



August 4, 2010

The Honorable Lisa P. Jackson  
Administrator  
U.S. Environmental Protection Agency  
Mail Code 1101A  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460  
**VIA EMAIL TRANSMISSION**

Dear Administrator Jackson,

I am writing you today to call to your attention what we believe to be a significant error in the lifecycle greenhouse gas (GHG) analysis performed by the U.S. Environmental Protection Agency (EPA) for the expanded Renewable Fuels Standard (RFS2) Final Rule (75 Fed. Reg. 14,670). Specifically, according to its own analysis, EPA grossly overestimated potential emissions from land use change (LUC) attributable to the GHG lifecycle of corn ethanol and other biofuels. We briefly discussed this issue with members of your staff during a meeting May 11, 2010. This letter builds upon that discussion by further detailing the nature of EPA's error and offering a straightforward method for correcting the miscalculation. Correcting this miscalculation reduces net LUC emissions (international and domestic) assigned to corn ethanol by 62% from 28.4 grams of CO<sub>2</sub>-equivalent/mega joule (g/MJ) to 10.8 g/MJ. Such a reduction in LUC emissions means overall lifecycle GHG emissions for 2022 average corn ethanol would be 38% less than baseline gasoline emissions, rather than the 21% estimate finalized by EPA.

EPA's overestimation of LUC emissions stems from the fact that the agency's analysis attempts to isolate the potential land use impacts of increasing the production of only one biofuel at a time while holding other biofuel volumes constant, rather than examining the land use impacts of simultaneously increasing production of all biofuels as required by the Energy Independence and Security Act (EISA). Attempting to isolate the potential impacts of individual biofuels results in significantly exaggerated estimates of the overall lifecycle GHG intensity of corn ethanol and other biofuels. Because the EISA requires increasing volumes of various biofuels simultaneously, EPA should have based its LUC estimates on the scenario results that simulated concomitant increases in the various biofuels required by the Act.

To estimate the aggregate GHG emissions associated with the increase in renewable fuel mandated by EISA, EPA compared a "Control Case," in which renewable fuels volumes increase consistent with EISA requirements, to a "Reference Case" that is meant to represent a world *without* EISA (this may also be thought of as the "business as usual case"). Notably, volumes for *all* biofuels increase simultaneously in the Control Case relative to the Reference Case. The Control Case represents EPA's view of the actual increases in biofuel volumes that will result from implementation of EISA.

However, in an apparent attempt to isolate the possible land use change emissions impacts of individual biofuels, EPA also modeled several scenarios in which only the volume of one type of biofuel

was changed and all other biofuels volumes are assumed not to differ from the Control Case. EPA conducted three such cases in an attempt to isolate the possible land use change impacts of corn ethanol, soybean-based biodiesel, and sugarcane ethanol. EPA referred to these modeling scenarios, respectively, as the “Corn Only Case,” “Soy Only Case,” and “Sugar Only Case” (hereafter we refer to these three cases collectively as the “Only” cases). The results from these Only cases were used to estimate the LUC emissions for corn ethanol, soy biodiesel, and sugarcane ethanol that were ultimately incorporated into the overall lifecycle GHG estimates for the individual biofuels that were finalized in the RFS2 Final Rule.

EPA’s method of using the individual Only case scenarios to determine LUC emissions for each type of biofuel rather than using the Control Case results in significant overestimation of LUC effects. This is demonstrated by examining EPA’s own estimates of the total amount of land converted under each of the Only cases compared to the total amount of land converted in the Control Case (see for example RFS2 Regulatory Impact Analysis, Table 2.7-3, page 508). Table 1 of the attachment compares land conversion estimates under the Control and Only cases. Logically, the sum of land use changes from the three Only cases should be equivalent to the total land use change from the Control Case. However, there is tremendous inconsistency in the results from the Control Case versus the sum of the three Only cases. Summing the land conversions from the three Only cases results in 2,139.7 thousand hectares, or *nearly double* the amount of land converted when all three biofuels are increased simultaneously in the Control Case. For example, the Corn Only Case alone, which examines the impacts of an increase in the volume of corn ethanol in isolation of the other biofuels, results in land conversion of 928.9 thousand hectares. However, based on the Control Case, increasing *all three biofuels* simultaneously as mandated by the RFS2 causes total land use change of 1,101.3 thousand hectares.

Outside of the wide discrepancy between the sum of the Only cases and the Control Case, there are obvious problems with EPA’s decision to use the Only cases to determine LUC emissions for individual biofuels. In the Only scenarios, when acreage for the biofuel crop being isolated is increased in the FASOM and FAPRI models, acreage for other crops is usually lowered, and some forest and pasture is also converted to cropland. For example, with increased corn ethanol in the Corn Only Case, soybean acreage declines. However, when all biofuels volumes are increased in the Control Case, the available land limitation causes the economic models to decrease acreage for other less competitive crops (like rapeseed and cotton), while trying to keep the areas for the biofuel crops relatively high. Consequently, it is not valid to use the Only cases to estimate the land use changes, because this method ignores available land limitations, disregards cross-commodity impacts, and overlooks the actual competition that occurs for the cropland when all biofuels volumes are increased in accordance with the RFS2 schedule. Therefore, the Control Case results—not the Only case results—represent the best available data for determining LUC impacts for the RFS2 as modeled by the FASOM/FAPRI framework.

EPA recognizes in the rulemaking record the weakness of its approach and acknowledges that, in particular, potential land use changes associated with simultaneous increases in the volumes of various biofuels are highly interrelated. As such, EPA used the Control Case—not the Only cases—for its determination of the aggregate GHG impacts of the program. However, EPA suggests it is not possible to discern the land use change impacts of individual biofuels based on the Control Case. In the Regulatory Impact Analysis, EPA writes, “*Several of the lifecycle emission impacts for one fuel are interrelated with those of another fuel, in particular the land-use changes* (emphasis added). For our analysis of the overall GHG impacts of the program (discussed in Section 2.7), we modeled all of the fuel changes simultaneously to determine the land-use impact. However, from that analysis it is not possible to differentiate the contribution of the land-use change to one fuel vs. another. As a result, for this analysis *we had to model the impacts of just one fuel change at a time* (emphasis added).” RFS2 RIA, pages 311-312.

We disagree that it is “not possible to differentiate the contribution” to total land use change of one biofuel versus another. In fact, there is a relatively straightforward method for allocating LUC emissions to individual biofuels based on the results from the Control Case and the proportions of land use change by fuel type from the Only cases. A logical method for performing the allocation is to adjust the three Only scenarios so that not only does the total land converted match that of the Control Case, but the relative contributions of each biofuel type and region (domestic and foreign) are maintained proportionally.

We have performed this adjustment and the results (shown in Table 2, attached) are compelling. Overall, the land use emissions for the normalized Control Case are significantly lower than the results derived strictly from the Only cases. Using the normalized Control Case method, corn ethanol LUC emissions drop from EPA’s estimate of 28.4 g/MJ to 10.8 g/MJ, while soybean biodiesel LUC emissions fall from 32.2 g/MJ to 7.9 g/MJ and sugarcane ethanol LUC emissions decline from 4.7 g/MJ to 2.7 g/MJ.

As we have shown, using the Only cases to determine LUC emissions for biofuels results in the gross overestimation of the GHG intensity of crop-based biofuels in the RFS2 analysis. If EPA’s true intent was to estimate the LUC impacts and overall lifecycle GHG effects of biofuels mandated under the RFS2, it should have used the Control Case results, in which all biofuel volumes are increased concomitantly. Due to the large discrepancy in EPA’s estimates of land conversions under the Control Case and Only Cases, we believe this issue warrants the agency’s attention. While we continue to have other serious concerns about EPA’s RFS2 lifecycle GHG analysis (many of which are discussed in detail in our written comments to EPA dated September 25, 2009, EPA-HQ-OAR-2005-0161-2329.1), we believe the significance of this particular issue warrants immediate corrective action. We would appreciate the opportunity to discuss this important issue and share our calculations with appropriate EPA staff. Geoff Cooper of the RFA staff will follow up with your staff to inquire about an opportunity to meet soon.

Sincerely,

A handwritten signature in black ink that reads "Bob Dinneen". The signature is stylized and includes a long horizontal flourish extending to the right.

Bob Dinneen  
President & CEO

cc:

Gina McCarthy  
Margo Oge  
Sarah Dunham  
Vince Camobreco  
Bob Larson

Attachment

## ATTACHMENT

### Supporting Tables

<b>TABLE 1.</b>					
<b>Comparison of Land Use Changes (1000s of Hectares) from “Only” Cases Versus “Control” Case</b>					
	“Soy Only Case” (considering only change in soybean biodiesel vol.)	“Corn Only Case” (considering only change in corn ethanol vol.)	“Sugar Only Case” (considering only change in sugarcane ethanol vol.)	Sum of “Only” Cases	“Control Case” (considering change in all fuel vols. simultaneously)
Domestic	101.5	139.7	35.4	276.6	306.8
Foreign	678.4	789.3	395.4	1,863.1	794.4
World (Total)	779.9	928.9	430.8	2,139.7	1,101.3

Note: Based on RIA Table 2.7-3 (international) and FASOM technical reports and output spreadsheets (domestic)

<b>TABLE 2.</b>			
<b>Comparison of LUC Emissions (gCO<sub>2</sub>e/MJ) Based on Control Case Versus Only Cases</b>			
	Based on Control Case	Based on “Only” Cases (As Finalized by EPA)	% Reduction
Soybean Biodiesel	7.9	32.2	-76%
Corn Ethanol	10.8	28.4	-62%
Sugarcane Ethanol	2.7	4.7	-43%