Fall Fertilizer Application Implementation;
- **Qualifying Feedstocks**—Additional Feedstocks, Intermediate Oilseeds, Millet, Process for Adding More Feedstocks, Spring Canola;
- **Quantification**—Data Gaps, Model Selection and Evaluation, Regional Variability, Scale, USDA FD-CIC, USDA Programs;
- **Soil Carbon and Baseline**—Baseline, Soil Carbon Time Scale, Permanence, and Quantification;
- **Verification and Recordkeeping**—Align Standards with Existing Programs, Book and Claim/Mass Balance, Data Privacy and Transparency, Recordkeeping Clarification, Reduce Recordkeeping Burdens on Producers, Verification of Nitrogen Rate Reduction; Verifier Qualifications/Accreditation Requirements—Third Party Verifications/Accreditation Requirements, Verification Capacity, and;
- **General Comments**—Cost to Producers, Environmental Tradeoffs and Impacts on GHGs, Equitable Access for Producers, Regulatory Impact Analysis (RIA) and Costs and Benefits, Scientific Basis/Rigor, Supportive Comments.

This final rule responds to the comments received by the public comment deadline and makes clarifying and related changes. In addition to the general summary of changes and comments above, a detailed summary of comments and responses is included below.

Summary of Comments on Qualifying Practices

Conservation Crop Rotation

Comment: USDA received comment in support of adding conservation crop rotations (CCR) as a qualifying practice in the rule. Comments highlighted a wide range of conservation benefits associated with CCR including expanding eligibility to new crops. Comments also referenced either utilizing or modifying NRCS 238 as a model for designing a CCR practice for the use of this rule.

Response: USDA appreciates comments and feedback regarding the

addition of the conservation crop rotation practice and acknowledges that there are conservation benefits resulting from this practice. USDA may consider adding the conservation crop rotation practice in the future. No change is being made to the regulation in response to this issue.

Comment: USDA received comment stating that additional research is still needed to determine the benefits of CCR, should CCR be included in the future. The commenter stated that limited replicated field studies with sufficient statistical power exist to determine the lifecycle GHG emissions associated with these practices and recommended USDA consider emerging research on how CCR can impact yields.

Response: USDA agrees that additional research and data are needed to quantify the potential CI benefits associated with the adoption of conservation crop rotation. No change is being made to the regulation in response to this issue.

Conservation Land Management

Comment: USDA received comment advocating for the inclusion of various conservation land management practices in the final rule including: agroforestry, buffers, grassland and wetland management, prairie strips, integrated grazing perennials, polyculture, and permaculture. Commenters noted the environmental and carbon impact of each practice.

Response: USDA appreciates comments regarding conservation land management and acknowledges that the practices listed above have conservation benefits. At present, USDA has limited the eligible agricultural management practices to on-field practices which apply to the production of the feedstocks currently included in the tool. USDA may consider adding these practices in the future. No change is being made to the regulation in response to this issue.

Consideration of Non-GHG Benefits

Comment: USDA received comment stating that the practices included in this rule can have multiple environmental benefits including soil health benefits (increased SOC, soil fertility, reduced soil erosion, improved water quality and increased biodiversity), and ecosystem services.

Response: USDA agrees that many of the agricultural management practices included have additional benefits beyond CI reductions. This rule is designed specifically to quantify and incentivize CI reductions associated with biofuel feedstock production. Additional requirements and

quantification methodology would be required to assess environmental benefits and costs beyond CI, which USDA may consider in the future. No changes are being made to the regulation in response to this issue.

Cover Crop Implementation

Comment: USDA received comment recommending USDA allow cover crops to be mechanically harvested and/or grazed as the method of cover crop termination to enhance net revenue as well as significantly advance soil health noting that any such limitation in cover crop management may reduce the incentive for many farm producers to adopt this beneficial practice.

Response: USDA appreciates the comments and feedback regarding cover crop implementation. In response to public comment, USDA has allowed for the grazing of cover crops for additional implementation flexibility. The regulatory text has been modified at §§ 2100.052(a)(8) and 2100.052(b)(8) to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment requesting USDA allow fertilizer application to cover cropped fields.

Response: USDA understands and appreciates comments requesting fertilizer application of cover crops. The interim final rule took a practice-based approach to nitrogen management. The final rule shifts to a user-defined NUE approach which allows for the application of fertilizer on cover crops. This approach allows producers to include fertilizer application to cover crops in their total nutrient use efficiency calculation. The regulatory text has been modified at § 2100.052, in subpart C, and a subpart G has been added to address these concerns. No other changes are being made to the regulation in response to this issue.

Enhanced Efficiency Fertilizer and Biofertilizer

Comment: USDA received comment recommending the inclusion of urease inhibitors, control/slow-release fertilizers, and biostimulants in addition to nitrification inhibitors which are already included in the interim rule. Commenters also provided feedback on broadening the definition of enhanced efficiency fertilizer to include of a range of biostimulants including as seed/soil/plant inoculants, additions to liquid manure, beneficial bacteria, and fertilizers.

Response: USDA appreciates comments regarding urease inhibitors, control/slow-release fertilizers, and biostimulants. USDA has taken a NUE

approach for calculating the resulting CI score for nutrient management. The NUE approach allows producers to manage their own nutrient application in the way that is best for their individual operation or field regardless of practice. The tool requires users to input synthetic nitrogen applied per acre, fraction of nitrogen receiving nitrification inhibitors, nitrogen applied from manure, and yield per acre for each field, and calculates the NUE and associated N₂O emissions based on these inputs. This approach provides flexibility for producers to use a variety of products to maximize their NUE. The regulatory text has been modified at subpart C and subpart G has been added to address these concerns. No other changes are being made to the regulation in response to this issue.

The tool does not include variables for fraction of nitrogen receiving urease inhibitors, control/slow-release fertilizers, or biostimulants because of data and modeling constraints. Available scientific research and current modeling of non-irrigated systems does not support sufficient CI reductions to merit the inclusion of control/slow-release fertilizers in the final rule. USDA was not able to model and include urease inhibitors in the final rule. These technologies may be implemented by producers to improve NUE by facilitating the reduction of nitrogen application. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment expressing concern about limited replicated field studies with sufficient statistical power to determine the GHG emissions associated with enhanced efficiency fertilizers.

Response: After a thorough review of current scientific research conducted of both field and lab studies and in both domestic and international settings, USDA is confident in the efficacy and GHG emissions reductions of nitrification inhibitors. Current modeling also supports GHG emissions reductions with the use of nitrification inhibitors. No change is being made to the regulation in response to this issue.

Comment: USDA received comment recommending the requirement of inhibitor use for fall nitrogen application while leaving in-season nitrogen application optional for inhibitor use.

Response: USDA appreciates this feedback and has implemented a NUE approach. Producers can apply nitrogen at any point during the crop interval and utilize USDA FD-CIC to calculate NUE. The regulatory text has been modified at subpart C and subpart G has

been added to address these concerns. No other changes are being made to the regulation in response to this issue.

Manure

Comment: USDA received comment requesting the inclusion of manure application as a qualifying practice in the final rule. Commenters mentioned the benefit of manure to both increase soil organic carbon while also avoiding emissions from synthetic fertilizer. One commenter also highlighted manure as the primary pathway for livestock producers to benefit from environmental markets for biofuel production.

Response: USDA appreciates this feedback, USDA has included manure as an eligible form of nitrogen in the final version of the rule, but has not included potential soil organic carbon impacts of manure. The regulatory text has been modified to add a subpart G to address these concerns. No other changes are being made to the regulation in response to this issue.

No-Till Implementation

Comment: USDA received comment recommending either removing the required commitment to reduce till or no-till for four out of five years, or change the required commitment to reduce till or no-till four out of five crops in a rotation. Comment stated that the requirement to commit to reduced till or no-till four out of five years is unnecessary and can result in lower adoption of no-till. The commenter also wrote that it is unclear as to how a project developer is expected to verify that the criteria are met and what potential consequences are if this requirement is not met.

Response: USDA appreciates the comments and feedback regarding no-till implementation. USDA's quantification approach regarding tillage assumes reversals as a way to account for the potential loss of necessary management changes. USDA's assumptions are based on adoption rates of the majority of farm producers historically utilizing no-till or reduced till, which do reflect some level of reversals. This approach also satisfies the need to sustain the benefits of soil carbon while accounting for permanence and reversals, and is reflective of the quantification of CI. As part of maintaining a Biofuel Feedstock Report, producers are required to provide a Farm Producer Attestation that includes a declaration that when implementing no-till, the producer will continue no-till for a minimum of four out of every five years. This rule does not include any specific incentives or consequences; any such incentives or

consequences would be determined by any policies that adopt this rule. No changes to this regulation are being made in response to this issue.

Practice Clarification

Comment: USDA received comment asking USDA to clarify implications of unintentional/accidental burning and urged USDA to not penalize farm producers for accidental burning that consumes residue.

Response: USDA appreciates this feedback and has shifted to a field-level CI quantification approach for the final rule. In the event of unintentional/accidental burning, the impact for that field will not impact the CI of other fields. The regulatory text has been modified at been modified at subpart C and §§ 2100.031 and 2100.040 to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment requesting clarification in the final rule whether cash crop residues can be grazed.

Response: USDA understands the request to graze cash crop residues; however, USDA has not modeled these impacts therefore the rule does not explicitly allow or disallow grazing of cash crop residues. No change to the regulation has been made in response to this issue.

Comment: USDA received comment requesting clarification in the final rule whether residues may be harvested for silage or hay.

Response: USDA understands the request to harvest residues for silage or hay; however, the removal of biomass is likely to have a negative impact on the CI of these practices and would need additional modeling time to determine the impacts of this practice. USDA may consider the addition of this practice in the future. No change to the regulation has been made in response to this issue.

Comment: USDA received comment requesting USDA clarify whether the period of practice is from the harvest of the previous crop to the harvest of the low-carbon biofuel crop.

Response: USDA appreciates the request for clarification; the crop interval is defined as the time immediately following harvest or termination of one cash crop through harvest or termination of the next cash crop in the rotation, including fallow periods. USDA believes that this existing definition sufficiently defines the period of practice eligibility. No change to the regulation has been made in response to this issue.

Comment: USDA received comment requesting clarification on whether soil

tests are required for the nutrient budget.

Response: USDA appreciates the request for clarification. The regulatory text has been modified in subpart C and clarified in the addition of subpart G to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment requesting greater clarity around the nutrient budget requirements, as well as how to account for legume cover crops in their nutrient budgets.

Response: USDA understands the need for producers to account for legume cover crops in their nutrient budgets. Producers should consult the professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or other persons approved by the Federal Crop Insurance Corporation (FCIC), whose research or occupation is related to the specific crop or practice for which such expertise is sought. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment asking for both clarity on practice standards and recommended USDA align practice standards with NRCS guidelines and definitions. Commenters noted that the interim rule has several sections on practice standards, some of which include NRCS recognized practices and others that do not.

Response: USDA appreciates the request for clarity. This rule defines some terms based on existing USDA definitions, relying heavily on NRCS practice definitions used in existing conservation programs. These definitions provide the necessary context for subpart F of 7 CFR part 2100, which lays out the parameters for low-carbon practices that farm producers can implement to produce low-carbon crops. However, this rule only includes practices that are relevant to the production of the identified biofuel crops and have appropriate data and quantification methodologies needed to estimate the associated net emissions. Additionally, some NRCS practices were excluded because they only generate net emissions benefits on land that is not growing crops, such as field edges or borders. Emissions benefits from such off-field practices cannot directly be tied to the production of a biofuel feedstock, making it difficult to assign emissions benefits to the biofuel feedstock crop and subsequently produced biofuels. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment requesting clarification on the amount of time that is acceptable for residue removal prior to or as part of the planting operation. Additionally, comment requests clarification as to if “the planting operation” is referring to the next cash crop or if removing residue prior to planting the cover crop is allowed.

Response: USDA appreciates this comment. USDA has modified the rule to clarify that removing residue from the crop planting row area prior to or as part of the cash crop or cover crop planting or seeding operation is allowed. The regulatory text has been modified at §§ 2100.051(a)(4) and 2100.051(b)(3) to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received multiple comments about the use of STIR values to classify tillage systems. Some commenters agreed that STIR provided a scientific basis for defining tillage and some commenters expressed concern that the use of STIR to define tillage systems did not provide adequate flexibility. USDA received one comment asking for clarification of whether the STIR value needs to be calculated based on the “recommended” or “actual” operating speed and tillage depth, commenter recommend changing “recommended” to “actual”. One commenter recommended the use of a more streamlined tillage intensity calculation, specifically the soil carbon disturbance index used in the COMET-Farm tool.

Response: USDA appreciates these comments and requests for clarification. COMET-Farm uses the DayCent model and employs the soil carbon disturbance index described in USDA’s *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory* report (USDA Methods report). Based on comments, and further evaluation, USDA has changed the method used to classify and verify tillage practices in the final rule. USDA evaluated both STIR and the soil carbon disturbance index that is used by the DayCent model. The STIR rating was developed to quantify the effect of tillage on erosion and emphasizes surface cover removal and burial over the crop or rotation interval, while the soil carbon disturbance index used in DayCent is focused on assessing disturbance within the soil column (from 0–30 cm) during discrete tillage windows to determine impacts on decomposition and soil carbon. While these two systems mostly align, there are instances where they do not. DayCent, the underlying model used to

evaluate tillage impacts in the USDA FD–CIC tool, employs the soil carbon disturbance index to classify tillage systems. Given this, USDA chose to align the classification of tillage in the final rule with this method. USDA has developed a new user-friendly tool using this method, called the Tillage Disturbance Index for Soil Carbon (T–DISC), which will allow users to classify their tillage system in alignment with the USDA FD–CIC tool, DayCent, and the USDA Methods report. USDA will publish on its website <https://www.usda.gov/t-disc> the T–DISC calculator for public use with a user guide. The regulatory text has been modified at §§ 2100.001, 2100.051(a)(1), 2100.051(b)(1), and 2100.051(d) to address these concerns. No other changes are being made to the regulation in response to this issue.

Process for Adding More Practices

Comment: USDA received comment that urged the agency to establish a process for consistent and timely updates to eligible feedstocks and practices. Some commenters suggested the incorporation of yearly planned updates to eligible feedstocks and practices.

Response: With additional time, resources, and data, USDA may consider the addition of practices and feedstocks to this rule and may undergo a rulemaking process to update 7 CFR part 2100. No changes are being made to the regulation in response to these issues.

Soil Amendments

Comment: USDA received comment requesting USDA to consider a range of soil amendments for inclusion in the final rule including: biochar, enhanced rock weathering, soil conditioners, and microbial inoculants. Commenters assert that such soil amendments can reduce CI scores while also enhancing the long-term carbon sequestration potential of agricultural lands.

Response: Some soil amendments listed above may increase soil carbon sequestration; however, USDA has not modeled associated benefits for the purposes of this rule due to time and resource constraints. USDA may consider the addition of soil amendments in the future, and USDA will commit to further exploration of the issue in consultation with DOE. No changes are being made to the regulation in response to these issues.

Reduced Nitrogen Rate

Comment: USDA received comment expressing broad support for the use of NUE as a calculation of nitrogen applied

divided by yield to calculate a reduced nitrogen application rate practice. Commenters suggested USDA calculate and implement NUE through a final rule through the establishment of a baseline NUE and measuring a farm producer's NUE against the baseline.

Response: USDA appreciates suggestions regarding the use of NUE to calculate a reduced nitrogen application rate. USDA has updated the USDA FD–CIC tool to allow for users to indicate nitrogen inputs and yield such that the calculated feedstock CI accounts for NUE as defined by the user. The regulatory text has been modified at subpart C and subpart G has been added to update implementation and verification requirements related to this change. No other changes are being made to the regulation in response to this issue.

Split and Fall Fertilizer Application Implementation

Comment: USDA received comment regarding spring and fall fertilizer application including:

- Some commenters request that USDA remove the requirement that the no fall application standard prohibits the application of phosphorus fertilizers that contain nitrogen in the fall.
- Other commenters urged USDA to extend the 30-day window for Spring Nitrogen application if weather delays planting dates and recommended either expanding the 30-day window to a 60-day window or amending the language to include language to allow for weather-related planting delays.
- Commenters also urge USDA to revise the in-season, post-emergence split definition, commenters write that 75% of Nitrogen application is too restrictive, instead recommending a 50% post-emergence split Nitrogen application rate.

Response: USDA understands and appreciates comments related to fertilizer timing. The interim final rule took a practice-based approach to nitrogen management. The final rule shifts to a user-identified NUE scoring approach which allows producers to manage fertilizer application timing and amount on their operation by calculating the associated NUE and resulting CI score. The regulatory text has been modified at subpart C and subpart G has been added to address these concerns. No other changes are being made to the regulation in response to this issue.

Summary of Comments on Qualifying Feedstocks

Additional Feedstocks

Comment: USDA received many comments requesting USDA consider over 30 different types of additional feedstocks including, but not limited to: wheat straw, crop residues, animal manures, processing residuals, cellulosic crops, pennycress, and prairie biomass.

Response: USDA understands and appreciates the feedback regarding the additional feedstocks. For feedstocks suggested, but not included in the final rule, USDA may consider this feedback in the future. No changes are being made to the regulation in response to these issues.

Intermediate Oilseeds

Comment: USDA received many comments requesting the inclusion of intermediate oilseeds such as winter canola, carinata, pennycress, and camelina as eligible feedstocks.

Response: USDA agrees that these are important biofuel feedstocks. More data and research are needed to identify low-carbon agricultural management practices and associated benefits which are applicable to intermediate crops. Given additional time, data, and resources, USDA may consider adding intermediate crops in the future. No changes are being made to the regulation in response to these issues.

Millet

Comment: USDA received comment requesting USDA to include millet, notably proso millet, as an eligible feedstock.

Response: USDA understands and appreciates this feedback. USDA considered including millet in the final rule; however, due to time and resource constraints, in addition to the limited current acreage in production, USDA was not able to incorporate millet at this time. USDA may consider adding millet in the future. No changes are being made to the regulation in response to these issues.

Process for Adding More Feedstocks

Comment: USDA received comments urging USDA to establish a process for consistent and timely updates to eligible feedstocks. Some commenters suggested the incorporation of annual planned updates to eligible feedstocks and practices.

Response: With additional time, resources, and data, USDA may consider the addition of practices and feedstocks to this rule and may undergo a rulemaking process to update 7 CFR

part 2100. No changes are being made to the regulation in response to these issues.

Spring Canola

Comment: USDA received comment regarding the inclusion of spring canola as a biofuel feedstock in the final rule.

Response: USDA appreciates the comments recommending the addition of canola as a biofuel feedstock. USDA agrees spring canola is a prominent biofuel feedstock with millions of acres of annual production in the United States, and has accordingly added spring canola as an eligible feedstock. The regulatory text has been modified at § 2100.011 to address these concerns. No other changes are being made to the regulation in response to this issue.

Summary of Comments on Quantification

Data Gaps

Comment: USDA received comment urging USDA account for other emissions factors including land-use change, ecosystem services, methane, emissions associated with the production and application of herbicides used to terminate cover crops, changes to on-farm energy use, and yield reductions to create a true lifecycle assessment (LCA) of biofuel production.

Response: USDA FD–CIC does or does not account for these emission sources in the following ways:

- *Land-use change:* Land-use change emissions are not included within USDA FD–CIC because they are already accounted for in a separate Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) module, the Carbon Calculator for Land-Use and Land Management Change from Biofuels Production (CCLUB).

- *Ecosystem services:* GHG emissions are the only environmental attribute that is measured and accounted for in USDA FD–CIC. While non-GHG ecosystem services are important, they are outside of the scope of this rule.

- *Methane:* While methane is a GHG, USDA FD–CIC does not include methane emissions since they are de minimis in feedstock production.

- *Production and application of herbicides:* These GHG emissions are included in USDA FD–CIC, although they do not vary depending on the farming practice employed so they do not consider increase GHG emissions associated with cover crop use. We could consider making such adjustments in future iterations.

- *On-farm energy use:* These GHG emissions are included in USDA FD–

CIC and vary depending on the farming practice adopted (e.g., conventional till vs. no-till).

- *Yield reductions:* USDA FD–CIC has incorporated yield reductions in the N₂O emission calculations in this updated version due to the new NUE approach. We could consider the effects of yield reductions on SOC in future iterations of USDA FD–CIC.

No change is being made to the regulation in response to this issue.

Model Selection and Evaluation

Comment: USDA received comment suggesting a multi-model approach should be used to underpin the USDA FD–CIC tool and urged USDA to use a multi-model ensemble (MME) approach in its final rule. Commenters noted that as compared to the use of individual models alone, an MME approach to modeling using the lower bound of the 95th confidence interval would give better predictions and improve certainty of results.

Response: USDA acknowledges that a multi-model approach could reduce estimate bias. The model used to generate parameter values in USDA FD–CIC is DayCent. USDA's 2024 edition of *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory* recommends that DayCent be used for performing Tier 3 calculations. In addition, as discussed below, the methodology addresses bias and uncertainty associated with differences between modeled and measured data. USDA may consider a multi-model approach in the future. No change is being made to the regulation in response to this issue.

Comment: USDA received comment expressing concern about the USDA FD–CIC tool's ability to account for uncertainty and that estimates generated by USDA FD–CIC should be conservative to account for uncertainty.

Response: DayCent's methodology for generating the parameters employed by USDA FD–CIC to represent the impacts of nitrogen management and conservation practices uses a number of methods to account for uncertainty in model formulation and parameterization and to correct for model bias identified through comparison of measured and modeled data (Ogle et al. 2010; Del Grosso et al. 2010; Ogle et al. 2007).⁹ See

⁹ Ogle, S.M., F.J. Breidt, M. Easter, S. Williams, K. Killian, and K. Paustian, "Scale and uncertainty in modeled soil organic carbon stock changes for U.S. croplands using a process-based model." *Global Change Biology* 16:810–822, 2010, <http://dx.doi.org/10.1111/j.1365-2486.2009.01951.x>.

Del Grosso, S.J., S.M. Ogle, W.J. Parton, and F.J. Breidt, "Estimating Uncertainty in N₂O Emissions from U.S. Cropland Soils." *Global Biogeochemical*

the Environmental Protection Agency's Inventory of U.S. Greenhouse Gas Emissions and Sinks (EPA) for more information about the DayCent modeling framework. No change is being made to the regulation in response to this issue.¹⁰

Comment: USDA received comment urging USDA to continue to refine models and tools by incorporating data from published studies and collect direct measurements on an ongoing basis. Commenters also encouraged USDA to guide future data collection efforts to reduce existing uncertainties and emphasized the need for increased data collection and standardization to improve existing models.

Response: USDA agrees that the models and tools utilized should be updated as needed to align with the evolution of the best available science. USDA plans to make improvements and updates to the models and tools as appropriate. No change is being made to the regulation in response to this issue.

Comment: USDA received comment suggesting USDA verify the modeling results in the USDA FD–CIC tool that result in negative biofuel CI scores without carbon capture and permanent storage.

Response: USDA FD–CIC has undergone additional sensitivity and robustness checks of large negative CI values since the beta version published in January 2025. USDA took additional steps to adjust outliers that appeared anomalous, as we document in the updated methodology document. No change is being made to the regulation in response to this issue.

Comment: USDA received comment suggesting that USDA should work with the Department of Energy (DOE) and/or Argonne National Laboratory (ANL) on aspects of 45ZCF–GREET.

Response: The technical issues raised in this comment are outside of the scope of what is included in USDA FD–CIC. No change is being made to the regulation in response to this issue.

Regional Variability

Comment: USDA received comment sharing concerns that the regional variability involved in quantifying GHG

Cycles, 24, GB1009, 2010, <https://doi.org/10.1029/2009GB003544>.

Ogle, S.M., F.J. Breidt, M. Easter, S. Williams and K. Paustian, "Empirically-Based Uncertainty Associated with Modeling Carbon Sequestration Rates in Soils." *Ecological Modeling* 205:453–463, 2007, <https://doi.org/10.1111/j.1365-2486.2009.01951.x>.

¹⁰ EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2022 U.S. Environmental Protection Agency, 2024, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022>.

benefits/CI scores creates “winners and losers”. Commenters note that not all crops/practices are available or suitable for all regions. Commenters also express concern over geographic “fairness”, that CI gains are not equal between locations/practices and represent a “penalty” for some producers.

Response: USDA understands and values the concerns around regional differences in CI scores based on regional conditions including soil and climactic differences. USDA’s rule is intended to provide technical guidance for estimating the carbon intensity of biofuel feedstocks. To do this, USDA FD–CIC calculates carbon intensities associated with the implementation of conservation practice on a regional basis as accurately as possible. No change is being made to the regulation in response to this issue.

Scale

Comment: USDA received comment expressing concern that because CI scores are calculated at farm level and not field level, CI scores may be lower for farms that cannot adopt these practices on large parts of the operation, thus preventing their participation and disincentivizing adoption of low-carbon practices. Comment states that this would also impact first points of aggregation and intermediary entities negatively.

Response: USDA appreciates the comments and feedback regarding the calculation of CI scores at the farm versus field level. USDA agrees that a field level CI score is more beneficial for increased accuracy and participation and, in response to public comment, has integrated this change in the final rule. The regulatory text has been modified at subpart C and §§ 2100.031 and 2100.040 to address these concerns. No other changes are being made to the rule in response to this issue.

USDA FD–CIC

Comment: USDA received comment expressing concern about the accuracy and rigor of the tool. Some commenters noted outlier values that seem to reflect a significant reduction in CI scores for some location/crop/management scenarios that commenters state are not supported by science. Another comment expressed concern over the soil carbon benefits associated with transitioning from baseline to conservation tillage. Another comment expressed concern over increased N₂O emissions rising from implementation of agricultural management practices.

Response: USDA agrees with the need for data accuracy and rigor. The approach employed by USDA is

consistent with the methodology used in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*.⁹ The agriculture methodology consistent with this analysis is available in the *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory*.¹ These methods have been peer-reviewed and are considered the best available science for estimating GHG emissions associated with agricultural production. Since publication of the interim final rule, USDA FD–CIC has undergone additional peer review, revisions, and updates since the beta version published in January 2025. USDA took additional steps to adjust outliers that appeared anomalous. USDA plans to make improvements and updates to the models and tools as appropriate. No change is being made to the regulation in response to this issue.

Comment: USDA received comment stating that the tool lacks transparency including the underlying datasets which are not publicly accessible leading to concerns over the accuracy and rigor of the tool.

Response: USDA understands and agrees with the importance of transparency and providing the public with a description of the methodology used for USDA FD–CIC. USDA has published a methodology document of USDA FD–CIC that describes all of the data sources and methods that were employed to develop USDA FD–CIC. No change is being made to the regulation in response to this issue.

Comment: USDA received comment expressing concerns that appear to apply to separate tools with different methodologies and assumptions compared to the USDA FD–CIC.

Response: The technical issues raised in this comment are outside of the scope of what is included in USDA FD–CIC. No change is being made to the regulation in response to this issue.

Comment: USDA received comment expressing concern that the USDA FD–CIC tool is not as rigorous nor consistent or similar to the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as required by 45Z.

Response: USDA agrees that USDA FD–CIC should be established with the best available science. The underlying models used to generate values in USDA FD–CIC have undergone extensive peer review. Further, under USDA’s authorities in 16 U.S.C. 3845, in April 2024, USDA published *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity Scale Inventory*. The publication of these methods adhered to the OMB guidelines “Final Information Quality bulletin for

Peer Review” 70 FR 2664–2677, and this document has been designated by OMB as a highly influential scientific assessment. The method recommended for quantifying changes in soil carbon stocks and (N₂O) emissions from agricultural soils refers to the DayCent ecosystem model, which is used as described in this rule to generate the CI estimates in USDA FD–CIC. No specific comments were provided about aspects of CORSIA’s methodologies that might be applicable to USDA FD–CIC. No change is being made to the rule in response to this issue.

Comment: USDA received comment on tools that allow the user to enter in more details about fertilizer applications and provides what they believe to be greater accuracy, transparency, and credibility. Suggestions include allowing producers to input actual nitrogen application rates and yield, considering green and blue ammonia, inclusion of manure applications, and allowing for a five-year average to consider weather damages to crops.

Response: USDA appreciates these suggestions.

Regarding nitrogen application and accounting for yield losses, USDA is implementing a revised approach which will allow producers to input yield as well as actual nitrogen application rates from synthetic fertilizer and manure. The yield used to calculate users’ per-bushel impact will fall within 20% (plus or minus) of an expected yield defined by either the yield used to establish coverage on their crop insurance policy or a county average yield for the county published by USDA. Actual yield will be used if it falls within that range, but it will be replaced by the relevant range boundary if actual yield falls outside the expected yield range in order to account for significant yield impacts due to weather events. The regulatory text has been modified at been modified at subpart C, §§ 2100.031 and 2100.040, and subpart G has been added to address these concerns. No other changes are being made to the regulation in response to this issue.

Regarding green and blue ammonia, USDA currently does not have the time or resources to model the benefits of blue and green ammonia. USDA may consider the inclusion of these practices in the future. No change is being made to the rule in response to this issue.

Regarding manure application, USDA appreciates this feedback. As a result of public comment, USDA has included manure as a form of nitrogen in the final version of the rule. The regulatory text has been modified at subpart C and subpart G has been added to address

these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment suggesting user friendliness and useability improvements. Comments suggested changes to the tool such as color-coding input cells, providing error trapping, and making model calculations available for digital service providers to replicate and automate CI calculations within their own digital platforms.

Response: USDA agrees with the need to make the tool accessible and easy to use. USDA conducted user testing and made interface changes to the tool to improve the user friendliness and useability improvements in line with user recommendations. In addition, the public is welcome to use the data tables and formulas to develop their own digital platforms to further improve useability. No change is being made to the regulation in response to these issues.

Comment: USDA received comment suggesting improvements to USDA FD–CIC outputs including reporting N₂O and CO₂ separately and reporting CI scores per unit of fuel as well as per bushel to enable farm producers to estimate value of practices to biofuel producers.

Response: USDA appreciates feedback on improvements to USDA FD–CIC outputs. Users of USDA FD–CIC can view the CO₂e emissions of each subcategory in the excel workbook (e.g., direct N₂O emissions, indirect N₂O emissions, and soil organic carbon changes). USDA FD–CIC does not report CI values in CO₂e emissions per unit of fuel because the feedstocks can be inputs for multiple types of fuel. No change is being made to the regulation in response to these issues.

USDA Programs

Comment: USDA received comment regarding the need to align with crop insurance standards. Commenters stressed the importance of producers being able to manage risk through crop insurance while participating in the production of biofuel feedstocks under this rule.

Response: USDA understands and appreciates the need for aligning with crop insurance standards. USDA cannot perfectly align this rule with crop insurance practices. In most cases, USDA's requirements in this rule are less strict than crop insurance requirements so both sets of rules can be followed. Producers participating in crop insurance should pay special attention to ensure that they follow both crop insurance requirements and the

requirements in this regulation, as these requirements may not be consistent:

- When interseeding into cover crop/ planting green
- Terminating a cover crop via grazing
- When using cover crops as hay, grazing, or forage

No change is being made to the regulation in response to this issue.

Comment: USDA received comment recommending that USDA staff and resources be made available to small and mid sized farm producers looking to follow the practice requirements in the interim rule. Commenters also highlighted the Environmental Quality Incentives Program (EQIP), the Conservation Stewardship Program (CSP), and Inflation Reduction Act (IRA) conservation funding as existing programs that incentivize adoption of similar practices, suggesting that these programs may be more effective than the life-cycle-accounting based approach detailed in the interim rule.

Response: USDA appreciates comments highlighting available resources and programs. NRCS resources for technical assistance are still available and can be utilized by producers wishing to reduce their CI scores. While this rule will not involve current USDA programs such as EQIP and CSP, producers who do not wish to participate in policies that reference this rule can still participate in these programs. No change is being made to the regulation in response to this issue.

Comment: USDA received comment regarding increased data entry barriers as a consideration for program alignment. One commenter recommended aligning guidelines in the interim rule with FSA programs so that farm producers can report low-carbon practice data in tandem with their other FSA reporting. Another commenter suggested that program data entry requirements should be aligned such that programs can function like nesting dolls, where participation in one program paves the way for participation in others.

Response: USDA understands the need to decrease reporting producer reporting burdens; however, USDA must maintain a strong commitment to producer data privacy. Because these data are to be kept by the producer and made available to a third-party verifier, USDA records and data cannot be shared due to privacy concerns. No change is being made to the regulation in response to this issue.

Summary of Comments on Soil Carbon and Baseline

Baseline

Comment: USDA received comment urging against using a national average baseline as the basis for assessing CI scores, and urged USDA to use a more granular (e.g., county level of farm level) baseline.

Response: USDA harmonized the CI calculation with a national average baseline, as policies who may use the rule may wish to align CI values estimated through USDA FD–CIC with a national default. No change is being made to the regulation in response to this issue.

Soil Carbon Time Scale, Permanence, and Quantification

Comment: USDA received significant comment and input from the public related to soil carbon flux quantification, permanence, and time scale. While these are separate issues, it is helpful to address them within relation to each other.

- *Length of time:* USDA received comment acknowledge that practices have beneficial effects on soil organic carbon, but some commenters expressed concern about the length of time through which this occurs. Commenters note that the effects of these practices on soil organic carbon stocks typically take many years to occur, making empirical measurements to verify changes in soil organic carbon stocks difficult.

- *Permanence:* USDA received comment regarding concerns that practices that increase soil organic carbon or enhance soil organic carbon stocks are reversible, or lacking in permanence. Additionally, these commenters wrote that increasing sequestration of soil organic carbon has a long time scale which risks being upended by extreme weather events or land conversion in the future. USDA received comments both in support and in opposition of long-term contracts to address permanence.

- *Soil Carbon Quantification:* USDA received comment expressing concern that there is a high degree of quantification uncertainty of practice benefits due to a variety of factors including: spatiotemporal heterogeneity, irrigation, warming weather, soil disturbance, especially at harvest, and fertilizer applications. One commenter suggested that USDA should select a random sample of farms implementing reduced CI agriculture practices and perform soil sampling each year for verification of benefits and model improvement.

Response: USDA acknowledges that SOC storage is subject to reversal due to changes in agricultural management and this is why USDA assumed that one year of tillage would occur every five years when utilizing the no-till scenario to account for the possibility of reversals. The 30-year modeling timeframe exists to capture a range of weather variability in order to assign CI impacts to one year of production. This rule does not address longer-term issues with disadoption related to land use change or other impacts.

In response to early feedback received prior to the release of the interim final rule regarding the length of time to sequester and permanence of soil organic carbon, USDA produced a white paper that provides the rationale and evidence that changes in SOC stocks due to the implementation of low-carbon practices help address the buildup of GHGs in the atmosphere and that the reductions in net CO₂ emissions are persistent over time. For more information, see the Documentation of Literature and Modeling Analysis to Support the Treatment of CSA Practices that Reduce Agricultural Soil Carbon Dioxide Emissions and Increase Carbon Storage White Paper.¹¹ While the practice benefits underlying the tool are largely averaged to regional levels, DayCent is run over thousands of National Resources Inventory (NRI) points which mitigates a great deal of variability, including: spatiotemporal heterogeneity in soils and weather, irrigation, climate/warming weather, management differences, and fertilizer applications. The regional averages cannot represent all potential variability, but they are derived based on weighted averages of multiple NRI points that reflect and capture that variability.

On the suggestion to include on-farm measurements, we note that USDA has considered requirements for in-field farm-scale soil carbon monitoring. We have determined that in-field soil carbon monitoring is not appropriate for this rule. The costs of such approaches are prohibitive. Measuring soil carbon poses challenges given the variability of carbon storage within fields, the cost of sampling, and the varying temporal accrual of carbon stocks in soil (Smith et al., 2020).¹² Additionally, differences

in soil moisture, texture, and slope across a field create challenges in capturing representative samples that can be extrapolated across a field. Grid sampling can help control for some of these variability challenges but introduces significant extra costs. For these reasons, sampling has increasingly been used to help parameterize and calibrate models, rather than serving as a stand-alone quantification approach. For the reasons noted above, soil carbon sampling systems do not necessarily reduce uncertainty and can introduce bias from factors like soil handling, bulk density measurements, and lab analysis that are out of the control of a producer.

No changes are being made to the regulation in response to these issues.

Summary of Comments on Verification and Recordkeeping

Align Standards With Existing Programs

Comment: USDA received many comments recommending alignment with the California Low Carbon Fuel Standard (LCFS), CSP, EQIP, FSA programs, Roundtable on Sustainable Biomaterials (RSB), International Sustainability and Carbon Certification (ISCC), and other clean fuel production programs. Key reasoning for aligning with existing programs include reducing confusion, allowing for easier in-tandem reporting, and relying on examples that have already been proven effective.

Response: USDA understands the desire to align this rule with existing programs; however, USDA created this rule because there are no existing programs that satisfy the reporting requirements for quantifying the change in CI score for biofuel feedstocks relative to an estimated national average with changes in agricultural management. USDA attempted to utilize records and verification requirements that would also be maintained for similar programs such as the programs outlined by commenters. No changes are being made to the regulation in response to these issues.

Book and Claim/Mass Balance

Comment: USDA received an overwhelming response to questions posed about utilizing a book and claim versus mass balance system. In total, over 60 comments were received regarding book and claim and mass balance systems.

Overwhelmingly, commenters, and especially farm producers, were supportive of a book and claim traceability standard. USDA received

over 45 comments, including 11 farm producers, in support of a book and claim traceability standard. The majority of commenters support a book and claim traceability standard due to the ability to incentivize reduced CI practices in all feedstock crop production areas, not just those near biofuel facilities ensuring broader farm producer participation. Additionally, commenters noted that a book and claim system decouples CI certificates from physical bushels, allowing farm producers to market their grain as they choose while separately selling CI certificates on transparent trading platforms. Commenters also wrote about the ability to reduce compliance cost, reduce emissions by eliminating the need for physical movement of feedstocks, and increase reduced CI crop uptake.

USDA received a number of comments in support of a mass balance traceability standard, including two comments from farm producers. Commenters recognized that the infrastructure does not currently exist for a book and claim system. One commenter wrote that the use of a book-and-claim traceability standard, in separating the sustainability token from the physical product, removes any incentive for participation from the commercial grain sector because the sustainability token trading would likely occur through a separate third party so there is no additional value associated with the grain flowing through the elevator. By separating the sustainability token from the physical grain, the commenter notes, farm producers will lose price transparency from the biofuel producer, with the price they are receiving for the physical grain potentially suffering from a basis reduction to offset the purchase of sustainability credits depending on the entity they sell the physical grain to. Commenters were also concerned that a book and claim traceability standard will lead to a loss of value for the emissions reduction, as biofuel refiners continually pursue the lowest priced credit, ignoring the cost of production realities for feedstocks produced in their own geographic footprint.

Response: USDA appreciates the feedback outlined by commenters in support of a book and claim traceability standard; however, at this time, USDA does not have the existing infrastructure required to implement adequately a book and claim traceability standard. USDA also appreciates the comments in support of a mass balance traceability standard, at this time, this is the traceability standard utilized under the rule. USDA chose to utilize a mass

¹¹ See USDA Documentation of Literature and Modeling Analysis to Support the Treatment of CSA Practices that Reduce Agricultural Soil Carbon Dioxide Emissions and Increase Carbon Storage White Paper, January 2025. https://www.usda.gov/sites/default/files/documents/USDA_Durability_WhitePaper_01_14.pdf.

¹² Smith et al. 2020, How to measure, report and verify soil carbon change to realize the potential of

soil carbon sequestration for atmospheric greenhouse gas removal. Global Change Biology 26: 219–241. DOI: 10.1111/gcb.14815.

balance traceability standard because it allows for more flexibility than an identity preserved system, while still putting measures into place to protect against fraud. USDA may consider a transition from mass balance to book and claim traceability standard in the future and will take these comments into consideration. No changes are being made to the regulation in response to these issues.

Comment: USDA also received comment in support of a transition from mass balance to book and claim with recommendations on strategies to effectively execute a transition.

- Several commenters wrote in support of using existing verification programs like ISCC as a framework to transition to a book and claim traceability standard.

- One commenter wrote that transition to book-and-claim should be considered in a second phase of the rule once verification systems through local FSA offices are well established, ensuring a smooth and practical implementation.

- Another commenter noted that establishing a regulated registry where the certificates can be registered, traded, and claimed may help facilitate the transition between Mass Balance and Book and Claim.

- One commenter recommended USDA define “chain of custody” criteria and the necessary documentation, provide a means to distinguish between certified sustainable feedstock and non-certified feedstocks, develop a third-party registry system to manage the credits, and provide verification criteria and requirements of verifiers such as certification under International Organization for Standardization (ISO) 14065.

- Other commenters urge USDA to make book and claim an alternate option while maintaining mass balance rules in place.

Response: USDA appreciates these comments, and USDA may consider a transition from mass balance to book and claim in the future and will take these comments into consideration. No changes are being made to the regulation in response to these issues.

Data Privacy and Transparency

Comment: USDA received several comments with regards to both data privacy and transparency. Commenters urged USDA to ensure that sensitive information including documents and data retained through verification are protected. Other commenters urged USDA to ensure transparency around program participation and enforcement and practice adoption.

Response: USDA appreciates the need to balance both data privacy and transparency. USDA’s rule specifies that farm producers maintain their own records to be verified through an independent third-party verifier. USDA will not collect any data through this rule and only outlines requirements of records that must be maintained by the farm producer and records that must be transmitted through the supply chain in order to track the CI of reduced-CI feedstock being sold. The burden of data privacy is on the third-party verifiers and other entities in the supply chain participating in this program, including farm producers themselves. Through this rule, producers must include a Farm Producer Attestation as part of the Biofuels Feedstock Report that states that they will not double sell CI information, attributes, or low-carbon benefits associated with the reduced CI crop into more than one market. Additionally, the verifier must also verify that reduced CI feedstock has not been sold into multiple sustainability markets. The regulatory text has been modified at §§ 2100.030 and 2100.040(g) to address these concerns. No other changes are being made to the regulation in response to this issue.

Recordkeeping Clarification

Comment: USDA received comment requesting clarification on the definition of farm for the weighted average recordkeeping requirements. In particular, commenters wanted clarification on whether the entire farm needed to enroll in the program or just the fields growing biofuel feedstocks. Other commenters requested clarification on how the weighted average was calculated and which fields should be included. One commenter asked for clarification on whether the first point of aggregation would need to score and audit fields whose crop was purchased by different buyers.

Response: USDA has addressed these comments and concerns regarding clarification of the definition of farm as it relates to the weighted average by shifting to a field-level CI quantification system. In this system, producers can choose which fields they would like to calculate a CI for. Fields with the same management practices that meet the definition of a “management unit” as defined in the rule may aggregate those fields together for the purpose of plugging inputs in to USDA FD-CIC and calculating a common CI score for the feedstock produced across those fields. With regards to the comment addressing the first point of aggregation, the producer must maintain records demonstrating all sales from the farm of

corn, soybeans, sorghum, and spring canola so that the verifier can ensure no reduced-CI crop is double-counted. The regulatory text has been modified at subpart C and §§ 2100.031 and 2100.040 to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment requesting that USDA clarify recordkeeping requirements, specifically for no-till.

Response: The rule currently requires specific recordkeeping requirements outlined in Section 2100.051. A farm producer attestation is required to verify that the producer implemented no-till for four out of five years. Under the rule, a farm producer attestation alone would not suffice for record keeping requirements specific to no-till. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment recommending USDA specify whether the exact practices used by the farm producer to contribute to the reduced-CI score need to be reported in the Biofuel Feedstock Report.

Response: USDA appreciates this recommendation; in paragraph (c) of § 2100.031, USDA currently requires the exact practices used by the farm producer that contribute to the reduced-CI score be reported in the Biofuel Feedstock Report. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment requesting clarification of the intention of § 2100.033 of the interim rule (recordkeeping standards for entities that process, sell, or purchase processed product derived from reduced-CI crops) and limit its scope to those intermediate reduced-CI processed products created after the farm producer/aggregator and before the final biofuel refiner.

Response: USDA has updated the definition of reduced-CI processed products in response to public comment. To clarify, soybean oil and canola oil would be considered reduced-CI processed products since they are derived from reduced-CI crops and are used in the production of biofuel. However, distiller’s corn oil coproduced with ethanol is not a reduced-CI processed product, since GHG emissions from crop production are not attributed to biofuel coproducts. Additionally, soybean meal or canola meal would not be considered a reduced-CI processed product since it is not used in the production of biofuel. The regulatory text has been modified at § 2100.031 (c) to address these concerns. No other changes are being made to the regulation in response to this issue.

Reduce Recordkeeping Burdens on Producers

Comment: USDA received comment with both general and specific recommendations on verification, recordkeeping, and Measurement, Monitoring, Reporting, and Verification (MMRV). Additionally, commenters asked USDA to more generally adjust the recordkeeping requirements to reduce producer burden.

Response: USDA appreciates the sentiments to keep recordkeeping practical and not overburdensome; however, it is important to balance this with protecting against fraud. The rule outlines requirements that strive to be as flexible as possible, as well as providing multiple methods of verification in an attempt to reduce the burden of farm producers as much as possible. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment stating that the verification burden of cover crops is higher than the other practices and suggested USDA to allow alternatives to georeferenced and timestamped photographic evidence. Conversely, another commenter wrote that all practices should be held to the same high standard of evidence, incorporating external verification methods like those used for cover cropping.

Response: USDA appreciates the feedback on cover crop requirements. The rule does not require all farm producers implementing cover crops to use georeferenced and timestamped photographs; instead, georeferenced photographs are one of several options available to document cover crop establishment. No changes are being made to the rule in response to these issues.

Comment: USDA received comment recommending USDA standardize the Biofuel Feedstock Report.

Response: USDA understands the need for a standardized Biofuel Feedstock Report and has provided a list of all elements required in the Biofuel Feedstock Report included in 2100.031(e). In order to maintain flexibility in how farm producers create, maintain, and transmit this report, USDA does not specify a specific form or format to allow for a range of ways to meet this requirement including using paper records, farm management software, and digital files. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment urging USDA to include yield records because field-level yields impact total incentives, especially with varied

tillage, cover cropping, and nutrient management practices. The commenter wrote that specific guidance for field-level grain yield should include machine-generated data, defined recordkeeping methodologies for yield monitor outputs, or grain load weights and moisture contents.

Response: USDA's rule specifies that a sale of receipt for reduced-CI crops is required to demonstrate yield of all crops during the crop interval (that is, from the time immediately following harvest or termination of one cash crop through harvest or termination of the next cash crop in the rotation, including fallow periods). This is because USDA is crediting the volume of reduced-CI crops that enter the supply chain, and receipts are official records of sale of crops entering the supply chain. The regulatory text has been modified at § 2100.031(b) to address these concerns. No other changes are being made to the regulation in response to this issue.

Comment: USDA received comment requesting the removal of requirements not directly associated with low-carbon practices including yield goals, nutrient plans, and evidence of soil samples.

Response: USDA appreciates comments requesting streamlined recordkeeping requirements. Records demonstrating yield goals, nutrient plans and soil sampling are all relevant to ensuring that claimed CI is accurate and that appropriate incentives exist which limit over-application of nutrients, for example. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment recommending that USDA create a lower tier of third-party verification requirements for small programs, for example less than 5 million gallons.

Response: USDA appreciates comments recommending that low-volume sales would benefit from fewer verification requirements. However, any reduction in verification requirements may lead to increased risk of fraud or inaccurate CI accounting. Given that participation in USDA's rule is voluntary, one standard is applied to all participating farmers. Additionally, third-party audits are only conducted on a sample of farms for any given first point of aggregation, reducing verification burden on farm producers of all sizes. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment recommending USDA use a data management platform for recordkeeping that requires shapefiles, full crop plans that include fertilizer rates, tillage practices, crop protection use, cover

crop details, and yield in a data management system.

Response: USDA appreciates the comments on data management platforms as a means to facilitate recordkeeping. USDA's rule does not prohibit farm producers from utilizing such platforms, however, requiring farm producers to submit records to such a platform raises data privacy concerns. USDA's rule specifies that farm producers maintain their own records to be verified through an independent third-party verifier. No changes are being made to the regulation in response to these issues.

Verification of Nitrogen Rate Reduction

Comment: USDA received comment providing a number of recommendations to verify nitrogen rate reduction. These strategies included: using as-applied maps or fertilizer prescriptions from the retailer; farm records such as soil tests and nutrient management plans, receipts, location and timing of nitrogen application, historic and current organic and synthetic nitrogen application rates, historic and current yield records, and attestations from crop advisors.

Response: USDA appreciates suggestions to verify nitrogen rate reduction. USDA currently lists a wide variety of records that can be used for nitrogen management including, but not limited to, physical documentation (for example, paper forms, invoices, receipts, seed tags), digital files (including from farm management software), data generated by farm equipment (for example, precision agriculture equipment, as applied maps), remotely sensed data, georeferenced and timestamped photographs, or data and records used for participation in USDA programs. No change is being made to the regulation in response to this issue.

Summary of Comments on Verifier Qualifications/Accreditation Requirements

Third Party Verifier Qualifications/Accreditation Requirements

Comment: USDA received comment regarding the use of ISO 14065 as an accreditation standard. Several commenters wrote in support of the use of ISO 14065, including comment suggesting a phased approach for the use of ISO 14065.

Response: USDA appreciates comments in support of ISO 14065. The rule currently states that third-party verifiers that conduct audits in accordance with this part must be accredited to ISO 14065: General

principles and requirements for bodies validating and verifying environmental information by a member of the International Accreditation Forum. No changes are being made to the regulation in response to these issues.

Comment: USDA received comments expressing concerns about third-party verifier qualifications including concern for potential conflicts of interest, regional expertise of verifiers, and minimum requirements for verifier certification.

Response: USDA appreciates the need to have highly qualified third-party verifiers. USDA has identified ISO 14065 accreditation as the industry standard for third-party verifiers in this space. No change is being made to the regulation in response to this issue.

Verification Capacity

Comment: USDA received comment highlighting the need to increase verification capacity. Some commenters wrote that the application of the interim rule in 45Z could put a strain on verifiers and introduce a new level of recordkeeping complexity that to date has not been experienced in the agriculture industry. Other comments suggested allowing specific sources of third-party verifiers, including private sector companies; agronomists with a Certified Crop Advisor (CCA) or a Certified Professional Crop Consultant (CPCC) certification; and USDA experts in FSA and NRCS.

Response: USDA is establishing requirements for verification that will ensure that entities follow the applicable standards in this rule. Participation in the production of low-carbon biofuel feedstocks is voluntary. Given this, USDA anticipates that the capacity to provide verification services will grow to meet demand. No change is being made to the regulation in response to this comment.

Summary of General Comments

Cost to Producers

Comment: USDA received comment asserting that this policy fails to provide adequate incentives for producers to adopt low-carbon practices. One commenter wrote that the credit value for soybean practices is insufficient to offset productivity or cost concerns associated with practices.

Response: USDA appreciates comments regarding incentives to participate. However, incentives are not driven by USDA's rule and are instead driven by policies that incorporate the rule into the policy. No change is being made to the regulation in response to this issue.

Environmental Tradeoffs and Impacts on GHGs

Comment: USDA received comment asserting that scientific evidence suggests that biofuel production leads to a net increase in GHG emissions and other environmental harms. Commenters identified environmental concerns resulting from biofuel production including: losses of soil carbon due to land conversion; direct emissions of GHGs including those resulting from nutrient application; increases in fuel/food prices; carbon opportunity cost of not growing native vegetation; air, water, and soil pollution; habitat destruction; and adverse impacts to biodiversity.

Response: This rule is structured to reduce GHG emissions from agricultural commodity production. In addition, practices included in the rule, like no-till and cover crops, are known to provide other important ecosystem services including reducing air and water pollution, soil erosion, and improved biodiversity. Improving nutrient use efficiency, included in the rule, can also reduce surface and groundwater pollution. Furthermore, estimating the environmental impacts of land conversion are addressed in indirect GHG emission lifecycle methodologies outside of USDA FD-CIC. USDA FD-CIC does not model the effects of biofuel production on food prices, as there are other economic models that already examine these effects. No changes are being made to the regulation in response to these issues.

Comment: USDA received comment citing literature which indicates that biofuel production can lead to the emissions of harmful compounds, even compared to pollution from oil refineries. Specifically, one commenter noted the following compounds: nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOCs), ammonia (NH₃), and particulate matter (PM_{2.5}).

Response: USDA understands concerns about biofuel production; however, these issues are outside of the scope of this rule. This rule is focused on low-carbon agriculture practices that reduce GHG emissions from on-farm production of biofuel crops. No change is being made to the regulation in response to this issue.

Comment: USDA received comment regarding the impacts of land use change. Commenters urged USDA to consider how this rule may incentivize forest and wetland conversion to biofuel production and made recommendations to impose restrictions on eligible land

for biofuel production. Some commenters also noted that it is important to take into account indirect land use change when evaluating the CI of biofuel feedstocks stating that land use conversion can cause harmful impacts like biodiversity loss and soil degradation.

Response: The attribution and estimation of land-use emissions from the crop-based biofuels are determined using separate methodologies than USDA FD-CIC. In addition, participating farm producers must attest that they did not convert the land used to produce low-carbon biofuel feedstock crops into crop production after the date of rule publishing. No change is being made to the regulation in response to this issue.

Comment: USDA received comment stating that land use change impacts associated with biofuels are often overestimated. Commenters wrote that many studies on the land-use change impacts of the renewable fuel standard have been discredited or outdated, and USDA should instead focus on scientific consensus on the GHG emissions benefits of biofuels. Commenters conclude that USDA should not consider indirect land use change as a factor in CI and doing so would penalize U.S. producers for the implied activities of foreign competitors.

Response: The attribution and estimation of land-use emissions from crop-based biofuels are determined using separate methodologies than USDA FD-CIC. No change is being made to the regulation in response to this issue.

Equitable Access for Producers

Comment: USDA received comment asserting that this rule does not treat all producers equally. Commenters wrote that this rule will disproportionately benefit large producers and is unfair to producers who cannot sell their feedstocks to biofuel producers because there is no refinery in their area. Commenters also noted that this rule is unfair to livestock and other producers who cannot participate.

Response: This rule specifically applies to the production of low-carbon biofuel feedstocks for liquid transportation fuels, which presents a clear environmental services market. Although USDA intends to include additional feedstocks and practices in the future, this will require time, resources, and data in order to quantify the carbon benefits of relevant agricultural management practices. USDA offers a number of other programs to support farm producers of all sizes and commodities in

implementing agricultural management practices. No change is being made to the regulation in response to this issue.

RIA and Costs and Benefits

Comment: USDA received comment regarding the costs and benefits estimates. While some commenters agree with USDA's assessment of costs and benefits and finds cost estimates reasonable and well-calculated, other commenters urged USDA to take other factors and strategies into account. One commenter urged USDA to take both environmental and economic factors into account in determining practice eligibility and quantification.

Response: USDA thanks commenters for this feedback, and agrees that capturing the environmental and economic factors is good practice in regulatory analysis. OMB's Circular A-4¹³ directs agencies conducting regulatory impact analysis to capture the marginal impacts of the rule over the status quo. USDA's rule develops a voluntary framework providing a more standardized set of guidelines for the quantification, reporting, and verification of reduced-CI biofuel feedstocks grown with low-carbon practices. USDA anticipates this framework can be broadly implemented in clean fuel programs and policies, but the rule does not generate emissions reductions or incentivize the use of low-carbon practices on its own. As such, USDA's regulatory analysis monetizes the economic burden from recordkeeping, reporting, verification, and audits attributable to the rule, but does not attempt to monetize the potential costs or benefits of the framework implemented alongside other government programs and policies. These impacts would be estimated in future rulemakings. No change is being made to the regulation in response to this issue.

Comment: USDA received comment suggesting that farm producers should be able to test the program on a single field to ensure that the financial return justifies the transition. Another commenter wrote that farm producers must be adequately compensated for adopting practices.

Response: USDA appreciates the need for this program to compensate farm producers adequately to justify transition to these practices; however, this is a voluntary program and farm producers will not adopt the practices unless the compensation is adequate.

Additionally, specific incentives and consequences would be implemented by other entities which adopt this rule as part of their biofuel program. No change is being made to the regulation in response to this issue.

Scientific Basis/Rigor

Comment: USDA received comment stating that the rule lacked adequate scientific basis/rigor in its estimates of the CI scores for various feedstocks. Additionally, some commenters wrote that the USDA FD-CIC tool estimates GHG reductions with a degree of precision that is not supported by the underlying science.

Response: The underlying models used to generate values in USDA FD-CIC have undergone extensive peer review. Further, under USDA's authorities in 16 U.S.C. 3845, in April 2024, USDA published *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity Scale Inventory*. The publication of these methods adhered to the OMB guidelines "Final Information Quality bulletin for Peer Review" 70 FR 2664–2677, and this document has been designated by OMB as a highly influential scientific assessment. The method recommended for quantifying changes in soil carbon stocks and N₂O emissions from agricultural soils refers to the DayCent ecosystem model, which is used as described in this rule to generate the CI estimates in USDA FD-CIC. No change is being made to the regulation in response to this issue.

Comment: USDA received comment stating that there is insufficient scientific evidence to claim that any crop-based biofuel meets the requirement to reduce GHG emissions by 50% to qualify for the 45Z biofuel tax credits created in the 2022 IRA.

Response: USDA appreciates the commitment to scientific integrity. This rule makes no claims as to whether crop-based biofuels are or are not eligible for 45Z biofuel tax credits. No change is being made to the regulation in response to this issue.

Supportive Comments

Comment: USDA received comment in support of the increased potential to scale the production capacity of low-carbon, renewable fuels produced in the U.S. One commenter wrote that the rule would encourage feedstocks that would help expand the competitiveness of U.S. biofuels both domestic and abroad.

Response: USDA thanks the public for these comments and feedback. No change is being made to the regulation in response to this issue.

Comment: USDA received overwhelming comment emphasizing the importance of integrating the rule into the 45Z tax credits for biofuels to empower farm producers to play a leading role in the future of domestic biofuel development. Commenters also recommended extending the 45Z tax credits beyond 2027.

Response: USDA thanks the public for these comments and feedback. No change is being made to the regulation in response to this issue.

Comment: USDA received comment in support of aligning land conservation efforts with economic viability as well as aligning agricultural practices with GHG emissions reductions goals and market incentives. Commenters also supported USDA compensating farm producers for practices that build soil health, reduce erosion, and other environmental benefits, while meeting the broader fuel, food, and fiber needs of the country, safeguard our food system, and de-risking farm producers' management decisions.

Response: USDA thanks the public for these comments and feedback. No change is being made to the regulation in response to this issue.

Comment: USDA received comment in support of the importance of establishing standardized procedures and voluntary standards for quantifying, reporting, and verifying GHG emissions associated with biofuels as put in place with the rule. Commenters also wrote in appreciation of the science-based methodologies and leveraging process-based biogeochemical models included in the rule. Overall, commenters support efforts to enhance the accuracy, transparency, and verification of GHG emissions within the agricultural sector.

Response: USDA thanks the public for these comments and feedback. No change is being made to the regulation in response to this issue.

Comment: USDA received comment describing the guidelines as clear and actionable. Respondents were also pleased that the rule unbundled and expanded available practices producers can use to lower CI.

Response: USDA thanks the public for these comments and feedback. No change is being made to the regulation in response to this issue.

Notice and Comment, Effective Date, and Exemptions

The promulgation of regulations to implement the programs of Chapter 58 of Title 16 of the U.S. Code, as specified in 16 U.S.C. 3846, and the administration of those programs, are:

¹³ Office of Management and Budget's Circular A-4, Regulatory Analysis (2003). <https://www.whitehouse.gov/wp-content/uploads/2025/08/CircularA-4.pdf>.

- Exempt from the Paperwork Reduction Act (44 U.S.C. chapter 35), and

- To use the authority in 5 U.S.C. 808 related to Congressional review and any potential delay in the effective date.

Per Subtitle E of the Small Business Regulatory Enforcement Fairness Act of 1996, also known as the Congressional Review Act (5 U.S.C. 801–808), the Office of Information and Regulatory Affairs has determined that this rule does not meet the criteria specified in 5 U.S.C. 804(2), so the Congressional Review Act's 60-day effective date delay requirement for rules does not apply. Even if this rule did meet the criteria specified in 5 U.S.C. 804(2), the 2018 Farm Bill directs the Secretary to use the authority in 5 U.S.C. 808 to specify this rule's effective date.

This rule is exempt from the regulatory analysis requirements of the Regulatory Flexibility Act (5 U.S.C. 601–612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996. The Regulatory Flexibility Act generally requires an agency to prepare a regulatory analysis of any rule whenever an agency is required by the Administrative Procedure Act or any other law to publish a proposed rule, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. This rule is not subject to the Regulatory Flexibility Act because the Office of Energy and Environmental Policy (OEEP) is not required by the Administrative Procedure Act or any law to publish this rule.

Executive Orders 12866, 13563, and 14192

Executive Order 12866, “Regulatory Planning and Review,” and Executive Order 13563, “Improving Regulation and Regulatory Review,” direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasized the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. Executive Order 14192, “Unleashing Prosperity Through Deregulation,” announced the Administration policy to significantly reduce the private expenditures required to comply with Federal regulations to secure America's economic prosperity and national security and the highest possible quality

of life for each citizen and to alleviate unnecessary regulatory burdens placed on the American people. In line the Executive Order requirements, the Agency chose this regulatory approach, which is voluntary yet provides clear guidelines to quantify, report, and verify production of reduced-CI crops, to maximize benefits and minimize burden on American farm producers. Relative to the preceding interim final rule, this final rule generates no more than *de minimis* costs, and is therefore neither an E.O. 14192 regulatory action nor an E.O. 14192 deregulatory action.

OMB designated this rule as significant under Executive Order 12866, “Regulatory Planning and Review,” and therefore, OMB has reviewed this rule. The analysis of costs and benefits of this rule is summarized below.

Regulatory Impact Analysis Summary

16 U.S.C. 3845 directs the Secretary to establish technical guidelines that outline science-based methods to measure the environmental services benefits from conservation and land management activities to facilitate the participation of farm producers, ranchers, and forest landowners in emerging environmental services markets. It also directs the Secretary to give priority to the establishment of guidelines related to farm producer, rancher, and forest landowner participation in carbon markets. It further directs the Secretary to establish verification guidelines, including the role of third parties in conducting independent verification of benefits produced for environmental services markets and other functions.

Under these authorities, this rule facilitates recognition of crops grown with low carbon practices in biofuel markets and provides farm producers with opportunities to market biofuel crops based on their lower net GHG emissions. It also provides standardized guidelines for entities in the biofuel supply chain (including first point aggregators, intermediary entities, and biofuel refiners) to quantify, verify, and trace reduced-CI feedstocks (that is, those crops grown with low carbon practices) through the biofuel supply chain, from farm to biofuel refiner. The rule achieves these outcomes by providing quantification, recordkeeping, chain of custody, and verification standards that:

- (1) decrease information asymmetries between biofuel supply chain entities with respect to the carbon intensity of biofuel feedstocks, and
- (2) reduce transaction costs and increase efficiencies in existing systems

that quantify, trace, and verify emissions benefits associated with biofuel feedstocks produced with low carbon practices.

The Regulatory Impact Analysis estimates the expected costs of this rule quantitatively and discusses the expected benefits qualitatively.

To estimate the expected costs of the rule, USDA created a model that quantifies the total per entity annual costs (in hours and dollars) of quantification, recordkeeping, and verification processes conforming to the rule standards for each entity type in the biofuel supply chain including farm producers, first point aggregators, intermediary entities, and biofuel refiners.

Model inputs were derived from multiple sources, including:

- USDA program office data on the hours required of producers to record and verify information about the adoption of conservation practices (including low carbon practices in this rule) for existing USDA programs, such as the Environmental Quality Incentives Program;

- internal USDA data on the time costs (hours) associated with third party verification of reduced-CI feedstocks;

- Bureau of Labor Statistics wage rates applicable to labor used by each entity type to conduct quantification, recordkeeping or verification;

- latest USDA data on estimated acres and bushels of biofuel feedstock production with low carbon practices; and

- annual volume throughput of biofuel feedstocks for each entity type in the biofuel supply chain calculated using internal USDA data and data from the U.S. Energy Information Agency.

Aggregate costs of the rule for all entities in the biofuel supply chain are not estimated in the RIA because they depend on the level of participation among biofuel supply entities in policies or programs that adopt the rule's standards. Additional details about the RIA assumptions, model inputs, methodology, and limitations are described in the RIA.

Summary of Costs and Benefits

Costs

The costs of this rule include costs associated with collection of information, the maintenance of such information in records, and the exchange of these records between entities in the biofuel supply chain. Under this rule's standards, information collection and the maintenance and exchange of records occurs between private entities. The federal government

does not collect, maintain, or exchange any information or records as part of the rule standards. The regulatory impact analysis calculates the costs of this rule in burden hours and dollars on a per entity basis (for each entity type including farm producers, first point aggregators, intermediary entities, and biofuel refiners) and on a per bushel basis for each entity type.

USDA estimates of the per entity level of effort (LOE) per entity type (farm producers, first point aggregators, intermediary entities, and biofuel refiners) are summarized in Tables 1 and 2 below.

LOEs for farm producers are estimated to be between 5 to 7 hours per year and

were scaled based on the number of low carbon practices adopted which assumes that additional practices require additional recordkeeping time. The LOE estimates for producers are inclusive of quantification of carbon intensity of the crop and recordkeeping time costs. LOE for farm producer audits is estimated separately (9 hours) because not all farm producers in a given year will be selected for auditing by a third-party verifier. LOE for farm producers using manure was also estimated separately (2 hours) because not all farm producers will utilize this nutrient management option.

LOE for first point aggregators are estimated to be between 56 and 335

hours per entity per year, depending on the size (measured in throughout of biofuel feedstock) of the entity. The LOE estimates for First Point Aggregator verification does not include verification fees; these fees however are included in the per entity costs estimated, as summarized in Table 2.

LOE for intermediary entities is estimated to be 168 hours per entity per year. These LOE estimates also do not include any verification fees (see Table 2).

LOE for biofuel refiners is estimated to be 796 hours per entity per year. These LOE estimates also do not include any verification fees (those are included in Table 2).

TABLE 1—ESTIMATED LEVEL OF EFFORT (LOE) PER ENTITY PER YEAR

Category	LOE (hours per year)
Producer (Nitrogen Management)	5.7
Producer (Nitrogen Management plus Tillage OR Cover Cropping)	6.3
Producer (Nitrogen Management plus Tillage AND Cover Cropping)	6.8
Additional Producer burden if audited*	9.0
Additional if Applying Manure**	2.0
First Point Aggregators (small)**	48
First Point Aggregators (medium)**	143
First Point Aggregators (large)**	286
Intermediary Entities**	143
Biofuel Refiners**	673

Notes:

* Some producers will have approximately 9 hours of additional LOE to comply with audits.

** Producers applying manure have additional recordkeeping requirements and fees associated with verification.

Table 2 summarizes the annual per entity costs (in 2024 dollars) per entity type. For farm producers, depending on the number of low carbon practices adopted, the annual costs range from \$340 to \$410, which include costs associated with quantification of the carbon intensity of the crop and recordkeeping time costs and a lawyer

fee for completing the farm attestation, with an addition \$540 annually per entity in the event that a farm producer is audited, and an additional \$150 if using manure. The verification and recordkeeping costs for First Point Aggregators are estimated to be between \$4,000 to \$22,700 per year per entity, depending on the size of the aggregator.

These costs include any verification fees incurred for their audits and the audits of the farm producers. The verification and recordkeeping cost for intermediary entities are estimated to be \$11,000 per entity per year. Finally, recordkeeping and verification costs for biofuel refiners are estimated to be \$83,500 per entity per year.

TABLE 2—ESTIMATED COST PER ENTITY TYPE PER YEAR
[In 2024 dollars]

Category	Cost
Producer (Nitrogen Management)	\$340
Producer (Nitrogen Management plus Tillage OR Cover Cropping)	380
Producer (Nitrogen Management plus Tillage AND Cover Cropping)	410
Additional Producer burden if audited*	540
Additional if Applying Manure**	150
First Point Aggregators (small)**	4,000
First Point Aggregators (medium)**	11,500
First Point Aggregators (large)**	22,700
Intermediary Entities**	11,000
Biofuel Refiners**	83,500

Notes:

* Some producers will have approximately 9 hours of additional LOE to comply with audits.

** Producers applying manure have additional recordkeeping requirements and fee associated with verification.

Additional details about these estimates are described in the RIA.

While this RIA quantifies the paperwork burden associated with the

rule, this rule's information collection requirements and associated burden

hours (that is, level of effort estimates) are exempt from Paperwork Reduction Act of 1995 review and approval by the Office of Information Affairs within the Office of Management and Budget, as indicated by 16 U.S.C. 3846, as noted above.

Benefits

The benefits of this rule include the reduction in transaction costs and efficiency gains associated with the rule's framework for the quantification, reporting, and verification of reduced-CI biofuel feedstocks grown with low carbon practices. USDA believes the framework specified in this rule provides a more standardized set of guidelines for the quantification, reporting, and verification of reduced-CI biofuel feedstocks grown with low carbon practices. With this more standardized framework, USDA expects that the transaction costs incurred by entities for the quantification, reporting, and verification of reduced-CI feedstocks will be reduced. This standardization is expected to improve the efficiency of quantifying, reporting, tracing, and verifying reduced-CI feedstocks. USDA expects these improvements could facilitate participation in clean fuels policies and programs, should these policies and programs incorporate a reduced-CI for crops produced using low carbon practices. Increased adoption of low carbon practices in the production of biofuel feedstock crops will also generate environmental benefits such as improved water and air quality. Because insufficient data is available to quantify these benefits, the cost benefit analysis only qualitatively discusses them.

Environmental Review

This rule qualifies as an activity under USDA categorical exclusion 7 CFR 1b.3(a)(6): "Activities which are advisory and consultative to other agencies and public and private entities, such as legal counselling and representation." As such, it is excluded from the requirements of an environmental assessment or environmental impact statement under the National Environmental Policy Act (42 U.S.C. 4321–4347) and its implementing procedures. The rule contains voluntary technical guidance in the form of quantification, reporting, and verification standards that may or may not be adopted in future policies at various levels of government to incentivize the adoption of CSA practices for biofuel feedstock production, or may or may not be adopted by proponents of potential future actions that require measurement

of GHG emissions. Making voluntary technical guidance available to a variety of users is advisory and consultative in nature. The rule also qualifies as "Educational and informational programs and activities" under 7 CFR 1b.3(a)(4) because technical guidance is educational and informative in nature. The rule does not authorize or fund any policy or action. If the standard is used in any future federal actions, a project specific analysis may be warranted at that time.

OEEP has found that there are no extraordinary circumstances indicating that further NEPA analysis would be necessary or informative in promulgating this technical assistance; nor has it found any extraordinary circumstances indicating that providing this voluntary technical guidance may have significant effects on the quality of the human environment, individually or cumulatively. OEEP has determined, therefore, that the rule does not constitute a major Federal action that would significantly affect the quality of the human environment. Therefore, OEEP will not prepare an environmental assessment or environmental impact statement for this regulatory action, and this notice serves as the documentation of the programmatic environmental compliance decision for this federal action.

Executive Order 12372

Executive Order 12372, "Intergovernmental Review of Federal Programs," requires consultation with State and local officials that would be directly affected by proposed Federal financial assistance. The objectives of the Executive Order are to foster an intergovernmental partnership and a strengthened Federalism, by relying on State and local processes for State and local government coordination and review of proposed Federal Financial assistance and direct Federal development. This rule does not provide Federal financial assistance to State and local governments. Therefore, consultation is not required.

Executive Order 12988

This rule has been reviewed in accordance with Executive Order 12988, "Civil Justice Reform." This rule will not preempt State or local laws, regulations, or policies unless they represent an irreconcilable conflict with this rule. Before any judicial actions may be brought regarding the provisions of this rule the administrative appeal provisions of 7 CFR part 11 and 2100 are to be exhausted.

Executive Order 13132

This rule has been reviewed under Executive Order 13132, "Federalism." The policies contained in this final rule do not have any substantial direct effect on States, on the relationship between the Federal government and the States, or on the distribution of power and responsibilities among the various levels of government, except as required by law. Nor does this rule impose substantial direct compliance costs on state and local governments. Therefore, consultation with the States is not required.

Executive Order 13175

Executive Order 13175 requires Federal agencies to consult and coordinate with Tribes on a government-to-government basis on policies that have Tribal implications, including regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian Tribes, on the relationship between the Federal Government and Indian Tribes, or on the distribution of power and responsibilities between the Federal Government and Indian Tribes.

This rule has potential Tribal implications. USDA consulted on the rule on September 3, 2025, and received no substantive comments or concerns. If a Tribe requests consultation in the future, OEEP will work with the Office of Tribal Relations to ensure meaningful consultation is provided.

The Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, requires Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments or the private sector. Agencies generally must prepare a written statement, including a cost benefit analysis, for proposed and final rules with Federal mandates that may result in expenditures of \$100 million or more in any 1 year for State, local, or Tribal governments, in the aggregate, or to the private sector. UMRA generally requires agencies to consider alternatives and adopt the more cost effective or least burdensome alternative that achieves the objectives of the rule. This rule contains no Federal mandates, as defined in Title II of UMRA for State, local, or Tribal governments, or the private sector. Therefore, this rule is not subject to the requirements of sections 202 and 205 of UMRA.

E-Government Act Compliance

OCE is committed to complying with the E-Government Act of 2002, to promote the use of the internet and other information technologies to provide increased opportunities for citizen access to Government information and services, and for other purposes.

Civil Rights Impact Analysis

OCE has reviewed this final rule in accordance with USDA Regulation 4300–4, Civil Rights Impact Analysis, to identify any major civil rights impacts the final rule might have on program participants on the basis of age, race, color, national origin, sex, disability, marital, or familial status. Based on the review and analysis of the final rule and all available data, issuance of this final rule is not likely to negatively impact low and moderate-income populations, minority populations, women, Indian tribes, or persons with disability, by virtue of their age, race, color, national origin, sex, disability, or marital or familial status. No major civil rights impact is likely to result from this final rule.

USDA Non-Discrimination Statement

In accordance with Federal civil rights law and USDA civil rights regulations and policies, USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Individuals who require alternative means of communication for program information (for example, braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or the USDA TARGET Center at (202) 720–2600 (voice and text telephone (TTY)) or dial 711 for Telecommunications Relay Service (both voice and text telephone users can initiate this call from any telephone). Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD–3027, found online at <https://www.usda.gov/oascr/how-to-file-a->

program-discrimination-complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all the information requested in the form. To request a copy of the complaint form, call (866) 632–9992. Submit your completed form or letter to USDA by: (1) mail to: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue SW, Washington, DC 20250–9410; (2) fax: (202) 690–7442; or (3) email: program.intake@usda.gov.

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List of Subjects in 7 CFR Part 2100

Alternative fuels, Agriculture, Environmental protection, Fuel economy, Greenhouse gases, Natural resources, Reporting and recordkeeping requirements.

For the reasons set out in the preamble, the Department amends 7 CFR part 2100 as follows:

PART 2100—TECHNICAL GUIDELINES FOR THE PRODUCTION OF REGENERATIVE AGRICULTURAL BIOFUEL FEEDSTOCKS

■ 1. The authority citation for part 2100 continues to read as follows:

Authority: 16 U.S.C. 3845–3846.

■ 2. The heading for part 2100 is revised to read as set forth above.

■ 3. Revise § 2100.001 to read as follows:

§ 2100.001 Purpose.

The purpose of this part is to establish technical guidelines for quantifying, reporting, and verifying the carbon intensity of agricultural biofuel feedstock commodity crops grown in the United States.

■ 4. Amend § 2100.002 by:

■ a. In the definition for “Agricultural expert,” removing the words “other persons” and adding the words “other Agricultural Experts” in its place;

■ b. In the definition for “Biofuel,” removing the word “a” before the word “liquid”;

■ c. Revising the definition for “Carbon intensity (CI)”;

■ d. Removing the definitions for “Climate smart agriculture (CSA) crop” and “Climate smart agriculture (CSA) practices”;

■ e. In the definition for “Conventional crop,” removing the word “CSA” and add the word “low-carbon” in its place;

■ f. In the definition for “Crop interval,” adding the words “and cover crops” after the words “fallow periods”;

■ g. Revising the definition for “Intensive tillage”;

■ h. In the definition for “Leguminous cover crop,” removing the word “are” and adding the word “is” in its place;

■ i. Adding a definition for “Low-carbon agriculture (low-carbon) practices” in alphabetical order;

■ j. In the definition for “Management unit,” removing the words “similar treatment needs and planned” and adding the words “the same” in their place;

■ k. Adding a definition for “Manure” in alphabetical order;

■ l. Revising the definitions for “No-till” and “Reduced-carbon intensity (reduced-CI) crop”;

■ m. Removing the definition of “Reduced-carbon intensity processed product (Reduced-CI processed product)” and adding the definition of “Reduced-carbon intensity (reduced-CI) processed product” in its place;

■ n. Revising the definition for “Reduced till”;

■ o. Removing the definition for “Soil Tillage Intensity Rating (STIR)”;

■ p. Adding definitions for “Spring canola” and “Tillage Disturbance Index for Soil Carbon (T-DISC)” in alphabetical order.

The revisions and additions read as follows:

§ 2100.002 Definitions.

* * * * *

Carbon intensity (CI) means a measure of greenhouse gas (GHG) performance reflecting the estimated quantity of GHG emissions associated with one unit of production. For biofuel feedstock crops, carbon intensity is expressed as grams of carbon dioxide equivalent (CO₂e) per bushel of produced crop (g CO₂e/bushel).

* * * * *

Intensive tillage means the implementation of a tillage system that involves extensive inversion or mixing of the soil with implements such as a moldboard, disk, or chisel plow. Intensive tillage does not meet the standards of reduced till or no-till in this part.

* * * * *

Low-carbon agriculture (low-carbon) practices means agricultural management, practices, systems, and technologies that have been demonstrated to generally reduce GHG emissions or increase soil carbon sequestration.

* * * * *

Manure means feces, urine, other excrement, and bedding produced by livestock including dairy, swine, beef and poultry.

* * * * *

No-till means the implementation of a tillage system that limits the amount of

disturbance to soil from mixing or inversion, creating only minor disturbances to the upper layers of soil throughout the crop interval.

* * * * *

Reduced-carbon intensity (reduced-CI) crop means a crop that is produced according to this part.

Reduced-carbon intensity (reduced-CI) processed product means a product derived from reduced-CI crops, between the farm and first biofuel refiner, used for the production of biofuel.

Reduced till means the implementation of a tillage system that limits disturbance to soil from mixing or inversion throughout the crop interval but allows minimal tillage and soil disturbance.

Spring canola means a canola crop that is planted during or between the months of January and June.

* * * * *

Tillage Disturbance Index for Soil Carbon (T-DISC) means a numerical value between 0–1 that estimates the intensity of soil disturbance caused by a tillage system. The higher the value, the more soil disturbance and higher potential for soil carbon loss. The T-DISC value applies to the entire tillage system used in producing a crop. The components of the rating include tillage type, mixing efficiency, and tillage depth.

■ 5. Revise and republish §§ 2100.011 and 2100.012 to read as follows:

§ 2100.011 Biofuel feedstock crops.

Crops produced in accordance with subparts F and G of this part, where a CI is quantified in accordance with subpart C of this part, are referred to as reduced-CI crops. Crops produced not in accordance with this part are referred to as conventional crops. A farm producer may produce both reduced-CI crops and conventional crops. Reduced-CI crops and conventional crops can be physically mixed. Crops for which a reduced-CI may be quantified include:

- (a) Field corn;
- (b) Soybeans;
- (c) Sorghum; and
- (d) Spring canola.

§ 2100.012 Low-carbon practices to produce reduced-CI crops.

Reduced-CI crops must be produced using nutrient management or nutrient management and one or more low-carbon practice(s):

- (a) No-till or reduced till; and/or
- (b) Cover crops.

■ 6. Revise and republish subpart C to read as follows:

Subpart C—Quantification of Field-level Crop-specific Carbon Intensity

§ 2100.020 Quantification of CI.

Any farm producing and selling reduced-CI crops must calculate a field-level CI for each field or management unit employing nutrient management or a unique combination of nutrient management and low-carbon practices for each crop type (field corn, soybeans, sorghum, or spring canola). The field-level crop-specific CI represents the net GHG emissions resulting from production of one bushel of that crop on a specified field or management unit. The field-level crop-specific CI applies to the year in which the crop was harvested and the total amount of a crop harvested from that field or management unit in a given year must be included in the calculation. Once a field-level CI is calculated for a specific crop, the total amount of that crop from that field is assigned the field-level crop-specific CI and may be sold as reduced-CI crop. To calculate the field-level CI for each crop:

(a) Farm producers must calculate the CI for each field or management unit on which nutrient management and low-carbon practice(s) were implemented, in accordance with subparts F and G of this part, using the U.S. Department of Agriculture (USDA) Feedstock Carbon Intensity Calculator (FD-CIC). This step must be repeated for every field or management unit producing reduced-CI crops. To calculate a field or management unit-level CI in USDA FD-CIC, farm producers must input data on:

- (1) Farm location (county and state).
- (2) Crop type produced.
- (3) Field or management unit acres.
- (4) Actual yield adjusted to the following moisture content.
 - (i) For field corn, 15.5%;
 - (ii) For soybeans, 13%;
 - (iii) For sorghum, 14%; and
 - (iv) For spring canola, 8.5%.
- (5) Expected yield.
- (i) For farm producers holding a crop insurance policy covering the reduced-CI crop for the current crop interval, farm producers must input the expected yield as the USDA Risk Management Agency (RMA) applicable approved yield(s) used to establish coverage on their crop insurance policy; or
- (ii) For farm producers that do not hold a crop insurance policy, a farm producer must input the expected yield as the RMA applicable transitional yield(s) or Agriculture Risk Coverage (ARC) County Benchmark yield for their county published by the Farm Service Agency (FSA).
- (6) Total synthetic nitrogen applied per acre.
- (7) Fraction of synthetic nitrogen receiving nitrification inhibitors.

(8) Amount, type, and nitrogen content of manure applied.

(9) Use of no-till or reduced till.

(10) Use of a cover crop or grazed cover crop.

(b) USDA FD-CIC will use the farm producer inputs from paragraph (a) of this section to calculate a CI for each field or management unit.

(c) Farm producers must repeat paragraphs (a) and (b) of this section for each field or management unit for each crop type that is sold as reduced-CI crop.

■ 7. Amend § 2100.030 by:

■ a. Removing the words “from when” and adding the words “beginning at the date in which” in their place in paragraph (d); and

■ b. Adding paragraph (e).

The addition reads as follows:

§ 2100.030 General recordkeeping and reporting standards.

* * * * *

(e) Any entity specified in § 2100.010 that participates in or has recently participated in more than one sustainability certification system must provide a third-party verifier with relevant documentation (e.g. mass balance, auditing reports) of all relevant certification systems to assess compliance with § 2100.031(e)(4)(v).

■ 8. Revise and republish § 2100.031 to read as follows:

§ 2100.031 Farm recordkeeping and reporting standards.

(a) Farm producers must keep records demonstrating implementation of the nutrient management and low-carbon practices used in calculation of a CI.

(1) For reduced till or no-till, see § 2100.051(c).

(2) For cover crops, see § 2100.052(b).

(3) For nutrient management, see § 2100.064.

(b) Farm producers must keep records demonstrating all sales from the farm of corn, soybeans, sorghum, and spring canola for the duration of the crop interval. These records must indicate the total amount sold, moisture content, the purchasing entity, and the date of the transaction. For sales of reduced-CI crop, records must also include the CI.

(c) Farm producers must provide records demonstrating the expected yield input in USDA FD-CIC which must include:

(1) For farm producers holding a crop insurance policy covering the reduced-CI crop for the current crop interval, records demonstrating the crop insurance policy documenting the expected yield used in the CI calculation; or

(2) For farm producers that do not hold a crop insurance policy, records

demonstrating the appropriate transitional yield published by USDA RMA (for example, screenshots or printouts from the RMA web pages or RMA documents where transitional yields for the appropriate county and crop are published) or the appropriate ARC-County Benchmark yield published by USDA FSA.

(d) Farm producers must provide records demonstrating that the actual yield input in USDA FD-CIC is adjusted to the applicable moisture content according to § 2100.020(a)(4).

(e) For each crop that is sold as a reduced-CI crop, farm producers must prepare and maintain a Biofuel Feedstock Report. Farm producers must provide the Biofuel Feedstock Report to any entity purchasing reduced-CI crop. The Biofuel Feedstock Report must:

(1) Begin with a statement that the undersigned farm producer certifies the following under penalties of perjury.

(2) State the farm name, farm producer name, and farm location (county and state).

(3) Demonstrate the quantification of each field or management unit with reduced-CI crop through:

(i) Documentation of USDA FD-CIC calculation for each field or management unit (for example, screenshots or printouts from the USDA FD-CIC tool, or similar documentation showing USDA FD-CIC inputs and outputs including CI for each field or management unit) including a unique identifier for each field or management unit.

(ii) [Reserved]

(4) Include a Farm Producer Attestation declaring that the farm producer:

(i) Has operational control over all fields using low-carbon practices and has decision-making authority to manage fields as specified for practice standards in subpart F of this part and nutrient management standards in subpart G of this part;

(ii) Implemented low-carbon practice(s) that were used in calculation of the CI according to the implementation standards in subpart F of this part, implemented nutrient management according to the implementation standards in subpart G of this part, inputted nitrogen applied and yield accurately into the calculation of the CI, and if applicable, applied manure according to § 2100.062;

(iii) Calculated each field-level CI as specified in subpart C of this part;

(iv) Will retain required records for five years and make records available upon request to accredited third-party verifier;

(v) Will not double sell CI information, attributes, or GHG benefits associated with the reduced-CI crop into more than one market;

(vi) When implementing no-till, will continue no-till on all crops in the rotation for a minimum of four out of every five years; and

(vii) Did not convert the land used to produce reduced-CI biofuel feedstock crops into crop production after January 17th, 2025.

(5) Include a statement that the farm producer understands that the fraudulent use of this Biofuel Feedstock Report may subject the farm producer, or any other party making fraudulent use of this Biofuel Feedstock Report, to a fine or imprisonment, or both, together with the costs of prosecution.

(6) Be signed by the farm producer.

■ 9. Amend § 2100.032 by:

■ a. In paragraph (a) introductory text:

■ i. Removing the word “reporting” and adding “recordkeeping” in its place; and

■ ii. Adding the words “ensure accuracy and” after the words “place to”;

■ b. In paragraph (a)(1)(i), adding the words “and moisture content” after the word “amount”;

■ c. In paragraph (b) introductory text:

■ i. Removing the word “chapter” and adding “section” in its place; and

■ ii. Removing the word “some” and adding “the following” in its place; and

■ d. Revising and republishing paragraph (c).

The revision reads as follows:

§ 2100.032 First point of aggregation and intermediary entity recordkeeping and reporting standards.

* * * * *

(c) When a first point of aggregation or intermediary entity sells reduced-CI crops or reduced-CI processed products, the entity must provide the following documentation to the purchasing entity:

(1) Documentation that the first point of aggregation or intermediary entity received third-party verification in accordance with this part;

(2) The Biofuel Feedstock Report associated with the reduced-CI crop or the reduced-CI crop used as an input in the reduced-CI processed product being sold; and

(3) An attestation including the following information signed under penalties of perjury:

(i) Total amount of reduced-CI crop or reduced-CI processed product sold;

(ii) CI(s) associated with the amount of reduced-CI crop or reduced-CI processed product sold; and

(iii) A statement that the first point of aggregation or intermediary entity understands that the fraudulent use of

this attestation may subject the entity and all parties making any fraudulent use of this attestation to a fine or imprisonment, or both, together with the cost of prosecution.

■ 10. Amend § 2100.033 by:

■ a. Revising the section heading;

■ b. Adding the words “or spring canola” after the word “soybeans” in paragraph (a) introductory text;

■ c. Revising paragraphs (a)(1) and (b)(3); and

■ d. Adding paragraph (b)(4).

The revisions and addition read as follows:

§ 2100.033 Additional recordkeeping standards for entities that process, sell, or purchase processed product derived from reduced-CI crops.

(a) * * *

(1) Keep records on processing of reduced-CI crops, including the entity’s crushing yield, the amount of reduced-CI crop used in processing, the Biofuel Feedstock Report associated with all reduced-CI crop being processed into reduced-CI processed product, and the corresponding amount of reduced-CI processed product; and

* * * * *

(b) * * *

(3) The Biofuel Feedstock Report associated with reduced-CI crop used as an input for reduced-CI processed product sold or purchased; and

(4) The amount of reduced-CI processed product sold or purchased.

■ 11. Amend § 2100.034 by:

■ a. Adding the words “measured at their dry weight (0% moisture content) and are” after the words “entity i are” in paragraph (d)(1) introductory text; and

■ b. Adding paragraph (e).

The addition reads as follows:

§ 2100.034 Mass balance recordkeeping standards.

* * * * *

(e) Entities must provide documentation of amounts in dry weight of incoming and outgoing conventional crop for each time period to the third-party verifier during audits.

■ 12. Amend § 2100.035 by revising and republishing paragraph (b) to read as follows:

§ 2100.035 Biofuel refiner recordkeeping standards.

* * * * *

(b) For reduced-CI crops and reduced-CI processed products that are sourced from a first point of aggregation or intermediary entity, a biofuel refiner must keep:

(1) Records of incoming reduced-CI crops or reduced-CI processed products,

which, at a minimum this includes records of incoming reduced-CI crop or reduced-CI processed products, including the total amount of reduced-CI crop or reduced-CI processed product purchased, the moisture content of reduced-CI crop, the entity from which the crop or processed product was purchased, the associated CI, and the date of the transaction;

(2) The Biofuel Feedstock Report associated with the reduced-CI crop or the reduced-CI crop used as an input in the reduced-CI processed product purchased; and

(3) Documentation that the entity supplying reduced-CI crop or reduced-CI processed product has undergone third-party verification by an accredited third-party verifier and met the standards of this part, including any attestations made by the entity as required under §§ 2100.031 and 2100.032.

* * * * *

■ 13. Amend § 2100.040 by:

■ a. Revising the first sentence in paragraph (a)(3) introductory text and paragraph (a)(3)(iii);

■ b. Revising and republishing paragraph (b)(3); and

■ c. Adding paragraph (g).

The revisions and addition read as follows:

§ 2100.040 Third-party audits.

* * * * *

(a) * * *

(3) The first point of aggregation must include all farms supplying reduced-CI crops in its audit scope. * * *

(iii) The third-party verifier must select the individual farms to be included in the sample for verification. The third-party verifier should select the sample in a way that is representative of supplying farms' characteristics including types of supplied reduced-CI crop, size of farm, geographic location, and risk of non-conformity or fraud and include an element of randomization in the selection.

(b) * * *

(3) For farms that are audited individually or included in an audit sample:

(i) The third-party verifier must verify that low-carbon practices, nutrient management, and recordkeeping is in accordance with the standards in subparts F and G of this part;

(ii) The third-party verifier must verify that the field-level CI for each crop is calculated correctly in accordance with subpart C of this part; and

(iii) The third-party verifier must verify that the actual yield is accurate

and accounted for correctly in accordance with §§ 2100.020(a)(4) and 2100.031; and

(iv) The third-party verifier must verify that the expected yield is accurate in accordance with § 2100.020(a)(5); and

(v) Records from relevant sub-contractors or service providers must be made available during the farm audit at the request of the third-party verifier if necessary to audit practice standards.

* * * * *

(g) *Audit standards for entities participating in multiple sustainability markets.* For each entity that that participates in or has recently participated in more than one sustainability certification system, an audit conducted by a third-party verifier must verify that multiple claiming (for example, double counting) of sustainability characteristics cannot and did not occur. The third-party verifier should assess relevant documentation (for example, mass balance accounting, auditing reports) of all relevant certification systems. The third-party verifier must verify the overall plausibility of incoming and outgoing sustainable material and ensure that the sustainable material sold is not greater than the sustainable material received.

■ 14. Revise § 2100.041 to read as follows:

§ 2100.041 Accreditation of third-party verifiers.

Third-party verifiers that conduct audits in accordance with this part must:

(a) Be accredited to ISO 14065: General principles and requirements for bodies validating and verifying environmental information by a member of the Global Accreditation Cooperation Incorporated (Global ACI);

(b) Be unrelated to the entity seeking verification. To avoid any real or potential conflict of interest, a third-party verifier must not have a relationship with the entity based on one or more of the following factors (this is a non-exclusive list): familial or personal relationship, or shared ownership, governance, management, personnel, resources, finances, contracts, or marketing (including branding); and

(c) Assign at least one verifier to the verification team who is an Agricultural Expert.

■ 15. Revise the heading of subpart F to read as follows:

Subpart F—Low-Carbon Agriculture Practice Standards

§ 2100.050 [Amended]

■ 16. Amend § 2100.050 by removing the word “CSA” and adding the words “Low-carbon” in its place.

■ 17. Amend § 2100.051 by:

■ a. Revising and republishing paragraph (a)(1);

■ b. Adding the words “or harvested” after the word “burned” in paragraph (a)(3);

■ c. In paragraph (a)(4), removing the words “the planting operation is allowed” and adding the words “the cash crop or cover crop planting or seeding operation is allowed” in their place;

■ d. Revising and republishing paragraph (b)(1);

■ e. Adding the words “or harvested” after the word “burned” in paragraph (b)(2);

■ f. Revising and republishing paragraph (b)(3) and the introductory text of paragraph (c);

■ g. In paragraph (c)(6), removing the second sentence; and

■ h. In paragraph (d), removing the word “STIR” in the last sentence and adding the word “T-DISC” in its place.

The revisions read as follows:

§ 2100.051 Tillage management.

* * * * *

(a) * * *

(1) The T-DISC value of the tillage system must be no greater than 0.252. Tillage methods where the entire soil surface is disturbed by tillage operations such as chisel plowing, field cultivating, tandem disking, vertical tillage, or ridge tillage are permitted. The T-DISC value must include all field operations that are performed during the crop interval (that is, from the time immediately following harvest or termination of one cash crop through harvest or termination of the next cash crop in the rotation, including fallow periods). The T-DISC value must be determined using USDA's T-DISC calculator or utilizing USDA's T-DISC methodology and underlying parameters to produce results equivalent to those produced by USDA's T-DISC calculator. Permitted methods are also commonly referred to as mulch tillage, conservation tillage, or ridge till;

* * * * *

(b) * * *

(1) The T-DISC value of the tillage system must be no greater than 0.075. Full-width soil disturbance must not be performed, from the time immediately following harvest or termination of one cash crop through harvest or

termination of the next cash crop in the rotation, regardless of the depth of the tillage operation. Strip tillage and fertilizer injection are permitted. The T-DISC value must include all field operations that are performed during the crop interval (that is, from the time immediately following harvest or termination of one cash crop through harvest or termination of the next cash crop in the rotation, including fallow periods). The T-DISC value must be determined using USDA's T-DISC calculator or utilizing USDA's T-DISC methodology and underlying parameters to produce results equivalent to those produced by USDA's T-DISC calculator;

* * * * *

(3) Removing residue from the crop planting row area prior to or as part of the cash crop or cover crop planting or seeding operation is allowed.

(c) *Tillage management recordkeeping standards.* Records must contain sufficient detail to be readily understood and auditable. Records may be of varying types and origins including, but not limited to, physical documentation (for example, paper forms, invoices, receipts, seed tags), digital files (including from farm management software), data generated by farm equipment (for example, precision agriculture equipment), remotely sensed data, georeferenced and timestamped photographs, or data and records used for participation in USDA programs. The records under this paragraph (c) for the year in which the practice is implemented must be kept for 5 years and demonstrate:

* * * * *

■ 18. Revise and republish § 2100.052 to read as follows:

§ 2100.052 Cover crop management.

(a) *Cover crop standards.* To qualify for the cover crop practice under this part, field(s) or management unit(s) must be managed according to the following standards:

(1) Cover crop species selection, seedbed preparation, seeding rate(s), seeding date, seeding depth, and seeding method must be consistent with applicable soil and site conditions;

(2) When a leguminous cover crop is used individually or as part of a mix, the farm producer must develop a nutrient budget which demonstrates:

(i) The available nitrogen resulting from the cover crop; and

(ii) An adjustment in total planned nitrogen application to the harvested production crop following the cover crop;

(3) Cover crops must be seeded in the fall. Cover crop may be interseeded into

an existing or established crop. Cover crop species and seeding dates should not adversely affect crop yield or interfere with the maintenance and harvest process;

(4) Cover crops should be seeded as early as possible and terminated as late as practical (late vegetative stage or later), with termination timing established to minimize the risk of yield loss and soil moisture depletion;

(5) Cover crops must be terminated via winter kill or using herbicide or non-soil disturbing mechanical methods (that is, roller crimper, mowing) in the spring;

(6) Planting green is permitted;

(7) Cover crop biomass must not be mechanically harvested. Residues must remain on the surface following termination and may not be burned; and

(8) If cover crops are grazed prior to termination, grazing should occur at later stages of maturity in order to maximize root biomass and to allow for at least 50% of the total above ground vegetation to remain with the majority to be flattened onto the soil surface.

(b) *Cover crop recordkeeping standards.* Records must contain sufficient detail to be readily understood and auditable. Records may be of varying types and origins including, but not limited to, physical documentation (for example, paper forms, invoices, receipts, seed tags), digital files (including from farm management software), data generated by farm equipment (for example, precision agriculture equipment), remotely sensed data, georeferenced and timestamped photographs, or data and records used for participation in USDA programs. The records under this paragraph (b) for the year in which the practice is implemented must be kept for 5 years and demonstrate:

(1) Purchase and receipt of cover crop seed in sufficient quantities to cover the area seeded;

(2) Field(s) or management unit(s) where cover crop practice is implemented, including location and acreage;

(3) Cover crop seeding date, method, and seeding rate;

(4) Total acreage seeded in cover crop across the operation;

(5) Photographic evidence of cover crop establishment;

(6) Cover crop termination date and method;

(7) Total bushels of the crop harvested from field(s) or management unit(s) where the cover crop practice was implemented immediately prior to seeding or planting the harvested production crop; and

(8) For grazed cover crops, georeferenced and timestamped photographs of cover crops being grazed.

(c) *Cover crop verification.* When auditing the cover crop practice, third-party verifiers must review documentation demonstrating cover crop species selection, seeding date, seeding method, seeding rate, total seeded acreage, termination date, and termination method. Through an on-site visit, remote sensing data, or georeferenced and timestamped photographs, third-party verifiers must verify the establishment of cover crops.

§ 2100.053 [Removed]

■ 19. Remove § 2100.053.

■ 20. Add subpart G, consisting of §§ 2100.060 through 2100.065, to read as follows:

Subpart G—Nutrient Management Standards

Sec.

2100.060 General nutrient management.

2100.061 Nitrification inhibitor standards.

2100.062 Manure application standards.

2100.063 Nutrient management recordkeeping standards.

2100.064 Nutrient management verification.

§ 2100.060 General nutrient management.

Every field or management unit must be managed according to the following standards:

(a) Prior to application of nutrients, the farm producer must develop and document a planned nutrient budget, yield goal, and applications of at a minimum, nitrogen, phosphorus, and potassium (N-P-K) in pounds per acre. The nutrient budget must account for all known measurable nutrient sources and removals. Sources of nitrogen may include, but are not limited to, commercial fertilizers (including starter and in-furrow starter or pop-up fertilizer), animal manures, legume crops, green manures, plant or crop residues, compost, organic by-products, digestate, municipal and industrial biosolids, wastewater, organic materials, estimated plant available soil nutrients, and irrigation water; and

(b) The farm producer must base the nutrient budget on current soil test results or the professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or other Agricultural Experts approved by the Federal Crop Insurance Corporation (FCIC), whose research or occupation is related to the specific crop or practice for which such expertise is sought. If the nutrient budget is based on soil test results, soil test results must

be no older than 2 years. Tissue testing may be used for monitoring or adjusting the nutrient budget in accordance with the state land grant university (LGU) guidance, or industry practice recognized by the state LGU. If the nutrient budget is based on the professional opinion of an Agricultural Expert, the Agricultural Expert must be unrelated to the farm producer. To avoid any real or potential conflict of interest, an Agricultural Expert must not have a relationship with the farm producer based on one or more of the following factors (this is a non-exclusive list): familial or personal relationship, or shared ownership, governance, management, personnel, resources, finances, contracts, or marketing (including branding).

§ 2100.061 Nitrification inhibitor standards.

To include the use of nitrification inhibitors in the calculation of the carbon intensity of the reduced-CI crop under this part, field(s) or management unit(s) must be managed in accordance with § 2100.060. Nitrification inhibitors must be defined by the Association of American Plant Food Control Officers (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition), and label claims.

§ 2100.062 Manure application standards.

Farm producers applying solid or liquid manure must apply manure according to the following standards:

(a) Farm producers may not exceed application rates as stated in their nutrient budget developed in accordance with § 2100.060; and

(b) A manure test for each type of manure applied must be used for development of the nutrient budget required in § 2100.060. The manure test must be collected during the current crop interval. The manure test must at a minimum provide information on N–P–K content of the manure.

§ 2100.063 Nutrient management recordkeeping standards.

Records must contain sufficient detail to be readily understood and auditable. Records may be of varying types and origins, including, but not limited to, physical documentation (for example, paper forms, invoices, receipts, seed tags), digital files (including from farm management software), data generated by farm equipment (for example, precision agriculture equipment, as applied maps), remotely sensed data, georeferenced and timestamped

photographs, or data and records used for participation in USDA programs. The records under this section for the year in which the reduced-CI crop is produced must be kept for 5 years and demonstrate:

(a) A nutrient budget that accounts for realistic yield goal and all known and measurable sources of N–P–K based on either soil test results or the professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or Agricultural Experts approved by the FCIC, whose research or occupation is related to the specific crop or practice for which such expertise is sought.

(1) If using soil test results, records must demonstrate soil test results, soil test methods, laboratory where soil test was conducted, and date of the soil test within 2 years of the development of the nutrient budget;

(2) If using the professional opinion of an Agricultural Expert, a statement by the Agricultural Expert documenting how they currently meet the requirements in § 2100.060(b) and if applicable, documentation of any professional certification including certification name, number, license name and number, agricultural retailer business name, or other brief written statement indicating how the requirements are met; and

(3) If used, in-season soil samples or tissue samples results for N analysis should be provided along with methods, laboratory, and date sampled.

(b) Date(s), method(s), location(s) of all nutrient applications in pounds per acre for N–P–K per field or management unit.

(c) Receipts identifying the source and type of nutrients supplied, including nutrient content.

(d) Planting or seeding date for each field or management unit where reduced-CI crop is produced.

(e) Total acreage for each field or management unit where reduced-CI crop is produced.

(f) Total bushels of the crop harvested from each field or management unit where reduced-CI crop is produced.

(g) Nitrification inhibitor recordkeeping. Farm producers applying nitrification inhibitors must maintain records of receipts identifying the amount and the type of nitrification inhibitors applied are in accordance with § 2100.061.

(h) Manure application recordkeeping. Farm producers applying manure must maintain records that demonstrate:

(1) Date of sample, description of where manure collection occurred, and

animal source of the manure for each type of manure tested and applied;

(2) Results of manure test(s) for each type of manure applied; and

(3) Records demonstrating amount of manure applied:

(i) For manure originating outside the farm, receipts demonstrating the sale or exchange of manure including date, quantity, type, and location of manure source; or

(ii) For manure that is produced on farm:

(A) If the farm participates in a livestock insurance program, insurance records demonstrating number of head or flock size specific to the year in which the manure was produced; or

(B) If the farm does not participate in an insurance program, farm records demonstrating livestock inventory specific to the year in which the manure was produced such as receipts of livestock or livestock products sold, permits, program enrollment documents that demonstrate number of head or flock size.

§ 2100.064 Nutrient management verification.

When auditing nutrient management implementation, the third-party verifier must verify development of a nutrient management budget that accounts for all known and measurable sources of nutrients (that is, N–P–K). The third-party verifier must verify that the nutrient management budget was developed based on current soil test results or the professional opinion of an Agricultural Expert who is employed by the Cooperative Extension System or the agricultural departments of universities, or other Agricultural Experts approved by the FCIC, whose research or occupation is related to the specific crop or practice for which such expertise is sought. The third-party verifier must verify that the nitrogen application and yield in each field or management unit on the Biofuel Feedstock Report is aligned with records. For nitrification inhibitors, the third-party verifier must verify that inhibitors followed requirements in § 2100.061. For farms applying manure, the third-party verifier must verify that the manure recorded in the calculation of the CI is consistent with farm records required in § 2100.063(h).

Kathryn Zook,

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[FR Doc. 2026–13092 Filed 6–26–26; 8:45 am]

BILLING CODE 3410–GL–P