



ENVIRONMENTAL PROTECTION AGENCY

[FRL-9754-4]

Notice of Decision Regarding Requests for a Waiver of the Renewable Fuel Standard

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Governors of several States requested that EPA waive the national volume requirements for the renewable fuel standard program (RFS or RFS program), pursuant to section 211(o)(7) of the Clean Air Act (the Act), based on the effects of the drought on feedstocks used to produce renewable fuel in 2012-2013. Several other parties submitted similar requests. Based on a thorough review of the record in this case, EPA finds that the evidence and information does not support a determination that implementation of the RFS program during the 2012-2013 time period would severely harm the economy of a State, a region, or the United States. EPA is therefore denying the requests for a waiver.

DATES: Petitions for review must be filed by [insert date 60 days from date of publication of the federal register notice].

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA-HQ-OAR-2012-0632. All documents and public comment in the docket are listed on the www.regulations.gov website. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the Air and Radiation Docket in EPA Headquarters Library, EPA West Building, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Reading Room is (202) 566- 1744. The Air and Radiation Docket and Information Center's website is

<http://www.epa.gov/oar/docket.html>. The electronic mail (e-mail) address for the Air and Radiation Docket is: a-and-r-Docket@epa.gov, the telephone number is (202) 566-1742, and the Fax number is (202) 566-9744.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

I. Executive Summary

Governors from several States have requested a waiver of the national volume requirements for the renewable fuel standard program (RFS or RFS program). Broadly summarized, the States requesting a waiver (requesting States) assert that the RFS program is having a negative impact on their respective State economies based on this period of severe drought conditions by diverting corn from other markets to production of ethanol to meet volumes required under the RFS, leading to increased corn prices and resultant negative impacts on the livestock industry and food prices. Other parties requested a waiver on similar grounds. On August 30, 2012, EPA published a Federal Register notice inviting public comment on the waiver requests and other matters relevant to EPA's consideration of those requests.

In determining whether these waiver requests should be granted or denied, our decision is based on the relevant criteria for a waiver set forth in CAA Section 211(o)(7) – whether

implementation of the RFS volume requirements would severely harm the economy of a State, a region or the United States. In making its determination, EPA took into consideration all comments submitted as well as an analysis of relevant impacts of the drought on the crops that would be used as feedstock in the production of renewable fuel during the 2012/2013 corn marketing year (September 2012 through August 2013). EPA analyzed the impacts with and without a waiver, utilizing an updated version of an Iowa State University (ISU) model that was used in response to a Texas waiver request in 2008 (discussed further below) when analyzing this year's waiver requests. This analysis identified the extent to which, if any, implementation of the RFS volume requirements would affect ethanol production and thereby the price of corn and other products over the relevant time period. EPA also considered other empirical data including historical and current Renewable Identification Number (RIN) credit prices and the available quantity of carryover RINs.¹

After weighing all of the evidence before it, EPA found that the evidence does not support a determination that implementation of the RFS over the time period in question would severely harm the economy of a State, region, or the United States, the high statutory threshold for a waiver. The body of information shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore will have no impact on corn, food, or fuel prices. In addition, the body of the evidence also indicates that even in the unlikely event that the RFS mandate would have an impact on the corn and other markets during the 2012-2013 time frame, its nature and magnitude would not be characterized as severe. In the small percentage of modeled scenarios where a waiver of the RFS mandate would have any impact on the production of ethanol (11 percent of the cases), the

¹ A RIN is unique number generated by the producer and assigned to each gallon of a qualifying renewable fuel under the RFS program, and is used by refiners and importers to demonstrate compliance with the volume requirements under the program.

decrease in ethanol production is small and the resulting reduction in corn prices is projected to be limited (on average \$0.58 per bushel of corn).² These potential impacts from implementation of the RFS program would not be considered as meeting the high statutory threshold of severe harm to the economy set by the statute. It is worth emphasizing that the modeling shows that even this degree of impact is a very unlikely outcome. The most likely outcome is that implementation of the RFS program during this time frame would have no impact at all on ethanol production and corn prices.

EPA also received comment on issues related to, among other topics, the general impact of increased use of biofuels on the economy and global markets, on ethanol's characteristics as a transportation fuel, and on the RFS program in general. EPA recognizes that many parties, both those supporting the waiver and those opposing the waiver, have raised issues of significant concern to them and to others in the nation concerning the role of renewable fuels and the RFS program in our country. In particular, EPA recognizes comments that focus on the severity of the drought and its major impacts on multiple sectors across the country. Many commenters describe the dire economic impact that this year's drought has had on corn crops, corn prices and those industries that rely on corn as an input. EPA and its federal partners recognize the substantial negative economic impacts suffered as a result of this year's historic drought. The drought's impact on U.S corn and other crop production has been well documented and was reflected in increasing corn prices starting early this summer.³ Crop growing regions across the country were affected, and the impacts of reduced crop production are far-reaching.

² On average, across the 500 cases considered in the ISU analysis, a small \$0.07 cent per bushel reduction on corn prices would be expected in the case of a waiver.

³ See for example the World Agricultural Supply and Demand Estimates, select issues, prepared by the U.S. Department of Agriculture; <http://www.usda.gov/oce/commodity/wasde>.

However, as was the case in 2008, the issue directly before the Agency is limited given EPA's authority under section 211(o)(7)(A) of the Act. After considering all of the public comments, both those in support of a waiver and those against, and consulting with the Secretaries of Agriculture and Energy, EPA has determined that the waiver requests should be denied because the evidence does not support making a determination that implementation of the RFS volume requirements during this time period would severely harm the economy of a State, region, or the United States.

It is important to note that this and other waiver decisions are based on current circumstances and market conditions. As indicated by EPA's modeling, the impact of the RFS volume requirements is highly dependent on the volumes at issue, the number of RINs carried over from prior years and the relevant market commodity prices, such as corn and crude oil prices, and other factors applicable during the time period analyzed.

II. Overview of the Renewable Fuel Standard (RFS) Program

The Energy Policy Act of 2005 (EPAct) amended the Clean Air Act to establish a Renewable Fuel Standard (RFS) Program and gave EPA responsibility for implementing it. EPAct required EPA to issue regulations ensuring that gasoline sold in the U.S., on an annual average basis, contained a specified volume of "renewable fuel." The Energy Independence and Security Act of 2007 (EISA) amended the RFS program by, among other things, extending the program to cover transportation fuel, not just gasoline, extending the years in which Congress specified the required volume of renewable fuels by ten years, and increasing the required volumes of renewable fuels. EISA set the 2012 and 2013 RFS renewable fuel mandates as 15.2

billion gallons and 16.55 billion gallons respectively, and the mandate rises to 36.0 billion gallons by 2022. EISA also imposed additional requirements for the use of advanced biofuel, biomass-based diesel, and cellulosic biofuel, included within the overall mandate of renewable fuel. As part of EISA, Congress required EPA to determine the life-cycle emissions of greenhouse gases associated with renewable fuels, and required a minimum level of greenhouse gas reduction to qualify as renewable fuel, advanced biofuel, cellulosic biofuel or biomass-based diesel. EPCA had the statutory goal of increasing the volume of renewable fuels that are required to be used in the transportation sector and Congress furthered that goal with the passage of EISA. In this context, implementation of EISA is aimed at reducing dependence on foreign sources of energy, increasing the domestic supply of energy, and reducing greenhouse gas emissions associated with the transportation sector.

EPA published regulations for the RFS program as amended by EISA on March 26, 2010 (75 FR 14670), and the amended RFS program became effective starting July 1, 2010. Since that time more than 36 billion ethanol-equivalent gallons of renewable fuel have been produced under the RFS program.⁴ EPA has also continued to update the RFS regulations through rulemaking actions to establish specific required renewable fuel volumes and annual percentage standards, as well as to identify additional qualifying renewable fuel production pathways. New pathways to produce renewable fuel for the RFS program, such as biomass-based diesel produced from canola oil have been approved as qualifying renewable fuels under RFS, and several others, such as ethanol produced from grain sorghum, are currently under evaluation. As

⁴ Data from EPA's Moderated Transaction System (EMTS) through September 2012. Retrieved November 8, 2012 from EMTS. See "RIN Rollover" memo in the docket for more information. or <http://www.epa.gov/otaq/fuels/rfsdata/index.htm>.

new biofuel, feedstock, and fuel production technologies approach commercialization EPA will continue to review potential renewable fuel pathways for inclusion in the RFS program.⁵

In April 2008, EPA received a request from the Governor of the State of Texas for a fifty percent waiver of the national volume requirements for the RFS; we provide more detail on this request here due to the relevance of our response to that request to today's determination. Texas based its request on the assertion that the RFS mandate was having a negative impact on the economy of Texas, specifically in the form of increased corn prices negatively impacting the livestock industry and food prices. After considering all of the public comments, and consulting with the Secretaries of Agriculture and Energy, EPA denied the waiver request.⁶ In making this decision, and as discussed in more detail below, EPA interpreted the statutory provisions to require a determination based on the expected impact of the RFS program itself, a generally high degree of confidence that implementation of the RFS program would severely harm the economy of a State, region, or the United States, and a high threshold for the nature and degree of harm. After weighing all of the evidence before it, EPA determined that the evidence in 2008 did not support a finding that implementation of the RFS would severely harm the economy of a State, region, or the United States. First, the evidence indicated that the most likely result was that the RFS would have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, feed, food, or fuel prices. Second, EPA also determined that if the RFS volume requirements were to have an impact on the economy during the 2008/2009 corn marketing year, it would not be of the nature or magnitude that could be characterized as severe. As part of the determination, EPA also provided guidance on what types of information should be submitted in the case of future waiver requests under the same provision of the Act.

⁵ A renewable fuel "pathway" under the RFS program encompasses a feedstock, process, and fuel combination. For example, ethanol (fuel) produced through a dry-mill process (process) and derived from corn starch (feedstock).

⁶ 73 FR 47168 (August 13, 2008).

III. EPA's Administrative Process

In this section we first provide background information concerning the waiver requests and EPA's public notice of, and solicitation of comment on those requests. We also address comments related to procedural issues concerning our consideration of the waiver requests.

1. Letters Seeking an RFS Waiver and EPA's Request for Comment

Beginning in July 2012, EPA received a number of requests for it to exercise its authority under CAA 211(o)(7) to grant a waiver in whole or in part of the renewable fuel standard requirements. In addition, EPA received a number of petitions seeking the same or similar EPA action from a number of state Governors, including the Governors of Arkansas, North Carolina, New Mexico, Georgia, Texas, Virginia, Maryland, Delaware, Utah, and Wyoming. The Governor of Florida wrote in support of a waiver in an October 16, 2012 letter to the EPA.^{7,8,9}

All of the letters from State Governors discussed above, as well as the many letters EPA received supporting the waiver requests or asking EPA to waive the RFS volume requirements, cite the negative impact of this year's severe drought conditions, and most discuss the effect the drought has had on corn and feed prices, and the subsequent impacts being felt by the livestock, poultry, and other sectors.¹⁰ Several of the letters claim that the RFS program significantly

⁷ See, for example, the July 30, 2012 letter submitted by the National Pork Producers Council (NPPC), on behalf of several national regional livestock, poultry, and other organizations ("July 30 NPPC letter") requesting a waiver, EPA-HQ-OAR-2012-0632-0012.

⁸ The Governors' letters requesting a waiver are available at docket number EPA-HQ-OAR-2012-0632.

⁹ In an August 9, 2012 letter, the Governors of Delaware and Maryland jointly wrote in support of the July 30 NPPC letter. The Governor of Delaware subsequently wrote in a September 25 letter asking that the August 9 letter "be formally considered a Petition for Waiver;" mentioned in EPA-HQ-OAR-2012-0632-1969. The Governor of Maryland also submitted a subsequent letter dated October 11, 2012 requesting a waiver, EPA-HQ-OAR-2012-0632-2259.

¹⁰ This includes several letters EPA received from Members of Congress supporting a waiver, all of which are available in the docket.

increases demand for corn, thereby increasing corn prices and harming those sectors that use corn as a production input, such as the livestock and poultry industries. Many of the letters claim that a waiver of the RFS volume requirements would alleviate some of that harm. Though not all of the letters specify a time period for the waiver, many of them request a waiver of the RFS volume requirements in 2012 and 2013. While the contents of the letters described above vary in detail, each letter either requests that the Administrator grant a waiver of required RFS volumes or expresses support for the granting of such a waiver.

On August 30, 2012, EPA published a Federal Register Notice providing notice of its receipt of the waiver petitions, letters of support for the waiver petitions, and requests that EPA grant a waiver and invited public input on those requests over a 30-day comment period.¹¹ EPA stated in the Notice that any similar requests received by EPA after issuance of the Notice would be docketed and considered together with the requests already received (collectively, the “waiver requests”).

EPA requested comment from the public on any matter that might be relevant to EPA’s review of and actions in response to the waiver requests, including but not limited to: (a) whether compliance with the RFS would severely harm the economy of Arkansas, North Carolina, other States, a region, or the United States; (b) whether the relief requested will remedy the harm; (c) to what extent, if any, a waiver would change demand for ethanol and affect prices of corn, other feedstocks, feed, and food; (d) the amount of ethanol that is likely to be consumed in the U.S. during the relevant time period, based on its value to refiners for octane and other characteristics and other market conditions in the absence of the RFS volume requirements; and (e) if a waiver were appropriate, the amount of renewable fuel volume appropriate to waive, the date on which any waiver should commence and end, and to which compliance years it should apply.

¹¹ 77 FR 52715 (August 30, 2012) (“August 30 Notice”).

In response to requests for an extension of time for public comment, EPA extended the public comment period by 15 days to October 11, 2012.¹² EPA received in excess of 29,000 comments during the comment period; the majority of the comments were short statements generally in support of the requests for a waiver. EPA also received numerous comments from various trade organizations and businesses, Governors, Members of Congress and other elected officials, researchers, and environmental organizations either supporting or opposing a waiver. Many of the comments referenced various analyses which are discussed below. In addition, EPA received comments that either supported EPA's legal interpretation of section 211(o)(7) as described in the 2008 Texas waiver determination or suggested that different interpretations and applications were appropriate. EPA addresses these and other comments either in the discussion of our process, results and conclusions, or in section VI of this determination.

2. EPA's Treatment of Petitions for a Waiver, Letters in Support of Petitions for a Waiver, Letters Requesting that EPA Act on its Own Authority to Issue a Waiver

Section 211(o)(7)(A) states, in relevant part, that "The Administratormay waive [the RFS requirements] in whole or in part *on petition by one or more States, by any person subject to the requirements of this subsection, or by the Administrator on his own motion... (i) based on a determination. . . that implementation of the requirement would severely harm the economy or environment of a State, a region or the United States, or (ii) based on a determination . . . that there is an inadequate domestic supply.*" (Emphasis added). The statutory criteria that must be met to issue a waiver are the same regardless of whether EPA acts on its own motion or responds to a petition from a State or person subject to the RFS

¹² 77 FR 57566 (September 18, 2012).

requirements. The only difference the statute draws between the Administrator acting on her own motion or in response to a petition submitted by the listed parties is the 90-day deadline for EPA action in the latter case, set by section 211(o)(7)(B). Therefore, EPA has given all waiver requests, whether received before or after the August 30 Notice, equal consideration. For the reasons described below, EPA is denying all of the waiver requests.

EPA received comment that although EPA sought comment on all the waiver requests, the Administrator need only decide that *one* of the requests meets the statutory requirements of CAA section 211(o)(7) in order to exercise her authority to waive the requirements of CAA section 211(o)(2) in whole or in part. This commenter noted that while EPA may consider the entirety of information and comments submitted on the various waiver requests, it need not decide that all, or several, of the requests have sufficient basis in order to grant a waiver. The commenter suggests that the waiver provision requires the Administrator to make individualized decisions with respect to “a State,” or “a region” of the United States that may be the subject of an individual request. EPA has considered all of the information and analysis submitted by the petitioners and parties who requested a waiver, as well as that submitted in comments. We have considered all information before us, including an analysis developed by EPA, as discussed below. Our technical analysis is relevant to all of the individual waiver requests. Based on the entire record before it, EPA has determined that each of the petitions and requests should be denied. In this decision EPA addresses each of the requests and petitions it has received to date. Therefore, EPA does not find itself in the situation posited by the commenters where some of the individual petitions are determined to satisfy the criteria for a waiver and other petitions do not. Rather, EPA has determined that each of the petitions should be denied.

3. Other Comments Related to EPA's Administrative Process

As mentioned above, as part of the 2008 waiver determination EPA provided guidance on what types of information and analysis should be submitted with future waiver requests. In response to this year's August 30 Notice, commenters argued that such guidance effectively established "completeness criteria" that petitioning States failed to meet, and that EPA failed to apply when initially evaluating the requesting letters.¹³ Commenters argue that had EPA applied such criteria, EPA "would not have even sought comment on the state petitions submitted this year."¹⁴ Commenters further argued that because the petitions submitted in 2012 fail to meet the criteria put forth by EPA in 2008, EPA "may not grant a waiver as the public has been deprived of the opportunity to comment on the basis for granting a waiver" of the RFS.¹⁵

EPA takes seriously its responsibility to evaluate whether circumstances warranting a waiver have arisen. EPA also recognizes the need to avoid the uncertainty to the renewable fuel and RIN markets that may be associated with unnecessarily frequent evaluations of whether issuing a waiver is appropriate. To help meet those objectives, EPA provided guidance in 2008 regarding expectations for future waiver requests, and today we repeat that such guidance should be followed in the future. At the same time, we explicitly stated in 2008 that the guidance provided "is not a rule, and therefore is not binding on the public or EPA. Any final decision on the sufficiency and merit of a petition will be made upon review of a petition by EPA in consultation with USDA and DOE." We further stated that EPA would "review a request for a waiver and first determine whether to proceed with public notice and comment."

¹³ EPA-HQ-OAR-2012-0632-2357, EPA-HQ-OAR-2012-0632-2218.

¹⁴ EPA-HQ-OAR-2012-0632-2218.

¹⁵ EPA-HQ-OAR-2012-0632-2218.

EPA, in consultation with USDA and DOE, reviewed the waiver requests received in July and August. In light of the severe drought affecting much of the country, and the clearly expressed support for a waiver by a number of States, governmental representatives and industry trade groups, it was clearly appropriate to seek public comment on the requests before making a final decision. Such a step would be required before EPA could make a decision to grant a waiver, and it was clearly appropriate to do so in these circumstances involving severe drought conditions before making a decision to either grant or deny a waiver. The many important public submissions in response to EPA's solicitation of comment have affirmed the importance of addressing the waiver issue in a prompt and transparent fashion.

IV. Key Interpretive Issues

Section 211(o)(7) of the CAA provides that EPA may waive the mandated national RFS volume requirement in whole or in part based on a determination by the Administrator that: (i) "implementation of the requirement would severely harm the economy or environment of a State, a region, or the United States," or (ii) "that there is an inadequate domestic supply." The 2012 waiver requests are all based on claims of severe economic harm to states, regions and/or the country as a whole associated with implementation of the RFS requirements in light of the drought experienced in large agricultural production areas of the country this summer. Therefore, the relevant statutory provision authorizes a waiver if EPA determines that RFS implementation "would severely harm the economy of a State, a region or the United States."

In the August 30 Notice, EPA sought public comment on its interpretation of this provision as discussed in the context of the 2008 Texas waiver determination. EPA's responses

to the comments received are set forth in section VI of this determination. For reasons more fully described in that section, EPA continues to interpret this statutory provision as it did in 2008. Thus, it would not be sufficient for EPA to determine that there is severe harm to the economy of a State, region or the United States; rather, EPA must determine that RFS implementation would severely harm the economy. Furthermore, EPA interprets the word “would” as requiring a generally high degree of confidence that implementation of the RFS program would severely harm the economy of a State a region, or the United States. EPA interprets “severely harm” as specifying a high threshold for the nature and degree of harm. Although there are many factors that affect an economy, the RFS waiver provisions call for EPA to evaluate the impact of the RFS mandate itself. EPA does not evaluate the impact of the RFS volume requirements in isolation, but instead evaluates them in the context of all of the relevant circumstances, including in this case the impact of the drought. However the purpose of this analysis is to characterize the impact of the RFS mandate itself, within this context. Finally, because the statute specifies that EPA “may” grant a waiver if it determines that implementation of the RFS requirements would severely harm the economy of a State, a region or the United States, the statute provides EPA with discretion to decline to issue a waiver even if it finds that the severe harm test is satisfied. This discretion allows EPA to take into consideration the possible impacts of issuing a waiver that extend beyond the geographic confines of a particular State or region. EPA believes that such consideration is particularly appropriate in light of the statutory requirement that any RFS waiver be nationwide in scope.¹⁶ To the extent relevant to the waiver requests before it, EPA has applied this interpretation in reaching a decision on the waiver requests.

¹⁶ Section 211(o)(7) reads, in relevant part, that the “Administrator...may waive the [RFS] requirements...by reducing the *national quantity* of renewable fuel...”. Emphasis added.

V. Technical Analysis

To evaluate the impact that implementation of the RFS would have on the amount of ethanol produced and consumed over the relevant time period, and the resulting impacts, if any, on the agricultural and other industries, we applied the same analytical framework EPA used in evaluating the 2008 waiver request. We first assessed what impact implementation of the RFS program would have on ethanol production and consumption, and thus corn prices, by conducting our own analysis using a model developed by Iowa State University. We then evaluated the impacts such changes, if any, would have on a set of key factors, including corn prices, feed prices, food prices, and fuel prices. A number of commenters submitted analyses looking at similar issues, and we reviewed those studies as part of our overall evaluation. Throughout this section we also address various comments we received in response to the August 30 Notice.

1. Methodology

(a) Analytical Model

To assess the impact of implementation of the RFS, EPA evaluated two scenarios: one in which no waiver is granted and another in which a waiver of the total renewable fuel mandate is granted, as discussed below. As we did in evaluating the 2008 Texas waiver request, EPA utilized an economic model developed by researchers at Iowa State University (ISU model).

During development of the analytical framework used in 2008, EPA evaluated different models and modeling approaches, and we refer readers to that discussion for more detail.¹⁷

EPA believes the ISU model continues to be the most appropriate choice for a number of reasons. First, as discussed in 2008, EPA believes it is critical to use a stochastic framework to capture a range of potential outcomes, rather than a point estimate, given potential variation in a number of critical variables associated with ethanol production (e.g., corn yields, gasoline prices). Second, the ISU model captures the interaction between agricultural markets and energy markets, and is able to examine the impacts of uncertainty in variables within both sectors. The ability of the ISU model to account for this variability across both sectors gives the model an advantage over other models that are locked into a single projected fuel price or corn crop estimate. Third, documentation for the ISU model is relatively straightforward and transparent compared to other options, and allows all interested parties to understand the assumptions that drive the results.¹⁸ Fourth, the ISU model was designed to be easily and regularly updated with the most recently available data, such as USDA's World Agricultural Supply and Demand Estimates (WASDE) and the Energy Information Administration's (EIA) Short Term Energy Outlook (STEO) reports, making it useful for analysis looking at fairly short time frames (e.g., within one year into the future).^{19, 20} Finally, we note that the ISU model has been used in analytical work conducted outside EPA; reports based on such work are and have been available in the public domain for review. We are using a model, in other words, that has been subjected to external scrutiny independent of our own analysis. By way of example, many commenters

¹⁷ 73 FR 47173 (August 13, 2008).

¹⁸ For a recent example of this documentation, see: Babcock, B. "Updated Assessment of the Drought's Impacts on Crop Prices and Biofuel Production." ("Babcock-Iowa State.") Center for Agricultural and Rural Development, CARD Policy Brief 12-PB 8, August 2012, available in the docket and at http://www.card.iastate.edu/policy_briefs/display.aspx?id=1169.

¹⁹ <http://www.usda.gov/oce/commodity/wasde/>.

²⁰ <http://www.eia.gov/forecasts/steo/>.

cited a non-EPA study that used the ISU model and same basic approach we adopt here to analyze potential impacts of a waiver in 2012.²¹ EPA is not aware of any significant technical criticism of the ISU model itself.²²

The ISU model is a stochastic equilibrium model that projects, among other outputs, the prices of corn, ethanol and blended fuel given uncertainty in six variables: U.S. corn yields, U.S., Brazilian, and Argentinean soybean yields, U.S. wholesale gasoline prices, and Brazilian ethanol production.²³ The analysis simulates 500 scenarios, and for each one the model independently picks a value for each exogenous factor (such as U.S. corn yield) by randomly selecting from a probability distribution curve for that factor. Since the probability of the specific value of a given corn yield is built into the distribution curve for corn yields, the greater the probability of a certain corn yield, the more likely it is that the model will pick that value for any scenario. The result is that the distribution of the random draws for each exogenous factor fairly reflects the probability of the various uncertain variables. For each of the 500 scenarios, the model projects ethanol production and the prices of corn, ethanol, and blended fuel based on the values picked for the exogenous factors for that run. As mentioned above, we ran the model with and without a waiver, modeling 500 different scenarios, to assess the impact of a waiver.

For the results described below, EPA made modifications to the model in preparation for the current analysis. At EPA's request, ISU researchers updated their model with data from the October WASDE and STEO reports. After consultation with DOE, we also modified the demand curve for ethanol to reflect our understanding of flexibility in refinery markets over the next twelve months. A full description of the ethanol demand curve developed in consultation

²¹ Babcock-Iowa State.

²² The assumptions and inputs used within any model are of critical importance to modeled results, and we explain our selection of key inputs below.

²³ These variables are called exogenous factors, or uncertain variables. The gasoline price put into the model is a "petroleum only" price, meaning that it represents a gallon of gasoline that contains no ethanol.

with DOE can be found in the docket.²⁴ We discuss the issue of refiner flexibility more fully in Section V.1.d below. Further, as detailed in Section V.1.c below, the model utilizes EPA estimates regarding excess, or “rollover” RINs, that will be available for use for compliance purposes in the 2012/2013 corn marketing year time period. The time period analyzed is discussed in Section V.1.b below. The estimates of rollover RINs are based on information submitted to EPA related to RIN generation. Additional details on the model changes and assumptions made for EPA’s analysis are included in the docket.²⁵

(b) Scope of Technical Analysis

To analyze the impact of implementation of the RFS, our technical analysis focused on the volume of renewable fuel representing the difference in volume between the advanced biofuel requirement and the total renewable fuel requirement. This is the portion of the total volume requirement that is currently met almost exclusively with corn ethanol.²⁶ EPA compared circumstances with and without a waiver to identify the impact properly associated with the use of corn ethanol in the implementation of the RFS program for the 2012/2013 corn marketing year.²⁷

²⁴ See memo to the docket from the Department of Energy on ethanol demand for further information.

²⁵ See memos to the docket describing the ISU model (“Description of Iowa State University Stochastic Model”) and detailing EPA modeling results (“EPA Stochastic Modeling Results”) for more information.

²⁶ Note that the RFS program does not require that this volume of renewable fuel be met through use of corn based ethanol; any other renewable fuel can also satisfy the requirement.

²⁷ While some of the requests for a waiver do discuss a “whole or partial” waiver, our analysis focuses on a waiver of the full amount between the advanced biofuel requirement and the total renewable fuel requirement. Analyzing scenarios with and without the volume requirements in place helps evaluate the full impacts of the RFS program. Because we find that it is unlikely that the RFS requirements are having an impact in the time period analyzed, we do not address the question of a partial waiver. If waiving the entire volume requirement were to have no impact, then we would not expect waiving just a portion of the requirements to have an impact.

We note that several of the States requested a waiver of RFS requirements “in 2012 and 2013,” although the various waiver requests were not always specific with respect to the time period for which the waiver was requested. EPA focused its technical analysis on the 2012/2013 corn marketing year (which runs from September 1, 2012, to August 31, 2013) for a number of reasons. All of the petitioners referenced the serious drought conditions as the underlying reason for waiving the RFS volume requirements. The drought primarily affects the 2012/2013 corn marketing year, and the harm claimed by the requesters was the impact of taking corn from the reduced crop affected by the drought and using it to produce ethanol as a transportation fuel. The corn crop at issue is the 2012/2013 corn marketing year crop, and it is ethanol produced from this corn crop that was the overwhelming focus of the waiver requests. Focusing the technical analysis on the production of ethanol during this same 2012/2013 time period focused the analysis on the time period where implementation of the RFS volume requirements was claimed to be the source of the harm. In addition, focusing on the 2012/2013 marketing year is consistent with the petitioners request to waive the RFS requirements “in 2012 and 2013” since it would cover portions of both calendar years. Finally, while other time periods are possible to analyze, data is often reported on a marketing year basis, and analysis of commodity markets is frequently done similarly. The WASDE data used in our analysis, as well as all other USDA projections of U.S. corn yields, production, and prices, are done within this same time frame.

EPA received comment that a waiver granted for some or all of 2013 might have impacts on market dynamics in the 2013/2014 corn marketing year, and that EPA is not limited to assessing only a one-year impact.²⁸ Commenters state that a waiver granted for some or all of the 2013 RFS compliance year would make more RINS available for use in 2014, when the RFS

²⁸ For example, see comments submitted by National Pork Producers Council, available at EPA-HQ-OAR-2012-0632-2209, stating that “benefits of [a] waiver do not need to coincide with waiver period” at 26.

standards are higher, and that such a waiver would provide “relief” in 2013/2014. In considering the time frame used for this technical analysis, EPA recognizes that we have discretion in determining the appropriate time period to analyze. In this case, however, and as described above, we focus our analysis on the 2012/2013 corn marketing years as that is the time period where the requesters claim that implementation of the RFS volume requirements would severely harm the economy. Evaluating whether implementation of the RFS volume requirements would severely harm the economy after the end of the 2012/2013 corn marketing year would require a new set of assumptions regarding future crop yields, gasoline costs, refining market behavior, and other parameters, which can be projected but are less certain at this time.²⁹ EPA believes that evaluating the potential impacts of implementation of the RFS volume requirements in 2013/2014 should take into account information on the 2013/2014 corn crop, as well as updates on other information used in the analysis. While it is possible to look over a longer time period, as some of the studies submitted to EPA attempt to do,³⁰ assessing impacts over a longer time period introduces an additional set of variables that increase the uncertainty of any analytical results.

To the extent parties believe that implementation of the RFS program would severely harm the economy in 2014 because of the production of renewable fuel from corn, then a future waiver request that focuses on the harm in that time period could present analysis and arguments addressing the impact of implementation of the RFS volume requirements during that time period. For example, the availability of rollover RINs in future time frames could be more limited, a fact which could impact the results of such an analysis. However as noted above

²⁹ For example, using gasoline prices for longer-term projections necessarily involves a higher degree of uncertainty. The same goes for projections related to crop yields.

³⁰ See, for example, “Renewable Fuel Standard Waiver Options during the Drought of 2012,” Food and Agricultural Policy Research Institute, University of Missouri, Report #11-12, October 12, (“FAPRI-Missouri”), available in the docket.

assessing those issues now would involve a high degree of uncertainty. To the extent parties assert that implementation of the RFS volume requirements would severely harm the economy in 2014 because of market based limits on the volume of ethanol in gasoline (typically referred to as the blendwall, as blends greater than E10 or E15 may only be marketed to flexible fuel vehicles), then a future waiver request that focuses on this issue could present information and analysis addressing the relevant issues. However, it would be more appropriate to consider such issues in a future annual RFS rulemaking setting the volume requirements for years after 2013.

In a related vein, EPA also received comments related to EPA's ability to renew a waiver beyond a one-year time frame.³¹ Other commenters suggested that EPA should grant a waiver for two years. The statute provides that a waiver granted under section 211(o)(7) of the Act "shall terminate after 1 year, but may be renewed by the Administrator after consultation with the Secretary of Agriculture and the Secretary of Energy." EPA interprets this provision to mean that Congress intended the length of time for which a waiver should be granted to be one year, and that EPA may consider, in consultation with USDA and DOE, whether the period should be extended. Such consultation would be in the context of evaluating the economic impacts of the initial waiver as well as whether severe economic harm is still being caused by implementation of the RFS volume requirements. EPA does not need to decide now the scope of its authority for a renewal of a waiver, especially since EPA is denying the waiver requests that are before it. EPA clearly has authority to grant a waiver for a period of one year only, and any renewal would need to be the subject of a separate, if related, action.

For these reasons, with respect to assessing the impact that implementation of the RFS will have on ethanol production levels, and to evaluating the impacts and potential degree of harm from implementation of the RFS on corn prices and other factors, EPA believes that it is

³¹ National Pork Producers Council comments at EPA-HQ-OAR-2012-0632-2209.

appropriate in this case to focus its technical analysis on impacts that occur from the production of ethanol in the 2012/2013 corn marketing year.

EPA's technical analysis focuses on whether the RFS mandate has an effect on corn ethanol production and consumption over the 2012/2013 marketing year. EPA recognizes that the drought affecting much of the nation during 2012 has affected not only corn yields, but also other crops used in the production of renewable fuels, most notably soybeans, which are used as a feedstock in biomass-based diesel (BBD) production. EPA also received comment arguing that a waiver should analyze impacts on all potential feedstocks and volume standards under RFS.³² EPA chose to focus our technical analysis on conventional ethanol, corn prices, and related impacts primarily because the requesting States and other parties as well as commenters focused the overwhelming majority of their discussion on ethanol production, corn price changes, and subsequent impacts from those increased corn prices on industries that use corn as an input (e.g., feed, livestock, and poultry industries). These parties assert that the RFS is creating demand for corn for use in production of transportation fuel, and that reducing that demand via a waiver would result in making additional corn available for other end uses and reduce prices of corn. Because the focus of the requesting parties is on corn and corn ethanol, we believe it is reasonable to similarly concentrate our technical analysis on the impacts of a waiver affecting the portion of the total renewable fuel mandate that is currently satisfied with conventional renewable fuel RINs, the majority of which represent corn-based ethanol.

At the same time, some of the requesting States mentioned the drought's impacts on soybean crops, and many of the requesting States requested a waiver of "applicable volumes" of

³² See, for example, comment from Chevron at EPA-HQ-OAR-2012-0632-2306.

renewable fuel.³³ While EPA did not conduct its own technical analysis of these issues, EPA considered the technical analysis and other information submitted by commenters, and has determined that a waiver should not be granted for the RFS biomass-based diesel volumes. We discuss the biomass-based diesel and cellulosic volume requirements in section V.6.

(c) Availability of Rollover RINs

Under the RFS program, RINs are valid for compliance purposes for both the calendar year in which they are generated and the following calendar year. By regulation, the amount of an obligated party's Renewable Volume Obligation (RVO) that can be met using previous-year, or "rollover," RINs is capped at 20 percent. EPA explained our interpretation of the relevant statutory provisions, and our reason for establishing a cap of 20 percent, in the 2007 RFS final rulemaking on RFS.³⁴ For purposes of the current analysis, the number of rollover RINs available during the 2012/2013 marketing year affects the impact of implementation of the RFS volume requirements in 2013.

The specific number of rollover RINs available for use in the 2012/2013 marketing year is an input into EPA's stochastic modeling. To the extent that the number of rollover RINs is greater, the RFS requirements could be met with less production and blending of ethanol in 2013. The converse is the case if the number of rollover RINs is less. As discussed in Section V.1.d, we believe that refiners and importers, the parties obligated to comply with a renewable volume requirement, at least in many cases, have reasons other than the RFS program for choosing to rely on ethanol blending for compliance purposes. However, to the extent that the

³³ See, for example, the waiver request letter from the Governor of Utah, at EPA-HQ-OAR-2012-0632-2486, requesting a waiver "as to have the maximum impact on the price of corn and soybeans..."

³⁴ 72 FR 23935 (May 1, 2007).

RFS program also creates such pressure, rollover RINs reduce it in a given time period by increasing compliance flexibility for obligated parties. It also provides more flexibility for renewable fuel producers. From the perspective of the ISU model, one rollover RIN is equivalent to one liquid gallon of ethanol: both equally satisfy the RFS requirements, and thus both are sources of ethanol to draw upon in the model.

Based on the most current data available from the EPA Moderated Transaction System (EMTS), EPA projects that obligated parties will collectively be able to roll over 2 to 3 billion 2012 vintage RINs into the 2013 compliance period. EMTS currently reports that approximately 3.5 billion 2011 vintage D6 RINs are available for use towards 2012 compliance. As discussed above, no more than 20 percent of a given year's renewable fuel standard can be met with RINs from the previous year.³⁵ That requirement is 15.2 billion gallons in 2012, meaning that as many as 3.04 billion 2011 RINs can be carried over for 2012 compliance.³⁶ Since these 2011 vintage RINs expire at the end of the 2012 compliance period, obligated parties have a strong incentive to use these RINs first, carrying over any excess 2012 RINs into the 2013 compliance period. Based on this incentive and supported by conversations with industry and governmental stakeholders, EPA believes that obligated parties will utilize the maximum possible amount of 2011 RINs (i.e., 3.04 billion RINs out of a total 3.46 billion RINs available) for 2012 compliance and not let them expire.

Based on total 2012 EMTS data available to date, we project for purposes of this analysis that D6 RIN rollover into the 2012/2013 marketing year period will exceed 2.0 billion. Total D6 RIN generation for 2012 has already exceeded 10.8 billion gallons. Monthly generation of D6 (general renewable fuel) RINs was approximately 1.05 billion in October of 2012, only slightly

³⁵ 40 CFR 80.1427.

³⁶ 3.04 billion RINs is 20 percent of the total renewable fuel requirement for 2012 (i.e., 15.2 billion gallons).

lower than the 1.1 billion RINs generated in October of 2011 and just below average for 2012 as a whole.³⁷ If monthly RIN generation holds constant at October levels for the rest of 2012, rollover of 2012 vintage RINs to 2013 would likely exceed 2.6 billion. If RIN generation increases in November and December of 2012, as it did in both 2010 and 2011, rollover RIN availability would likely exceed 2.7 billion and could potentially be even higher. Thus in all of these scenarios, it is expected that at least 2.0 billion rollover RINs will be available for the 2013 compliance year. Further information on RIN rollover projections is also available in the docket.³⁸

Several studies prepared by non-EPA researchers observe, and we agree, that the availability of rollover RINs can significantly affect the potential impact of implementation of the RFS volume requirements. Some studies have suggested that, in scenarios where rollover RINs are relatively scarce, waiving the effective conventional renewable fuel volume requirement might lead to a significant decrease in corn prices. However, if significant numbers of rollover RINs (i.e., 2.0 billion or more) are available, these studies suggest that the effect of a waiver is significantly smaller.³⁹

EPA recognizes that the estimate of rollover RIN availability used in the ISU model (and other models) can have a significant effect on the results of the modeling. For purposes of our analysis, EPA assumed that no more than 2.0 billion rollover RINs would be available for use in the 2012/2013 time period. As discussed above, current data suggest that RIN rollover is likely

³⁷ Even if D6 RIN generation declines by 10 percent monthly in November and December of 2012, we expect that the number of 2012 vintage D6 RINs available after obligated parties fulfill their 2012 compliance obligations would still exceed 2 billion, and would likely exceed 2.5 billion. See “RIN Rollover” memo in the docket for more information.

³⁸ See “RIN Rollover” memo in the docket.

³⁹ See Babcock-Iowa State. See also Purdue University/Farm Foundation study, “Potential Impacts of a Partial Waiver of the Ethanol Blending Rules,” EPA-HQ-OAR-2012-0632-0025

to be higher or even significantly higher than this. We believe 2.0 billion rollover RINs is a conservative analytical assumption.

Historically refiners and blenders have blended more ethanol than required due to its favorable economics, leading to the large carryover RIN balance discussed above. EPA received comment suggesting that even if the blending economics were not favorable for ethanol, refiners and blenders might look forward to future obligations and purposefully over-comply with the RFS requirements in 2013 to increase their “bank” of relatively low-cost RINs that could be carried into 2014, in case they anticipate RIN prices to be higher then. If such behavior were to take place, ethanol production in the 2012/2013 corn marketing year would be higher than the level projected in the ISU modeling results. The implication is that the waiver could have a slightly larger impact on ethanol production and corn prices than what is projected in the ISU modeling results. If this type of over-complying behavior were to take place, we would expect demand for ethanol to be right at the E10 blend wall limit in 2012 and 2013. However, the empirical data does not support the theory that obligated parties are over-complying to the maximum extent that they can bank RINs today, since there is still a small but significant gap between the volumes of ethanol consumption our modeling projects for next year and the estimated E10 blend wall. Even if parties were to engage in over-compliance for banking purposes in 2013, their desire to do so would likely be limited by their ability to blend ethanol into low level blends (i.e., E10). Therefore, we do not believe that this type of behavior would have any appreciable effect on our analysis for this waiver decision.

(d) Flexibility in the Refining Sector

In assessing the impact of implementing the RFS volume requirements in the 2012/2013 time frame on ethanol production, a key consideration is the economic incentives for refiners to use ethanol during that time frame as well as the ability of refiners and fuel blenders to reduce, over that one-year timeframe, the quantity of ethanol currently being blended into the gasoline pool. As ethanol production and availability in the U.S. has increased over the past 10 years, the economics of blending ethanol into gasoline have been such that many refiners have transitioned from producing primarily finished gasoline to producing primarily blendstocks for oxygenate blending (BOBs) which require the addition of ethanol in order to meet the specifications of finished gasoline. However, assuming refiners wanted for business reasons to reduce the quantity of ethanol blended into the gasoline pool, refiners would have to seek alternative high octane blend stocks or significantly adjust refinery operations to make up for the volume and octane increase they currently receive from ethanol. Logistical challenges to the refined product distribution system would also have to be overcome in parallel with the necessary refinery operation changes.⁴⁰

As mentioned, currently most refiners produce a sub-octane unfinished gasoline lacking oxygenates called blendstocks for oxygenate blending (BOBs). These BOBs are transported through fuel pipelines or other modes to petroleum product terminals where they are then blended with ethanol and become finished gasoline. Since ethanol is generally not produced near large refineries and may absorb water and impurities that normally reside in petroleum product pipelines, a separate ethanol distribution system has been established to distribute and ultimately blend ethanol into BOBs at terminals to produce the finished fuel.

⁴⁰ See Department of Energy memo on ethanol demand, available in the docket, for further information. See also EPA memo, "Economics of Ethanol Blending and Refining Sector Flexibilities," available in the docket.

One reason refiners choose to blend ethanol into gasoline is for purposes of boosting gasoline octane levels. Ethanol has an octane value of 115 (R+M/2) while finished gasoline's pump octane value ranges from 87 – 93.⁴¹ Ethanol also has a value as a gasoline extender when blended into the gasoline pool. Other properties of ethanol, such as its volatility and low sulfur and benzene content, influence its value to refiners. Each refiner is expected to make decisions about ethanol blending independently, in light of the value they place on these factors and the complexity and uniqueness of each refinery. Where the blending of ethanol is profitable to refiners we expect that they would continue to blend ethanol into the gasoline pool even in the absence of a renewable fuel requirement.⁴²

After consultation with DOE, review of comments, and analysis undertaken by EPA, we determined that, assuming refiners had an economic incentive to reduce ethanol blending, refiners have limited flexibility to make the necessary adjustments to reduce ethanol blending if a one year waiver of the RFS program were granted under projected scenarios for ethanol and gasoline prices. Our modeling inputs reflect this determination.⁴³ At current ethanol and crude oil prices, the blending of ethanol into gasoline is an economically beneficial practice for refiners, and based on EIA forecasts this is expected to continue through at least 2013. However if that were to change and blending ethanol into gasoline was no longer an economically beneficial practice for refiners, we believe that the challenges at both the refinery level and in the refined product distribution system would be significant deterrents to reductions in ethanol blending in response to a one-year waiver. Studies conducted by independent organizations such

⁴¹ Octane rating or octane number is a standard measure of the performance of a motor or aviation fuel. The higher the octane number, the more compression the fuel can withstand before detonating.

⁴² EPA acknowledges that the blending economics for ethanol are significantly different for E10 and E85. Our ethanol demand curve takes these differences into consideration, resulting in large drop in the ethanol to gasoline price ratio at the volume of ethanol that corresponds to the E10 blendwall.

⁴³ We note that our analysis does take into account different fuels where appropriate, including imported ethanol derived from sugarcane.

as Morgan Stanley and Hart Energy, among others, support our assumption that refiners would be limited in their ability to reduce ethanol blending if a one year waiver of the RFS requirements is granted under current economic circumstances.⁴⁴ For example, Morgan Stanley argues that there would be significant impediments to moving away from ethanol because it is widely available and is the least expensive source of octane/oxygenates for most refineries. Similarly, Hart Energy estimates that ethanol's octane value and the cost of partially replacing ethanol use will limit the economic attractiveness to refiners of using less ethanol even with a waiver. They conclude that because an RFS waiver cannot force a reduction in domestic ethanol usage or exports, a waiver would likely have a small, if any, effect on reducing corn prices based on the continued demand for ethanol under current market economics.

EPA also received comments from the American Petroleum Institute, Chevron, and Marathon Petroleum Company stating that a one year waiver would be unlikely to result in a significant decrease in ethanol blending.⁴⁵ Though we did receive some comment arguing that refiners could make operational changes quickly, commenters provided little evidence upon which to assess this claim. These comments are likely based on historical practices when splash blending of ethanol was much more prevalent and refining and distribution had not optimized toward the use of ethanol.

Several commenters cited the challenges that refiners would face in reducing the quantity of ethanol blended into the gasoline pool in the near term as justification for a longer-term waiver.⁴⁶ These commenters stated that doing so would allow the refining industry sufficient

⁴⁴ Morgan Stanley, "Ethanol Demand a Function of Economics, Not RFS," August 7, 2012. Hart Energy Special Report, "U.S.: RFS Waiver Unlikely to Affect Ethanol Use," October 12, 2012. Both analyses are available in the docket.

⁴⁵ Comments submitted by American Petroleum Institute, EPA-HQ-OAR-2012-0632-2240, Chevron, EPA-HQ-OAR-2012-0632-2306, and Marathon Petroleum Company, EPA-HQ-OAR-2012-0632-1968.

⁴⁶ See for example National Chicken Council comments, EPA-HQ-OAR-2012-0632-1994 and Grocery Manufacturers Association comments, EPA-HQ-OAR-2012-0632-2341.

time to address the operational and logistical challenges mentioned in the previous paragraphs and be necessary to result in reduced ethanol demand and consequent relief from high corn prices to affected industries. While we recognize that analyzing a longer period could affect the results of our modeling, EPA did not conduct such an analysis here for the reasons discussed above, including the high uncertainty involved in projecting relevant conditions further into the future. As such our technical analysis is based on the impacts of implementation and a potential waiver over a period of one year.

2. Projected Impact of Implementation of the Renewable Fuel Standard

We ran the ISU model with the updates and inputs described above and here describe the outputs. The ISU model projects that the average expected amount of conventional ethanol produced in the United States during the 2012/2013 corn crop year without a waiver will be 12.48 billion gallons. ISU's model predicts that for 89 percent of the simulated scenarios, waiving the RFS requirements would not change the overall level of corn ethanol production or overall U.S. ethanol consumption in 2012/2013 because in the event of a waiver the market would demand more ethanol than the RFS would require. For those 89 percent of the scenarios, waiving the RFS requirements would therefore have no impact on ethanol use, corn prices, ethanol prices, or fuel prices. We refer to that model result as an 89 percent probability that the RFS will not be "binding" in the 2012/2013 marketing year. Conversely, in 11 percent of the simulated ISU model runs the RFS would be binding. In those 11 percent of the random draws, the resulting market demand for ethanol would be below the RFS requirement and, therefore, the RFS would require greater use of ethanol than the market would otherwise demand. The binding

scenarios are generally those in which projected fuel prices and corn yields are both unrealistically low, with both gasoline prices and corn yields in 2012/2013 falling significantly below their current DOE and USDA projections.⁴⁷ In those cases, the RFS would have an impact, albeit a limited or moderate one, on ethanol use and the food and fuel markets in the United States.

The ISU model assumes corn ethanol would account for at most 13.6 billion gallons of the RFS volume requirement during the 2012/2013 corn marketing year. Because the corn marketing year is split over two RFS compliance years, the 13.6 billion gallons is based on the fraction of the marketing year that would occur in the 2012 compliance year (one-third) and the 2013 compliance year (two-thirds). EISA requires 15.2 billion gallons of renewable fuels in 2012 and 16.55 billion gallons in 2013; however, 2 billion gallons of the 2012 volume and 2.75 billion gallons of the 2013 volume must be from advanced biofuels. While advanced biofuels, including biomass-based diesel, advanced ethanol, and cellulosic biofuels are included in the ISU model we focus our analysis on evaluating the effects of a waiver of the portion of the RFS volume requirement filled by corn ethanol (see Section V.1.b). The full results from this analysis are included in the docket. The modeling projects that 2.0 billion gallons of rollover RINs from 2012 will be used to meet the 13.6 billion gallons during this time period.

Certain empirical data also support the projection that the RFS is unlikely to be binding in the 2012/2013 timeframe. For example, the price of tradable renewable identification number (RIN) credits remains relatively low: below five cents per gallon as of September 26, 2012. Refiners and importers verify their compliance with the RFS by collecting and retiring RINs, which are assigned to volumes of renewable fuel by their producers. Refiners and importers use

⁴⁷ Were we to use the November WASDE estimates, the percentage of time that the RFS requirements are projected to be not binding would be even higher, due to the increase in the lower end of the corn yield projections.

RINs for an appropriate volume of renewable fuel to demonstrate compliance with their RFS volume requirement. Parties that exceed their RFS obligations for a compliance period can trade excess RINs to other parties that need them for compliance, or under certain conditions, can bank them for future compliance. When the RFS requirement is expected to be binding, we would expect the demand for RINs would increase and the supply of excess RINs to decrease, leading to an increase in RIN prices.

Therefore, we expect the current RIN price reflects the market's current and near-term expectations about how binding the RFS is likely to be. Recent RIN prices represent a very small share of the price of a gallon of ethanol, suggesting that refiners and blenders expect the RFS is not likely to be binding in 2012 or 2013. It is possible that RIN prices have been depressed by market uncertainty generated by the recent waiver requests. However, the record high RIN price before these waiver requests was only approximately 6.5 cents per gallon. In this particular case, the empirical RIN price information corroborates the modeled impacts of the RFS.

3. Analysis of the Degree of Impact

When evaluating the economic impacts of implementation of the RFS volume requirements, our analysis centered on four major areas: average U.S. corn prices, food prices, feed prices, and fuel prices. While there may be other areas of potential impact, we focused on these areas because they are expected to have the largest potential economic impacts in the U.S. Given the time available for this analysis, we have not looked at the interaction of these impacts in an integrated modeling system. However, we believe that looking at these indicators

individually provides a useful framework for determining the impact of the RFS volume requirements.

As discussed above, the body of information shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, food, or fuel prices. In the unlikely event that the RFS program would have an impact on the corn and other markets during the 2012-2013 timeframe, its nature and magnitude is described below. Our analysis considers the impact in three ways (1) when the RFS volume requirements are not binding (89% of the scenarios), (2) the average across all 500 scenarios, binding and not binding, (3) and the average across the binding scenarios (11%). As a bounding exercise, we also provide information on a “worst case” scenarios from within the binding scenarios (see Section V.3.e below).

(a) Corn Price Impacts

Based on the ISU modeling results, the average expected impact of waiving the RFS requirements over all the potential outcomes would be a decrease in the price of corn by \$0.07/bushel. This average result must be considered in context, however, since our analysis projects that it is highly likely that the RFS volume requirements are not binding, and that the impact on corn prices will be zero. There is only an 11% chance that the requirements will be binding. Because of this, we project that it is highly likely that the impact of waiving the RFS program is zero change in corn prices. However, in the subset of potential outcomes in which the RFS requirements are binding (11 percent of the results), waiving the program would result in an average expected decrease in the price of corn of \$0.58/bushel. This leads to a non-zero

average impact across all 500 scenarios, even though the most likely result is still zero impact.

Table V.3.a-1 presents the ISU scenarios.

Table V.3.a-1: Range of Estimated Corn Prices

	Iowa State Mean Estimate	Iowa State When RFS Does Not Bind	Iowa State When RFS Binds
Mean Corn Prices with Mandate (\$/bushel)	\$8.02	\$8.00	\$8.15
Mean Corn Prices with Waiver (\$/bushel)	\$7.95	\$8.00	\$7.57
Change in Corn Prices with Waiver (\$/bushel)	-\$0.07	\$0.00	-\$0.58
Percentage of Runs	100%	89%	11%

(b) Food Price Impacts

In consultation with USDA, EPA estimated how these projected changes in corn prices would influence U.S. food prices. It is highly likely that the RFS volume requirements are not binding and there will be no impact on food prices. The results of the modeled corn price impacts discussed above appear to be modest for both the mean estimate and the subset of scenarios in which the RFS requirements are binding (see Table V.3.b-1). A \$0.07/bushel decrease in corn prices would result in a 0.04% decrease in Food consumer price index (CPI) and a 0.006% decrease in All Item CPI. A \$0.58/bushel decrease in corn prices would result in a

0.35% change in Food CPI and a 0.049% change in All Item CPI. For the average household, a \$0.07/bushel decrease in corn prices would result in a reduction of household expenditures on food equal to \$2.59 in 2012/2013, while a \$0.58/bushel decrease in corn prices would result in a savings of \$22.68.

Since people in the lowest income groups are more sensitive to changes in food prices, we also analyzed the impact of changes in food expenditures as a percentage of total consumer expenditures and as a percentage of income. The changes in food expenditures are relatively small compared to total consumer expenditures for both average and low income households. When comparing the changes in food expenditures relative to income, the impact on low income households is larger than the impact on average households. Additional details on the methodology used to calculate the CPI and household expenditures are included in the docket.⁴⁸

Table V.3.b-1: Impacts on Food Prices, CPI Indicators, and Household Expenditures

	Units	ISU Mean Estimate	ISU When RFS Binds
Change in Corn Prices with Waiver	\$/bushel	-\$0.07	-\$0.58
Change in Food CPI with Waiver	Percent	-0.04	-0.35
Change in All Item CPI with Waiver	Percent	-0.006	-0.049
Change in Annual Food Expenditures for Average Household with Waiver	\$	-\$2.59	-\$22.68
Change in Annual Food Expenditures for Lowest Quintile Household with Waiver	\$	-\$1.42	-\$12.46
Change in Food Expenditures as a Percentage of Consumer Expenditures for Average Household with Waiver	Percent	-0.005	-0.047
Change in Annual Food Expenditures as a Percentage of Consumer Expenditures for Lowest	Percent	-0.007	-0.061

⁴⁸ See USDA memo on Food CPI and Food Expenditures in docket.

Quintile Household with Waiver			
Change in Food Expenditures as a Percentage of Income After Taxes for Average Household with Waiver	Percent	-0.005	-0.046
Change in Food Expenditures as a Percentage of Income After Taxes for Lowest Quintile Household with Waiver	Percent	-0.0065	-0.057

(c) Feed Price Impacts

Using WASDE projections (which assume the mandate is in place) for feed costs in 2012/2013, we estimated that U.S. feed prices are projected to be \$318.45/ton, using a weighted average use of corn, sorghum, barley, oats, and soybean meal. In estimating the impact of a change in corn prices on feed costs, we used a simplifying assumption that the percentage change in corn prices is applied to all components of the feed grains components used in this analysis. Since the price of other feed grains tend to track the price of corn, we believe this simplifying assumption is a realistic estimate of how feed grains will track each other with changes in corn prices. It is highly likely that the RFS volume requirements are not binding, and there will be no impact on feed prices. We estimated the potential impact of granting the waiver on feed costs for the corn price scenarios described in the previous sections: the ISU mean estimate of a \$0.07/bushel decrease in corn price and the subset of ISU scenarios in which the mandate is binding (\$0.58/bushel decrease in corn price).

Table V.3.c-1: U.S. Feed Prices

	2009/10	2010/11	2011/12	2012/13
Feed Cost (\$/ton) without Waiver	\$158.17	\$212.93	\$255.38	\$318.45
Decrease in Feed Costs, \$/ton (\$0.07/bushel corn price change scenario)				-\$1.88
Decrease in Feed Costs, \$/ton (\$0.58/bushel corn price change scenario)				-\$16.50

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Source: October 10, 2012 WASDE

Note: Feed is equal to the weighted average sum of feed use of corn, sorghum, barley, and oats plus domestic use of soybean meal.

Based on USDA's estimates for U.S. livestock feed costs and returns, we estimated the impact of a percentage change in feed costs per unit for poultry, hogs, fed cattle, cow-calves, and milk production. Details on the methodology used to calculate feed impacts are included in the docket. Using USDA's production and slaughter estimates, we aggregated the potential feed cost impacts of a waiver for the U.S. and the States that requested a waiver. Table V.3.c-2 presents the estimated changes in total nationwide and statewide feed costs due to the corn price changes observed in our modeling, alongside 2011 livestock revenue and GDP. As Tables V.3.c-3, V.3.c-4, and V.3.c-5 show, in dollar terms, the largest sectors of the livestock industry that could potentially benefit from the waiver are the cattle and dairy industry. However, as a portion of total feed costs, the impacts are similar across livestock types. As stated above, it is highly likely that the RFS volume requirements are not binding and there will be no impact on feed prices. However, we present the potential impacts from the corn price changes noted above in order to illustrate what might happen under those circumstances.

When considering impact of the implementation of the RFS volume requirements, EPA considered the impacts in both absolute terms and relative to the entity being affected, since impacts will be more meaningful for some states than others. Texas, for example, sees the largest dollar value feed impacts among states that requested a waiver. Our average projected corn price impact of \$0.07/bushel represents a decrease of \$35.2 million in total feed costs. However, this is only a 0.6 percent decrease in total Texas feed costs, which is equivalent to approximately 0.2 to 0.4 percent of State livestock revenue. In the 11 percent of cases where we

modeled the RFS requirements as binding, we project that a waiver might decrease Texas feed costs by about \$308.5 million (a 2.0-3.8 percent decrease in feed costs).

In a State like Arkansas, where livestock revenue represents about 3.5 percent of state GDP (the largest proportion of any state that requested a waiver of the RFS mandate), the impact of the waiver might be expected to have a larger impact. However, here we see only a 0.5 percent decrease in feed costs in the \$0.07/bushel case, which is equivalent to only a 0.06 to 0.1 percent impact on State livestock revenue.

Table V.3.c-2: 2011 Gross Domestic Product, 2011 Livestock Revenue, and Projected Total Feed Costs and Estimated Decrease with RFS Waiver for Combined Cattle, Poultry, Pork, and Dairy Production in the U.S. and States Requesting a Waiver

	Total Feed Costs without Waiver (million \$)	Decrease in Feed Costs in million \$ (\$0.07/bushel corn price change scenario)	Decrease in Feed Costs in million \$ (\$0.58/bushel corn price change scenario)	2011 State Livestock Revenue (million \$)	2011 GDP (million \$)
U.S.	\$77,802.37	-\$451.93	-\$3,964.30	\$123,400	\$14,981,020
AR	\$526.83	-\$2.84	-\$24.95	\$3,900	\$105,846
DE	\$364.77	-\$1.88	-\$16.49	\$700	\$65,755
FL	\$738.80	-\$4.31	-\$37.80	\$1,340	\$754,255
GA	\$1,619.71	-\$8.69	-\$76.19	\$3,900	\$418,943
MD	\$295.42	-\$1.66	-\$14.52	\$1,000	\$301,100
NM	\$1,289.02	-\$7.61	-\$66.78	\$2,100	\$79,414
NC	\$2,728.98	-\$15.32	-\$134.37	\$5,400	\$439,862
TX	\$6,041.58	-\$35.17	-\$308.47	\$10,800	\$1,308,132
UT	\$538.24	-\$3.18	-\$27.87	\$917	\$124,483
VA	\$1,006.17	-\$5.63	-\$49.40	\$1,800	\$428,909
WY	\$23.00	-\$0.14	-\$1.19	\$840	\$37,617

In addition to examining total feed costs in each state, we analyzed the impacts on the three main segments of the livestock industry: cattle and dairy, pork, and poultry and eggs. Here we present both the projected national-level impacts of a waiver and the impacts in selected

States (chosen either because their livestock industry is large or because we observed a larger proportional impact on their market in cases where the mandate affects corn prices).

As observed above, it is highly likely that the RFS volume requirements are not binding and there will be no impact on these industries. Our analysis suggests that implementation of the RFS program, when binding, has a proportionally greater impact on the cattle and dairy industries, and those industries would consequently see greater cost reductions from a waiver in those scenarios. National cattle and dairy feed costs would decrease by 0.6 percent with a waiver. Texas, New Mexico, and Florida see the largest cattle and dairy feed cost impacts of a waiver in total dollar value, while Delaware and Utah would, along with Florida and New Mexico, see the largest cattle and dairy feed impacts from a waiver as a proportion of their total revenue in this sector. These outcomes indicate that, if the RFS volume requirements were binding, these are the states where a waiver may have the most impact on economic activity related to cattle and dairy. We present the impacts on their sectors below in Table V.3.c-3. In the \$0.07/bushel case, the impact of a waiver in all of these states is less than a 1 percent reduction in cattle and dairy feed costs. This reduction represents a change of approximately 0.35 percent of Texas livestock revenue and a change of approximately 0.38 percent for New Mexico and Florida. In Delaware, the state where the change in feed costs has the greatest proportional effect on the cattle and dairy industry (due to the small size of this sector in Delaware), this reduction in costs would be equivalent to a 0.5-0.8 percent increase in cattle and dairy revenue and an approximately 0.0002 percent increase in Delaware State GDP. Impacts in Delaware would increase to 4.5-7.1 percent of cattle and dairy revenue in the \$0.58/bushel

scenario. A full comparison of these impacts to cattle and dairy revenues is available in the docket.⁴⁹

Table V.3.c-3: Total Feed Costs and Estimated Decrease with RFS Waiver for Cattle and Dairy Production in the U.S. and Selected States Requesting a Waiver in Millions of Dollars

	Total Feed Costs without Waiver (in million \$)	Decrease in Feed Costs in million \$ (\$0.07/bushel corn price change scenario)	Decrease in Feed Costs in million \$ (\$0.58/bushel corn price change scenario)
U.S.	\$49,518.32	-\$292.44	-\$2,565.30
TX	\$5,114.25	-\$30.20	-\$264.94
NM	\$1,288.82	-\$7.61	-\$66.77
FL	\$533.78	-\$3.15	-\$27.65
UT	\$482.60	-\$2.85	-\$25.00
DE	\$27.75	-\$0.16	-\$1.44

The proportional impact of a waiver on the national pork industry is projected to be about the same as cattle and dairy, approximately 0.6 percent. Of the states that submitted waiver requests, we project that the combined pork industry of North Carolina and Virginia would benefit the most from a waiver if the RFS volume requirements were binding, followed by Texas and Arkansas.⁵⁰ A \$0.07/bushel decrease in corn prices is projected to reduce hog feed costs by just under \$10 million in North Carolina and Virginia. We project an average savings of \$87.35 million in cases where the mandate is binding. Impacts on pork revenue and State GDP in Texas and Arkansas would be smaller in both absolute and proportional terms. Impacts in Florida and

⁴⁹ See memo on “Livestock Impacts” in docket.

⁵⁰ The pork industries of North Carolina and Virginia are here analyzed together, owing to the fact that both are dominated by the operations of one company. Because of this, their pork feed costs and revenues are intertwined and are here examined together.

Delaware, where the impact on the pork sector is much smaller in absolute terms but represents a large percentage of total pork revenue, in the \$0.07/bushel case would represent less than 1 percent of their respective state livestock revenues and less than one thousandth of a percent of their State GDPs.

Table V.3.c-4: Total Feed Costs and Estimated Decrease with RFS Waiver for Pork Production in the U.S. and Selected States Requesting a Waiver

	Total Feed Costs without Waiver (in million \$)	Decrease in Feed Costs in million \$ (\$0.07/bushel corn price change scenario)	Decrease in Feed Costs in million \$ (\$0.58/bushel corn price change scenario)
U.S.	\$14,439.12	-\$85.27	-\$748.02
NC/VA	\$1,686.06	-\$9.96	-\$87.35
TX	\$51.95	-\$0.31	-\$2.69
AR	\$27.21	-\$0.16	-\$1.41
FL	\$4.30	-\$0.03	-\$0.22
DE	\$1.93	-\$0.01	-\$0.10

The proportional impact of a waiver on the national poultry and egg industries is projected to be slightly smaller than those that might accrue to cattle and dairy and hogs, approximately 0.5 percent. The impacts of a waiver on the poultry industry are also the smallest of the three sectors in absolute terms. Of the states that submitted waiver requests, we project that Georgia’s poultry industry would benefit the most from a waiver if the RFS volume requirements were binding, followed by North Carolina and Texas. A \$0.07/bushel decrease in corn prices is projected to reduce Georgia poultry feed costs by 6.74 million. We project feed cost savings of \$59.11 million in cases where the mandate is binding. We project that poultry revenue impacts in North Carolina and Texas would be smaller in absolute terms but roughly equal proportional terms. Impacts in Utah and Florida would be equivalent to a larger portion of

total poultry revenue, but would still only represent between 0.1 and 0.3 percent of revenue in the \$0.07 per bushel case.

Table V.3.c-5: Total Feed Costs and Estimated Decrease with RFS Waiver for Poultry and Egg Production in the U.S. and Selected States Requesting a Waiver

	Total Feed Costs without Waiver (in million \$)	Decrease in Feed Costs in million \$ (\$0.07/bushel corn price change scenario)	Decrease in Feed Costs in million \$ (\$0.58/bushel corn price change scenario)
U.S.	\$13,844.94	-\$74.21	-\$650.98
GA	\$1,290.01	-\$6.74	-\$59.11
NC	\$1,136.26	-\$5.91	-\$51.86
TX	\$875.37	-\$4.66	-\$40.83
FL	\$200.72	-\$1.13	-\$9.92
UT	\$51.48	-\$0.30	-\$2.65

In their waiver requests, most States cited quantitative impacts on their agricultural sectors that are already realized or projected to occur due to the drought. EPA recognizes the significant impacts that the drought has had on state and national agricultural sectors. However, as we discuss above, the analytical task before us is to determine whether implementation of the RFS volume requirements themselves severely harm the economy. Most of the States that submitted waiver requests discuss the crucial role that corn prices play in the overall financial health of their livestock industries, but for the most part these States did not attempt to quantify in detail the impact of waiving the RFS on corn prices and the livestock industry. Various commenters in the livestock sector did provide analysis attempting to quantify the possible

impact of a waiver on corn and soybean meal prices; these studies or the analyses such studies rely on are examined in Section V.4.b below.⁵¹

In summary, our analysis suggests that it is very likely that the RFS volume requirements will have no impact at all on ethanol production volumes in the relevant time frame, and therefore no impact on corn or feed prices. EPA looked, however, at what impacts on corn and feed prices might be in the unlikely event that the RFS mandate would have an impact on the corn and feed prices during the 2012/13 time frame. EPA assessed feed price impacts at the national level, State level, and at the individual sector level within eleven States. EPA believes that analyzing the feed price impacts on the nation, States, and individual sectors at the national and State levels is appropriate and provides further evidence upon which to base this decision, even considering the low probability that the RFS volume requirements will have an impact on ethanol production volume, and therefore corn and feed prices, in the relevant time frame. Given the low probability of the RFS having an impact in that time frame, and the estimated impact to state livestock sectors, EPA did not analyze any further geographical areas, as we consider the analysis above sufficient basis upon which to base our decision.

EPA received comment that, during a period of drought, impacts attributable to the RFS, even if relatively small, could be enough to influence firm-level decisions regarding whether to continue operations or to shut down. Since our analysis indicates that the RFS is highly unlikely to have an impact on ethanol production, and therefore corn prices, in the time period of concern, and our analysis necessarily focuses on the level of an economy, as opposed to the firm-level, we did not conduct analysis assessing the incremental impact the RFS would have, if any, on individual firms.

⁵¹ See, for example analysis prepared for the North Carolina Poultry Federation at EPA-HQ-OAR-2012-0632-2429, and comments submitted by the Virginia Poultry Federation at EPA-HQ-OAR-2012-0632-2066.

(d) Fuel Price Impacts

The ISU model also predicts changes in U.S. ethanol, gasoline, and blended fuel prices based on changes in ethanol production volumes. EPA’s analysis indicates that it is highly likely that the RFS volume requirements are not binding and there will be no impact on fuel prices. The ISU modeling projects that the average impact across all modeled scenarios is that waiving the RFS mandate would decrease blended gasoline prices by 2/10 of one cent.⁵² Blended gasoline prices in the ISU model decrease slightly on average across all of the modeled scenarios because ethanol prices decline by roughly one cent with less ethanol demand, for the limited scenarios where the RFS volume requirements are binding. We note, however, that this estimate should be considered within the limitations of the ISU model. The ISU model is not a refinery or fuel system model, and does not consider responses in the fuel markets to a reduction in U.S. ethanol demand in any depth. We include an estimate here to examine the potential magnitude of changes on average across all of the modeled scenarios, but we note that these results are based on a fairly simplistic approach to estimating blended gasoline price impacts.

Table V.3.d-1: Range of Estimated Ethanol and Blended Gasoline Prices

	Units	ISU Mean Estimate
Mean Ethanol Price with Mandate	\$/gallon	\$2.90
Mean Ethanol Price with Waiver	\$/gallon	\$2.89
Mean U.S. Corn Ethanol Production with Mandate	billion gallons	12.48
Mean U.S. Corn Ethanol Production with Waiver	billion gallons	12.44
Blended Gasoline Price with Mandate	\$/gallon	\$2.918
Blended Gasoline Price with Waiver	\$/gallon	\$2.916

⁵² As with the average impact on corn prices, this figure is potentially misleading, in the sense that it is a non-zero outcome even though the most likely impact is zero (see Section V.3.a above).

Change in Blended Gasoline Price	\$/gallon	\$0.002
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Given the limitations associated with our estimate on fuel price impacts, we present the projected average impact on fuel prices in Table V.3.d-1 as a sensitivity analysis. Were blended gasoline prices to change as the ISU model projects as a result of a waiver, this is the average impact we might expect to see. Based on these small predicted changes in blended gasoline prices, the overall impacts on the economy as it relates to fuel prices are also expected to be modest. It is highly likely that the RFS volume requirements are not binding and there will be no impact on fuel prices. Our analysis shows that a \$0.002/gallon decrease in blended gasoline price for the Iowa State mean scenario would be expected to change the Energy CPI by 0.029%. Details on the methodology for determining these impacts are included in the docket.⁵³

For the average household that owns a vehicle, the \$0.002/gallon change in gasoline prices would result in a \$1.98 decrease in annual gasoline expenditures in 2012/2013. When analyzing the impact of these changes on the lowest income groups, the absolute expenditures on gasoline are lower than for the average household, due to the fact that this segment of the population tends to drive fewer miles on average.

Table V.3.d-2: Impacts on Energy CPI and Gasoline Expenditures for Average and Low Income Households

	Units	ISU Mean Estimate	ISU When Mandate Binds
Change in Blended Fuel Price with Waiver	\$/gallon	-\$0.002	-\$0.016
Change in Energy CPI with Waiver	Percent	-0.029%	-0.225%
Change in Annual Expenditures on Gasoline for Average Households with Vehicles	\$	-\$1.98	-\$17.40

⁵³ See Department of Energy memo on Energy CPI in docket.

Change in Annual Expenditures on Gasoline for Lowest Quintile Households with Vehicles	\$	-\$1.20	-\$10.49
Change in Gasoline Expenditures on Gasoline as a Percentage of Consumer Expenditures for Average Households with Vehicles	Percent	-0.004%	-0.035%
Change in Gasoline Expenditures as a Percentage of Consumer Expenditures for Lowest Quintile Households with Vehicles	Percent	-0.005%	-0.048%
Change in Gasoline Expenditures as a Percentage of Income After Taxes for Average Households with Vehicles	Percent	-0.003%	-0.028%
Change in Gasoline Expenditures as a Percentage of Income After Taxes for Lowest Quintile Households with Vehicles	Percent	-0.012%	-0.104%

Some commenters argued to the contrary, claiming that waiving the RFS would significantly impact the price of fuel. They argue that if less ethanol is blended into gasoline as a result of a waiver, then the demand for petroleum-based gasoline would increase, putting an upward pressure on the world price of oil. In turn, the increase in petroleum prices would boost overall blended fuel prices. For example, a recent 2012 study by authors at Louisiana State University found that "...every billion gallons of increase in ethanol production decreases gasoline price as much as \$0.06 cents".⁵⁴ Other studies such as Du and Hayes from Iowa State University have suggested that increases in ethanol production over the last decade have reduced overall blended fuel prices.⁵⁵ Thus, a waiver which reduced the use of ethanol would have the effect of raising blended fuel prices. We note that there is disagreement about the extent of these impacts (see, for example, Knittel and Smith and others).⁵⁶ In any case, the Du and Hays and

⁵⁴ Marzoughi H. and Kennedy, P. Lynn, "The Impact of Ethanol Production on the U.S. Gasoline Market", Paper presented at the Southern Agricultural Economics Association Annual Meeting, February, 2012, available in the docket or at <http://EconPapers.repec.org/RePEc:ags:saea12:119752>.

⁵⁵ Xiaodong Du, Dermot J. Hayes, "The Impact of Ethanol Production on U.S. and Regional Gasoline Markets: An Update to 2012," Center for Agricultural and Rural Development, Iowa State University, May 2012, available in the docket or at <http://www.card.iastate.edu/publications/synopsis.aspx?id=1166>.

⁵⁶ Christopher R. Knittel and Aaron Smith, "Ethanol Production and Gasoline Prices: A Spurious Correlation," July 12, 2012, available in the docket or at http://web.mit.edu/knittel/www/papers/knittelsmith_latest.pdf.

Knittel and Smith studies do not address the specific case at hand, the fuel price impacts of a waiver of the RFS mandate.

As mentioned above, our analysis indicates that it is highly likely that waiving the RFS mandate would have no impact on ethanol volumes. The ISU modeling predicts that the average impact across all modeled scenarios is that waiving the mandate would decrease ethanol demand by only 40 million gallons, and in 89 percent of the modeled cases the mandate is not binding. As a simplifying assumption, the ISU model does not take into account any potential impacts on the global oil markets, which we believe is a reasonable assumption in this situation given the small change in ethanol volumes that are projected in this analysis. Even in the 11 percent of the cases where the mandate was binding, changes in world oil market would be so small as not to change the overall conclusions of the study.

(e) Worst Case Scenario

As a bounding exercise, we also considered a “worst case” scenario that could occur if both corn yields and gasoline prices were at the low ends of the probability distributions used in our modeling. This worst case example considered the 1 percent of scenarios (five out of five hundred) where a waiver could have the largest potential impacts on corn prices. In this worst case scenario, the impact of waiving the mandate could decrease corn prices by \$1.86/bushel, with a correspondingly larger impact on livestock, food, and fuel prices. It is highly unlikely that the combination of extremely low corn yields (approximately 116 bushels per acre) and wholesale gasoline prices (approximately \$1.96/gallon) would occur simultaneously during the 2012/2013 corn marketing year. However, we have included more information on this worst case scenario in the docket for illustrative purposes.

4. Overview and Discussion of External Analyses

Comments submitted to EPA referenced or included a number of analyses and studies examining the impact of a potential waiver of RFS standards. These include studies from: Hart Energy, Irwin and Good (University of Illinois),⁵⁷ Carter, Smith, and Abu-Sneh (University of California-Davis),⁵⁸ Purdue University and the Farm Foundation (Purdue/Farm Foundation), FAPRI-University of Missouri (FAPRI-Missouri), Babcock-Iowa State, Edgeworth Economics,⁵⁹ the Energy Policy Research Foundation, Inc. (EPRINC),⁶⁰ Cardno-ENTRIX,⁶¹ Dr. Thomas Elam of FarmEcon LLC,⁶² and the Department of Environment, Food, and Rural Affairs of the United Kingdom government (DEFRA).⁶³ Some of the studies focus more on fuel market impacts, while other studies concentrate specifically on U.S. agricultural sector impacts. Multiple alternative assumptions and options are explored across the different sets of analyses of a waiver of the RFS2 volume requirements making comparison of results challenging. Only a few of the studies are based on a fully integrated view that directly attempts to link detailed agricultural commodity markets with fuel market assessments to assess the impact of implementation of the RFS volume requirements and a waiver's impacts.

⁵⁷ Irwin, S. and Good, D., "Ethanol – Does the RFS Matter?" August 2, 2012, available in the docket or at www.farmdocdaily.illinois.edu/2012/08/ethanoldoes_the_rfs_matter.html.

⁵⁸ Comment submitted by Carter, Smith and Abu-Sneh, EPA-HQ-OAR-2012-0632-2245.

⁵⁹ Edgeworth Economics, "The Impact of a Waiver of the RFS Mandate on Food/Feed Prices and the Ethanol Industry," October 10, 2012, submitted in comments from Growth Energy, EPA-HQ-OAR-2012-0632-2357.

⁶⁰ Energy Policy Research Institute Foundation Inc., "Ethanol's Lost Promise," EPA-HQ-OAR-2012-0632-2231.

⁶¹ Urbanchuk, J., Cardno-ENTRIX, "Impact of Waiving the Renewable Fuel Standard on Total Net Feed Costs," September 2012, submitted with comments from Renewable Fuels Association, EPA-HQ-OAR-2012-0632-2218.

⁶² Elam, T., FarmEcon LLC, "Ethanol RFS and 2012 Drought Impact on Virginia Agriculture", August, 2012, and "Ethanol RFS and 2012 Drought Impact on North Carolina Agriculture and Consumers", September, 2012.

Submitted with comments by the North Carolina Poultry Federation at EPA-HQ-OAR-2012-0632-2429, and comments submitted by the Virginia Poultry Federation at EPA-HQ-OAR-2012-0632-2066.

⁶³ Durham, C., Davies, G., and Bhattacharyya, T., "Can Biofuels Policy Work For Food Security? An Analytical Paper for Discussion," June 2012, available in the docket.

(a) Fuel Market Studies

Fuel market studies that focus on the impacts of an RFS waiver look at the economics of blended ethanol. Irwin and Good (University of Illinois) suggest that a waiver is likely to have little impact on the liquid fuel supply system. Their analysis rests on their observation that ethanol is currently the least expensive octane enhancer available, and that the current liquid fuel supply system in the U.S. has closely integrated ethanol use as a component to the finished gasoline supply. Alteration of ethanol's utilization would take time and require reallocation of infrastructure. Irwin and Good argue that even if a waiver is granted, only a combination of relatively high ethanol prices and low wholesale gasoline prices would change current gasoline and ethanol supply patterns. They estimate that gasoline prices would have to fall to roughly \$69/barrel (West Texas Intermediate crude) before a shift would occur. Alternatively, corn prices, which are the key determinate of the price of ethanol, would have to rise on a sustained basis to over \$10/bushel.

Carter, Smith, and Abu-Sneh (University of California-Davis) present analysis using two different assumptions – one in which ethanol is priced in terms of its energy content, and one in which ethanol is priced on a volumetric basis. They suggest that the former is more likely, and that motorists realize the energy penalty associated with ethanol, but consumers do not have a choice but to accept the associated energy loss. If motor gasoline is valued for its energy content, they conclude that ultimately the RFS mandate is “severely harming” motorists. Their analysis suggests that, at current market prices, octane enhancement alternatives to ethanol would arise in the medium to long term without the RFS mandate if blended gasoline were

valued based on energy content. They conclude that, if the mandate were eliminated, lower demand for ethanol would result in lower average corn prices by up to \$0.87/bushel.⁶⁴ They estimate the “harm” from the conventional fuel RFS requirement to be roughly \$2.9 – \$5.9 billion annually, which they claim could be higher if all the costs associated with the use of ethanol are accounted for. There are several limitations of their analysis, however. The authors acknowledge that their conclusions do not incorporate all of the costs of reduced ethanol usage. For example, many oil refiners move their products through common pipelines. Refiners need to coordinate with other users of the pipeline to ensure that a uniform product enters the pool. The coordination costs of lower ethanol usage are not estimated. Furthermore, this study does not provide sufficient data or analysis upon which we can evaluate their assertion that consumers are currently aware or modify behaviors in response to the energy penalty associated with ethanol. Despite the paper’s conclusion that the RFS requirements should be waived, it is important to point out that their second scenarios supports our assessment that there would be “no market response” to a waiver if finished gasoline is priced on a volumetric basis. We discuss the basis for our ethanol demand assumptions above, and we did not see evidence presented in this study to change our reasoning with respect to how ethanol is priced.

A study published by EPRINC, while not attempting to quantify the impact of a waiver on corn prices, states that a long term waiver would likely reduce corn prices and “could free over 18 millions of acres of existing farm land for the production of crops to meet market needs for food, livestock feed, exports, or fuel.”⁶⁵ This study acknowledges, however, that a near term waiver (6 months to 1 year) would have little to no effect on corn demand for ethanol

⁶⁴ This result refers to removal of the RFS, not from a one-year waiver of the RFS requirements.

⁶⁵ EPA-HQ-OAR-2012-0632-2231.

production.⁶⁶ In concluding that the RFS mandate increases corn costs by \$0.87/bushel, Carter, Smith, and Abu-Sneh (University of California-Davis) cite the EPRINC study when discussing the ability of refiners to decrease ethanol blending in the gasoline pool in the medium to long term. The studies here discuss the ability of refiners to decrease ethanol blending over the medium to long term, but they do not discuss whether the economics of ethanol and gasoline production would be such that there would be an economic incentive to do so. As discussed above, whether refiners would move away from ethanol blending if they had the opportunity to do so is influenced by a variety of factors, including economic ones. Examining the impacts of a medium to long term waiver is a significant distinction between these two studies and the analysis performed by EPA. EPA's authority is limited to granting a one year waiver, with potential for extending the waiver, a fact specifically noted by EPRINC.⁶⁷ For a further discussion of this issue see Section VI.7(b).

As discussed above, based upon a review of multiple external analyses including the studies cited above, consultation with DOE, and review of comments that we received, and given the circumstances and scenarios examined in our analysis, we believe that it would be highly unlikely that refiners and blenders would seek to replace ethanol in the time frame analyzed (i.e., one year) even if the RFS requirement were reduced or waived over the 2012/2013 corn marketing year. Ethanol blending is an economically beneficial option for refiners at this time, given the price of ethanol and the cost of production of finished gasoline. That is not expected to change during the time period at issue. In addition, even if it were economically advantageous to do so, previous investments that have been made to configure the fuel supply production and distribution systems (e.g., blending terminals) to incorporate ethanol are costs that have already

⁶⁶ EPA-HQ-OAR-2012-0632-2231.

⁶⁷ EPA-HQ-OAR-2012-0632-2231.

been expended, and any change in utilization of these investments could take time and require reallocation of infrastructure. In addition, options or opportunities to make infrastructure changes may be technically and economically limited in the short term. Refiners are unlikely to make the changes to allow for reduced ethanol blending, such as modifying refining operations to produce higher octane blendstocks and draining storage tanks, if they do not believe these changes will be economically beneficial in the medium to long term, though this could differ in a scenario differing from that analyzed here with respect to oil prices, rollover RINs, and other key parameters. Fuel supply investments also tend to involve large capital expenditures. Fuel contractual obligations may be set over extended periods of time and could be difficult to alter in the short run (e.g., six months to a year). Also, the costs of using ethanol replacements, in terms of using different octane additives or even different sources of finished gasoline, including imports of finished gasoline to the U.S., would likely be significant in the near term.⁶⁸

Further, assuming that U.S. agricultural markets return to pre-drought conditions in the following years (e.g., 2013/14 and beyond) and the blending of ethanol into the gasoline pool continues to be a profitable practice, it would not appear to be in a refiner's economic interest to make changes in the fuel supply system. This would especially be the case if EPA were to not renew a waiver after one year, since refiners would need to quickly undo all of the changes they had just made in order to comply with the RFS in 2014. Carter, Smith, and Abu-Sneh acknowledge the costs of switching back and forth to different levels of ethanol usage between 2013 and 2014 could be high.

EPA further received comment that the RFS is saturating the ethanol market in the U.S.; commenters point to the large corn ethanol exports in 2011 as evidence that blending ethanol

⁶⁸ See Morgan Stanley, August 7, 2012.

into gasoline in the US is not a profitable practice.⁶⁹ We do not agree that the significant corn ethanol exports in 2011 indicate that blending ethanol into gasoline was not profitable in the US and driven by the RFS. In 2011 the blending of ethanol into gasoline exceeded the RFS mandates by a wide margin. The most likely reason for this is that refiners and blenders found the blending of ethanol to be a profitable practice. Low prices for corn ethanol RINs appear to support this. We believe the large volume of exported ethanol in 2011 is yet more evidence that, at least in 2011, ethanol production was the highest value use for corn. RINs for ethanol that is exported outside the US must be retired when the fuel is exported; we therefore believe it is highly unlikely that the RFS program encouraged this practice and that converting corn into ethanol for export was simply more profitable than selling it into the food or feed markets.

Comments also cited work done by EPRINC that shows that increased ethanol blending has not lead to decreased crude oil imports, but only to changes in the end uses of the crude oil as evidence that waiving the RFS would lead directly to reduced corn ethanol production.⁷⁰ They cite the EPRINC study concluding that any decrease in ethanol blending could be made up for with additional gasoline from existing refineries without additional crude oil imports, but rather through shifting of refined crude oil products. While this may be the case we note that any increased gasoline production would correspond in a decrease in other refined products, most likely diesel fuel as noted in the EPRINC study. We believe that if these changes were profitable refiners would already be looking to minimize ethanol blending, which has not been the case in the past several years. We also note that the EPRINC study also states that a short term waiver would have little effect on corn demand for the production of ethanol.

⁶⁹ National Chicken Council comments, EPA-HQ-OAR-2012-0632-1994.

⁷⁰ EPA-HQ-OAR-2012-0632-1994.

(b) Agricultural Market Studies

Several studies focus on the agricultural sector impacts of a possible waiver of the RFS volume requirements. A number of these studies provide quantitative estimates of impacts of a waiver on corn prices and feed prices. Where commenters provided estimates of impacts to a State or a particular industry sector, such estimates were frequently based on results from the studies discussed below.⁷¹ In many cases, the studies below present a range of estimates for impacts, and commenters cited estimates from both the low and, more frequently, the high ends of those ranges. In general, these agricultural sector studies are directionally consistent with EPA's analysis using the ISU model. In fact, the range of estimates provided in the Purdue/Farm Foundation study (described in more detail below), bracket the results that we present on the average impacts of a waiver and the impacts when the mandate is binding. Similarly, all of the referenced studies cite the importance of the same key assumptions that we have discussed previously, namely the amount of carryover RINs that are available and the degree of flexibility available to the refining industry over a one year period. As discussed further below, EPA believes that our technical analysis uses the most up-to-date data on available RINs and takes into account important information on refiner flexibility that these other studies treat only qualitatively or not at all

⁷¹ Comments submitted by, for example, the Virginia Poultry Federation and the North Carolina Poultry Federation included studies by FarmEcon LLC (Elam), which examined changes in feed prices and effects on revenue if corn prices were to decrease, due to a waiver, by \$1.14 per bushel. The estimate of a \$1.14 decrease is from the Purdue/Farm Foundation study. It is the difference in corn prices between a case with 13.8 billion gallons of corn ethanol production and a case with 10.8 billion gallons of production. For reasons discussed elsewhere (see, for example, sections V.1.e and V.2), we believe that ethanol production in the even of a waiver is unlikely to decline by 3 billion gallons. We also project that corn ethanol production in 2012/13 without a waiver is most likely to be around 12.48 billion gallons (see Section V.2), less than the projection used by FarmEcon LLC. See, for example analysis prepared for the North Carolina Poultry Federation at EPA-HQ-OAR-2012-0632-2429, and comments submitted by the Virginia Poultry Federation at EPA-HQ-OAR-2012-0632-2066.

FAPRI - Missouri finds that ethanol production falls by roughly 160 million gallons from eliminating the “conventional gap” which they define as “the maximum amount of conventional (corn starch) ethanol that can be counted towards the mandate”. Less corn is needed to produce ethanol and, as a result, average corn prices decrease by roughly \$0.04 cents per bushel. Lower average corn prices means lower feed costs for livestock producers, though the lower corn prices are partially offset by higher soybean meal and distillers grain prices. These feed price changes lead to an increase in net returns to meat production and, as a result, meat production increases and meat prices decrease. The FAPRI-Missouri results, like the EPA results presented above, predict a fairly modest impact on corn prices from a waiver of the 2013 conventional mandate.⁷²

Babcock-Iowa State looks at the impacts of a waiver of the conventional fuel component of the RFS requirements under two cases: a “full” and a “flexible” mandate compared to a “no mandate” case. In the “flexible” mandate case, Babcock assumes that there are 2.4 billion rollover RINs for the 2012/2013 corn-marketing year. Comparing the “full” and the “flexible” mandates, average corn prices decrease significantly, by \$1.91 per bushel. As discussed in the Babcock paper, the “full” mandate is not a realistic scenario, since it assumes there will not be any carryover RINs available in 2013. Based on the empirical RIN data discussed above, EPA is confident that there will be a significant number of carryover RINs in 2013 unless ethanol production changes drastically in November and December of 2012. Therefore, the “full mandate” results should only be considered as a bounding exercise. Comparing the “flexible” to the “no” mandate scenario, average corn prices decrease by roughly \$0.58 per bushel across all runs—a decline of roughly 7.4 percent. By way of comparison, in the EPA analysis eliminating

⁷² “[R]educing the overall RFS has a small negative effect on the corn price in 2012/13 relative to the baseline because overall ethanol use and production are projected to be motivated mostly by crop and fuel market conditions in the current marketing year, not the RFS. Waiving the mandate, a minimum use requirement, has limited market impact if people were going to use almost as much as the mandate anyway.” FAPRI-Missouri study at 1.

the RFS requirements would result in a decrease in average corn prices of roughly \$0.07/bushel, on average across all runs.

One of the key differences between Babcock's results and the results presented in EPA's analysis above is how responsive ethanol demand is to the relative prices of unblended gasoline and ethanol. Babcock assumes that ethanol demand is more responsive to changes in prices, meaning his analysis assumes refiners and blenders have more flexibility to substitute away from ethanol in response to a waiver. In light of the limitations on refiner flexibility identified in Section V.1.d above, we believe that our assessment of refiner flexibility, performed in consultation with DOE, is a better reflection of current conditions. In addition, Babcock's analysis uses older WASDE data (which reflects larger uncertainties in corn yields) and older gasoline price data (in which the average gasoline price is lower than the October STEO).

The Purdue/Farm Foundation study looks at different levels of drought (e.g., a weak, median and strong drought) and different combinations of ethanol blending levels, which could be achieved either with a waiver or the use of conventional RINs (e.g., 11.8, 10.4 and 7.75 billions of gallons of ethanol). They conclude that if refiners and blenders have flexibility to reduce ethanol usage in the short term, use of prior blending RINs credits and/or a large waiver could reduce average corn prices by roughly \$1.30/bushel of corn. Alternatively, a more modest waiver may reduce average corn prices by roughly \$0.47/bushel of corn. As stated in the paper, results of the analysis are highly dependent upon how much flexibility is assumed to exist in the refining sector. Depending on the degree of refining and blending flexibility (and the severity of the drought), Purdue's "range of corn price impacts from a partial waiver is zero to \$1.30/bu."⁷³ Their results therefore "bracket" the results projected by the ISU model.

⁷³ An updated version of this study is discussed below.

Similar to the Babcock-Iowa State study, a large part of the difference in the agricultural sector impacts (e.g., commodity price impacts) between the Purdue/Farm Foundation study and EPA's analysis is due to the responsiveness of ethanol demand to the relative prices of unblended gasoline and ethanol. Our review of multiple external analyses including the studies cited above in Section V.1.d, consultation with DOE, and review of comments that we received, suggests that ethanol demand, particularly in the short-run (i.e., the one-year, the 2012/2013 corn marketing time frame of a possible waiver) would be relatively unresponsive. Even if the U.S. fuel system could adjust and reconfigure to use less ethanol in the 2012/2013 time frame, the economic circumstances of ethanol and gasoline production are such that there would continue to be an economic incentive to blend ethanol into gasoline, particularly if the expectation is that drought conditions will subside and corn production in the U.S. will return to more typical (e.g., pre-drought) levels as early as the 2013/2014 corn marketing year.

For the reasons discussed above, we believe these external studies find potential impacts of the waiver that are similar in scope and direction as the analysis that EPA conducted. Whereas some of the external studies present a range of results from varying key assumptions, our analysis uses a stochastic approach to capture uncertainty in several key variables. Where a stochastic analysis was not possible (e.g., on the refinery flexibility issue our review of multiple external analyses including the studies cited above in Section V.1.d, consultation with DOE, and review of comments that we received, suggests that ethanol demand, particularly in the short-run (i.e., the one-year 2012/2013 corn marketing time frame of a possible waiver) would be relatively unresponsive. Other agricultural analysis primarily discussed this issue qualitatively.

Edgeworth Economics undertakes a scenario analysis to estimate the impacts on various sectors of the U.S. economy of a waiver of the RFS volume requirements. Based upon their

review of recent studies (e.g., Babcock-Iowa State, Purdue/Farm Foundation) of the impacts of a waiver, Edgeworth Economics uses a decrease in average corn prices of roughly \$0.52/bushel to estimate these impacts. They estimate that a waiver would decrease feed costs across the U.S. by roughly \$3.1 – \$4.7 billion in the 2012/2013 crop marketing year. The low end of the range is based upon an assumption that other feed prices would not track the price of corn. Alternatively, corn growers would see a loss of revenues of roughly \$5.8 billion if feed costs track the price of corn. Ethanol producers, faced with a corresponding loss in demand of roughly 950 million gallons of ethanol in the scenario, would see a decrease in revenues and co-product sales of roughly \$2.9 billion. This finding with regards to corn prices and feed price impacts is consistent with our projection of the impact of the RFS program in the binding case. We project that, in cases where the conventional portion of the RFS requirements are binding, a waiver would reduce corn prices by \$0.58/bushel and feed prices by approximately \$3.6 billion nationwide. However, as stated above, we only project this outcome in 11 percent of cases, which are premised on the unrealistic view that gasoline prices and corn yields in 2012/2013 both fall significantly below their current DOE and USDA projections. Edgeworth Economics' projections are plausible only to the extent this would occur. Further, because the Edgeworth study is premised upon an averaging of the Babcock and Purdue/Farm Foundation results, it shares the limitations of those findings as well.

Cardno-ENTRIX evaluated two scenarios under a waiver: a “low” scenario in which ethanol production in 2013 is reduced by 500 million gallons, or 3.7 percent below 2012 levels, and a “high” scenario in which ethanol production in 2013 is reduced 1,425 million gallons or 10.5 percent from 2012 levels. In both scenarios, biodiesel production is reduced by 500 million gallons, or 50 percent below 2012 levels of production. These scenarios are patterned off of the

results of recent analyses of RFS waiver impacts by Babcock – Iowa State University and Purdue/Farm Foundation. The reduction in biodiesel volumes makes the scenarios somewhat different. As did Purdue/Farm Foundation, Cardno-ENTRIX assumes that sufficient economic refiner flexibility exists to reach the volume of ethanol production assumed in each of their scenarios.

In the “low scenario”, average corn prices fall by \$0.46/bushel and average soybean prices fall by \$0.74/bushel. In the “high scenario”, average corn prices fall by \$0.48/bushel and average soybean prices fall by \$0.96/bushel. As a response of demand shifts in the corn market (i.e., less ethanol, more feed and exports), corn price declines are roughly similar in the “low” and the “high” scenarios. The “low” scenario is comparable to our projected outcome if the RFS program is binding. In that case, we project that ethanol production would decrease by approximately 414 million gallons, with corn prices decreasing \$0.58/bushel. Much of the difference is attributable to differences in key assumptions. The Babcock paper from which Cardno-ENTRIX drew this estimate utilized earlier WASDE estimates and also used gasoline futures prices instead of STEO estimates. Inputs to that analysis also vary in terms of the economic value of ethanol to refiners, and under what circumstances refiners would shift away from ethanol. As discussed elsewhere in this decision in detail, our analysis with respect to the value of ethanol to refiners given current conditions led us to results that differ.

In both scenarios, increases in DDGS and soybean meal prices offset declines in corn and soybean prices with relatively minimal impacts on net feed ration costs. For example, in the “low scenario”, there is a slight decrease in net feed costs for beef due to the relatively high share of feed costs for feeder cattle accounted for by corn grain. However, net feed costs for dairy cattle increase by more than four percent and net feed costs for swine, broilers and layers

increase by less than one percent. Part of the reason for the livestock outcomes in this analysis is due to scenario design. A waiver that reduces biodiesel usage results in less soy meal production and increases feedstock costs. The reduction in soy meal offsets the livestock impacts of a waiver that only influences ethanol production.

Studies performed by FarmEcon LLC attempted to quantify the potential impacts of a waiver on poultry, dairy and hog producers in North Carolina and Virginia. Both studies cite the Purdue/Farm Foundation study as their source for the key analytical input of commodity prices; other commenters cited the Purdue/Farm Foundation study as well when presenting quantitative impacts.⁷⁴ In one of the studies, FarmEcon LLC uses a decrease in average corn prices of \$1.14/bushel from the Purdue/Farm Foundation large waiver scenario to look at feed costs impacts for the dairy, poultry and hog producers in North Carolina. The corn price changes estimated by Purdue/Farm Foundation are higher than the change in corn prices we anticipate to result from a waiver for reasons discussed above. Using a larger change in corn prices, FarmEcon LLC estimates larger feed market impacts than we anticipate.

We also note that this analysis does not consider the effects of a waiver on distillers grains prices. To the extent that a waiver would reduce corn ethanol production (as it would to at least some extent in all three scenarios examined above), it would also reduce the supply of distillers grains. This increased scarcity of distillers grains would likely increase their price; at

⁷⁴ Quantitative analysis presented in comments by the National Chicken Council, for example, uses estimates from an updated version of the Purdue/Farm Foundation study, EPA-HQ-OAR-2012-0632-1994. At the request of the National Chicken Council, the authors of this study applied September WASDE data to the same methodology, providing new results. The National Chicken Council refers to a projected change in corn prices of \$2.00/bushel as a result of a waiver. The authors of this study projected that change assuming that ethanol production dropped from 13.8 billion gallons without a waiver to 7.75 billion gallons with a waiver. As we detail in our discussion of Elam, we do not agree with the estimate that 13.8 billion gallons of ethanol would be produced in 2013 with RFS requirements in place. Further, as we detail in our discussion of the Purdue/Farm Foundation study, the assumption that ethanol consumption by the refining sector could fall by roughly 6 billion gallons within the space of one year does not reflect our assessment of limits on refiner flexibility.

best prices would remain stable. To the extent that a waiver would lead to increased distillers grain prices, the projected reductions in feed costs detailed above would be mitigated.

Other studies submitted by commenters included work done by Babcock examining potential long-term impacts of the RFS program on the swine industry.⁷⁵ We do not respond to this study here as it is analyzing a set of issues outside the scope of the current decision. The DEFRA analysis does not contain sufficient detail with respect to methodology or analytical parameters to enable an evaluation of its results in the context of the current waiver requests. For example, DEFRA assess illustrative scenarios where a price spike is simulated by reducing the U.S. corn area harvested by 40 percent while maintaining the U.S. renewable mandate and ethanol blenders' subsidy in 2011. Various scenarios are simulated which waive an increasing share of the U.S. renewable fuel requirement, all while maintaining the ethanol blenders' subsidy. DEFRA finds that the larger the share of the mandate waived, the larger the price increases that are offset. The DEFRA study does not analyze impacts of a potential waiver under current conditions (e.g., with projected corn yields for the 2012/13 corn marketing year, elimination of the blenders' subsidy), and instead examines more generic consequences of a waiver for average corn prices.

5. Summary of the Technical Analysis

For the 2012/2013 corn marketing year, our analysis shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, food, or fuel prices. In addition the body of the

⁷⁵ "Iowa State Analysis for 2015-2020/Analysis of Ethanol and Corn Market and the Impact on the Swine Industry," submitted in comments by the National Pork Producers Council, EPA-HQ-OAR-2012-0632-2209.

evidence also indicates that even in the unlikely event that the RFS requirements would have an impact on the corn and other markets during the 2012-2013 timeframe, it would have at most a limited impact on the food, feed, and fuel markets. The nature and magnitude of these projected impacts, which are not likely to occur, would not be characterized as severe. After reviewing the analysis and information submitted by commenters, including that discussed above, EPA continues to believe that the results of its modeling are the most reliable indicator of the likelihood that implementation of the RFS volume requirements will have an impact on the economy, and in the unlikely case that it would have an impact, the nature and magnitude of such impact.

6. Waiver Requests Related to Implementation of the RFS Biomass-based Diesel and Advanced Biofuel Volume Requirements

EPA received several comments addressing issues related to a waiver of the biomass-based diesel (BBD) volume requirements. In general, the comments provided relatively little information or analysis on the relevant issues.

While few analyses and comments examined the issue of a BBD waiver, those that did focused on the impact on livestock and feed prices. The key price impact here is that of soybean meal, since this is the primary soy product fed to livestock. We are aware of two quantitative studies that projected price impacts on soybeans and soybean meal as a result of a possible BBD waiver, Babcock-Iowa State and Cardno-ENTRIX.⁷⁶ Babcock projects that a waiver of the BBD

⁷⁶ Most of the studies examined in this determination, including those by Purdue/Farm Foundation, Irwin and Good, and Edgeworth Economics (all discussed elsewhere in this notice), focus only on the impacts of corn ethanol. FAPRI-Missouri provides estimated impacts of a biodiesel waiver on soybean prices, but does not provide estimated

requirements might reduce soybean prices by \$0.61 per bushel or about 3.5 percent (assuming that rollover RINs are available), but would also increase soybean meal prices by \$22.00 per ton or about 4.2 percent. Cardno-ENTRIX finds, under an assumed 500 million gallon decrease in the BBD requirements, that soybean prices would decrease by \$0.74 per bushel or 4.5 percent, while soybean meal prices would increase by \$32.96 per ton or about 6.7 percent. Because most livestock are fed soybean meal, not whole soybeans, these projections would mean that a waiver of the BBD volumes would very likely increase feed costs.⁷⁷ This would mean that waiving the BBD requirements would likely exacerbate the impacts that the drought has had on feed prices. It is likely that waiving any portion of the BBD requirements would cause more economic harm than it would alleviate in food and feed markets. Given this, and in light of the fact that the few commenters who asked us to consider a biodiesel waiver focused on the impacts on livestock costs, we do not believe that an EPA analysis similar to our examination of corn ethanol is merited. In addition, EPA concludes that the evidence does not support a determination that implementation of the RFS BBD volume requirements would severely harm the economy and a waiver would therefore not be appropriate.

Similarly, we have not conducted a technical analysis of the potential impacts of waiving the advanced renewable fuel standard, since a majority of the advanced standard is expected to be met with biomass-based diesel in the 2012/2013 corn marketing year. Finally, we have not analyzed the impacts of waiving the cellulosic renewable fuel standard in 2012/2013, since we did not receive any specific information or rationale concerning a possible justification for waiving the cellulosic volumes. In addition, the cellulosic volume requirement for 2013 is likely

impacts for key soybean products (i.e soybean meal). For this reason, this paper's estimates for soybeans are of limited usefulness in the context of feed costs.

⁷⁷ EPA received comment on this topic from various soybean-related parties, including, for example, the Illinois Soybean Association and Minnesota Soybean Processors (CITE).

to be relatively small and production volumes unlikely to be affected by the drought due to their sources of feedstock.

VI. Other issues

EPA received comment on several areas of concern in addition to the economic impact of implementation of the RFS volume requirements. Comments addressed, among other things, overall U.S. policy on biofuels and the RFS; the environmental impacts of renewable fuels in general and the RFS program in particular; the impact of granting a waiver on the future of ethanol production in the U.S.; the characteristics, favorable or otherwise, of ethanol as a transportation fuel; and EPA's interpretation of section 211(o)(7) of the Act. Although this section summarizes and provides general responses to some of the more frequently – raised comments that are unrelated to the economic impact of implementing the RFS, EPA notes that these issues generally were not relevant to EPA's consideration of the current waiver request. While EPA has broad discretion to consider such issues in determining whether or not to grant a waiver if it finds that implementation of the RFS would severely harm the economy of a State, region or the U.S., these issues are not relevant to EPA's decision where, as here, EPA is denying the waiver requests because the evidence and information does not support a determination that the statutory criteria for granting a waiver are satisfied.

1. Impacts on Corn Prices from Increasing Renewable Fuel Production

EPA received many comments discussing the impact of increasing renewable fuel production over time on crop and feed prices, and on the economic consequences of increasing prices on various sectors, including the livestock, poultry, dairy, various food-related industries, and segments of the population.⁷⁸ Multiple commenters argued that the rise of corn prices over the past several years has coincided with and is in substantial part a result of the increasing renewable fuel volumes required under the RFS program. Commenters state that the consequences of this dynamic include tighter global corn supplies, a more volatile commodity market, and higher costs for various sectors of the economy as the prices of a key input, corn, have risen. A number of the requesting States and many commenters state that higher corn prices caused in part by increased demand from the RFS program have had significant negative effects on the livestock, poultry, and dairy industries due to the rising costs of feed. Other commenters focus on the link between higher prices for corn or other food commodities and increased prices of food for consumers. Some of these comments cite analysis conducted by various individuals or organizations estimating the portion of the increase in corn prices over a period of time that is attributable to increased renewable fuel use, or the impact of rising corn prices on consumer food items.

EPA acknowledges the linkages between corn prices, feed prices, costs to the livestock, poultry, and dairy industries, as well as impacts on food prices; the analysis presented above explicitly examines these connections. At the same time, and as many commenters also point out, the market price of corn is influenced by a variety of factors, including among other things macroeconomic factors like oil prices, international demand for coarse grains, crop production in different corn-growing countries, fertilizer costs, and weather conditions that affect crop

⁷⁸ Examples include petitions and/or comments submitted by various requesting States and by individuals and organizations associated with the livestock, poultry, and dairy industries.

production levels. As many of the requesting State letters point out, and as we discuss in the Executive Summary, this year's severe drought has had a significant impact on the recent increase in corn prices.⁷⁹

As mentioned above we fully recognize the toll this year's drought has taken on multiple sectors of the economy, and we have reviewed comments submitted to us in detail. While we generally agree that the issues raised by commenters are important considerations, as discussed previously, the issue before EPA is a narrow one – whether implementation of the RFS volume requirements over the time period at issue would severely harm the economy. The historical impacts of overall production and use of biofuels in the U.S. is not the relevant issue for purposes of determining whether implementing the RFS would severely harm the economy of a State, region or the U.S. over the time period of concern.

2. Overall U.S. Policy on Renewable Fuels

EPA also received comments from various individuals and organizations critical of the broader RFS program and policies that promote renewable fuels in general. Some commenters raise the potential negative environmental consequences of renewable fuels, including impacts on wildlife habitat due to renewable fuel policy, and the potential for increased greenhouse gas emissions from land use changes connected to renewable fuel policy.⁸⁰ Others focus on the impacts that the RFS and other renewable fuel policies can have on international commodity markets, effects of price changes in developing countries, volatility in agricultural prices, and

⁷⁹ See, for example, August 13, 2012 letter from the Governor of Arkansas, EPA-HQ-OAR-2012-002. "Virtually all of Arkansas is suffering from severe, extreme, or exceptional drought conditions. The declining outlook for this year's corn crop and accelerating prices for corn and other grains are having a severe economic impact on the State."

⁸⁰ See for example comment submitted by Bullock et al., EPA-HQ-OAR-2012-0635-1707.

effects on domestic consumers, and argue that a waiver of RFS requirements would help to begin addressing such negative impacts. Some commenters either cited or submitted a study by Dr. Thomas Elam of FarmEcon LLC presenting a fairly comprehensive assessment of the RFS program, its impact on the agricultural sector, fuel markets, and global commodity markets, and proposals for statutory modifications.⁸¹

EPA considers these important topics and has reviewed such comments in detail. However, the question before us is fairly narrow. EPA received requests for a waiver under a specific provision of law and our decision in response to those requests is necessarily based on our authority under that provision. EPA has no authority to grant the waiver requests under this provision unless it determines that implementation of the RFS volume requirements would severely harm the economy of a State, region, or the United States,. The evidence before EPA does not support such a determination, and EPA therefore is denying the waiver requests. With respect to the environmental impacts of increased renewable fuel use, the waiver requests are not based on a claim of sever harm to the environment. Outside the context of a waiver, EPA is required to address environmental concerns in various ways, including through analysis of lifecycle greenhouse gas emissions associated with different renewable fuels and fuel pathways. EPA's lifecycle analysis of such emissions is discussed at length in our March 26, 2010 final RFS rulemaking (75 FR 14670). A separate provision of EISA 2007 (the section 204 report to Congress) requires EPA to assess other potential impacts of biofuel use.⁸² EPA also considers those kinds of factors when setting national volume requirements for the years not specified by Congress, under section 211(o)(2)(B)(ii).

⁸¹ See Dr. Thomas Elam, FarmEcon LLC, "The RFS, Fuel and Food Prices, and the Need for Statutory Flexibility," July 16, 2012, submitted with comments from the National Chicken Council, EPA-HQ-OAR-2012-0632-1994.

⁸² The first triennial Report to Congress is available at http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=506091.

3. RFS Programmatic Issues

Comments submitted by organizations representing the oil refining sector suggested that either eliminating or increasing the 20 percent cap on previous-year RINs that can be used for compliance under §80.1427(a)(5) would increase the flexibility available to obligated parties in the event of a market disruption.⁸³ As mentioned above, EPA described its rationale for setting the cap at 20 percent in the May 1, 2007 final RFS rulemaking.⁸⁴ The cap is a reasoned way to implement the statutory requirements that credits in the RFS program have a duration of only 12 months. We continue to believe that the 20 percent cap strikes an appropriate balance between allowing flexibility to address market disruptions while providing biofuel producers with a degree of certainty with respect to demand. Therefore, EPA is not considering modifying the cap level at this time.

4. Characteristics of Ethanol as a Transportation Fuel

EPA received multiple comments describing what commenters view as unfavorable characteristics of ethanol as a transportation fuel; most of these comments focused on either ethanol blended into gasoline at the 10 percent or 15 percent level (E10 or E15). Commenters discussed the lower energy density of ethanol relative to gasoline and concerns with the use of E15 in certain engine types. While EPA appreciates the importance of such topics, they are beyond the scope of this determination and we do not address them here.

⁸³ See for example, comments submitted by the American Petroleum Institute, EPA-HQ-OAR-2012-0632-2240.

⁸⁴ 72 FR at 23934-5.

5. The Future of the Renewable Fuel Industry

Many commenters raised concerns regarding the impact that granting a waiver could have on the renewable fuel industry and the future of renewable fuel production. Such commenters, especially those associated with the renewable fuel sector, pointed out that granting a waiver would increase uncertainty in the marketplace, reduce investment, and hinder progress towards the policy goals of EISA 2007. EPA also received numerous comments related to the potential negative economic impacts of a waiver on renewable fuel producers and various related supporting industries, including impacts on jobs. EPA recognizes that were a waiver to be granted, the impacts would not be constrained to those industries that utilize corn as a feed input (e.g., livestock or dairy sectors), and that impacts would also affect other sectors of the economy, including in the agriculture and renewable fuel production sectors. EPA has reviewed comments on this topic and will continue to monitor the status of the U.S. biofuels industry, but in light of today's decision does not address these comments in detail here.

6. The Ethanol “Blendwall”

Comments from oil refiners and associated trade organizations, as well as others, discuss potential impacts to fuel market dynamics as the level of ethanol in blended gasoline approaches the “E10 blendwall.”⁸⁵ The term blendwall generally refers to the market based limits on the volume of ethanol in gasoline, as ethanol-gasoline blends greater than E10 or E15 (depending on the model year of the vehicle) may only be marketed to flexible fuel vehicles. Commenters note

⁸⁵ See for example comments submitted by the American Fuel and Petrochemical Manufacturing Association, EPA-HQ-OAR-2012-0632-1939.

that volumes of ethanol required by the RFS in the near future exceed the volume that can be consumed as E10. Commenters state that once ethanol in gasoline hits this E10 saturation point, blending additional ethanol into gasoline will not be a viable strategy to comply with RFS-required volumes.

In their letters requesting an RFS waiver, the requesting States do not focus on issues that might be posed by the blendwall, though some commenters in the livestock and poultry industry raise this topic as an issue of concern. In addition, while some commenters pointed to analysis related to blendwall impacts, it was not a focus of the majority of comments, and the amount of data and analysis submitted on the blendwall, its impacts on the overall fuel market, and the relationship between a waiver and blendwall impacts in different years was relatively small. The blendwall issue is not relevant to the analysis undertaken as part of this determination, as EPA's technical analysis indicates that for the 2012/2013 corn year, in light of the volume requirements in RFS and the amount of rollover RINs, that the market is expected to cause production of more ethanol than is needed to comply with the RFS volume requirements. However we believe it may be instructive to discuss the general topic briefly here.

In establishing the RFS program, Congress created a framework to increase the amount of renewable fuel used in the domestic transportation sector over time. It gradually increases from 4.0 billion gallons in 2006 to 36.0 billion gallons in 2022. Congress charged EPA with implementation of the program, and directed the Agency to assign the obligation to use renewable fuels to "refineries, blenders, distributors and importers as appropriate" to ensure that the annual national statutory volumes were met. EPA subsequently promulgated the implementing regulations for the RFS program first in 2007 in response to the Energy Policy Act of 2005 and then again in 2010 in response to the Energy Independence and Security Act. Under

these regulations refiners and importers are required to ensure that the volumes of renewable fuel required under the Act are actually consumed.

The RFS program establishes volume requirements for each obligated party, but it is neutral with respect to the type or form of renewable fuel used to meet the volume requirements, as long as the fuels are used to replace or reduce the quantity of fossil fuel present in a transportation fuel, heating oil or jet fuel; meet the required life-cycle greenhouse gas (GHG) performance standards; and are made from qualifying renewable biomass.

Ethanol has been the dominant domestic renewable fuel for several years, and during development of the law and regulations stakeholders in the fuel sector reasonably expected that ethanol would play a significant role in fulfilling the RFS volume requirements. As pointed out by commenters, E10 is approaching the point at which it saturates the gasoline market. As a result, if obligated parties choose to achieve their required RFS volumes using ethanol they should work with their partners in the vehicle and fuel market to overcome any market limitations on increasing the volume of ethanol that is used. Stakeholders in the refining sector have been aware of the E10 blendwall since passage of EISA in December of 2007.

As the market has approached the E10 blendwall, the ethanol industry has worked to support the introduction of E15 into the market, and domestic auto manufacturers have increased production of vehicles capable of running on even higher ethanol blends. Over ten million flex-fuel vehicles (FFVs) are now in the existing fleet. FFVs currently consume E85 only about 0.4% of the time, but were they to be regularly fueled on E85, such vehicles would be capable of consuming billions of additional gallons of ethanol. The affected industries have had and continue to have the ability to achieve widespread adoption of E85 through working with partners in the retail and terminal infrastructure sectors to increase the number of stations that

offer E85 or other intermediate ethanol blends and improve the pricing structure relative to E10.⁸⁶ As noted above, however, other fuel options are available to meet RFS requirements.

7. Legal Interpretation of 211(o)(7)

(a) Implementation of the RFS Itself Must Severely Harm the Economy

The statute authorizes a waiver where “implementation of the requirement would severely harm the economy.” In the 2008 waiver determination, EPA concluded the straightforward meaning of this provision is that implementation of the RFS program itself must be the cause of the severe harm. We found that the language provided by Congress does not support the interpretation that EPA would be authorized to grant a waiver if it found that implementation of the program would significantly *contribute* to severe harm. EPA noted several instances in section 211 and other sections of the Clean Air Act where Congress authorized EPA action based on the contribution made by a factor or activity, and worded the statute to clearly indicate this intention. We cited as an example section 211(c)(1) of the Act which authorizes EPA to control or prohibit a fuel or fuel additive where it “causes or contributes” to air or water pollution that may reasonably be anticipated to endanger public health or welfare. EPA also cited to various waiver provisions where Congress clearly used language indicating that a waiver could be based on a determination that there is a contribution to an adverse result or a similar lesser degree of casual link to the adverse result. Section 211(f)(4), for example, allows EPA to waive a certain prohibition on fuels and fuel additives upon a determination that they will not

⁸⁶ The number of retail service stations that offer E85 has grown at a rate of only 350 stations per year since 2007. As of today, the total number of retail stations offering E85 is only about 3000, so that only one out of every 50 retail fuel stations offers E85.

“cause or contribute” to a specified harm. Other examples are presented in the 2008 waiver determination.

In response to the August 30, 2012 Notice, one commenter argued that the concept of “cause or contribute to” arises in the Clean Air Act under a set of contexts that pertain to “public health, environmental quality, safety,” but do not relate to the concept of economic harm. In interpreting the language of 211(o)(7) by examining other instances where Congress utilizes the concept of contribution under section 211, commenters assert, EPA unnecessarily limited itself to an overly stringent reading of the RFS waiver provision.⁸⁷

EPA disagrees with this argument. Had Congress intended to authorize EPA to grant a waiver where RFS implementation is merely a contributing factor to severe economic harm, it could clearly have done so by using statutory language similar to that found in the statutory provisions cited by the commenter.

Another commenter argued that EPA’s interpretation renders the provision impossible to meet and essentially prejudices the issue. They noted that implementation of the RFS requirements must always occur within the context of an existing economy and fact situation, so that it is inappropriate to interpret the waiver provision as requiring that implementation of the RFS alone would cause severe economic harm. They state that the statute does not require the Administrator to ignore the worst drought in 50 years, its effects on corn stocks, and the price effects of the interaction of the RFS with the drought-induced supply shock. The commenter misinterprets EPA’s position. EPA agrees that implementation of the RFS must necessarily occur within the context of existing market conditions, and that it is necessary and appropriate for EPA to consider the effect of RFS implementation in the context of those existing conditions. That is why for today’s determination EPA has modeled the impact of RFS implementation in

⁸⁷ American Petroleum Institute, EPA-HQ-OAR-2012-0632-2240

the current economic environment, including the context of the current drought and its impacts on corn yields and corn prices. Nor does EPA believe that its interpretation renders the provision impossible to meet. In Section V we discuss a number of key parameters and inputs used in our modeled analysis; these include availability of rollover RINs, gasoline prices, and corn yields, among others. Changes in one or several of these variables could lead to analytical results that could provide support for a finding that implementation of the RFS is severely harming the economy – but our analysis does not support such a finding for the time period and scenario analyzed here.

(b) There Must Be a Generally High Degree of Confidence That There Will Be Severe Harm as a Result of the Implementation of RFS

The waiver provision indicates that EPA must find that implementation of the RFS “would” severely harm the economy. We previously interpreted this as indicating that there must be a generally high degree of confidence that severe harm would occur from implementation of the RFS, and we continue to believe this interpretation is appropriate. In the 2008 waiver determination we noted that Congress specifically provided for a lesser degree of confidence in a related waiver provision, section 211(o)(8). That provision applies for just the first year of the RFS program, and provides for a waiver of the 2006 requirements based on a study by the Secretary of Energy of whether the program “*will likely result* in significant adverse impacts on consumers in 2006.” (Emphasis supplied). The term “likely” generally means that something is at least probable, and EPA believes that the term “would” in section 211(o)(7)(A) means Congress intended to require a greater degree of confidence under the waiver provision at issue here.

We also noted in 2008 EPA's belief that generally requiring a high degree of confidence that implementation of the RFS would severely harm an economy would appropriately implement Congress' intent for yearly growth in the use of renewable fuels, evidenced by the 2005 and 2007 requirements for such growth. In addition, it would limit waivers to circumstances where a waiver would be expected to provide effective relief from harm. If there is generally high confidence that implementation of the RFS program would cause harm, then a waiver should provide effective relief from that harm. However in situations where there is not such a high degree of confidence, a waiver might be ineffectual and unnecessarily disrupt the expected growth in use of renewable fuels.

In our prior Texas waiver determination we found support for our interpretation of this waiver provision in an analogous approach taken by EPA in applying former section 211(k)(2)(B), the provision for waiver of the oxygen content requirement for RFG. In that provision, Congress provided that EPA "may" waive the oxygen content requirement upon a determination that compliance with this requirement "would" prevent or interfere with attainment of a NAAQS. EPA interpreted this as calling for the waiver applicant to "clearly demonstrate" interference before a waiver would be granted. This interpretation was upheld in *Davis v. EPA*, 348 F.3d 772, 779–780 (9th Cir. 2003).

In response to the August 30, 2012 Notice, one commenter argued that EPA erred in finding support for its interpretation of the term "would" in Section 211(o)(7) by reference to the less stringent "will likely result" statutory test set forth in 211(o)(8) for a waiver of the renewable fuel requirements in 2006. The commenter suggests that the fact situation in 2006 was different in that it was the first year of the RFS program, and that relatively smaller renewable fuel volumes were involved. While EPA agrees that the fact situation in 2006 was different than in

subsequent years of RFS implementation, that fact does not render EPA's analysis of the different statutory terms unreasonable. No doubt because the fact situation was different in 2006 than in subsequent years of RFS implementation, Congress established a different, and less stringent, test to justify an RFS waiver in that year than in subsequent years. It is entirely reasonable for EPA to conclude that Congress intended a higher degree of certainty of harm in 211(o)(7) than in 211(o)(8) in light of the different statutory terms used in those sections. Therefore, EPA believes the "would severely harm" test in 211(o)(7) requires a higher degree of certainty of harm than the "will likely result" test in 211(o)(8).

(c) "Severely Harm" Indicates That Congress Set a High Threshold for Grant of a Waiver

In 2008, EPA discussed the level or threshold of harm necessary to satisfy the "severely harm" phrase found in section 211(o)(7). EPA continues to agree with the interpretation from the 2008 waiver determination, where we stated that while the statute does not define the term "severely harm," the straightforward meaning of this phrase indicates that Congress set a high threshold for issuance of a waiver. In the 2008 determination we discussed our rationale for this reading, pointing to the difference between the criteria for a waiver under section 211(o)(7)(A) and the criteria for a waiver during the first year of the RFS program. In section 211(o)(8)(A) Congress provided for a waiver based on an assessment of whether implementation of the RFS in 2006 would result in "significant adverse impacts" on consumers. A waiver under section 211(o)(7)(A), however, requires that implementation "severely harm" the economy, which is clearly a much higher threshold than "significant adverse impacts." We also considered the use of the term "severe" in CAA section 181(a). Ozone nonattainment areas are classified according to their degree of impairment, along a continuum of marginal, moderate, serious, severe or

extreme ozone nonattainment areas. Thus, in section 181, “severe” indicates a level of harm that is greater than marginal, moderate, or serious, though less than extreme. We previously stated our belief that the term “severe” should be similarly interpreted for purposes of section 211(o)(7)(A), as indicating a point that is quite far along a continuum of harm, though short of extreme. In response to the August 30, 2012 Notice, one commenter, addressing this comparison, wrote, “EPA suggested in the Texas waiver decision that it needed to interpret ‘severe’ within CAA section 211 in the same manner as CAA section 181(a). EPA is under no such mandate.”⁸⁸ EPA agrees that we are under no such mandate, and disagrees with the commenter’s characterization of our decision in 2008. EPA is not required to interpret the term “severe” in section 211 in the same manner as section 181(a), but as we wrote in the 2008 determination, it is “instructive” to do so. EPA continues to believe this is the case.

As in 2008, and after reviewing comments submitted this year, EPA finds that we do not need to interpret this provision in any greater detail for purposes of acting on any of the waiver requests, as the circumstances in this case do not demonstrate the kind of harm from RFS implementation that would be characterized as severe. In addition, as described in section V, EPA has determined that it is highly likely that implementation of the RFS in 2012 and 2013 will have no impact on the use of renewable fuel in the United States. Thus, implementation of the RFS could not be seen as severely harming the economy, regardless of EPA’s interpretation of the term.

(d) Harm to the Economy

Under EPA’s prior Texas waiver determination EPA considered the meaning of the term “economy” in section 211(o)(7)(A)(2). Although Texas had argued that the term should be

⁸⁸ National Pork Producers Council comments, EPA-HQ-OAR-2012-0632-2209.

interpreted such that a showing of severe harm to one sector of the economy, *e.g.*, the livestock industry, is sufficient under the statute, others argued that there must be a showing of severe harm to the entire economy of a State, region or the United States, including all sectors. EPA stated its belief that it would be unreasonable to base a waiver determination solely on consideration of impacts of the RFS program to one sector of an economy, without also considering the impacts of the RFS program on other sectors of the economy or on other kinds of impact. It is possible that one sector of the economy could be severely harmed, and another greatly benefited from the RFS program; or the sector that is harmed may make up a quite small part of the overall economy. EPA stated its belief that in the context of any RFS waiver request we should responsibly review and analyze the economic information that is reasonably available regarding the full impacts of the RFS program and a possible waiver, including detrimental and beneficial impacts, before determining that a waiver of the program is warranted. In addition, we examined the language in the statute providing that EPA “may” waive the RFS volume requirement after finding that implementation of the RFS program would severely harm the economy. As such, we determined that a broad consideration of economic and other impacts could be undertaken whether or not EPA adopted the more limited interpretation of the term “economy” advanced by Texas. For example, if EPA examined the full impacts on an economy, EPA would determine whether RFS implementation would severely harm the overall economy of a State, region, or the U.S. However, if EPA adopted the more limited interpretation, and then found severe harm to a sector of the economy, EPA would still evaluate the overall impacts on the economy and other factors before exercising its discretion under the “may” clause to grant or deny the waiver request. Some commenters argued in response to the August 30 notice that EPA’s interpretation in the 2008 Texas waiver decision was incorrect,

because nothing in the statute allows EPA to broadly consider possible economic benefits as well as harm to various sectors of the economy. The commenter failed to acknowledge that EPA is not required to issue a waiver when severe economic harm to a state, region or the United States is demonstrated. The statute provides that EPA “may” do so in that situation. EPA continues to believe that in exercising its discretion under the statute to grant or deny a waiver request, it would be reasonable for EPA to consider all impacts associated with RFS implementation. In its Texas waiver determination EPA found that it did not need to resolve the issue of whether a waiver could be granted based solely on a demonstration of harm to one sector of the economy, since the circumstances in that case did not warrant a waiver under either interpretation. Similarly, despite the comments EPA received on this interpretative issue within the current waiver requests, we find that EPA does not need to resolve this issue of interpretation since the circumstances in this case do not warrant a waiver under either interpretation.

VII. Decision

EPA recognizes that severe drought has taken a large toll on many States and sectors of the economy, and further acknowledges that many parties, both those supporting a waiver and those opposing a waiver, have raised issues of great concern to them and to others in the nation concerning the use of biofuels. However the issue before the Agency in this case is a much more limited one, as described below. Based on a thorough review of the record in this case, and applying the evidence to the statutory criteria, EPA finds that the evidence does not support granting a waiver.

EPA is authorized to grant a waiver request if EPA determines that implementation of the RFS requirements would severely harm the economy of a State, region, or the United States. As discussed above, this calls for a determination that implementation of the RFS itself would severely harm the economy; it is not enough that implementation would contribute to such harm. Today's determination has two basic parts. The first part addresses whether there is a generally high degree of confidence that harm would occur from implementation of the RFS. The second part considers whether such harm, if it were to occur, is "severe", indicating a high threshold for the nature and degree of harm that would support issuance of a waiver, a point that is quite far along a continuum of harm, though short of extreme. Based on a thorough review of the record in this case, and applying the evidence to the statutory criteria, EPA finds that the evidence does not support granting a waiver.

First, regarding the degree of confidence that implementation of the RFS program during the time period at issue would harm the economy, after weighing all of the evidence before it the evidence does not support a finding that implementation of the RFS would harm the economy of a State, region, or the United States. All parties agree that any claimed economic harm would derive from the increased production of ethanol associated with implementation of the RFS, and any associated increase in the price of corn. However the weight of the evidence shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, food, or fuel prices. The ISU modeling projects that waiving the RFS would have no impact at all on the use of ethanol in 89% of the scenarios modeled. The availability of rollover RINs, the beneficial economics of producing ethanol gasoline blends, the generally low level of flexibility of refiners to shift from ethanol over a one-year period, and the low price currently in the market for renewable fuel RINs

all support the conclusion that waiving the RFS program would not be expected to have any effect on the production of ethanol. In other words, demand for ethanol would remain high with and without the RFS volume requirements for the time period at issue. As discussed in section V, the evidence submitted to support the view that a waiver would have a large effect on ethanol use is less credible because of concerns about the validity of key assumptions that underpin those analyses. After considering all of the evidence and information and weighing it appropriately, EPA believes that it is very likely that implementation of the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame. The analysis also indicates that it is unlikely that implementation of the RFS would cause any degree of harm to the economy. Though EPA fully recognizes the harmful impact to the economy from the 2012 drought, the evidence before the agency does not support a finding that *implementation of the RFS* would likely or even probably cause harm to the economy over the 2012/2013 time period and certainly the evidence does not reach the generally high degree of confidence required for issuance of a waiver under section 211(o)(7)(A).

Second, the Agency examined the evidence to evaluate the potential impact of implementation of the RFS program on corn prices and the impacts of such corn prices on various sectors of the economy and the overall economy, both within the requesting States and for the entire United States. In the ISU modeling, a range of scenarios were modeled, with the model projecting ethanol use, corn price and fuel price. The modeling indicates that for 89% of the scenarios implementation of the RFS volume requirements would have no impact on ethanol use or corn price, with only 11% of the scenarios indicating a change in ethanol use and a corresponding change in corn price. EPA determined that the average change in corn price over all of the scenarios was \$0.07 per bushel of corn. The average change in corn price over the 11%

of scenarios where a waiver would have an effect was \$0.58 per bushel of corn. As discussed in section V, a price change in corn of this magnitude would have only a moderate impact on livestock costs and food prices. It would also be accompanied by a small change in fuel costs. For the reasons discussed above, EPA believes the weight of the evidence supports the view that it is highly likely there will be no impact on ethanol use or corn prices from implementation of the RFS program over the time period at issue, and if an impact were to occur, it would likely be on average \$0.58 per bushel of corn. EPA believes this range of potential price increases for corn, even without considering the accompanying impact on fuel prices, would not support a determination of severe harm to the economy, whether considering the various livestock industries of the requesting States, livestock industry of the nation, the economies of the requesting States, or the economy of the United States. In this case, EPA does not need to determine exactly what nature or degree of harm would amount to severe harm, as the evidence in this case clearly does not meet the statutory criterion of severe harm to an economy.

In conclusion, EPA finds that the evidence and information in this case does not support a determination that implementation of the RFS requirements during the time period at issue would severely harm the economy of a State, a region, or the United States.

Dated: November 16, 2012.

Lisa P. Jackson,
Administrator.

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