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September 24, 2009

Air and Radiation Docket and Information Center
U.S. Environmental Protection Agency (2822T)
1200 Pennsylvania Ave., NW
Washington, DC 20460

Attn: Docket ID No. EPA-HQ-OAR-2005-0161

Re: 40 CFR Part 80; Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program; Proposed Rule, 74 Federal Register 24904, May 26, 2009

Dear Sir or Madam:

On behalf of Exxon Mobil Corporation and ExxonMobil Oil Corporation (jointly "ExxonMobil"), I am submitting the following comments on the Proposed Rule, Regulation of Fuels and Fuel Additives: Changes to Renewable Fuels Standard Program; (74 Federal Register 24904, May 26, 2009) ("RFS2").

ExxonMobil is a major, integrated, international energy company with exploration, production, refining, transportation, and marketing operations. ExxonMobil owns and operates six refineries in the U. S. and has a fifty percent joint interest in a seventh. These seven refineries have a combined capacity of 2 million barrels per day. We operate 21 marketing terminals that distribute gasoline and distillate, and have over 10,000 branded retail outlets in 46 states and the District of Columbia. ExxonMobil's domestic refining and marketing operations are supported by over 12,000 employees who are committed to protecting the environment and operating our facilities safely and efficiently while providing quality goods and services to the public. As a producer and supplier of gasoline and diesel, and hence an obligated party under the existing RFS ("RFS1") and potentially under this proposal, ExxonMobil has a substantial interest in this rulemaking.

ExxonMobil appreciates the opportunity to provide input to EPA as the Agency considers the changes appropriate in the governance of the Renewable Fuel Standard (RFS) program as directed by the Energy Independence and Security

Act of 2007 (EISA). In particular, we appreciate the well-documented development process used by EPA to arrive at a scientifically sound life cycle analysis (LCA) of conventional fuels and biofuels as required by EISA. This critical change in the RFS program has the potential to better align the simple volume mandates of the original RFS with greenhouse gas reductions in the transportation sector. While many aspects of the LCA are controversial, EPA appears to have found a middle ground that adheres to science while permitting the design of workable program changes. ExxonMobil also appreciates EPA's stakeholder outreach and transparency in the rule development process. Many of the changes EPA has proposed represent scientifically sound and practical proposals or alternatives for comment. ExxonMobil also disagrees with some of EPA's proposed changes or additions to the RFS program.

The following summarizes key points in our attached detailed comments on the proposal.

- **The parties obligated under the RFS should be those parties that have control of the decision regarding whether to blend or not blend biofuels to make a finished fuel blend for retail or wholesale purchaser consumer sales.**

- **The separation of RINs by biofuel producers could simplify RIN reporting and verification, but it would necessitate other changes to safeguard against RIN market manipulation.**

- **EPA's current RFS1 energy density based equivalence values for the various renewable fuels are a reasonable mechanism and should be retained to encourage the use of higher energy density fuels.**

- **ExxonMobil agrees with EPA's interpretation that EISA requires that EPA's LCA consider both direct and indirect land use change impacts.**

- **As regards the averaging period and discount rate to be applied for LCA, we favor the use of 30 years for averaging and a zero discount rate as a more conservative approach. The shorter time period gives more weight to the known, more immediate, effects of carbon release from clearing, burning and loss of soil sequestration while a zero discount rate values future impacts the same as current impacts.**

- **ExxonMobil supports EPA's proposed Moderated Transaction System (EMTS) and has volunteered to work with EPA as a Beta tester.**

- **ExxonMobil supports the proposed read-across from RFS1 biodiesel and cellulosic ethanol RINs for use in RFS2. Using RIN "RR" codes for ester and non-ester based biodiesel to biomass-based diesel and the RIN "D" code for cellulosic ethanol are appropriate mechanisms for transitioning RFS1 RINs for use in RFS2.**

- Depending on the outcome of ongoing DOE/EPA/CRC testing for mid-level blend use in the legacy fleet, stronger preventive measures may be needed, as well as product liability relief to enable E10+ distribution and marketing, or widespread E85 use. EPA's proposal to require labels on pumps that dispense gasoline with greater than 10% ethanol content is the minimum mechanism necessary to prevent misfueling that can be supported.

- The delay in OMB approval of the draft RFS2 proposal makes it highly unlikely that EPA can respond to comment and finalize the RFS 2 rulemaking by the end of October 2009 so that it can take effect on January 1, 2010. If EPA is unable to complete the rulemaking on that schedule, ExxonMobil urges EPA to delay implementation until January 1, 2011 and rely on the current RFS 1 regulation for 2010.

- Regardless of when EPA finalizes the RFS2 rulemaking, the 2009 biomass-based diesel requirement should not be carried forward to 2010 and the 2010 biomass-based diesel and cellulosic ethanol requirements should not be carried forward to 2011.

- ExxonMobil does not support the proposed adjustment in the advanced biofuel GHG reduction threshold. If a 30 year averaging period and zero discount rate is used in the LCA, sugar ethanol could not qualify as an advanced biofuel even with the maximum adjustment.

- ExxonMobil does not support a monthly reporting requirement for 2010 as a lead in to the EMTS.

- As regards regulations governing the grandfathering of conventional renewable fuels in EISA, ExxonMobil supports EPA's limiting grandfathered volumes to the best three-month average during the first two years of operation. Moreover, the grandfathering should sunset no later than 15 years after enactment of EISA (i.e. no later than 2022).

- ExxonMobil does not support an adjustment to the biomass-based diesel GHG reduction threshold, nor any of the averaging approaches outlined by EPA as a mechanism to qualify biodiesel that would otherwise not qualify as biomass-based diesel. If EPA decides never-the-less to use an averaging approach to qualify vegetable oil sourced biodiesel as biomass-based diesel, ExxonMobil urges EPA to utilize an averaging mechanism that allows both producers and obligated parties to average the appropriate ratio of RINs.

- ExxonMobil supports EPA's expressed intention not to extend the RFS1 small refiner exemption.

- **Rollover RINs should not be capped. ExxonMobil urges the Agency to remove the current 20% cap on rollover RINs. The much higher demands of the RFS2 volumes and the increase in the number of mandates require greater flexibility for obligated parties.**

- **EPA's assessment of the statutory requirements of the cellulosic biofuel waiver provision is appropriate.**

- **EPA's assessment of forward year cellulosic ethanol production capability must be realistic, and based on actual demonstrated commercial production capability.**

- **EPA should require that new vehicles be certified on E10 as it is the prevailing fuel in the marketplace. If EPA subsequently grants a substantially similar waiver for an E10+ blend, the new E10+ blending level should become the new certification fuel for new vehicle production emissions testing.**

- **EPA's interpretation of Congressional intent with the inclusion of "home heating oil" as an additional renewable fuel is overly restrictive. Home heating oil is a generic reference to heating oil not intended by Congress to limit the crediting of biofuel blending only to residential uses of heating oil.**

Additional comments on the above issues as well as other issues for which EPA invited comment are contained in the detailed comments attached.

ExxonMobil Supports API and NPRA Comments

ExxonMobil supports the comments of the American Petroleum Institute and the National Petrochemical and Refiners Association and incorporates by reference those comments and any attachments to those comments.

If you have questions or need to follow-up on issues raised in these comments, please contact John Medley at (703) 846-3188 or by email at John.H.Medley@ExxonMobil.com.

Sincerely,

Attachment

CC:
Ms. Lisa Jackson
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Docket ID No. EPA-HQ-OAR-2005-0161
Detailed Comments of ExxonMobil Corporation
Re: 40 CFR Parts 80; Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program; Proposed Rule, 74 FR 24904, May 26, 2009

ExxonMobil appreciates the opportunity to provide input to EPA as the Agency considers the changes appropriate in the governance of the Renewable Fuel Standard (RFS) program as directed by the Energy Independence and Security Act of 2007 (EISA). In particular, we appreciate the well documented development process used by EPA to arrive at a scientifically sound life cycle analysis (LCA) of conventional fuels and biofuels as required by EISA. This critical change in the RFS program has the potential to better align the simple volume mandates of the original RFS with greenhouse gas reductions in the transportation sector. While many aspects of the LCA are controversial, EPA appears to have found a middle ground that adheres to science while permitting the design of workable program changes. ExxonMobil also appreciates EPA's stakeholder outreach and transparency in the rule development process. Many of the changes EPA has proposed represent scientifically sound and practical proposal or alternatives for comment.

As a result of this approach, ExxonMobil supports many aspects of the proposal as follows:

- **EPA's request for comment on a possible change in the definition of the parties subject to the renewable volume obligation that is based on the renewable fuel standard is appropriate. The parties obligated under the RFS should be those parties that have control of the decision regarding whether to blend or not to blend biofuels to make a finished fuel blend for retail or wholesale purchaser consumer sales.** In the absence of such a change, it will become increasingly difficult for refiners and importers to secure the requisite number of RINs to demonstrate compliance, particularly if their refinery production levels of gasoline or diesel exceed their downstream marketing volumes.

  Most biofuels are blended well downstream of refineries, either at the terminal rack or by distributors and jobbers downstream of the rack. Increasingly, state legislatures are proposing that fuel suppliers provide distributors and jobbers with a fuel suitable for downstream blending so they will have the option to decide whether to blend or not. With the decision of whether to blend or not removed from refiners, it does not make sense to continue to have refiners and importers as obligated parties for renewable fuel blending.

  EPA discusses two options in the proposal. The first would simply remove RBOB and CBOB from the list of fuels for which refiners and importers are obligated parties. While this change would correct the current gasoline/ethanol blending decision misalignment, it would leave the biodiesel blending decision misalignment in place. The second option outlined by EPA to move the obligation to "parties who supply finished transportation fuels to retail outlets or to wholesale purchaser-consumer facilities" would encompass both gasoline/ethanol blending and

diesel/biodiesel blending, providing a more comprehensive solution. ExxonMobil supports this approach.

EPA observes that such a change would create many new obligated parties. While that is true, all of the new obligated parties would already be registered and reporting under the RFS1 system due to their involvement in RIN transactions. In addition, with the implementation of EMTS, reporting and recordkeeping for these entities would become simplified, and EPA's compliance monitoring for a larger number of obligated parties would similarly be simplified. EMTS mitigates the reservations that ExxonMobil and EPA shared about downstream non-refinery parties being obligated parties for RFS1 due to the large number of parties involved. Therefore, it makes sense to align the blending obligation with the parties making the blending decision and doing the actual blending.

In the proposal, EPA offers the view that the potential change to allow separation of RINs by biofuel producers is yet another way to assist in making sure that refiners and importers who do not blend renewables and market directly have adequate access to RINs. We do not believe allowing biofuel producers to separate RINs adequately addresses the disconnection between refiners/importers and those parties who supply finished fuel to retail outlets and wholesale purchaser-consumers and control the blending decision. While we believe a potential change in RIN separation may be feasible with adequate safeguards, we do not believe EPA should presume that making such a change adequately addresses the current obligation disconnects.

- **EPA's request for comment on the separation of RINs by biofuel producers is also appropriate. While such a change could simplify RIN reporting and verification, it would necessitate other changes to safeguard against RIN market manipulation. The current requirement to keep RINs attached to the renewable fuel until it is in the hands of the obligated parties or until the renewable is blended with a petroleum product continues to be a workable mechanism if market transparency is considered important. A potential change in definition of the obligated party can more appropriately address the current disconnect between obligated refiners/importers and those parties who control the blending decision.**

  If EPA does decide to allow renewable producers to separate RINs when generated, such a change must be accompanied by new requirements to 1) preclude biofuel producers from accumulating RINs via month to month RIN inventory reporting, and 2) limit RIN trading to between producers and obligated parties, or to between obligated parties. As indicated in our comments for RFS1, the change to allow only trading between producers and obligated parties or between obligated parties should

be made regardless of whether EPA decides to allow RINs to be separated by the biofuel producer. If EPA makes such a decision to allow producers to separate RINs, it is paramount that month-to-month reporting of RIN inventories be required of producers and that producers are prohibited from increasing RIN inventories over time. Recognizing that some degree of month-to-month inventory variance is inevitable due to seasonality, market conditions, and operating reliability, EPA should allow RIN inventories to draw and be replenished, but not to build by more than 10% over any two month period.

If EPA decides to maintain the current RIN separation practice, simplification of RIN and physical batch reporting is still needed to reduce reporting burdens. EMTS may help in that regard if EPA will do the verification and allow renewable producers to transfer RINs to obligated parties collectively on some periodic basis. As long as the appropriate number of RINs is transferred consistent with the volume of renewable fuel transferred over a given time period, EMTS should have the appropriate batch-by-batch details and obligated parties should not need to track and verify those details.

- **EPA's current RFS1 equivalence values for the various renewable fuels based on energy density is a reasonable mechanism and should be retained to encourage the use of higher energy density fuels.**

- **As regards EPA's life cycle analysis for RFS2, ExxonMobil commends EPA for its scientific approach and diligence in examining the full gamut of potential impacts from the production and use of various biofuels. ExxonMobil agrees with EPA's interpretation that EISA requires that EPA consider both direct and indirect land use change impacts.**

- **As regards the averaging period and discount rate to be applied, we favor the use of 30 years for averaging and a zero discount rate as a more conservative approach.** The shorter time period gives more weight to the known, more immediate, effects of carbon release from clearing, burning and loss of soil sequestration while a zero discount rate values future impacts the same as current impacts. We believe 100 years of assumed use for a given biofuel and its pathway is simply assuming too much about future decisions beyond our control. In addition, it is inappropriate to use financial discounting to address physical phenomenon. If this more realistic averaging period and discount rate results in an unworkable program due to insufficient supply of qualifying biofuels, EPA should use its general waiver authority to adjust the RFS2 requirements accordingly. Finally, we support periodic reevaluations and updates to the LCA (perhaps every three years, initially) to adjust the analysis as technology and modeling evolve. In addition, we would urge EPA to

continue efforts with CARB to harmonize LCA methodologies, and be able to explain differences where authorizing documentation precludes harmonization.

The Appendix to these comments contains additional detailed comments on EPA's LCA approach.

- **ExxonMobil supports EPA's proposed Moderated Transaction System (EMTS) and has volunteered to work with EPA as a Beta tester during 2010.** We believe EMTS, when it becomes fully available, will greatly simplify RIN verification and accounting. We commend EPA for originating the concept and carrying it through the current state of development. We urge EPA to keep this critical new program on schedule and to require its use as soon as possible by all parties who hold or transact RINs. EMTS will also keep track of transactions between parties and therefore will have the information required under §80.1153. Therefore EPA should consider receipt of this information as an electronic product transfer document (PTD) which meets the requirements of §80.1153.

- **ExxonMobil supports the proposed read-across from RFS1 biodiesel and cellulosic ethanol RINs for use in RFS2**. Using RIN "RR" codes for ester and non-ester based biodiesel to biomass-based diesel and the RIN "D" code for cellulosic ethanol are appropriate mechanisms for transitioning RFS1 RINs for use in RFS2.

- **Depending on the outcome of ongoing DOE/EPA/CRC testing for mid-level blend use in the legacy fleet, stronger preventive measures may be needed, as well as product liability relief to enable E10+ distribution and marketing, or widespread E85 use. EPA's proposal to require labels on pumps that dispense gasoline with greater than 10% ethanol content is the minimum mechanism necessary to prevent misfueling that can be supported.** Before a determination can be made as to whether pump labels are sufficient to protect against E85 misfueling, EPA needs data regarding the short and long term impacts on emissions and engine durability of misfueling non-FFV legacy vehicles with E85. We encourage EPA to support such testing on a priority basis and consider carefully if additional physical measures beyond labeling may be needed to prevent E85 misfueling.

- **EPA's assessment of the statutory requirements of the cellulosic biofuel waiver provision is appropriate.** We believe the language leaves the Agency with little discretion. In the event that a waiver is required by the annual assessment of cellulosic biofuel capability, EPA must make available to obligated parties at their discretion allowances up to the amount of the revised cellulosic biofuel requirement. Hence, it becomes the obligated party's decision to what extent they will actually physically procure and blend cellulosic biofuel or rely on purchased allowances for

annual compliance. We support EPA's proposal that such allowances can not be traded or banked for future use, but that such allowances would be used to meet the cellulosic biofuel requirement, the advanced biofuel requirement, and the total renewables requirement. Use of allowances to meet all three requirements must be allowed due to the nested nature of the mandates.

In making its annual assessment of cellulosic biofuel capability, if EPA determines that a waiver is needed, we urge EPA also to adjust the advanced biofuel and total renewables requirements by the same volume as the cellulosic adjustment. If EPA accepts ExxonMobil's recommendation to adopt a 30-year averaging and zero discount rate for LCA, it is unlikely there will be any advanced biofuel to make up the cellulosic shortfall. Under no circumstances should EPA adjust only the advanced biofuel requirement and leave the total renewable requirement unchanged. Such an action would allow the use of grandfathered biofuels that need not provide any GHG reduction to replace cellulosic biofuels that are required to achieve at least a 60% GHG reduction.

- **EPA's assessment of forward year cellulosic ethanol production capability must be realistic and based on actual demonstrated capacity.** It is critical when EPA is making its annual assessment of cellulosic biofuel capability that EPA relies on demonstrated production capability. As evidenced in this proposal, reliance on "planned" capability for such new and unproven technologies is fraught with great risk. EPA's reliance on the plans by one potential cellulosic biofuel supplier to supply 70% of the 2010 cellulosic biofuel volume with as yet undemonstrated technology was not an appropriate evaluation of capability. As evidenced by the recent publicity, this supplier, Cello Energy, has yet to demonstrate the production of any cellulosic biofuel product, and has had a judgment in the amount of $10.4 million entered against them by an Alabama jury that found their technology claims to be fraudulent. Moreover, one of the investors who sampled the product from this process had those samples analyzed and the samples were found to contain no cellulosic biofuel, only petroleum diesel that Cello claims is a "carrier" oil in the process. When assessing new technologies, EPA must adopt a higher standard that capability must be demonstrated both in terms of the actual fuel being produced and the capacity of the plant to operate reliably at some demonstrated operating capacity. Obligated parties must not be put in the position of being forced to carry deficits forward due to the unreliability of new technology or overly optimistic acceptance of new technology capability claims.

- **EPA's proposal to allow RINs to be generated for electricity, propane and natural gas utilized as transportation fuel and produced from renewable biomass is appropriate if sufficient safeguards are built into the requirements to assure such claims are legitimate.** Generation of such RINs should be at the

producer's option, and should require demonstration of the renewable biomass source, as well as a verifiable mechanism for measuring the quantity of electricity, propane, or natural gas that is produced from the renewable biomass. We support this constructive broadening of the RFS 2 program to encompass other alternative fuels that may replace petroleum, but do not believe EISA provides EPA with the authority to mandate that producers of such alternative fuels from renewable biomass must generate RINs under RFS2

- **ExxonMobil supports EPA's efforts to make the land restriction provisions on renewable fuel producers as consistent as possible with current industry practice and USDA interpretation.** While we understand and support the intent of the restrictions as outlined in the statute, we appreciate the difficulty in designing a workable program given the diversity, geographical dispersion, and variation in feedstock sources a given renewable producer may have. We do not object to Conservation Reserve Program (CRP) land being included as "agricultural" land, but we do not think rangeland should be considered agricultural land as generally, rangeland has never been under till.

  We view the enforceability of these land restrictions as problematic. Considerable flexibility must be afforded renewable producers to keep such restrictions from preventing the production of renewable fuels with RINs. We see this situation as akin to the difficulty the petroleum industry has faced in assuring the appropriate blending of ethanol with RBOB when the blending occurs at some distance from the refinery by other parties. Renewable producers face a similar dilemma due to the potential remoteness from the bio-refinery of feedstock generation and accumulation. We suggest that the agricultural community and renewable producers may want to consider something akin to the RFG Association Survey approach to demonstrate to EPA that such restrictions are being followed. A representative survey of feedstock deliveries could be audited on a periodic basis to confirm general adherence to the land restrictions without having to require each and every feedstock delivery to a renewable producer prove its pedigree. We believe the latter approach to be unworkable and to likely result in the production of significant amounts of renewable fuel that can not also generate RINs simply due to a lack of documentation on feedstock pedigree.

  We suggest that EPA provide a phase-in period of several years wherein current renewable feedstock sources are deemed to be compliant with the feedstock land restrictions so as to provide the agricultural community and renewable producers adequate time to design a survey program that would meet the land restriction requirement to EPA's satisfaction. Without such a phase-in period, EPA may be forced to disqualify RINs and renewable fuels that were purchased in good faith, perhaps to the point that there is not enough qualifying biofuel to enable compliance

with the program requirements. We view this as a needless result, given that the potential for abuse of the land restriction provisions would be limited by the phase-in period, assuming the agricultural community and renewable producers act in good faith to develop a workable survey program, or some other mechanism, to satisfy the land use restriction requirement. While it might be expedient, we do not think EPA has the authority to set aside the land restrictions or ignore them, but providing a phase-in period demonstrates the intent to implement the restrictions while providing the affected parties time to develop a feasible, workable program. Moreover, as a practical matter, the potential for abuse of the land restriction verification requirement is limited in our view, particularly if CRP land is to be considered agricultural land. CRP land is likely the first choice for any incremental land under till, and the likelihood of forest land being cleared for till would seem low. Renewable fuel producers could actually choose to not provide the requisite renewable biomass certification and produce renewable fuel without RINs, thereby tightening the RIN market to their benefit if EPA decides to allow renewable producers to separate RINs and market them separately from the renewable fuel. If EPA does not decide to move the point of obligation downstream, below the rack blenders may provide a ready market for renewable fuel without RINs. Accordingly, we urge EPA to provide renewable fuel producers with constructive and flexible options to develop a feedstock verification program and continue to require that renewable fuel produced must generate RINs.

To assure that the land restriction provisions are also applied to foreign suppliers of renewable fuel, importers and foreign suppliers should also be afforded a phase-in period and domestic agricultural interests and renewable producers should be encouraged to include importers and foreign renewable suppliers in the development of whatever land use verification program is constructed.

In suggesting the phase-in period for development of a land restriction verification program, we are not suggesting that EPA should in any way set aside the registration process wherein domestic and foreign renewable producers must provide the requisite information regarding their feedstock sources, process technology employed, and products produced so as to permit determination of the appropriate D code for their product. The phase-in period would only serve to allow sufficient time to develop a land restriction verification program so that ongoing compliance can be demonstrated to be consistent with the feedstock sourcing in a given renewable producer's registration.

In addition to our support for these key portions of the RFS2 program, we offer comments on some other aspects of the program that should be changed, as follows:

- **Despite best intentions, the delay in OMB approval of the draft RFS2 proposal makes it highly unlikely that EPA can respond to comment and finalize the RFS2 rulemaking by the end of October 2009 so that it can take effect on January 1, 2010. If EPA is unable to complete the rulemaking on that schedule, ExxonMobil urges EPA to delay implementation until January 1, 2011 and to rely on the current RFS1 regulation for 2010.** ExxonMobil does not support a partial year 2010 implementation. The complexity involved for obligated parties and others who transact RINs that would be comprehended in administering different RFS regulations for parts of one year is not worth the resources required for all stakeholders. RFS1 rules can suffice to ensure use of biofuel volumes as detailed by Congress in EPACT05 for 2010.

- **Regardless of when EPA finalizes the RFS2 rulemaking, the 2009 biomass-based diesel requirement should not be carried forward to 2010 and the 2010 biomass-based diesel and cellulosic ethanol requirements should not be carried forward to 2011.** EPA lacks the authority to modify the statutory schedule for the individual mandates by combining them as proposed. The EISA statute instructs that the tabled volumes "shall" be followed, and EPA's authority to deviate from the tabled volumes does not commence until the year following the last year in the table, or through the use of waivers intended to reduce the obligation when justified.

  In addition, i the case of biomass-based diesel, there is insufficient waste grease biodiesel production to support more than 0.9 to 1.0 billion gallons per year of biomass-based diesel even if EPA decides to allow averaging of vegetable oil sourced biodiesel and waste grease sourced biodiesel and reduces the biomass-based diesel GHG reduction threshold by the maximum of 10% to 40%. In addition, by combining the 2009 and 2010 biomass-based diesel requirements, EPA is requiring blending infrastructure to be installed that will only be needed for one year as the following year biomass-based diesel requirement decreases to the statutory level.

  Actual cellulosic ethanol production will be well short of both 2010 and 2011 requirements, so carrying any volume of the cellulosic ethanol requirement forward would make no sense. Having carried forward unachievable volumes, EPA would then have to initiate the waiver process.

- **ExxonMobil urges EPA to avoid the use of "advisories" regarding possible future requirements.** In the future, EPA should refrain from issuing "advisories" on how it intends to promulgate RFS2 requirements, particularly if EPA can not meet its own schedule for promulgating such requirements. "Advisories" such as EPA

provided regarding its intended treatment of the 2009 biomass-based diesel requirement create added uncertainty for the regulated community. The regulated community should not be in the position of having to commit investment and resources to meet requirements outlined in an "advisory" when the potential exists that the requirement in the advisory will not eventually be promulgated or will be promulgated too late to be effective. This undermines the credibility of the program.

- **ExxonMobil does not support the proposed adjustment in the advanced biofuel GHG reduction threshold to allow sugar ethanol to qualify as advanced biofuel.** If a 30 year averaging period and zero discount rate is used in the LCA, the maximum adjustment that EPA is permitted to make is 10% and sugar ethanol could not qualify as an advanced biofuel even with the adjustment. That said, if the final EPA LCA assessment for sugar ethanol is within the allowable adjustment, ExxonMobil would not object to an adjustment in the threshold level to qualify sugar ethanol as an advanced biofuel. Obligated parties need at least one advanced biofuel that is produced reliably today to permit compliance with the advanced biofuel standard, or EPA would need to use its general waiver authority to modify the advanced biofuel standard due to insufficient supply.

- **ExxonMobil does not support a monthly reporting requirement for 2010 as a lead in to the EMTS.** We see no logical basis of increasing the reporting frequency during 2010 if EPA does finalize RFS2 for a portion of 2010. ExxonMobil urges EPA to rely on RFS1 until January 1, 2011 and implement both RFS2 and the EMTS at that time.

- **ExxonMobil does not support an adjustment to the biomass-based diesel GHG reduction threshold, nor any of the averaging approaches outlined by EPA as a mechanism to qualify biodiesel that would otherwise not qualify as biomass-based diesel.** If the final life cycle analysis does not qualify vegetable oil sourced biodiesel as biomass-based diesel, EPA should not resort to averaging techniques to artificially qualify such biofuels. Such averaging does not further the aims of GHG reduction inherent in the EISA RFS expansion. Rather, at its own initiative, EPA should initiate a general waiver process to reduce the biomass-based diesel requirement to the level of available biodiesel or renewable diesel that does qualify as biomass-based diesel, taking into account geographical and seasonal factors, and potential retention of equivalence values.

  Even if EPA believes such averaging is necessary to make the RFS2 program workable today, ExxonMobil counsels caution in setting such a precedent. A similar approach could be proposed in the future to expand the use of grandfathered biofuels that do not serve to reduce GHGs, but can be artificially enhanced by averaging with new advanced biofuels. Such averaging could serve to retard

development of new advanced biofuels if they will only be used to upgrade non-qualifying biofuels to the minimum threshold GHG reduction.

If, nevertheless, EPA proceeds with an averaging approach to qualify vegetable oil sourced biodiesel as biomass-based diesel, ExxonMobil urges EPA to utilize an averaging mechanism that allows both producers and obligated parties to average the appropriate ratio of RINs. This will provide the greatest degree of flexibility, which will be needed to overcome geographical and seasonal differences.

To facilitate averaging by either the producer or obligated party, we suggest use of an expanded list of D codes that will not only facilitate averaging but also enhance the granularity of the RFS2 program.

If EPA finalizes the RFS2 rulemaking for implementation on January 1, 2010 or January 1, 2011:

	D Code
RFS2 Cellulosic ethanol	1
RFS2 Cellulosic diesel	2
RFS2 Biomass-based diesel	3
RFS2 Vegetable Oil based biodiesel	4
RFS2 Waste grease based biodiesel	5
RFS2 Advanced Biofuel	6
RFS2 Renewable Fuel	7

If EPA finalizes the RFS2 rulemaking for a partial year implementation, then D codes should be assigned as follows:

	D Code
RFS1 Cellulosic	1
RFS1 Other	2
RFS2 Cellulosic ethanol	3
RFS2 Cellulosic diesel	4
RFS2 Biomass-based diesel	5
RFS2 Vegetable Oil based biodiesel	6
RFS2 Waste grease based biodiesel	7
RFS2 Advanced Biofuel	8
RFS2 Renewable Fuel	9

- **As regards regulations governing the grandfathering of conventional renewable fuels in EISA, ExxonMobil supports EPA's limiting grandfathered volumes to the best three-month average during the first two years of operation. Moreover, the grandfathering should sunset no later than 15 years after enactment of EISA (i.e. no later than 2022).** Without a sun-setting provision,

there will be no incentive for conventional renewable bio-refineries to upgrade to more efficient processing. Grandfathered facilities should lose their grandfathered status if they make changes that increase GHG emissions above their baseline, and any coal fired facility replacements should be either natural gas or biomass fired. In addition, we support the requirement that grandfathered facility owners annually report expenses for replacements, additions and repairs and that EPA use these reports to determine when the facility effectively becomes new due to rebuilding or modernization. Once EPA determines a facility is new, it should no longer have grandfathered status.

- **EPA exceeded its discretionary authority in promulgating RFS 1 by extending the statutory small refinery exemption to small refiners, and EPA would compound that mistake if it finalizes an extension of the small refinery exemption for small refiners in RFS2.** Accordingly, we support EPA's expressed intention not to extend the RFS1 small refiner exemption.

- **Rollover RINs should not be capped.** Putting a cap on the use of following year rollover RINs distorts the RFS by removing legitimate renewable fuel use that should count toward meeting the mandatory RFS obligation. ExxonMobil urges the Agency to remove the current 20% cap on rollover RINs. The much higher demands of the RFS2 volumes and the increase in the number of mandates require greater flexibility for obligated parties. If the Agency does decide to retain a cap on the use of rollover RINs, ExxonMobil urges the Agency to increase the cap to no less than 50% and to apply the cap collectively to all four mandates rather than to individual mandates. A rollover allowance of 30% alone is needed to provide flexibility for response to potential ethanol shortages arising from historical drought conditions, and additional flexibility above and beyond that requirement is needed due to the increased volumes and complexity of four separate mandates.

- **EPA should require that new vehicles be certified on E10 as it is the prevailing fuel in the marketplace. Moreover, if EPA subsequently grants a substantially similar waiver for an E10+ blend, the new E10+ blending level should become the new certification fuel for new vehicle production and testing.** EPA could ensure that new vehicles continue to meet current emission standards by changing the certification fuel to E10. By the time such a change could be implemented, virtually all gasoline sold in the US will be E10. New vehicles should be designed to comprehend this and the growing use of ethanol as a gasoline blend stock.

- **EPA's interpretation of Congressional intent with the inclusion of "home heating oil" as an additional renewable fuel is overly restrictive.** Home heating oil is a generic reference to heating oil not intended by Congress to limit the crediting of biofuel use in heating oil to only residential uses. Indeed, throughout the

proposal, EPA uses "home heating oil" and "heating oil" interchangeably in the preamble, but then precludes credits for biofuel use in heating oil commercial and industrial applications in the regulatory text. This overly restrictive interpretation should be changed so as to encourage the use of biofuels in such stationary source applications. Several states have either already imposed requirements or are considering such requirements for biofuel blending into heating oil. It would be ineffectual if biofuel mandated for use in heating oil in several of the states were not allowed to be credited under the RFS, particularly given the limited amount of diesel biofuel qualified under the RFS2 thresholds.

If EPA does not change its interpretation of Congressional intent, the restriction to "home" heating oil use provides yet another reason why a revision in the definition of obligated parties is justified. In this instance, only the final supplier of the heating oil (a wholesale purchaser-consumer) will know its end use and know whether biofuel blending is appropriate or if the RINs would have to be retired.

In response to specific requests for comments on a variety of issues in the proposal, ExxonMobil offers the following:

- **EPA's analysis of E85's potential needs updating and the use of realistic assumptions regarding FFV production as well as E85 use.** EPA's assumption for total annual vehicle sales makes clear that EPA's analysis predates the current economic downturn. Total annual sales have declined to a rate of 9 million vehicles per year from the 16 million vehicles EPA assumed, and much of the decline has been in models that were the traditional FFV offerings. EPA's assessment must be updated to reflect slower penetration of FFVs into the nation's vehicle inventory. Further, the rate of FFV penetration will be less than predicted by EPA due to the overall decline in vehicle sales and apparent customer preferences for models that have not traditionally been included in the FFV offerings.

  EPA's estimate of the cost of E85 infrastructure at a typical service station is low by almost a factor of two, even assuming that eventually UL certifies a sufficient number of the fuel delivery and fuel dispensing equipment items to permit such infrastructure upgrades. It is significant to note that the ~2000 service stations currently offering E85 are doing so using equipment that is not certified for that purpose, raising questions about liability in the event of an accident and insurance coverage, not to mention adherence with local fire codes.

  Reliance on E85 as a viable mechanism to grow the use of ethanol as a transportation fuel raises many practical questions that have not yet been answered. Some insight can be gained however from the experience that those 2000 or so

service stations have gained in offering E85 to real world customers. The experience suggests that owners of FFVs often choose not to purchase E85 because it provides only two thirds of the energy that is in gasoline. That means more frequent fill-ups, and as long as ethanol is priced at near parity or above gasoline, that means fueling costs increase with E85. For this reason, mandatory FFV production requirements will not provide an incentive for E85 use as owners of FFVs can still choose to fuel with gasoline.

To allow even a breakeven choice by consumers, ethanol would have to be priced at its energy equivalent value on a BTU basis with gasoline. Recent experience suggests that ethanol producers suffer financial difficulties if the ethanol market approaches parity with gasoline; this applies even after considering the current federal subsidy for ethanol. Hence, increasingly, ethanol proponents are seeking to blend and sell E10+ that is more likely to retain its value as gasoline due to the relatively lower ethanol content vs. E85.

At some point in the future with ethanol production efficiency improvements and reduced feedstock costs from higher agricultural yields (or much higher crude oil market valuation) it is conceivable that E85 might become competitive with gasoline. However, reliance on such developments to promulgate a workable RFS program is problematic. EPA's suggestion that somehow retail marketers could subsidize E85 sales with attractive pricing while seeking to recover the subsidy cost with E10 sales by raising the cost of E10 demonstrates a fundamental lack of understanding of petroleum product markets. Such markets are competitive, and an individual marketer can not hope to succeed by acting at variance with the market direction. Customers with FFVs would take advantage of his lower E85 price by preferentially filling up their FFVs at his station, generating a financial loss on the E85 volume he sells. However, customers who need E10 would go elsewhere to avoid the higher cost E10 gasoline he offers, since other marketers would be offering E10 that did not also carry the burden of an E85 subsidy recovery. Of course, anti-trust laws prevent a group of individual marketers from acting in "cooperative ways to promote E85 throughput to meet the proposed E85 requirements" (74 FR 25013, col 2) as EPA seems to anticipate. EPA should not look to petroleum marketers to somehow create an incentive for customers to buy a non-cost-effective product like E85. Market factors preclude the viability of such a strategy.

EPA's recently expressed intent to grant California's request for a waiver to regulate vehicle GHG emissions and to adopt similar federal requirements also raises significant questions regarding E85's viability as a solution. To date, few FFVs can meet the California emission standards, and 13 additional states representing ~40% of gasoline demand have indicated they will adopt the California vehicle standards.

If many FFVs can not meet those standards, the potential penetration of FFVs and E85 will be further constrained.

The slower-than-expected development of commercial cellulosic ethanol capability offers some potential for E10 blendwall relief, perhaps enough to enable the completion of E10+ testing and potential approval of an E15 or E20 ethanol blend. Conventional ethanol production from corn will effectively fill the national E10 requirement with a small excess that may be accommodated as E85. However, as the cellulosic ethanol industry evolves and is able to reliably produce ethanol, mid-level blend approval will be needed to accommodate these ethanol volumes because E85 is not a viable market driven alternative.

To the extent that EPA relies on expanded E85 use to achieve the RFS volume requirement, short and long term emissions and durability testing needs to be conducted on the legacy fleet to define the potential impacts of misfueling with E85 on the non-FFV legacy fleet (97% of existing vehicles). Defining these impacts is required to permit an informed decision regarding misfueling consequences that may be associated with widespread use of E85. If inadvertent or intentional misfueling of non-FFVs with E85 could result in significant damage to the vehicle or its emission control system, EPA may need to consider preventive rather than advisory misfueling measures.

For more on the detailed concerns we have with potential misfueling issues, please see API's comments on the Growth Energy E15 Substantially Similar Waiver petition.

- **A mid-level blend substantially similar waiver is needed to permit growth in the use of ethanol as the RFS2 mandates intend. However, long term durability testing of the legacy fleet must be completed so the potential impacts of a mid-level blend waiver decision can be adequately assessed. In addition, the adequacy of distribution and retail infrastructure to accommodate mid level blends must be assessed as well and a path available to enable any upgrading that may be needed.** For this reason, ExxonMobil does not support an EPA decision on a potential partial waiver for a portion of the legacy fleet prior to the completion of all legacy vehicle durability testing. Our view is that it is unlikely that a mid-level blend can be approved for all highway and non-road applications, and any mid-level blend approval will carry with it some requirement to continue to supply E10 on some geographically distributed basis so that customers who need E10 can access it. However, the size of the legacy fleet approved for mid-level blend use and the advisory or preventive misfueling measures defined by EPA will likely determine whether there is sufficient incentive to upgrade the distribution and retail infrastructure to supply any newly approved fuel. EPA must assure that

the misfueling issue is addressed in a way that provides marketers with a plausible and reliable liability defense for instances of inadvertent or intentional misfueling.

- **ExxonMobil does not support a "testing tolerance" approach to avoid the full testing and analysis requirements of a substantially similar waiver.** Such a suggestion is merely an effort to avoid the substantive requirements of the CAA. The volume percentage of ethanol in gasoline is readily determined using very accurate volumetric ratio blending facilities now in place at most blending terminals. However, experience also suggests that there is considerably variability in ethanol content and other gasoline properties if ethanol is added on a "splash" basis. Actual sampling of splash blends sometimes shows that inadequate mixing results in actual percentages of ethanol in gasoline higher than the 10% allowed. For this reason, whatever EPA decides to do about any mid-level blend waiver, ExxonMobil recommends that EPA limit the use of ethanol splash blending by banning this practice by a future date, with sufficient lead time to allow parties who do not now have tanks and ratio blend controls to install the necessary equipment to assure proper ethanol blending.

- **When EPA reaches a decision regarding the Growth Energy waiver petition or any subsequent petition that may result in approval of a mid-level blend for use, EPA must clarify the status of the 1 psi RVP waiver for 10% ethanol blending.** ExxonMobil urges the Agency to base its decision on a broad reading of the statute, recognizing that the 10% level required in the statute would still be met by a 15% or 20% blend and that measurements of the vapor pressure for such higher ethanol blends indicates that RVP remains flat or declines slightly as the ethanol content increases between 10% and 20%. Hence, continuing the 1 psi RVP waiver for higher blend levels does not cause any adverse environmental outcome and should be preserved.

- **Municipal Solid Waste (MSW) should not be considered renewable biomass.** While some MSW contains food waste and yard waste that is included in the EISA definition of renewable biomass, MSW also contains non-renewable items like plastic that should probably be recycled rather than used to make a transportation fuel. Keeping the food waste and yard waste as a separate category and not including MSW in the definition of renewable biomass will encourage the separation of food waste and yard waste for potential use as renewable biomass, and the separation of plastics and other non-renewables for recycling or disposal that will sequester any potential future carbon emissions. Moreover, given that the EPACT05 statute specifically qualifies MSW as a renewable biomass, but EISA07 does not, it can be inferred that Congress intentionally meant to limit the later statutory definition to those truly renewable components of MSW, such as food waste and yard waste.

- **RIN generation for co-processing of renewable and fossil fuels should be based on relative energy in the feedstocks**. Co-processing simply accomplishes the blending of the renewable fuel and the fossil fuel prior to processing instead of after processing. Arguably, this is a more efficient and cost effective approach than downstream blending and should be considered favorably. The blending of renewable and non-renewable feedstocks for processing should not be penalized via averaging to any greater extent than one would require the averaging of downstream blending of renewable with the fossil fuel. The EISA threshold GHG reduction requirement is supposed to be applied to the renewable fuel, not the combined renewable and fossil fuel blend.

- **EPA's proposal for 2010 RFS2 renewable standards is premature**. Given the lateness of the proposal, and the extension of the comment period, it appears unlikely that EPA will be in a position to finalize the RFS2 rules prior to 2010. However, EPA should plan to outline by November 30, 2009, the requirements for 2010 under RFS1, as well as under RFS2, in case a partial year implementation of RFS2 is contemplated (we do not support a partial year implementation, but recognize that EPA may nonetheless adopt a partial year approach or may not have reached a final determination by November 30, 2009). Based on the current LCA assessments provided in the proposal, and our recommendation for use of the 30 year average and zero per cent discounting, EPA could set RFS2 standards for a very limited volume of cellulosic ethanol (likely less than 10% of the statutory requirement) under its statutory cellulosic waiver authority, adjusting the advanced and total renewables requirements by a similar decrease. EPA would need to also promulgate a general waiver to reduce the remaining advanced biofuel requirement since no biofuel would appear to be available to meet that supply requirement. The biomass-based diesel requirement would also need to be adjusted due to supply inadequacy with a general waiver since only waste grease biodiesel will qualify as biomass-based diesel and that production level is less than half of the statutory biomass-based diesel requirement. EPA should also adjust the total renewable requirement by the amount of the biomass-based diesel decrease and the advanced biofuel decrease so as not to allow grandfathered biofuels to replace biofuels that were supposed to achieve at least a 50% GHG reduction.

  In terms of the 2010 requirement under RFS1 for all or a part of 2010, that requirement is specified in EPACT05 at 6.8 billion gallons per year (bgy) of renewable fuel. We do not believe EPA has the authority under EISA to impose EISA total renewable volume (12 bgy) until RFS2 rules are implemented. EISA granted EPA authority to adjust the 2008 RFS1 standard only, so until EPA is in a position to implement RFS2 rules, RFS1 volumes under EPACT05 should apply.

- **Current holders of biodiesel RINs for 2008, 2009 (and potentially 2010) should be able to carry those RINs forward for use in demonstrating compliance for 2011 if EPA carries any of the biodiesel requirements for 2009 or 2010 forward to 2011.** Obligated parties who acted in good faith based on EPA's advisory guidance provided during the 2009 standard setting process should not be penalized by losing the use of 2008, 2009 and potentially 2010 RINs, which have been accumulated at a premium vs. ethanol RINs. EPA's inability to promulgate final regulations as prescribed in the statute should not harm obligated parties or others who may hold such RINs. Such RINs should not be subject to any cap regardless of EPA's final decision on the need for or level of a rollover cap.

- **Marine use of blended biodiesel should not be excluded from additional renewable fuel credit.** RINs for biodiesel used in marine applications should not have to be retired. Such use provides just as much credit for petroleum replacement and GHG reduction as biodiesel use in highway and other non-road applications. While the statutory language may not include ocean going vessel (OGV) fuel in the definition of transportation fuel, that limitation should only apply to the Renewable Volume Obligation (RVO) calculation (i.e. OGV fuel should not be included in the RVO calculation). However, like the use of biodiesel in heating oil, marine use should receive full RIN credit rather than retirement. This credit has the potential to become significant once IMO and EPA Emission Control Area (ECA) regulations limiting OGV fuel sulfur levels to 0.1 wt. % S become effective in 2015 and much of the OGV fuel used within the ECA will become diesel.

- **Production Outlook Reports by biofuel producers should be required, but not overly relied upon, particularly for new biofuel technologies.** While the concept of Production Outlook Reports is good and the actual reports may be able to assist EPA in estimating projected biofuel production levels, forecast production levels for new technologies that are not yet commercially demonstrated must receive additional scrutiny and not be accepted at face value. Forecast production levels that rely on new technology are often overly optimistic in terms of when the new technology will actually become a reliable source of product on a continuous ratable basis. For new technologies, such as cellulosic ethanol, or biomass to liquids, EPA must insist on demonstrated capability on a ratable basis before using that capability as a basis for standard setting. Obligated parties can only blend those renewable fuels that are actually produced. As EPA observes in the preamble, "No commercial cellulosic diesel plants currently exist in the US, nor elsewhere in the world." The same can be said for commercial cellulosic ethanol plants. If the statement continues to be true as we approach November 30, 2009, EPA should not include any projected production level of cellulosic biofuel when setting the 2010 cellulosic standard, except for the very small quantities available intermittently from demonstration plants already operating.

Appendix

Comments on EPA RFS Program LCA

EPA has undertaken a very thorough analysis of the life-cycle GHG emissions associated with biofuels and petroleum fuels. In general we find the technical tools and procedures to be sound. However, in several cases the scenario parameters or model inputs bias the results. Examples include: use of 2022 as evaluation year for biofuels facilities, use of 100 year time horizon and several assumptions regarding cellulosic ethanol.

Land-Use Change

We strongly support EPA's inclusion of indirect land-use change (iLUC) in biofuel GHG LCA. EISA requires that indirect emissions associated with land use change be included in the lifecycle assessment and EPA's analysis is consistent with the intent of the legislation. Indirect land-use has been identified as a significant GHG emission source related to increased biofuel production by a number of researchers [1-5]. Including iLUC in the assessment of greenhouse gas (GHG) emissions from biofuels is critical if GHG reduction goals are to be achieved. The projected magnitude of iLUC emissions are large and therefore, notwithstanding the technical uncertainty, should be part of both near and long term quantification of biofuel GHG emissions. To that end, we support:

- Assessment of global iLUC emissions using the best available science, and continued refinement of this assessment as science and experience progress.
- Incorporation of iLUC emissions in regulations pertaining to biofuel GHG emissions by practical methodologies that can be applied in the near term.

Carbon stocks in natural ecosystems are much larger than carbon in the atmosphere. Tropical ecosystems alone store 340 billion tonnes of carbon, equivalent to more than 40 times the annual anthropogenic emissions from fossil fuel combustion [1]. Conversion of natural lands, particularly forest, to productive cropland releases large amounts of CO_2 into the atmosphere due to burning, clearing, and decomposition of plant biomass leading to a loss of soil carbon.

Land use change (LUC), both direct conversion to biomass production and indirect conversion through displacement effects, is a complex technical issue but the results to date indicate that land use is a significant portion of the GHG impact from many biofuel production pathways. Gnansounou, et al. [6] recommend "fixing the system boundaries at the world-wide level (commodity-trading countries) for economic modeling of iLUC".

Additionally they indicate that "collaborative work is needed at the international level in order to develop a common and appropriate methodology to account for iLUC."

In order to analyze iLUC the global response to changes in US policy need to be evaluated. The use of FASOM and FAPRI to model iLUC appears to be appropriate. These models are detailed tools with a high level of detail and data validation. FASOM has been used to model US agricultural GHG for many years. Linking the models is appropriate and allows the analytical strengths of both models to be utilized. We also support examination of GTAP as an alternative modeling platform with global scope. We agree with use of satellite (MODIS) data to estimate type of land converted internationally but recommend use of a larger dataset than just three years.

Time Horizon

The time horizon over which GHG emissions from time-dependent sources like iLUC are accounted can lead to differences in the carbon intensity applied to the fuel. The use of a discount factor can lead to further differences. Shorter time periods give more weight to the known, more immediate, effects of carbon release from clearing, burning, and loss of soil sequestration. Use of longer time periods gives more weight to activities that are much more uncertain. The 100 year period is a poor choice because: (a) 100 years is much longer than the life of individual biofuel plants, (b) there is great uncertainty about benefits in the out years of a 100-year period and (c) benefits that occur well beyond the period covered by the current regulation are credited. A longer time horizon also introduces a need for discounting emissions, but there is no clear rationale for selecting an appropriate discount rate. A time period of 30 years or less and simple averaging is a pragmatic approach that ensures that anticipated GHG benefits from the regulation are received. A thirty-year analysis period with no discounting is also consistent with recent CARB LCA. Not accounting for the integrated decay of GHG in the atmosphere can lead to under-prediction of the climate forcing associated with iLUC emissions due to timing effects. A recent paper outlines a simple approach to account for the timing of iLUC and other biofuel emissions and the lifetime of different GHG in the atmosphere [5].

Biofuel Analysis Year

EPA's analysis evaluates the incremental impact of renewable fuel facilities built in 2022. Considerable improvement in plant and agricultural efficiency is assumed compared to current conditions. This procedure underestimates GHG emissions from biofuel facilities before 2022 and introduces uncertainty through use of projected factors instead of validated data. It would be better to base the analysis on a near-term date using actual data and to then update as needed if data indicates improvement.

Cellulosic Ethanol

There is very large uncertainty in projected future GHG emissions of cellulosic ethanol due to the range in potential feedstocks and chemicals as well as yields and co-products, as well as the lack of any existing commercial operation. EPA has projected large improvements in performance to the 2022 time frame, but it is not clear these improvements will be realized. Although frequently ignored, GHG emissions associated with enzyme production for cellulosic ethanol can be much larger than corn ethanol and a can be significant fraction of cellulosic ethanol GHG [7]. While continued research may lead to the development of low dose high activity enzyme systems there is considerable uncertainty over the performance of future systems. Outlining current and possible future performance and tracking the progress over time would provide a better measurement of the LCA performance of cellulosic ethanol.

The RFS analysis projects large GHG credits for electricity co-generation. Under such a scenario the cellulosic ethanol facility is consuming additional biomass to produce electricity. Use of biomass to generate electricity in general provides much larger GHG benefits than fuel conversion. The alternative use of biomass as a direct feedstock for electric power generation should also be considered. We recommend that cellulosic ethanol be evaluated on an electricity neutral basis to isolate the GHG impact of the biofuel activity from that of electricity generation.

EPA's analysis projects significant soil carbon benefits due to cellulosic ethanol and these have a significant impact on the results. No-till farming with related carbon benefits is tied to corn stover collection for ethanol. No-till farming is being introduced today and therefore should not be tied directly to stover collection. Under many scenarios corn stover could lead to soil carbon depletion instead of accumulation [8]. Significant soil carbon benefits are also projected for switchgrass use but these benefits will not occur unless the land is dedicated to switchgrass in perpetuity.

The spreadsheet on cellulosic ethanol indicates that cellulosic ethanol causes a large reduction in GHG emissions from international livestock production. The mechanism for such a reduction is not clear.

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