

Growth Energy's Comments on June 4, 2015, 15-Day Notice for the Proposed Revisions to the LCFS Regulation

On December 30, 2014, CARB circulated for public review an Initial Statement of Reasons (the "ISOR") and an Environmental Analysis ("EA") for CARB's proposed revisions to the Low Carbon Fuel Standard (the "LCFS regulation"). Following a February 19, 2015, public hearing on the LCFS regulation, the Board directed staff to consider modifications to the LCFS regulation, and respond to environmental comments.

CARB released proposed modifications to the LCFS regulation through its June 4, 2015, Notice of Public Availability of Modified Text and Availability of Additional Documents (the "15-Day Notice"). Due to various concerns regarding the LCFS regulation, including issues raised in the 15-Day Notice, Growth Energy submits the following comments on the proposed modifications to the LCFS regulation under the California Environmental Quality Act, the California Administrative Procedures Act, and the Health & Safety Code.

A. CARB's LUC Value for Corn Ethanol of 19.8 gCO₂e/MJ Is Not Supported By Substantial Evidence, and Would Result in Adverse Climate Change Impacts

CARB's proposed revisions to the LCFS regulation contemplate a land use change ("LUC") value for corn ethanol of 19.8 gCO₂e/MJ. This value, however, is not supported by substantial evidence. Specifically, to calculate the corn ethanol LUC, CARB staff used the average of five price-yield values [0.05, 0.10, 0.175, 0.25, and 0.35], which is 0.19.

As explained in the accompanying declaration of Tom Darlington, a price-yield of 0.19 is contrary to the evidence, as the value recommended by Purdue is 0.25. (Decl. Darlington ¶ 5.) Lower price yields such as 0.05 and 0.10 are also inconsistent with CARB's own modeling. The research that could be read as supporting such low price-yields is based on short-term shock, while CARB's GTAP model uses medium- and long-term shock. (*Id.*)

Moreover, the only study relied upon by CARB to support a low price-yield value was prepared by David Rocke of UC Davis. The Rocke analysis is based on only one set of data – a 2012 dissertation by Juan Francisco Rosas Perez, who concluded that price-yield response was approximately 0.29. Despite the use of this data set, the Rocke study concluded – based on his own "statistical analysis" – that the price yield should be lower. (*Id.* ¶ 6.)

The rulemaking file does not contain an explanation as to how the Rocke study reached this conclusion or performed his statistical analysis. While commenting parties have requested this data, CARB staff has never supplied the data to the public. As a result, there is no evidentiary support for the lower price-yield values, and CARB should eliminate the lowest two values – 0.05 and 0.10 – due to a complete lack of evidentiary support for those values. (*Id.* ¶¶ 5-7.)

This failure is not merely academic. If the lowest two price yield values are eliminated, CARB's average price yield for corn ethanol would be 0.26. This would result in a

LUC value for corn ethanol of 15.53 gCO₂e/MJ, compared to 19.84 gCO₂e/MJ, (*id.* ¶ 7, Table 1), which would in turn lower the Carbon Intensity (“CI”) Value for corn ethanol.

In addition to the practical consequences on the use of corn ethanol in the marketplace, CARB’s reliance on unsupported price-yields also has real environmental consequences. The LUC values are a component of the CI Value placed on a fuel by CARB. If CARB inaccurately calculates the LUC (and thus the CI value) of a fuel as being too high, it will incentivize the use of fuels that have a higher carbon intensity, creating an adverse climate change impact. In the rulemaking for the first LCFS regulation, CARB’s consultants explained the importance of accurately calculating the CI Values in the Lookup Table:

[I]f we make a mistake in one direction in estimating these numbers, we’ll use too much of a biofuel that’s actually higher carbon [than] we thought and will therefore increase global warming. And if we use numbers that are too low, then we’ll use too little of a biofuel that’s lower carbon than we thought and will therefore increase global warming.

(Attachment “C” at 73-74 [excerpts from April 23, 2015, CARB Meeting].)

To avoid these potential adverse consequences, and to develop LUC Values (and thereby CI Values) that are based on scientific data, CARB should eliminate the lowest two values – 0.05 and 0.10 – for its average price-yield for corn ethanol.

B. CARB’s LUC Value for Brazilian Cane Ethanol Is Not Supported By Substantial Evidence, Due to Errors in the GREET Model

The most recent version of the GREET model made available in June 2015 contains an error in its estimation of emissions resulting from ethanol produced from sugar cane in Brazil. Specifically, as explained in the accompanying declaration of Tom Darlington, an error in the GREET model results in cane ethanol plants with no mechanized harvesting having the same emissions as plants with 100% mechanized harvesting. (Decl. Darlington ¶ 10.) The correction of this error would obviously result in an increase in the CI Value for cane ethanol.

C. CARB Should Not Eliminate the Multimedia Evaluation Provisions From the LCFS

The 15-day Notice for the revised LCFS regulation suggests that CARB is proposing to eliminate the multimedia evaluation (“MME”) provisions for new fuels contained in Sections 95490, 95481(a)(59), and 95488(c)(4)(G). As explained in the Declaration of Jim Lyons, the removal of the MME for new fuels has the potential to result in additional emissions and other adverse impacts. (Decl. Lyons ¶¶ 7-10.) Further, this change is not sufficiently related to the original text of the regulation such that a member of the directly affected public could have been put on notice that the changes had the potential to occur. Thus, CARB should reinstate the MME provisions and/or recirculate the proposed LCFS regulation for a full 45-day public review.

1. The Elimination of the MME for New Fuels Could Result in Additional Emissions

The elimination of the MME requirement for new fuels will result in potentially significant environmental effects. First, the MME process provides important safeguards to help ensure new fuels will not result in increases in emissions. (See, e.g., Health & Saf., § 43830.8.) Without such safeguards, fuels can be allowed in California that result in additional emissions of criteria pollutants.

For example, CARB permitted the introduction of biodiesels into the California market without requiring a MME under Section 43830.8. (Decl. Lyons ¶ 8.) “Based on CARB staff estimates, in 2014, biodiesel use for compliance with the LCFS regulation allowed by CARB without an approved [MME] . . . resulted in increased NOx emissions of 1.2 tons per day statewide.” (*Id.*) Had CARB adopted fuel specifications, and required biodiesels to complete the MME process in 2009, these increased emissions could have been eliminated. (*Id.* ¶¶ 8-9.) CARB should learn from its past mistakes – not repeat them – and require new fuels to undergo the MME evaluation process.

2. The Elimination of the MME Requirement for New Fuels Is Not Sufficiently Related to the Original Text, and Requires Recirculation of the LCFS Regulation for a 45-Day Comment Period

California law provides that “[n]o state agency may adopt, amend or repeal a regulation which has been changed from that which was originally made available to the public . . . unless the change is . . . *sufficiently related* to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action.” (Govt. Code, § 11346.8(c) [emphasis added].) To be “sufficiently related,” changes must be such that “a reasonable member of the directly affected public could have determined from the [original text of the] notice that these changes to the regulation could have resulted.” (1 Cal. Code Regs, § 42.)

California generally requires all new fuels to undergo the MME process under Section 43830.8 of the Health & Safety Code. Neither the original LCFS regulation nor the revised LCFS regulation circulated for a 45-day public review suggested that new fuels would be exempt from the MME process. Despite this, the 15-day notice now suggests many new fuels will be exempt from the MME requirement. Because Section 43830.8 is a preexisting requirement for new fuels that is unrelated to the LCFS regulation, the public could not have anticipated that the MME requirements would be eliminated by CARB. Thus, the elimination of the MME requirement for new fuels is not “sufficiently related” to the original text and, unless the MME requirement is reinstated, CARB must recirculate the revised LCFS regulation for a new 45-day public review period. (Govt. Code, § 11346.8(c); 1 Cal. Code Regs., § 42.)

D. CARB Failed to Include All Required Documents in the Rulemaking File

CARB recently added a series of email documents to the LCFS rulemaking file (see LCFS 15-Day Notice at 13), all of which date from 2013 or 2014. According to CARB, it is adding those materials to the rulemaking file, and inviting public comment on them, because the documents “might be characterized as containing non-privileged factual information submitted to ARB from ARB consultants.” (*Id.* at 13.)

Those emails, likely along with many other documents from 2013 and 2014 submitted to CARB in connection with the proposed regulatory amendments, should have been included in the rulemaking file that CARB opened at the time of the notice of proposed rulemaking, which was dated December 16, 2014. CARB cannot cure this self-evident violation of section 11347.3 of the Government Code by adding those materials to the rulemaking file and inviting 15-day comments; CARB must cure this deficiency, along with numerous other violations of the governing statutes and regulations, by noticing the LCFS regulation for another public hearing after allowing 45-days for public comment.

The requirements of the Government Code are clear. Section 11347.3 of the Government Code requires CARB to maintain a “file of [the] rulemaking proceeding” for any proposed regulatory action subject to the APA, including the LCFS regulation.” The rulemaking file must include, among other items, the following:

- (6) All *data and other factual information*, any studies or reports, and written comments submitted to the agency in connection with the adoption, amendment, or repeal of the regulation.
- (7) All data and other factual information, *technical, theoretical, and empirical studies or reports*, if any, on which the *agency is relying* in the adoption, amendment, or repeal of a regulation, including any cost impact estimates as required by Section 11346.3.

(Govt. Code, § 11347.3, subds. (b)(5), (b)(6) [emphasis added].) The entire rulemaking file, including the foregoing material, must be “available to the public for inspection” from the time when the first notice of the proposed rulemaking is published in the California Regulatory Notice Register, (*id.* at § 11347.3, subd. (a)), which in the case of the low-carbon fuel standards occurred on March 6, 2009. (See Cal. Reg. Notice Reg., Vo. 10-Z at 371.)

As the above-quoted text makes clear, rulemakings at ARB must include the creation of a rulemaking file that includes “[a]ll data and other factual information, any studies or reports, and written comments submitted to the agency” in connection with the proposal. (Govt. Code § 11347.3, subds. (a), (b)(6) [emphasis added].) To assure immediate public access to the supporting materials as soon as the 45-day materials are released, the APA requires that the 45-day notice include a statement that the agency on the date of the notice “has available *all* information upon which [the] proposal is based.” (*Id.* § 11346.5, subd. (a)(16) [emphasis added].) A separate provision confirms that the agency must in fact make those records, and any

other “public records, including reports, documentation, and other materials, related to the proposed action,” available. (*Id.* § 11346.5, subd. (b).)

The “written comments” that must be placed in the record are not simply those submitted to the agency in a particular manner or at a particular time, such as during the period between publication of the notice of a public hearing and public hearing – an agency must put “all” it receives “in connection with” a regulatory proposal in the rulemaking file. The Legislature’s choice of words to describe what comments must be placed in the file – “in connection with” – sweep with intentional breadth, and require inclusion of any comments that bear on the subject of the regulatory effort. In addition, the period of public availability must “[c]ommenc[e] *no later than* the date that the notice of the proposed action is published.” (*Id.* § 11347.3, subd. (a) [emphasis added].) The use of the term “no later than” makes it clear that the Legislature expected written comments submitted in connection with a proposed regulatory action and received before publication of the required notice to be included in the rulemaking file.

In addition to failing to include these new, late-added documents in the rulemaking file, CARB has not properly construed or applied the relevant provisions of the Government Code. In particular, the rulemaking file is not to be limited to “factual information” that comes from “consultants” to CARB: Section 11347.3(b)(5) does not use the word “consultant,” and it covers “any . . . written comments submitted to the agency in connection with” the adoption or amendment of a regulation. If “factual information” from sources that CARB defines as “consultants” received before CARB opened the rulemaking file for the current LCFS rulemaking warrant inclusion into the rulemaking file, so do any other written comment submitted to CARB in connection with the adoption or amendment of the LCFS regulation, or the adoption of the proposed alternative diesel fuels regulation. In addition, materials received from external sources, such as consultants, are presumptively not “privileged” and must be included in the rulemaking file.

Growth Energy therefore requests the following:

- An explanation of the reasons, if any, why CARB does not interpret section 11347.3 to require that all written comments received from any source in connection with the adoption or amendment of the LCFS regulation, or the adoption of the proposed alternative diesel fuels regulation, be included in the rulemaking file;
- An explanation of the reasons why the 2013-2014 documents that have now been added to the rulemaking file were not included in the rulemaking file at the time the file was first opened for public access; and
- An identification of each record from a consultant (or any person or entity retained by CARB) that would otherwise have been placed in the rulemaking file has not been placed in the file under color of privilege, so that compliance with section 11347.3 can be assessed by the public.

E. CARB Failed to Perform an Adequate External Scientific Peer Review for the Revised LCFS Regulation

This portion of Growth Energy’s comments addresses the requirements of section 57004 of the Health and Safety Code, and CARB’s failure substantially to comply with those requirements in the LCFS rulemaking.¹

1. Factual and Legal Background

Section 57004 of the Health and Safety Code creates several mandatory duties that must be fulfilled before CARB can take “any action” to adopt the proposed regulation to replace the current LCFS program. (Health & Saf. Code, § 57004, subd. (d).) Those duties include the following:

- CARB must submit “the scientific portion of the proposed rule” — in this instance, the regulation that the staff has proposed for final approval by the Board as a replacement for the current LCFS regulation — for review by an appropriate “external scientific peer review entity,” along with “a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the proposed rule are based and the supporting scientific data, studies, and other appropriate materials.” (*Id.*, § 57004, subd. (d) (1).
- The “external scientific peer review entity” must then “prepare a written report.” That report must “contain[] an evaluation of the scientific basis for the proposed rule.” (*Id.*, § 57004, subd. (d)(2).)

Memoranda sent by the CARB staff to the Manager of the Cal/EPA Scientific Peer Program dated November 19, 2014, and January 21, 2015, indicate an intent to comply to with section 57004. A letter from the Manager of the Cal/EPA Scientific Peer Program dated May 5, 2014, appears intended to convey the results of the external scientific peer review entity created for the proposed new LCFS rule. Neither the memoranda to the Manager of the Program nor the Manager’s letter indicate that compliance with section 57004 in the current rulemaking was not mandatory, or that complete compliance with section 57004 was not required. Nor does the record indicate that there was insufficient time to permit CARB to ensure compliance with the requirements of section 57004. Those who were responsible for compliance with section 57004 had twice the time to complete their work than the public was provided to comment on the proposed regulation, the scientific portions of which were to receive review by the external scientific peer review entity.²

¹ CARB posted some of the external scientific peer review materials for the new LCFS regulation on May 21, 2015, and additional materials on May 27, 2015 (*see* Attachment A), even though the peer review materials appear to have been completed weeks prior to May 21.

² There were 104 calendar days from January 21, 2015, to May 5, 2015. The rulemaking notice for the proposed regulation was dated December 16, 2014, but was not announced on the CARB website and made available to the public along with some supporting material until

Comment on the May 5, 2014 letter and its attachments is appropriate now, because the letter and its attachments comprise Reference 26 on the list of Additional References and Supplemental Documents in the staff's June 4, 2015, 15-Day Notice. Related materials also appear as References 27-29 on the same list.

Section 57004 of the Health and Safety Code defines the “scientific portions” of a proposed rule to include “those foundations of a rule that are premised upon, or derived from, *empirical data* or *other scientific findings, conclusions, or assumptions* establishing a regulatory level, standard, or other requirement for the protection of public health or the environment.” (Health & Saf. Code, § 57004, subd. (a)(2) [emphasis added].) As indicated in the May 5 letter, the Manager of the Cal/EPA Scientific Peer Program intended that the “reviewers” selected for participation in the work would be “ultimately responsible for assessing the relevance and accuracy of *all information* upon which the staff report is based.” (May 5 Letter at 2 [emphasis added].) While the May 5 letter is not clear about the identity of the “staff report” to which it refers, the reference may refer to the four summary documents that the CARB staff apparently prepared for consideration by the external scientific peer review entity; regardless, because those four documents are derived from the December 2014 Initial Statement of Reasons (“ISOR”) for the proposed regulation, the external peer review entity was responsible for assessing the relevance and accuracy of all the information on which the ISOR was based. If CARB disagrees with that interpretation of the scope of the external scientific peer review entity’s responsibilities in the current rulemaking, Growth Energy requests that CARB fully explain its reasons for disagreement in the response to these 15-day comments required by the California Administrative Procedures Act (the “APA”).

Finally, it is important to be clear on one other point. The CARB staff memoranda to the Manager of the Cal/EPA Scientific Peer Program specified the number of reviewers whom the CARB staff considered necessary for various elements of the proposed LCFS regulation, and the required expertise for the reviewers who were to comprise the external scientific peer review entity. Nevertheless, Cal/EPA requires the “UC Project Director,” following “careful consideration of the information” submitted by an agency, to determine the number of reviewers and the expertise required of the reviewers, presumably before the review gets under way.³ Any such determination by a UC Project Director appears to be missing from the rulemaking file, and for all that appears, is mandatory in order for CARB substantially to comply with the provisions of the Health and Safety Code.

Growth Energy requests an explanation for that omission in response to this comment as required by the APA.

December 30, 2014. There were 50 calendar days from December 30, 2014 to February 17, 2015, the deadline established by the Executive Officer for comment on the LCFS proposal, and 52 days from December 30, 2014 to the public hearing on February 19, 2015.

³ G.W. Bowes, “Exhibit F -- Cal/EPA External Scientific Peer Review Guidelines” (Nov. 2008) at 8, available at http://www.arb.ca.gov/fuels/lcfs/peerreview/exhib_f.pdf.

2. CARB Has Failed to Comply With Section 57004 Because it Did Not Obtain an Evaluation of the “Scientific Portions” of the LCFS Regulation By an “Entity,” as the Statute Requires, and Instead Has Provided Disaggregated Comments by Individual Reviewers

The text of Section 57004 makes plain that the evaluation of the scientific portions of a rule must be conducted by an “external scientific peer review entity,” which must prepare “a written report,” and that the entity must make certain findings. Individuals who participate in the work of that entity are not, acting themselves, the same as the “entity.” (Health & Saf. Code, § 57004, subd. (d)(2).) When the statute refers to individual reviewers, who are called “person[s],” (*id.*, § 57004, subd. (c)), it does so explicitly, in establishing the minimum credentials for participation in the work of the external scientific review entity. (*Id.*, § 57004, subds. (b),(c).) The report and the findings of the “entity” are to come from the entity, as a singular being, and not separately from each individual reviewer: thus, if the “entity finds,” (*id.*, § 57004, subd. (d)(2)), one or another conclusion to be true — and not what multiple reviewers might “find” — various consequences follow. The statute requires “a report,” (*id.*, § 57004, subd. (d)(2)), not multiple reports.

A single, unitary “entity” must do what the statute requires, for any number of reasons (though no specific reasons need be identified, given the clarity of the statute). A report that reflects the evaluation of more than one external reviewer might, for example, have been expected to have greater balance and to reflect a collective and therefore more thoughtful insight and analysis than what could be expected from a single reviewer. If the Legislature had intended for individual reviewers to make the necessary report and findings, it would have used the term “reviewer” in subsection 57004(d)(2), as it was able to do in other portions of the statute, such as subsection 57004(c). If the words used by the Legislature are to have any real meaning, “reviewer[s]” are not the same as the “external scientific review entity” in section 57004.

Against that statutory backdrop, CARB has not complied, substantially or otherwise, with the clear requirements of the statute. The collection of the separate reviews of the four individuals as attachments to the May 5 letter, which itself does not and cannot make any competent findings of the type required by the statute, do not constitute an “entity” of any type, much less the external scientific peer review entity that the statute requires, nor is the May 5 letter itself a “report” as the statute requires. The fact that CARB may not have complied with the statute in the past does not change the requirements of the statute: repeated noncompliance with section 57004 does not change that section’s requirement. CARB cannot take “any action” to finally approve the proposed LCFS regulation until it has obtained the necessary report and findings from an external scientific peer review entity as the statute requires. Once that report and those findings have been obtained, CARB must permit at least the same opportunity for public review and comment that it has provided with respect to the materials for which comment was invited on June 4. There is time for CARB to undertake and complete this process consistent with its goal of completing consideration of amendments to the LCFS regulation this year.

3. The Individual Evaluations of the Four Separate Peer Reviews Do Not Each Demonstrate Full or Adequate Command of the “Scientific Portions” of the LCFS Proposal and Do Not, Alone or on a Consolidated Basis, Adequately Evaluate the Proposed Regulation’s Lifecycle Emissions Analysis

Four individuals have provided written documents that appear intended to address various aspects of the scientific portions of the proposed LCFS regulation. Even if one could ignore the statutory text that requires a written report and certain findings from an entity, rather than from four separate reviewers, the four memoranda attached to the May 5 letter do not constitute competent and fully informed and considered reports that meet the purposes of the statute, which include providing a fully informed and well-considered external review of the CARB staff’s scientific analysis.

Dr. Clarens’ Memorandum. Starting with Dr. Clarens’ memorandum, which is only two pages in length, it is apparent that Dr. Clarens did not have a basic understanding of some of the main features of the lifecycle analysis on which the proposed rule is based. Perhaps for reasons beyond his control, Dr. Clarens did not even know the indirect land-use change value being assigned in the proposed rule to corn ethanol. Thus, he states: “The report does not provide the actual value of the iLUC contribution that CARB is using but I found it online (30 g/MJ)” (Clarens memorandum page 2.) The proposed ILUC value for corn ethanol of 19.8 g/MJ appears on page ES-6 of the ISOR. Dr. Clarens was obliged to conduct an “online” search to ascertain the ILUC values for alternative fuels like corn ethanol, and thought it important enough to include what he found “online” in his report (which is only two pages). Nevertheless, his online research gave him an obsolete and incorrect value for the indirect land-use emission factor assigned to corn ethanol. It is unclear what, if any, indirect land-use change values, for other alternative fuels, Dr. Clarens assumed or applied in his analysis, whether he considered those emissions factors for any alternative fuels other than corn ethanol, or indeed if he understood that different alternative fuels have been assigned different ILUC values that he needed to evaluate. While Dr. Clarens may be “confident” that the “methods” reflected scientific portions of the proposed rule that he reviewed “are based on sound science and represents [*sic*] the state of the art in CI estimation,” no one reading his report can have any confidence in Dr. Clarens’ analysis.

In addition to his clear error concerning ILUC values, Dr. Clarens shows confusion about the treatment of coproducts in GREET in this portion of his brief memorandum:

As written, the report states that the source must be directly consumed in the production process. But this is ambiguous in certain contexts such as those fuels that produce co-products. For example, if a corn feedstock were used to make ethanol and the stover were also used to make fuel (but was not consumed in the same production process) would that not trigger a switch from Tier 1 to Tier 2? It seems like it should but as written it might not. Clarifying this language is key for groups seeking to obtain co-product credit through the CA-LCFS.

In this statement, Dr. Clarens is referring to coproducts, corn feedstock, and stover. In his question, it is not clear whether he believes stover is a coproduct of the corn feedstock, or is a separate feedstock. If he believes stover is a coproduct of corn ethanol, clearly it is not. If he understands that both corn and stover are by themselves feedstocks, then it is not clear why he is mentioning the impact of coproducts the Tier 1/Tier 2 categories. In any event, Dr Clarens imagines a relevant confusion among “groups seeking to obtain co-product credit” that evades Growth Energy.

Insofar as Dr. Clarens is one of the reviewers expected to evaluate the OPGEE portions of the proposed rule, all he says is that the OPGEE model “goes into great detail” and that “the results are fascinating.” Yet there is no indication that Dr. Clarens actually reviewed any models in order to prepare his evaluation: his memorandum refers only to “reviewing ... three staff reports.” The May 5 letter claims that it was the responsibility of individual reviewers to assess the “relevance and accuracy” of ‘all information’ on which the staff’s reports are based. (See *supra*.) Dr. Clarens’ memorandum raises serious questions about the staff’s efforts to facilitate review of their proposal, or the process of selecting external reviewers and the standards applied in accepting materials from the reviewers for publication, or perhaps both. For the foregoing reasons, Dr. Clarens’ memorandum cannot properly be used in order to comply with CARB’s duties under section 57004.

Dr. Matthews’ Memorandum. Turning next to Dr. Matthews’ memorandum, there are also clear signs that Dr. Matthews lacked an adequate understanding of the scientific portions of the proposed rule, although his errors may seem not so blatant as those of Dr. Clarens’. Dr. Matthews’s comment — which he calls his “first impression” — that “the net effect on a CO₂e basis would be neutral between increasing VOC and decreasing CO emissions factors,” to the extent his comment is intelligible, does not appear to be directed at what the CARB staff and Cal/EPA would call the “Big Picture.” Conversely, Dr. Matthews (the reviewer with a background most heavily concentrated in economics) does not take account in his discussion of “the actual reduction in greenhouse gas emissions” of the fact that fuels to which higher CI values are assigned can and are produced and sold outside California regardless of the LCFS program. That effect, so-called “fuel shuffling,” has been conceded by the CARB staff, and it should have been part of the scientific basis for the proposed regulation to be evaluated, insofar as what Dr. Matthews calls the “actual” impacts on greenhouse gas emissions are relevant, in his opinion, to the proposed rule.

Dr. Matthews then makes the following observations about the CA-GREET results in one of the documents supplied by the CARB staff:

The CA-GREET results shown on pages 14-15 (Tables 1 and 2) are presented as ‘CI lookup tables’. As presented, it was not clear what these were. However from reading the ISOR my understanding is that these are default values determined ex ante by staff for a generic production of a Tier 2 fuel used for Method 1 (as a default value that would apply for a particular supplier unless they wanted to show a lower value from other use of the methods like 2A or 2B). My lack of understanding has no effect on the scientific merit of the work.

In the above passage, and putting his point more directly, Dr. Matthews is stating that he did not really understand the values presented in the materials supplied to him in order for him to evaluate CA-GREET, but that those values must be acceptable because the CARB staff must have had some basis for using them, and that in any event his own “lack of understanding has no effect on the scientific merit of the work,” so that he did not need to do anything further to address his lack of a complete understanding of the CA-GREET results.

With all due respect to Dr. Matthews, the approach to his assignment revealed in the quoted passage reflects substantial abdication of his responsibility as an external peer reviewer. Whether or not his ignorance about CA-GREET or the results of CA-GREET have any impact on the “scientific merit” of the CARB staff’s work, if those results were significant enough to warrant the mention that he gives them in his memorandum, he had a duty to assess their scientific merit. Stated another way, the issue is not whether Dr. Matthews’ ignorance affects the quality of the scientific portions of the proposed rule, but whether Dr. Matthews was equipped to review the model and the results of the model that he agreed to review, and that he was presumably paid to review. Dr. Matthews may or may not have understood his assignment, but there is no question that his evaluation of the CA-GREET model, such as it is, is incomplete if not useless, and cannot be relied upon in order to demonstrate compliance with section 57004. As with Dr. Clarens’ work, Dr. Matthews’ work either exhibits a level of ignorance concerning the scientific basis for the portions of the proposed rule for which he was a primary reviewer that requires CARB not to rely on his memorandum, or fails to demonstrate sufficient technical or scientific competence for his assignment to permit such reliance. By either standard, Dr. Matthews’ work cannot properly be used to try to demonstrate compliance with section 57004 of the Health and Safety Code.

Further questions about whether Dr. Matthews possessed an orientation to his assignment making his work useful in an external review process comes at the end of his memorandum, where he adverts to GTAP:

Component 3 -- GTAP/Indirect Land Use Model

While my area of expertise is connected with the first two models, I did my best to read through the third modeling area. While I was unable to comprehend the model, data, or inputs at the same level of critical insight, I found nothing associated with that work that caused me to doubt its credibility. I thus agree with the staff’s conclusion, have no big picture issues, and have no doubt that the work done was based on sound science.

Again putting Dr. Matthews’ statement more simply: he has “no doubt” that the “work done” to assess indirect land-use change was based on sound science, even though, as he states, “I was unable to comprehend the model, data, or inputs” at the “same level of critical insight” as he displayed in his evaluation of CA-GREET. This begs the question: what is Dr. Matthews’ reason for having “no doubt” about the scientific basis for the staff’s indirect land-use analysis?⁴ While the existence of bias is not necessary to demonstrate that Dr. Matthews’

⁴ Dr. Matthews states at the outset of his memorandum that it was an “honor” to “look at” the CARB staff’s work, and he calls the “work done by this evolving team over time “to have

analysis should not form a part of CARB's external peer review, Growth Energy has never read an external peer review for any CARB rulemaking that reflects bias in the same manner and to the same extent as Dr. Matthews' analysis.

Dr. McCarl's Memorandum. Compared to the work by Dr. Clarens and Dr. Matthews, a more skeptical and informed analysis might have been expected from the memorandum provided by Dr. McCarl, who holds a Chair at Texas A&M University, and who has experience in econometric analysis of agricultural markets. At the outset, it should be noted that it is possible that the version of Dr. McCarl's memorandum published by CARB was not his final memorandum: on page 7 of the memorandum (which lacks page numbers), the memorandum refers to "G tab," obviously a phonetic version of GTAP, and a sure sign that the published document was dictated but not reviewed by Dr. McCarl (or by the Cal/EPA official in charge of collecting peer review materials, or by the CARB staff). Later, the draft memorandum attributed to Dr. McCarl states:

In GTAP I believe that there also are increases in emissions from intensification (more irrigation or fertilization) so that the characterization of it only in terms of indirect land use change is not accurate. ... In improving the indirect land use analysis when you're looking at corn ethanol byproducts there are also newer developments in terms of extracting corn oil from the DDGs.

There are no increases in emissions in GTAP attributed to intensification, and so the first quoted statement is untrue, as anyone who has rudimentary knowledge of GTAP would understand. The second statement reflects no understanding of, or consideration of, the fact that the amount of corn oil converted to biodiesel is unknown. As with Dr. Clarens' memorandum, though perhaps for different reasons (such as CARB's apparent failure to obtain from Dr. McCarl a final version of his evaluation), Dr. McCarl's memorandum raises questions about the process used by CARB and the reviewers to provide or obtain adequate understanding of the scientific portion of the proposed rule, the competence of the reviewer to perform the evaluation, or both. Putting those questions aside, the memorandum attributed to Dr. McCarl that has been placed in the public docket reveals that a lack of understanding of GTAP should prevent CARB from attempting to rely on that memorandum in order to demonstrate adequate external review of the scientific portion of the proposed rule.

been "one of the most impressive scholarly efforts I have seen in my career." Dr. Matthews, who from the preamble of his memorandum makes it clear that he is a strong supporter of the LCFS program, imagines on page 4 of his memorandum a distinction between "scientific credibility of the method" used in the regulatory proposal, on the one hand, and what he calls the "magnitude of the overall potential benefits of the program." How Dr. Matthews believes that he can separate the "scientific credibility of the method" from the assessment of the potential impacts of the proposed regulation is unclear, unless he considers a "method" that does not permit an assessment of the potential benefits of a proposed regulation to possess scientific credibility, despite that deficiency. The question presented for Dr. Matthews is therefore this: what is the purpose of scientific credibility in a rulemaking intended to establish or create environmental benefits?

One indication that the deficiencies originate at least in part with the CARB staff appears on page 11 of Attachment 1 to CARB's January 21, 2015, memo. There, the CARB staff claims that 2004 is the "most recent year for which a complete global land use database exists." That statement is not correct, and should have been known to the CARB staff not to be correct at the time when written. A report by Iowa State University ("ISU") researchers, which the CARB staff reviewed in the fall of 2014, and which was the subject of testimony at the February 2015 public hearing, used a more recent complete global land-use database, inter alia to impeach or challenge the credibility of CARB's use of the 2004-based GTAP system. It is unknown how and why the CARB staff could advise their reviewers that a data set more than a decade old is the "most recent" that exists. If the CARB staff's use of the word "complete" in the phrase, "complete global land use database" is studied, then the lack of candor and transparency of the CARB staff in presenting relevant information to their reviewers makes a mockery of the peer-review process required by the Health and Safety Code, and makes that process as applied to this rulemaking substantially noncompliant with the statute. To obtain an external review of the scientific basis for the proposed rule with respect to GTAP, CARB must provide the external reviewers with, at a minimum, the ISU study that was a subject of interest to the CARB staff last year, and that was included in the comments filed with the Board prior to the February public hearing.

Overall Issues Concerning the Selection of Peer Reviewers. Growth Energy also believes the process used to select the external reviewers for the proposed LCFS regulation did not provide for sufficient depth of review because none of the reviewers expressed, or could have been identified from prior work to have possessed, any skepticism about the scientific portions of the current LCFS regulation or the approach being taken in the new proposed rule. Publications and other work available to the CARB staff since the commencement of the first LCFS rulemaking reveal experts who are both skeptical of the LCFS regulation and not aligned with stakeholders. They include Dr. Valerie Thomas, of the Georgia Institute of Technology, who was an external reviewer for the 2009 rulemaking process. Dr. Thomas noted in her 2009 review that "the values used to quantify the carbon intensity due to land use change for ethanol from corn and sugarcane are not yet sufficiently developed to be scientifically confirmed" and that "refinement and validation of those quantities [are] needed." (See Attachment B.) As Dr. Thomas also stated in 2009, "ARB could develop a more data driven and less model-dependent approach by observing and tracking changes in land use patterns that have been observed to date and that will be observed over the next few years"

Dr. Thomas's earlier external review is significant and raises two questions. The first is why Dr. Thomas did not participate in the current peer review. The second is why, in light of the success in identifying someone with Dr. Thomas' level of skepticism and independence in 2009, Cal/EPA or another appropriate body did not include anyone in the current external review process who expressed a similar, or any, level of skepticism about the scientific portions of the proposed new rule.

Growth Energy also notes that none of CARB's four current external reviewers appear to have attempted any systematic review of the CA-GREET model for sugarcane ethanol from Brazil, or biodiesel and renewable diesel. Given the importance assigned to those alternative fuels in the compliance scenarios developed for the new proposed rule by the CARB staff, those omissions are significant and make the current external scientific review substantially

noncompliant with section 57004 of the Health and Safety Code, because CARB has failed to obtain meaningful external review of all the relevant and important CA-GREET models.

4. Selected List of Specific Questions CARB Staff Must Address

Although the following list of questions does not cover all the comments presented above concerning CARB's LCFS external review, and should not be taken to limit the scope of issues that CARB must address in its response to the 15-day comments, this list includes some of the questions concerning the LCFS peer review that the CARB staff should address. If CARB does not consider itself obliged to respond in full to any of the following questions, Growth Energy requests that for each such question, CARB explain separately why it is taking such a position.

- Did the materials provided or made available to the external peer reviewers include all the “best available economic ... information” available to the CARB staff in developing the scientific portions of the proposed rule? (Cal. Health & Safety Code § 38561(e).) Did those materials include all the “best available ... scientific information” available to the CARB staff in developing the scientific portions of the proposed rule? (*Id.*) If not, why not?
 - Why were the external peer reviewers not advised of, or given materials concerning, fuel shuffling?
 - Why were the external reviewers not provided with the ISU report co-authored by Dr. Babcock that casts doubt on the use of GTAP in regulatory settings, which was supplied to CARB in the 45-day comment process?
 - What is CARB's definition of a “complete global land use database,” as that term is used in the materials provided to the external peer reviewers? Does (or do) the database or databases referenced in the ISU report noted above meet the standard or criteria for a “complete global land use database?” If not, how is the 2004 GTAP database more “complete” than the database or databases referenced in the ISU report?
- Does CARB consider Dr. Clarens to be adequately informed concerning the scientific portion of the proposed rule, notwithstanding the errors in his memorandum noted above? If so, why? Has CARB considered or will CARB consider asking Dr. Clarens to revise his evaluation and address the issues presented here, and if not, why not?
 - What is CARB's understanding of Dr. Clarens' knowledge of the ILUC value assigned to corn ethanol in the proposed rule? Upon receipt of Dr. Clarens' report, did CARB staff attempt to provide Dr. Clarens with additional information? If not, why not?

- What is CARB’s understanding of the portion of Dr. Clarens’ report excerpted on page 4 of the comments above? If CARB does not agree with Growth Energy’s interpretation of that portion of Dr. Clarens’ report, or with the identified errors in that portion of Dr. Clarens’ report, why not?
 - Does CARB have confidence that Dr. Clarens had an adequate understanding of the scientific portions of the proposed rule that he claimed to evaluate, and if so why?
- Does CARB consider Dr. Matthews’ comments on the indirect land-use change portions of the scientific basis for the proposed rule to be relevant or useful in the external review of the proposed rule? If so, why?
- Does CARB consider the CA-GREET results to which Dr. Matthews refers in the excerpt from his memorandum on page 5 of the above comments to be part of the scientific portion of the proposed regulation? If not, why did CARB include it in the report provided to the external reviewers? Which external reviews understood completely and reviewed those results?
- Does CA-GREET use the MOVES model? If so, in what respects? If not, did the CARB staff take any action to advise Dr. Matthews of the error postulated on page 5 of the above comments with respect to MOVES?
- Does CARB believe that the “scientific credibility” of the “method” that it used in the proposed rule is not affected by or related to estimates of the “overall potential benefits” of the LCFS regulation, as those terms are used in Dr. Matthews’ memorandum?
- Does CARB consider Mr. McCarl to be qualified to evaluate GTAP, notwithstanding the apparent errors in his understanding of GTAP noted on page 7 of the above comments? If so, why?
 - Does GTAP attribute emissions to intensification, as the latter term is used in Dr. McCarl’s draft memorandum?
 - Did CARB consider whether to invite Dr. McCarl to review and revise his memorandum? If not, why not?
- How did the CARB staff determine the number of peer reviewers required for each portion of the scientific basis of the proposed regulation? If the evaluations by Dr. Clarens, Dr. Matthews or Dr. McCarl are excluded to any extent from the external review, based on the issues presented here, will CARB seek additional external review? If so, under what specific circumstances, and if not, why not?

Attachment A

Drake, Stuart

From: Adams, Stephen@ARB <Stephen.Adams@arb.ca.gov>
Sent: Wednesday, May 27, 2015 3:19 PM
To: Drake, Stuart
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: RE: LCFS -- External Review Materials
Attachments: 01. CA-GREET_StaffReport.pdf; 02. OPGEE_StaffReport.pdf; 03. iLUC_StaffReport.pdf; CoverPage.pdf

Stuart,

I'm attaching three documents and a cover page that were provided to the LCFS peer reviewers but that were not posted to the peer review page when it was set up. I'm told these files contain all of the content you are asking about. Staff will be adding these documents to the web page as well.

Thank you,
Steve

From: Drake, Stuart [mailto:sdrake@kirkland.com]
Sent: Wednesday, May 27, 2015 11:15 AM
To: Adams, Stephen@ARB
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: RE: LCFS -- External Review Materials

Thanks Steve.

Stuart Drake | Kirkland & Ellis LLP
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202-654-9527 Direct Fax
stuart.drake@kirkland.com

From: Adams, Stephen@ARB [mailto:Stephen.Adams@arb.ca.gov]
Sent: Wednesday, May 27, 2015 2:12 PM
To: Drake, Stuart
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: RE: LCFS -- External Review Materials

Stuart,

I wanted to make sure you're aware that separate peer reviews were conducted on biodiesel and renewable diesel as part of the multimedia evaluation on those two fuels. Those reviews are listed in the 15-day notice for the ADF regulation that went out Friday, and the peer review documents for those are at <http://www.arb.ca.gov/fuels/diesel/altdiesel/biodocs.htm>

Steve

From: Drake, Stuart [<mailto:sdrake@kirkland.com>]
Sent: Wednesday, May 27, 2015 10:59 AM
To: Adams, Stephen@ARB
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: RE: LCFS -- External Review Materials

Thanks Steve, I appreciate it.

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From: Adams, Stephen@ARB [<mailto:Stephen.Adams@arb.ca.gov>]
Sent: Wednesday, May 27, 2015 1:57 PM
To: Drake, Stuart
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: RE: LCFS -- External Review Materials

Stuart,

I'm going to ask staff to take a look at your questions and the documents posted as part of the peer review reports. You can expect to hear back from me, or as you suggest I might have staff communicate directly with one of your colleagues if that seems the simpler way to proceed.

Steve

From: Drake, Stuart [<mailto:sdrake@kirkland.com>]
Sent: Wednesday, May 27, 2015 9:26 AM
To: Adams, Stephen@ARB
Cc: Elaine Meckenstock (Elaine.Meckenstock@doj.ca.gov); Brieger, William@ARB; tom darlington; Jim Lyons
Subject: LCFS -- External Review Materials

Steve --

Tom Darlington, Jim Lyons and I are having some trouble in readily locating some of the documents to which Dr. McCarl and Dr. Kumar, two of the LCFS external reviewers, refer in their April 29 and May 5 reports for the staff. On behalf of Growth Energy, I wondered if your Office could help us locate those documents, or if they are not currently on the external-review page on CARB's website, if your Office could let us know if there are any plans to post them. If it is more efficient for someone on the technical side to get in touch directly with Tom Darlington and/or Jim Lyons, that's fine too -- maybe we have just overlooked something. It is not possible to understand the external reviews without the ability to look at the same documents that the reviewers did.

Here is an excerpt from the first page Dr. McCarl's report:

"As I understand it the peer review is intended to develop external review opinions on whether the CI methodology used by the ARB staff and supporting parties in calculating carbon intensity values and use of greenhouse gas emission models yields a valid scientific basis for the conclusions in the air resources Board staff reports.

"I also believe that while I was sent three reports and a plain English version that I am only supposed to review those within my field of expertise which limits me to comment on

"Calculating Lifecycle Carbon Intensity Values of Transportation Fuels in California, March 2015 (Staff Report 1)

"Calculating Carbon Intensity Values from Indirect Land Change of Crop-Based Biofuels (Staff Report 3)

"Additionally I will comment on the attachment entitled Plain English summary of staff's methodology in calculating fuel carbon intensities."

Page 1 of Dr. Kumar's report refers to "Staff Report 2." That report appears to address carbon intensity values for crude oil.

The "Plain English" summary appears to be a 15-page document attached to Mr. Aguila's Jan. 21, 2015, memo to Dr. Bowes at the Water Board, which is posted on the external review page of the CARB website as part of Mr. Aguila's memo. Mr. Aguila's memo refers to the three Staff Reports but they do not seem to be attached to his memo, and in any event I don't understand how a memo dated January 2015 could have included a report that according to Dr. McCarl is dated March 2015. Are the three referenced Staff Reports also on the CARB website, and if so where? Are there multiple versions of the Staff Reports?

I also wanted to ask if there is a later version of Dr. McCarl's report. On the seventh page, there is a reference to "G tab," which we assume is supposed to be "GTAP."

Here is the url for the external review page:

<http://www.arb.ca.gov/fuels/lcfs/peerreview/peerreview.htm>

Anil Prabhu is listed as the technical contact person on the website.

Thanks in advance for your help, and my apologies if this is something easy to find that we have just missed. Give me a call if you would like to discuss.

-- Stuart

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and may be unlawful. If you have received this communication in error, please notify us immediately by return e-mail or by e-mail to postmaster@kirkland.com, and destroy this communication and all copies thereof, including all attachments.

Attachment B

Valerie Thomas, Ph.D.
Anderson Interface Associate Professor
School of Industrial and Systems Engineering
Georgia Institute of Technology
Atlanta, Georgia

Review of
Proposed Regulation to Implement the Low Carbon Fuel Standard
California Environmental Protection Agency
Air Resources Board

The Air Resources Board has made a great deal of progress in modeling and quantifying the greenhouse gas and other environmental impacts of fuels. This work provides a strong foundation for understanding the impacts of these fuels, and for further development of understanding as experience with alternative fuels increases.

The five issues identified by the ARB to be addressed by the peer reviewers are addressed below.

1. Greenhouse Gas Modeling

- a. The description in the text of the greenhouse gas impacts of corn-derived and sugarcane-derived ethanol is solid, and could be emphasized more prominently: "Direct GHG emissions from the production and use of corn and sugarcane ethanol are less than the comparable emissions from gasoline. When land use change emissions are considered, however, the emissions-reduction benefit from corn and sugarcane ethanol is diminished." (p. IV-42)
- b. The lookup table values for carbon intensity for the three gasoline fuels appear to be well justified.
- c. The evaluation of carbon intensity for eleven different corn-derived ethanol is sound practice and provides a basis for encouraging low-carbon production of corn-derived ethanol.
- d. The numerical values assigned to the GHG emissions from production of corn-derived and sugarcane-derived ethanol have some uncertainties that could be reduced through revised analysis and further reduced when more data become available.
 - i. The calculation of the direct GHG emissions from production of corn-derived and sugarcane-derived ethanol is by-and-large solid and consistent with a well-developed body of scientific research. The calculation of the coproduct credits does, in my view, somewhat overvalue these credits, resulting in an underestimate of the direct GHG impacts of corn-derived ethanol of perhaps 10%.

2. Land Use Modeling

The calculation of the indirect, land-use-change GHG emissions from production of corn-derived and cane-derived ethanol has significant uncertainties.

- a. That observed data have not been used to validate the GTAP model findings is a significant weakness. The changes in corn production resulting from the federal renewable fuel standard, and the changes in Brazilian sugar production resulting from increased ethanol production should be measurable, and should be measured to validate the model assumptions. The ARB model should be adjusted to reflect data.
- b. The lack of a time dimension in GTAP results in an awkward match with the question at hand. Corn yields have been increasing largely linearly for some time now in the United States, yet the model appears to use 2008 corn yields to determine land impacts of corn-derived ethanol. The projected steady increase in use of corn for ethanol in the US over the next few years suggests that land use change will be somewhat less than projected here.
- c. The greenhouse gas impact of land use change occurs mainly at the time of land clearing. This suggests that the effect of increased use of corn for ethanol will depend on whether and when total global corn production increases. An increase in use of corn for ethanol in a year in which corn demand decreases or stays constant will have a different greenhouse gas effect than in a year in which total corn demand increases. The increased use of corn for ethanol in one year can result in land clearing in a future year, depending on overall global total corn production and production of other crops. The ARB staff has put a great deal of effort in to thinking about the time dimension of this problem. Nevertheless, time-related issues are still addressed in piecemeal way that makes some unjustified assumptions. A more comprehensive approach to the changes in corn production over time would be simpler and could be more accurate. ARB could develop a more data driven and less model-dependent approach by observing and tracking changes in land use patterns that have been observed to date and that will be observed over the next few years as corn-derived and cane-derived ethanol production increases.
- d. The development of the land use change analysis for Brazilian sugarcane-derived ethanol appears to be less developed than the analysis of US corn-derived ethanol. The Brazilian analysis should be revised using up-to-date yield values, if they were not used in this analysis, and should reflect data on land use changes in Brazil.

3. Economic Impacts

The LCFS staff report predicts that the LCFS will result in an overall savings in the State of California. The economic impacts of the LCFS will depend on future prices of petroleum and the future production costs of alternative fuels and vehicle technologies, which cannot be definitively predicted in advance. Nevertheless, the economic assessment appears reasonable, and the projection that the net economic impact will not be large and may even be slightly positive appears sound.

4. Environmental and Multimedia Impacts

The LCFS staff report covers many of the environmental impacts well. An important set of environmental impacts that are not mentioned are the increased impacts of nitrogen, phosphorus, and other agricultural inputs from increased corn production. As mentioned in the report, the increase in corn production is not likely to take place in California. Nevertheless, the impacts may be significant at the national and international scale. Hypoxia in the Gulf of Mexico is linked to increased corn production.¹ The use of nitrogen fertilizers and other agricultural inputs have a range of other environmental impacts that should be included in the environmental assessment.

5. Credit Trading

The credit trading framework and details appear reasonable. Note that the credit trading provisions may help to reduce the actual land-use-change impacts of corn-derived and sugarcane-derived ethanol: When corn or sugar prices are high, regulated parties may choose to use less corn-derived or sugar-derived ethanol, which would help to moderate corn and sugar demand and reduce pressure to increase plantings of corn and sugarcane.

The Big Picture

a. Are there any additional scientific issues to be addressed?
No.

b. Taken as a whole, is the scientific portion of the proposed rule based upon sound scientific knowledge, methods, and practices?

Taken as a whole, the scientific portion of the proposed rule is based upon sound scientific knowledge, methods and practices. Use of a non-zero positive value for the carbon intensity due to land use change for ethanol from corn and sugarcane is sound. The direct emission values for ethanol from corn and sugarcane, and the differences in direct carbon intensity values for different ethanol production processes are sound. However, the values used to quantify the carbon intensity due to land use change for ethanol from corn and sugarcane are not yet sufficiently developed to be scientifically confirmed; refinement and validation of those quantities is needed.

Detailed comments:

¹ US EPA SAB. Hypoxia in the Northern Gulf of Mexico. December 2007. EPA-SAB-08-003 http://epa.gov/msbasin/pdf/sab_report_2007.pdf

Table IV-1, page IV-3. This table appropriately separates the direct emissions from the land use effects, and appropriately shows fewer significant figures for land use effects than for direct emissions. The direct emissions, however, should not be shown to four significant figures because the estimates are not that accurate; these results should be expressed to at most two significant figures.

p. IV-12. Coproduct allocation. Coproduct credits for corn ethanol are allocated in GREET by assuming that the use of coproducts as animal feed results in decreased production of the displaced feed in exactly the amount that is displaced. This effectively assumes completely inelastic demand for the displaced product. This is not consistent with the land use change calculations, which do assume demand elasticities. In other words, the coproduct calculation appears to be overestimated, resulting in a somewhat lower calculation of the direct GHG impact than is probably likely, and indicating uncertainty in the direct emissions results for corn ethanol of at least several percent.

p. IV-17. Among the choices to meet demand for biofuel feedstock, one option not mentioned is to convert existing agricultural lands from non-food crops – such as cotton or tobacco, for example.

p. IV-20. The GTAP model is not time dependent, whereas the land use change from biofuels is time-dependent. In particular, yields of corn and other feedstocks can be expected to increase in time. Although there is extensive discussion of this issue, particularly in Appendix C6, the expected increase in yield of corn beyond 2008 does not appear to be incorporated into the model.

p. IV-24. Of the three time accounting methods described, the first one is by far the most sensible. The Net Present Value calculation is not appropriate here. Net present value calculations are used for money because of the potential to invest money and receive a return over time. That is not true for greenhouse gas emissions. The Fuel Warming Potential also is not appropriate; the greenhouse gases will remain in the atmosphere beyond the project time horizon, and presumably the policy interest is to reduce climate change impacts over a longer time horizon than this project time horizon. Presenting the net present value approach and the fuel warming approach gives the impression that these are valid approaches that could be used. I suggest that discussion of these approaches be dropped from the main body of this report, although retained in the Appendices. Development of these ideas in the peer-reviewed literature would provide a basis for inclusion in future ARB analyses.

p. IV-26. ARB staff appropriately uses the annualized method.

p. IV-29. The results of the GTAP model are for a situation in which 13.25 billion gallons of increased ethanol production is produced in the year 2008. Yield will increase in subsequent years, requiring less land for a given amount of ethanol. If the increases in corn production occur after 2008, the land use impact will be less.

p. IV-31. It should be possible to validate with data the projections of land use change shown in Table IV-10, and especially the projections of US land use change.

p. IV-33, Table. IV-12. It should be possible to validate with data the projections of land use change resulting from cane-derived ethanol production in Brazil. The projections seem to be entirely model-derived, with no reference to studies of actual land use change in Brazil. The results should be validated with data. Also, cane yield in Brazil has increased significantly over time. The cane yield used in the GTAP model is not mentioned, but if the 2001 baseline is used, then the modeled land use change would be larger than if the 2006-08 sugarcane yield were used. And, as discussed elsewhere for corn, sugarcane yields can be expected to continue to increase, suggesting that land use change impacts will decrease over time.

p. IV-34. "As an initial estimate, we assumed a 75 percent coproduct credit for soy meal." ARB staff appropriately flags the uncertainty of this estimate.

p. IV-39. Comparison of GTAP results with Observed Market Behavior. The effects of corn ethanol on land use either are, or are not, large enough to be observable. As this section states, there are many factors that influence corn production and corn exports. If the effects of ethanol production are large enough to be measurable and identifiable, then this effect should certainly be taken into account in the assessment of corn-derived ethanol. Observation of the effect and validation of the model results is critical to validation of the greenhouse gas calculation for corn-derived and cane-derived ethanol. This section indicates that the GTAP model results cannot be validated, or have not yet been validated. Surely there is some aspect of the calculation that could be validated. For example, the changes in US forest and pasture land due to the federal RFS should be measurable.

p. IV-41-IV-42. This entire section expresses more certainty than warranted. Some judicious editing would prevent it from being misinterpreted. For example, in the bulleted list on p. IV-42, the word "about" should also be used in the last two bullets – these numbers are very uncertain.

p. IV-42. This statement is solid: "Direct GHG emissions from the production and use of corn and sugarcane ethanol are less than the comparable emissions from gasoline. When land use change emissions are considered, however, the emissions-reduction benefit from corn and sugarcane ethanol is diminished."

pp. IV-46. Increases in crop yield with time. The adjustments made to convert GTAP results from 2001 yields to 2006-08 yields, as described in Appendix C, do appear to be reasonable. However, the time profile of the land use change implied by the LCFS may warrant additional scaling of the GTAP results. In particular, if the increase in corn-derived ethanol is assumed to scale with the federal RFS, then the amount of corn used for ethanol will increase over time; if corn yields also increase over time then the land use impact of the corn-derived ethanol will decrease over time, although it will still be positive. However, if the amount of corn-derived ethanol used to fulfill the LCFS is

constant, as suggested by the scenarios presented in appendix E, then the land use change would all be concentrated in the very near future (or even recent past). The time scenario for corn-derived ethanol production (how much in which year, and the total change in demand in each year) will affect the actual land use change and the actual greenhouse gas impacts. The land use change impact will occur in the year that land use changes, which will not necessarily be the same as the year of the increased use of corn-derived ethanol.

p. IV-47. Uncertainties associated with time-accounting. As mentioned before, it would be feasible, and add clarity to the model, to do more explicit time-dependent modeling.

p. IV-48. The paragraph at the bottom of page IV-48 is solid. ARB should continue to refine its analysis and adjust the GHG emission values as the analysis develops, and data become available.

Appendices:

p. iii. The word "not" seems to be missing from lines 2.

p. C-5. Energy Economy Ratios. In Brazil, development of flex-fuel vehicle technologies with higher compression ratios has provided an opportunity to increase the efficiency of vehicles using ethanol fuels somewhat. ERB may not want to incorporate this potential into its LCFS EERs, but this potential may warrant at least a one-sentence mention.

p. C-27. A corn yield of 151.3 bushels per acre is mentioned here, but a corn yield of 160 bushels per acre is used in the derivation of the "110,000 acres of U. S. farmland" mentioned on p. IV-42 and derived on page C-41. The 160 bushels per acre may be taking into account future yield increases, as I have advocated above. The yield value assumptions, and the year to which each yield value is associated, should be clarified.

p. C-54. Co-product credit for DDGS. The decision of ARB to not adopt Wang's findings on this issue is solid. However, there is an additional co-product credit issue. In GREET, when a coproduct is used instead of the substitute product, the reduced use of the substitute is assumed to result in exactly that amount of decreased production of that product. This is surely an overestimate, resulting in a small underestimate of the direct GHG impacts of corn-derived ethanol.

p. C-54. "Staff will revisit this issue and make updates to the co-product credit, as appropriate." ARB's commitment to revising the analysis is important and will improve the assessment; increased production of biofuels will provide more data with which to refine the analysis.

Attachment C

MEETING
STATE OF CALIFORNIA
AIR RESOURCES BOARD

JOE SERNA, JR. BUILDING
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
BYRON SHER AUDITORIUM, SECOND FLOOR
1001 I STREET
SACRAMENTO, CALIFORNIA

THURSDAY, APRIL 23, 2009

9:04 A.M.

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Attachment "C"

1 We've been working in such close collaboration
2 that we scientists merge.

3 CHAIRPERSON NICHOLS: -- forgotten his last name.

4 STATIONARY SOURCE DIVISION CHIEF FLETCHER: But
5 Mike has been working with us very closely since the
6 inception of this project, and he has a few comments that
7 he would like to make.

8 CHAIRPERSON NICHOLS: Thank you.

9 MR. O'HARE: Oh, I guess we got that to work.

10 (Thereupon an overhead presentation was
11 Presented as follows.)

12 MR. O'HARE: So I'd like to make a few remarks on
13 I guess you could call a bigger picture look at the land
14 use change issue especially.

15 And the general burden of these remarks is to
16 regard the land use change estimates that the staff has
17 given you as being -- I don't want to use the word
18 "conservative," but I would say biofuel favorable in the
19 competition between fuels to satisfy the LCFS
20 requirements.

21 I do want to say at the beginning that it's not
22 clear what "conservative" means in this context because it
23 is a low carbon fuel standard. And if we make a mistake
24 in one direction in estimating these numbers, we'll use
25 too much of a biofuel that's actually higher carbon than

1 we thought and will therefore increase global warming.
2 And if we use numbers that are too low, then we'll use too
3 little of a biofuel that's lower carbon than we thought
4 and will therefore increase global warming.

5 So the cost to the world of being wrong in both
6 directions is fairly symmetrical. And there's no obvious
7 conservative direction as there is, for example, in life
8 and safety regulation.

9 Next slide please.

10 --o0o--

11 MR. O'HARE: I want to thank a large and growing
12 group of collaborators, including one of your
13 distinguished Board members, at this point, and also
14 remember Alex who set us out on this path a couple of
15 years ago. This has become quite a large group
16 enterprise. And I think it's good for that reason.

17 Next slide please.

18 --o0o--

19 MR. O'HARE: So let me just quickly recall the
20 history we'd been through and emphasize the policy is
21 forcing the science quite rapidly.

22 The policy intentions of California and the
23 nation and also other countries is pushing the science
24 forward probably a lot faster than it would otherwise go.
25 On the whole I think this is a good thing.