Growth Energy™
Expanding America's Bioeconomy

April 21, 2025

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Via electronic submission

RE: Growth Energy Comments on Third 15-Day Changes

Growth Energy appreciates the opportunity to provide comments to CARB regarding the Third 15-Day Changes to the Low Carbon Fuel Standard (LCFS) Amendments approved by CARB on November 8, 2024. Growth Energy is the world's largest association of biofuel producers, representing 97 U.S. plants that each year produce 9 billion gallons of renewable fuel; 131 businesses associated with the production process; and tens of thousands of biofuel supporters around the country. Together, we are working to bring better and more affordable choices at the fuel pump to consumers, improve air quality, and protect the environment for future generations. We remain committed to helping our country diversify its energy portfolio to grow more energy jobs, decarbonize the nation's energy mix, sustain family farms, and drive down the costs of transportation fuels for consumers.

Growth Energy has previously submitted extensive comments elaborating the vital role low carbon biofuels and higher biofuel blends can play in meeting California's ambitious climate goals. As we have previously noted, the Amendments impose new, costly, and unnecessary burdens on ethanol producers in the form of vague and undefined crop requirements (the "Crop Requirements"). These requirements risk substantially reducing the availability of credit-generating biofuels within the LCFS Program, resulting in significant disruptions to the LCFS market and increased consumer costs. They also will cause widespread structural changes to the nation's agricultural markets, including how crops are grown, sold, marketed and transported.

The Office of Administrative Law (OAL) correctly recognized that these Crop Requirements "fail[] to comply with the clarity standard of Government Code section 11349.1, subdivision (a)(3)."[1] Unfortunately, the mere cosmetic changes CARB has proposed in this Third 15-Day Changes fall far short of addressing the pervasive lack of clarity throughout this section of the Amendments. As such, we encourage CARB to meaningfully address the Crop Requirements' problematic scope and clarity. Absent

[1] OAL Decision of Disapproval of Regulatory Action, OAL Matter No. 2025-0103-01S at 2, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/disapproval_decision.pdf

much needed reconsideration and clarification, we urge OAL to again disapprove of the Amendments, including because CARB has not adequately evaluated and disclosed the sweeping changes to agricultural production and substantial costs the Amendments engender.

Moreover, OAL's initial disapproval has already delayed the regulatory process by months. We urge CARB to account for this unexpected delay and adjust the compliance deadlines to provide regulated parties adequate time to respond to the costs and complexities of the new rules and their impacts on agricultural markets and biofuels production. Relatedly, CARB's assessment of compliance costs released to the public for the first time after the Board voted to approve the Amendments lacks foundation and misstates by orders of magnitude potential compliance costs. A more realistic assessment, which should have been disclosed to the public and offered for comment, would highlight the substantial challenges for regulated parties and their supply chains in complying with the Crop Requirements, particularly on the expedited timeframe provided in the Amendments. As such, we urge CARB to thoroughly consider the economic consequences of the Amendments on both regulated parties and California consumers, along with the impacts of this regulatory delay, as it would be arbitrary and capricious for the agency to maintain its initial timeline in these circumstances.

Growth Energy encourages CARB to reconsider these aspects of the Amendments to ensure the real and significant GHG emissions reductions benefits of biofuels are realized under the LCFS.

I. CARB's Third 15-Day Changes Fail to Cure the Amendments' Lack of Clarity.

Regulations must have sufficient clarity to be "easily understood by those persons directly affected by them." Cal. Gov't Code § 11349(c); *see also* Sims v. Dep't of Corr. & Rehab., 216 Cal. App. 4th 1059, 1076 (2013). A regulation is not presumed to comply with the clarity standard if it "can, on its face, be reasonably and logically interpreted to have more than one meaning," 1 C.C.R. § 16(a)(1), or "uses terms which do not have meanings generally familiar to those 'directly affected' by the regulation, and those terms are defined neither in the regulation nor in the governing statute . . . ." *Id*., subd. (a)(3); *see also* Sims, 216 Cal. App. 4th at 1080.

The Crop Requirements are replete with provisions that are not easily understood, are susceptible to multiple meanings, and are not defined in regulation or statute. OAL's disapproval notice cites five separate provisions within the Crop Requirements at § 95488.9(g) that fail to meet regulatory standards for clarity. OAL's concerns with these specific provisions are well-founded, but they are the tip of the iceberg. In particular, there are three key areas where the Amendments' lack of clarity renders the Crop Requirements arbitrary and capricious and unconstitutionally vague: (1) the best environmental management practices ("BEMPs") in § 95488.9(g)(3), (2) the

third-party certification system criteria in § 95488.9(g)(8), and (3) sweeping compliance-with-all-laws obligations that would require producers to monitor and attest to farmers' actions' consistency with "all local, State, and federal rules and permits" in § 95488.9(g)(1-2).

First, the BEMPs requirements in Section 95488.9(g)(3) consist of vague goals disconnected from any actionable targets or approaches producers could implement. For example, the Amendments state that cropland on which biofuels used in the LCFS program are grown, whether in Iowa or Kansas or Brazil, must "[m]aintain or enhance biodiversity habitat on agricultural or forested lands," "[e]nhance soil fertility and avoid erosion or compaction," and "reduce unsustainable water use. . . ." 17 C.C.R. § 95488.9(g)(3). None of these terms are explained, defined, or otherwise expressed in a way that can be "easily understood" for producers to implement. It is impossible for producers to know what farming practices CARB will determine "enhance biodiversity," how one can demonstrate that their farms "avoid erosion," or what types of water use CARB will deem "unsustainable." Yet failure to comply with the BEMPs will result in ineligibility of feedstock for use in biofuel production separate and apart from whether the feedstock meets a third-party certifier's requirements. *Id.* § 95488.9(g)(4).

Second, the third-party certification system criteria are so nebulous that CARB preserves unfettered discretion over what certification systems will be approved or denied. Other than European certification systems, which CARB has bound itself to approve irrespective of consistency with U.S. or California law,[2] CARB has set such vague criteria that it is impossible for regulated parties to anticipate what certification systems will be approved or denied, and regulated parties have no voice in the approval process. For example, certification systems must "consider environmental, social, and economic criteria"—a category so broad that it is difficult to imagine anything that CARB would *not* be able to use as a basis for declining to approve a certification system. § 95488.9(g)(8)(A)(2). The Amendments also require "sanction mechanisms" for farmers without any indication of what types of sanctions are appropriate, and mandate "an effective grievance mechanism" without any description of how CARB will determine effectiveness. § 95488.9(g)(8)(A)(11-12).

In the context of this pervasive lack of clarity, CARB's cosmetic changes to the regulations in this 15-Day proposal are legally insufficient. OAL correctly rejected §§ 95488.9(g)(6)(C)(2), 95488.9(g)(7)(C)(1), and 95488.9(g)(8)(A) on the grounds that it was "unclear when the Executive Officer will choose not to approve a certification system."[3] In the 15-Day proposal, CARB adjusts these provisions to state that CARB "shall" rather than "may" adopt certification systems that satisfy the criteria listed in § 95488.9(g). But, despite numerous requests from Growth Energy and others to

[2] *See* 17 C.C.R. § 95488.9(g)(6)(C). Growth Energy notes its significant concern with CARB's delegation of its rulemaking authority to European regulators, where U.S. ethanol producers have no legal right to participate in the EU rulemaking process, whether through notice, comment, or democratic election.
[3] OAL Decision of Disapproval of Regulatory Action at 10.

elaborate this critical aspect of the Crop Requirements, CARB has done nothing to add clarity to the criteria. Regulated parties remain in the dark as to what practices the BEMPs require and which "social" criteria farmers in Iowa or elsewhere must adhere to in order to sell crops to biofuels producers.

Similarly, OAL correctly rejected § 95488.9(g)(8)(H) because, among other reasons, it was "unclear when the Executive Officer will remove, suspend, or otherwise modify approval of an approved certification system."[4] The language at issue included that "the Executive Officer may also remove, suspend or modify approval of an approved certification system if appropriate for consistency with a modification, removal, or suspension of the certification system standard in an analogous GHG program." § 95488.9(g)(8)(I). CARB's changes in the 15-Day proposal change the term "may…if appropriate" to "shall…if appropriate." *Id.* Any clarity provided by the use of "shall" in this provision is undermined by the retention of the qualifier "if appropriate." CARB retains full discretion to determine whether it is "appropriate" to remove, suspend, or modify approval of the certification system. As such, CARB's use of "shall" fails to improve the clarity of the rejected regulatory provision.

Third, the Amendments require biofuels producers to ensure farmers' consistency with—and attest under penalty of perjury to—sweeping compliance-with-all-laws statements despite not having first-hand knowledge of the information to which they are attesting. Of particular concern, the Amendments require biofuel producers to testify under penalty of perjury that crops were harvested "in accordance with **all** local, State, and federal rules and permits." § 95488.9(g)(1)(B)(1)(e)(emphasis added); § 95488.9(g)(2). The sheer breadth of this language makes it unclear how a biofuel producer could ever ensure compliance. It is unclear how biofuels producers should go about identifying *all* local, State, and federal rules and permits applicable to a particular farmer, let alone determining whether the farmer has complied with such rules and permits. Nor is it reasonable for a biofuel producer to ask farmers to make such sweeping and unqualified statements of compliance.[5]

To give one example of the unworkable breadth and lack of clarity of this aspect of the regulations, assume in the normal course of a farmer's operations a diesel tank used to refill farm tractors releases diesel in a manner inconsistent with state law. Although the farmer takes all appropriate steps to remediate the spill and even notifies and works collaboratively with relevant state authorities, is the farmer foreclosed from selling his grain to biofuels producers? If the release was not consistent with state law, would CARB view grain produced on that farm as ineligible for sale as feedstock in California biofuels? Would CARB retroactively invalidate credits for biofuels grown

[4] *Id.* at 11.

[5] CARB's attempt to draw analogy to pre-existing requirements that biofuel producers ensure *their own* compliance with *California* laws is inapt. *See* FSOR Appx. B at 440. CARB's new requirement that fuel producers attest to farmers' compliance with out-of-state laws and permits is far broader than the LCFS' current requirements to comply with California and federal law themselves.

using crops from that farm? Growth Energy's view is that such results would be absurd, and implores CARB to carefully consider the practical implications of such sweeping statements.

Moreover, the compliance-with-all-laws requirement and related attestation are not limited to environmental rules and permits: "all" rules and permits could implicate federal, state, and local rules on immigration, labor, zoning, or a host of other areas. It is unreasonable to require crop-based biofuels producers to audit farmers' employee records on immigration status and payroll, or delve through local road use permits to ensure tractors and other farming equipment is compliant. Critically, there is no nexus whatsoever between compliance with these laws and regulations and the carbon intensity of biofuel sold in California.

We understand that CARB *may* choose not to interpret these regulatory requirements to cover issues like immigration, labor, zoning, or even the diesel spill example. But there is nothing in the regulatory text that prevents CARB from doing so or otherwise provides a reasonable limiting principle. Requirements this vague result in a patently unclear process where CARB has complete discretion over whether to accept a producers' attestations, giving rise to fair notice and due process concerns. Simply put, if sweeping compliance-with-all-laws provisions and attestations are intended to go no farther than existing requirements (as CARB claims[6]) there is no point including them in the regulation. If, however, they are meant to be meaningful requirements shaping how biofuels producers procure crops, CARB must elaborate and clarify their scope and justify their inclusion under authority rooted in AB-32.

II. Given Gross Underestimation of the Costs of Compliance, CARB Must Reconsider the Crop Requirements.

For the first time in the Final Statement of Reasons (FSOR) released *after* the Board's approval of the Amendments, and *after* the close of multiple comment periods of the regulatory package, CARB shared with the public and regulated parties its estimate of implementation cost of the Crop Requirements. Without explanation or citation, CARB ballparks cost at "$4.7 million per year for the industry, an average of roughly $39,000 per company."[7] Relying on this unsupported calculation, CARB states that "staff do not expect the addition of sustainability requirements to reduce or limit the availability of biomass-based feedstocks in the program to a level that would significantly increase the costs of low carbon fuels and stifle investment in new low carbon feedstocks and technologies."[8] CARB further claims that the "main cost to fuel producers" are mitigated by the implementation timeline's *end date* of 2031, ignoring that the costs of establishing supply chain traceability will be borne *immediately* upon the Amendments' effective date for new pathway applicants and for existing pathway

[6] *See* FSOR Appx. B at 440.
[7] *Id.* at 441.
[8] *Id.*

holders that must restructure all crop procurement (to the extent even feasible) in less than 8 months.[9] CARB's assessment of both the magnitude of the expense burden and the relevant timing of such impacts necessitates reconsideration.

First, as a threshold matter, CARB's presentation of these compliance cost estimates is inconsistent with California procedural requirements. California agencies "shall include" in the Initial Statement of Reasons "[a]n identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the adoption, amendment, or repeal of a regulation." Cal. Gov. Code 11346.2(b)(3). Yet CARB withheld its $39,000 per company compliance cost estimate until after the comment period had concluded, finally releasing the figure in an appendix to the FSOR. And even the FSOR provides no explanation of the estimate's origin. CARB's procedural errors here deprived the public of any opportunity to provide technical information to refute this estimate. Indeed, the California notice and comment procedural protections exist for this very purpose—to allow the public to present information to correct flawed agency assumptions before those assumptions become codified into flawed regulations.[10] As such, we urge CARB to correct its error by disclosing and accepting comment on whatever technical basis CARB relied upon in this rulemaking to support its compliance cost estimates and assumptions.

Second, with respect to estimated costs, $39,000/company per year is a gross underestimate which underscores CARB's lack of understanding of the impacts of the Amendments on biofuels producers. Had CARB presented this estimate to regulated parties during the rulemaking process and explained how it was derived, the Board could have considered in its vote on the package a more realistic picture of the changes wrought by the Crop Requirements and their burden on industry as compared against the illusory benefits.

As explained further in the attached letter by environmental economists at Optima Analytics, regulated parties are likely to incur at least the following categories of costs to come into compliance with the Crop Requirements, each of which is likely to *independently* exceed $39,000 per company:

- Audit costs to verify farmers' compliance with all federal, state, and local laws.
- Additional personnel necessary at biofuels producers to ensure that feedstock is sourced from verified farmers and that all local, state, and federal regulations are being followed.

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[9] *Id.* at 440-41.

[10] *See, e.g.* POET, LLC v. State Air Res. Bd., 218 Cal. App. 4th 681, 744, 160 Cal. Rptr. 3d 69, 113 (2013), as modified on denial of reh'g (Aug. 8, 2013) ("The benefits of public participation in the regulatory process include (1) the agency being informed by interested parties about possible unintended consequences of a proposed regulation and (2) directing the attention of agency policymakers to the public they serve, thus providing some protection against bureaucratic tyranny.").

- Additional personnel necessary at grain elevators to oversee deliveries, track grain, and ensure that feedstock separation is maintained.

- Biofuel producers' direct costs in contracting with third-party certifiers to achieve third-party certification for every farm providing feedstock for the California market.

- Capital expenditures and operational costs for new equipment including silos, bins, and storage buildings at grain elevators to allow physical separation of certified and non-certified feedstock.

- Capital expenditures and operational costs for new equipment including fermentation tanks, stills, heat exchangers, storage bins and buildings, and process control panels and software at biorefineries to allow physical separation of California-destined and other-destination fuels.

- Capital and annual compliance costs incurred by farmers to achieve and maintain certification.

- Increased transportation costs to ensure certified and non-certified feedstocks and fuels are not commingled in trucks or trains.

Some of these costs may be so significant, and may require structural operational changes so fundamental, as to render compliance impossible for certain categories of producers and/or entities in the supply chain. Indeed, costs are also not limited to farmers and biorefineries. As researchers from Iowa State University recently concluded, "current corn and soybean handling, storage, and transportation systems are well suited for commodity management, but are not designed for the segregation and isolation of specialized products. The systems need physical and procedural modifications to effectively handle two grain streams."[11] For certain grain elevators and other suppliers of biomass the Crop Requirements are not simply a matter of compliance costs, but rather are likely to extinguish their business models. Grain elevators are not physically designed or technologically equipped to comply with requirements of identifying, segregating, and tracking fungible kernels of corn. Grain elevators may be forced out of market entirely unless they completely change physical layout, basic operations, and contracting practices. And even if a grain elevator had the capital available to make such substantial changes, the additional cost/bushel to keep grains separated would likely reduce already-slim margins by approximately one-third.[12] As a result, the Amendments will dramatically reshape how biofuels producers procure

[11] Pizarro, et al. *Cost Estimation Model for isolation and Segregation of Non-Genetically Modified Corn and Soybeans at Country Elevators* (March 2024) at 2.
[12] *Id.*

grain today, to the detriment of wholly out-of-state actors as well as California consumers forced to pay more for the same fuel.[13]

There is no evidence that CARB considered any of these compliance costs or structural changes to the interstate commodities market in promulgating this rule. Without adequate consideration of compliance costs, CARB's assumption that the Crop Requirements will not "reduce or limit the availability of biomass-based feedstocks in the program" is faulty.[14] As detailed in Growth Energy's previous comments, this faulty, unsupported assumption risks extreme adverse impacts to the California transportation fuel market.[15] If significant volumes of credit-generating ethanol are unable to comply and become assigned the carbon intensity of gasoline, Californians can expect the resulting shortage of available LCFS credits to result in a corresponding price increase that will predominately be felt by consumers at the pump.[16]

Finally, CARB greatly overstates the extent to which its implementation timeline defers compliance costs. Biofuels producers must immediately commence work to establish supply chain traceability in order to accurately submit spatial data and attest to the source of feedstock by the fast-approaching deadlines. As detailed above and in the attached expert report, this will require substantial investment to separate currently commingled grain handling, storage, and transportation systems, including but not limited to grain elevators. To be sure, the additional certification requirements arising in 2028 and 2031 will ratchet up compliance costs further. But CARB's extension of the "fully compliant" deadline to 2031 does not alleviate the significant immediate costs necessary to renovate complex agricultural supply chains before CARB's "first milestone" of sourcing and attestation requirements.

In sum, CARB should reconsider the economic implications of the Crop Requirements and provide an updated disclosure for public comment of estimated costs.

III. OAL Should Also Disapprove The Crop Requirements as Applicable to U.S. Ethanol Producers For Failing to Satisfy the Necessity Standard.

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[13] For example, research by Informa Economics into the cost implications of similar feedstock requirements considered (and rejected) by EPA for the Renewable Fuel Standard (RFS) Program estimated compliance costs at **$420 million/year** in 2009 dollars across the industry, equivalent to over **$621 million/year** today. Of course, the RFS is a national program, but California consumes approximately 10% of the nation's biofuel putting costs on the $60 million/year range, nowhere in the ballpark of CARB's unexplained estimate. We strongly encourage CARB to conduct a study into the costs of its proposal to develop an updated and accurate estimate of compliance costs specific to the LCFS Amendments. Informa Economics, *Compliance Costs Associated with the Proposed Rulemaking for RFS2* (Sep. 2009).

[14] FSOR Appx. B at 441.

[15] Growth Energy Comments on Proposed LCFS Amendments (Feb 20, 2024) at 2.

[16] *Id.*

In addition to needing sufficient clarity, California regulations must be shown to be "reasonably necessary to carry out the purpose and address the problem for which it is proposed." Cal. Gov. Code § 11346.2(b). This necessity standard requires both a "statement of the specific purpose of each adoption, amendment, or repeal;" and "information explaining why each provision of the adopted regulation is required to carry out the described purpose of the provision." 1 C.C.R. § 10.

CARB has failed to demonstrate that the Crop Requirements on ethanol producers are reasonably necessary. CARB claims that the Crop Requirements are intended to address increased crop demand from a "rapid expansion of biofuel production and biofuel demand."[17] Yet CARB does not project any "rapid expansion" in ethanol demand; and instead notes the opposite, that "ethanol volumes are expected to *decrease* over the course of the Proposed Amendments."[18] The only feedstock crops for which CARB has asserted that an increase in crop demand may occur are oil crops, used to produce biodiesel or renewable diesel. As Growth Energy and others have previously explained, oil crops are not used to produce ethanol.

CARB's response to comments on this issue is inapposite. It states:

> *By targeting or singling out specific biomass types, the risk increases for biomass not subject to sustainability requirements, as fuel producers shift to less stringent sources. All biomass-based fuels. . . are subject to the same sustainability criteria to minimize any incentive to shift to biomass sources with less stringent requirements.*[19]

This reasoning misses fundamental realities of the fuels market: ethanol is blended into gasoline, not diesel, and gasoline and diesel are not substitutes. As documented in the record, gasoline demand and diesel demand are on two different trajectories in California given different engine mixes.[20] CARB is incorrect to assert that placing constraints on feedstocks for biodiesel and renewable diesel would spur demand for corn used for ethanol when the fuels are not interchangeable.

Moreover, CARB already disproportionately disincentivizes the use of ethanol through an "indirect land use change" penalty that is roughly four times higher than recent values published by the U.S. Department of Energy.[21] Additional disincentives for ethanol are unreasonable and unnecessary, especially where CARB has not identified any current or expected increase to ethanol demand in California. OAL should therefore disapprove of the Crop Requirements as applied to ethanol producers.

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[17] Initial Statement of Reasons ("ISOR") at 32.
[18] Final Environmental Impact Analysis ("FEIA") at 51.
[19] FSOR Appx B at 443-44.
[20] 2022 Scoping Plan at 185-86.
[21] *See* 45ZCF-GREET Model (January 2025), https://www.energy.gov/eere/greet

IV. CARB Cannot Approve the Proposed 15-Day Changes Without Undertaking Further Proceedings Under CEQA.

1. CARB Must Prepare a Supplemental Environmental Impact Analysis or an Addendum to the Final Environmental Impact Analysis.

A supplemental EIR is required if significant new information or substantial changes in the project or surrounding circumstances necessitate major revisions to the EIR. *See* Moss v. County of Humboldt, 162 Cal.App.4th 1041, 1057 (2008); *see also* Guidelines, § 15164, subd. (a). That is the case here. Major revisions to the EIA are needed to address environmental impacts that were ignored or downplayed in the EIA due to CARB's reliance on a deeply flawed cost estimate as well as recent developments in global trade policy.

Public Resources Code section 21166 requires the preparation of a supplemental environmental impact report in certain circumstances, including, as pertinent here, where "[s]ubstantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the environmental impact report" or where "[n]ew information, which was not known and could not have been known at the time the environmental impact report was certified as complete becomes available." As explained below, both of these conditions are applicable here. Accordingly, CEQA requires that CARB prepare a supplemental EIA.[22]

"Section 21166 is intended to provide a balance against the burdens created by the environmental review process and to accord a reasonable measure of finality and certainty to the results achieved." Bowman v. City of Petaluma, 185 Cal.App.3d 1065, 1074 (1986). It "comes into play precisely because in-depth review has already occurred" and requires consideration of "whether circumstances have changed enough to justify repeating a substantial portion of the process." Martis Camp Cmty. Ass'n v. County of Placer, 53 Cal.App.5th 569, 604 (2020) (internal quotations omitted); Citizens for a Sustainable Treasure Island v. City and Cnty. of S.F., 227 Cal.App.4th 1036, 1051 (2014). Thus, "[i]f one of the conditions described in section 21166 applies, the lead agency ***must*** prepare either a subsequent EIR or a supplemental EIR." Martis Camp Cmty. Ass'n v. County of Placer, 53 Cal.App.5th 569, 604 (2020) (emphasis added).

[22] Although CARB prepared the EIA pursuant to its certified regulatory program, it remains subject section 21166 of CEQA. "A certified regulatory program remains subject to the provisions of CEQA outside the scope of the exemption provided by subdivision (c) of section 21080.5." POET, LLC v. State Air Res. Bd. 218 Cal.App.4th 681, 714 (2013). Section 21080.5, subdivision (c) exempts certified regulatory programs from "Chapter 3 (commencing with Section 21100), Chapter 4 (commencing with Section 21150), and Section 21167." Section 21166 is located in Chapter 6 of CEQA. Accordingly, CARB's certified regulatory program is not exempt from section 21166 and a supplemental EIA must be prepared if any of the conditions set forth in that provision are satisfied.

Significant new information and substantial changes in the circumstances under which the Amendments will be undertaken necessitates major revisions to the EIA. As shown above, CARB's $39,000 per company compliance cost estimate grossly underestimates the cost of complying with the Amendments. However, an accurate estimate of compliance costs is essential to evaluate the Amendments' secondary effects and whether they will result in significant environmental impacts. Because CARB's estimate of compliance costs so drastically underestimates the economic consequences of the Crop Requirements, the EIA ignores or downplays environmental impacts associated with the Amendments' reasonably foreseeable secondary effects, including changes to supply chain dynamics, changes to feedstock demand and availability, and environmental impacts resulting from changes to the mix of fuels consumed in California. For example, the EIA categorically fails to consider the likelihood that the Crop Requirements will strain feedstock availability and disrupt supply chains such that biofuel producers will reduce the volume of biofuel in the California transportation fuel market, resulting in a reasonably foreseeable increase in fossil fuel consumption.

Had CARB disclosed its cost estimate and its basis during the CEQA comment period, such errors could have been identified and corrected before the CARB board approved the Amendments. But this did not occur. Instead, CARB not only deprived the public of the opportunity to review and comment on staff's flawed cost estimate and its effect on the EIA, but also deprived the CARB board of the opportunity to consider public input on these issues before deciding whether to approve the Amendments. *See* Californians for Alts. to Toxics v. Department of Food & Agric., 136 Cal.App.4th 1, 13 (2005) (analysis must "provide[] sufficient information and analysis to allow the public to discern the basis for the agency's impact findings" and "should set forth specific data, as needed to meaningfully assess whether the proposed activities would result in significant impacts"); Guidelines, § 15151 (environmental analysis is intended "to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences.").

Recent global trade developments only increase the likelihood that the Amendments will cause new and more severe environmental impacts than those analyzed in the EIA. According to recent media reports, recent U.S. tariff policy "will severely disrupt global supply chains critical to renewable energy and electric vehicles."[23] In addition, retaliatory tariffs against U.S. crops may reduce global demand for U.S.-grown corn, soy, and other biofuel feedstocks.[24] This combination of disruptions to both the electric vehicle and biofuels supply chains may result in substantial changes to the mix of transportation fuels incentivized by the LCFS program.

[23] https://www.winssolutions.org/impact-2025-us-tariffs-on-sustainability/

[24] https://www.reuters.com/markets/commodities/us-agricultural-exportsimports-threatened-by-trump-trade-actions-2025-04-01/

At a minimum, the extreme economic uncertainty posed by these recent events warrants supplemental analysis.

In light of the above, new information and substantial changes to the circumstances in which the project will be undertaken necessitate major revisions to the EIA. The EIA acknowledges that reasonably foreseeable compliance responses resulting from CARB's adoption of the Amendments could result in significant impacts to the existing physical environment due to "modifications to cultivation volume and transport of feedstock," "changes to location and types of feedstock," "construction of new facilities to produce renewable [fuels]," "construction of solar and wind electricity generation projects," "modification to existing or new industrial facilities," "construction of new infrastructure," "modifications to electricity distribution and transmission infrastructure," "land use changes," and "changes to fuel-associated shipment patterns," among many other things. Final EIA, p. 43. Nevertheless, CARB's deeply flawed cost estimate conceals the true scope and extent of environmental impacts resulting from these compliance responses—impacts that the current global trade environment will amplify significantly.

CARB cannot simply ignore the obvious potential for new or different environmental impacts due to its flawed estimate of compliance costs and recent developments in global trade policy. These developments will substantially alter the number and extent of the Amendments' environmental impacts and therefore major revisions to the EIA are required to ensure that the public and the CARB board have sufficient information to consider meaningfully the project's environmental impacts before the project is approved. At a minimum, CARB must prepare an addendum to the EIA to document its determination that a supplemental EIA is not required." Martis Camp Cmty. Ass'n v. County of Placer, 53 Cal.App.5th 569, 604 (2020); *see* Friends of San Mateo Gardens v. San Mateo Cnty. Cmty. Coll. Dist., 1 Cal.5th 937, 946 (2016); Guidelines, § 15164, subd. (a).

2. By Including Additional Responses to Environmental Comments in an Addendum to the FSOR, CARB is Engaging in Impermissible *Post Hoc* Environmental Review

As the Supreme Court explained in Laurel Heights Improvement Assn. v. Regents of University of California, 47 Cal.3d 376 (1988) "[a] fundamental purpose of an EIR is to provide decision makers with information they can use in deciding whether to approve a proposed project, not to inform them of the environmental effects of projects that they have already approved. If post-approval environmental review were allowed, EIR's would likely become nothing more than *post hoc* rationalizations to support action already taken." *Id.* at 394; *see* No Oil, Inc. v. City of Los Angeles, 13 Cal.3d 68, 79 (1974); Guidelines, § 15004, subd. (a) ("Before granting any approval of a project subject to CEQA, every lead agency . . . shall consider a final EIR . . . ."). The timing requirement set forth in Section 15004 of the CEQA Guidelines "applies to the

environmental review documents prepared by [C]ARB . . . in lieu of an EIR." POET, LLC v. Calif. Air Res. Bd., 218 Cal.App.4th 681, 716 (2013).

CARB approved the Amendments, and certified the Final EIA on November 8, 2024 with the adoption of Resolution 24-14. However, CARB did not publicize compliance cost estimates and further analysis of environmental impacts until an addendum to the Final Statement of Reasons was released in January. This violates CEQA because the FSOR addendum raises new and significant environmental issues that must be evaluated ***before*** the project is approved under CEQA. Such issues cannot be addressed in an addendum to the FSOR ***after*** the Amendments and the Final EIA have been approved by the CARB board for purposes of CEQA without reopening the CEQA record. By declining to reopen the CEQA record and instead responding to significant environmental issues in an addendum to the FSOR, CARB is engaging in impermissible *post hoc* environmental review and depriving the CARB board of important information needed to evaluate whether to approve the Amendments in the manner required by CEQA. To comply with CEQA, CARB must reopen the CEQA record and present all environmental comments and all agency responses to those comments to the CARB board for approval.[25]

3. Resolution 24-14 Authorizes Piecemeal Environmental Review, Improper Delegation of Decision Making Authority, and *Post Hoc* Environmental Review

Resolution 24-14 purports to authorize CARB's Executive Officer to determine whether sufficiently related changes are needed to the regulatory package approved by the CARB board and to determine whether any further environmental review is required by such changes. But it does not require the Executive Officer to present the complete rulemaking package and all environmental analyses to the CARB board for final approval. Resolution 24-14 thus impermissibly piecemeals environmental review, improperly delegates decision making authority, and expressly authorizes *post hoc* environmental review—all in violation of CEQA. To satisfy its obligations under CEQA, CARB must present the complete rulemaking package and all environmental analyses to the CARB board before the "project" is approved for purposes of CEQA.

Resolution 24-14 states:

> [T]he Board directs the Executive Officer to determine if additional sufficiently related modifications to the regulations are appropriate, and that if no additional modifications are appropriate, the Executive Officer shall take CARB's final step for final approval of such amendments through submittal of the Board-approved

[25] To the extent the Third 15-Day Changes and response to comments also engage in further environmental review, this would also violate CEQA for the same reasons.

> rulemaking package to the Office of Administrative Law. . . . The Board delegates to the Executive Officer the authority to both (1) either approve or disapprove proposed [sufficiently related] changes in regulatory language under Government Code section 11346.8(c), and (2) conduct any appropriate further environmental review associated with such changes, consistent with the Board's Certified Regulatory Program regulations, at California Code of Regulations, title 17, sections 60000-60008, for those sufficiently related substantial modifications.

As explained above, further environmental review is necessary because significant new information and substantial changes in the circumstances under which the Amendments will be undertaken necessitates major revisions to the EIA. However, as explained below, the procedure set forth in Resolution 24-14 for review of 15-day modifications cannot be reconciled with well-established principles of CEQA or the Fifth District's decision in POET, *supra*, 218 Cal.App.4th 681. The Amendments and all 15-day modifications are part of the same CEQA "project" and all environmental impacts associated with that "project" must be analyzed and considered by the CARB board *before* the "project" is approved for purposes of CEQA.

First, Resolution 24-14 impermissibly piecemeals environmental review. "CEQA forbids 'piecemeal' review" of a project, Berkeley Keep Jets Over the Bay Comm. v. Board of Port Comm'rs, 91 Cal.App.4th 1344, 1358 (2001), which occurs when a lead agency "attempt[s] to avoid a full environmental review by splitting a project into several smaller projects which appear more innocuous than the total planned project." East Sacramento P'ships for a Livable City v. City of Sacramento, 5 Cal.App.5th 281, 293 (2016). By authorizing two distinct phases of environmental review—one conducted by the CARB board upon approving the Amendments and certifying the EIA and one conducted by the Executive Officer upon approving the proposed 15-day modifications and any further environmental review—Resolution 24-14 proceeds as if the sufficiently related modifications were a separate "project" for purposes of CEQA.

But that is not the case. "'Project' means 'the whole of the action'" that otherwise qualifies as a "project" under CEQA. Concerned McCloud Citizens v. McCloud Comty. Servs. Dist., 147 Cal.App.4th 181, 192 (2007) (quoting Guidelines, § 15378(a)). It "'does not mean each separate governmental approval.'" *Id.* (quoting Guidelines, § 15378(c)). To the extent the Executive Officer makes a change to the regulatory text of the Amendments that 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, subd. (c)), the change is "a reasonably foreseeable consequence of the initial project." Laurel Heights, *supra*, 47 Cal.3d at 396. Similarly, because the 15-day modifications to the Amendments would have no purpose but-for the Amendments, the two activities are "integral part[s]" of each other and thus both are "within the scope of the same CEQA project." Tuolumne Cty., *supra*, 155

Cal.App.4th at 1229. Consequently, the Amendments and all 15-day modifications must be analyzed and considered by the CARB board before the "project" is approved for purposes of CEQA. Laurel Heights, *supra*, 47 Cal.3d at 396.

Second, Resolution 24-14 improperly delegates decision making authority to the Executive Officer for the second phase of environmental review. As POET explains:

> CEQA is violated when the authority to approve or disapprove the project is separated from the responsibility to complete the environmental review. [Citations.] This conclusion is based on a fundamental policy of CEQA. For an environmental review document to serve CEQA's basic purpose of informing governmental decision makers about environmental issues, that document must be reviewed and considered by the same person or group of persons who make the decision to approve or disapprove the project at issue. In other words, the separation of the approval function from the review and consideration of the environmental assessment is inconsistent with the purpose served by an environmental assessment as it insulates the person or group approving the project "from public awareness and the possible reaction to the individual members' environmental and economic values.

POET, *supra*, 218 Cal.App.4th at 731 (quoting Kleist v. City of Glendale, 56 Cal.App.3d 770, 779 (1976)).

By transferring decision making authority to the Executive Officer in the second phase, the Resolution 24-14 impermissibly separates the responsibility for approving the "project" (*i.e.*, the original proposal and all 15-day modifications) from the responsibility for completing environmental review, contrary to POET, *supra*, 218 Cal.App.4th 681.

Third, Resolution 24-14 authorizes results in *post hoc* environmental review. Because the initial regulatory proposal and any subsequent 15-day modifications are part of the same "project" under CEQA, authorizing the Executive Officer to perform "further environmental review" after the state board has already approved the "project" for purposes of CEQA, Resolution 24-14 expressly authorizes *post hoc* environmental review in violation of CEQA. (17 Cal. Code Regs., § 60004, subd. (e).). Moreover, CARB's voluminous response to comments appendix to the FSOR contains new and significantly amplified analysis of environmental and cost issues which were not before the Board when the project was approved in November.

Accordingly, to comply with its obligations under CEQA, CARB must present the Amendments, all 15-day modifications, and all environmental analyses to the CARB board before the "project" is approved.

V. At a Minimum, CARB Must Adjust the Effective Date of the Crop Requirements to Account for the Delay in OAL Approval.

The Crop Requirements become applicable as early as the effective date of the Amendments for some producers and, at the latest, 2026 for others. This timeline was already highly burdensome to the regulated community as the requirements place substantial new requirements on feedstock and biofuels producers, which will take significant time to implement (if they can feasibly be implemented at all). Now, OAL's disapproval and CARB's resubmission of the Amendments has further abbreviated the period between finalization of the requirements and their effective date. It would be arbitrary and capricious for CARB to maintain the original compliance deadlines in light of the regulatory delay and the substantial changes that biofuels producers would need to make to come into compliance with these new requirements, including purchasing and installing new equipment, negotiating contracts with new suppliers, and for some biomass suppliers altering (or rendering obsolete) the fundamental structure of their business models. At a minimum, CARB must delay the effective date and "first milestone" requirements until January 1, 2027, and the later stages currently set for 2028 and 2031 should be delayed accordingly.

VI. Conclusion

Thank you for the opportunity to provide input on the Amendments including the Third 15-Day Changes. The LCFS Program is a critical tool to addressing climate change, and we look forward to working with CARB to ensure the role of biofuels in making California's fuel mix more sustainable.

Sincerely,

Christopher P. Bliley
Senior Vice President of Regulatory Affairs
Growth Energy

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APRIL 21, 2025

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments on 15-Day Changes to the Low Carbon Fuel Standard

Dear California Air Resources Board,

Optima Analytics (Optima) appreciates the opportunity to comment on the modifications to the proposed modifications to the Low Carbon Fuel Standard (LCFS) amendments released on April 4, 2025. As the owner and managing principal of Optima, I have over 35 years of professional experience in environmental consulting and strategic business services for various industries. My expertise includes conducting economic analyses of proposed environmental regulations and evaluating the potential economic impacts of climate change on assets such as water storage and fisheries.

The focus of these comments are the economic consequences of the LCFS amendments' sustainability chain of custody traceability requirements. The comments cover two main areas:

- Implementation Costs of Sustainability Requirements
- Economic Impact on the California Market

Implementation Costs of Sustainability Requirements

The primary participants in the crop-based biofuels production supply chain include farms, grain elevators, biorefineries and the trucks and/or trains used for transportation of feedstock between the primary participants. The LCFS amendments impose new requirements on each of the many participants within the production supply chain. In addition, the timing and cost of compliance differs regarding each participant, assuming that the participants are able to comply with the requirements at all.

Regarding timing, the *Final Statement of Reasons for Rulemaking Appendix B Summary Comments and Agency Response* (RTC) includes the following statement: "In response to concerns around costs and timeline with respect to the complexity of supply chains, staff have added an implementation timeline to section 95488.9(g) that specifies a period of more than 5 years for fuel producers to become fully compliant with the gradually phased-in sustainability requirements." RTC at 440. However, the RTC further states that "The first milestone is that beginning with 2026 data year fuel producers will be required to provide geographic data on farm boundaries (shapefiles, coordinates) where feedstocks are being sourced." RTC at 440. In addition, section 95488.9(g)(2) of the LCFS indicates that "biomass used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow since January 1, 2008. Biomass must be cultivated and harvested in accordance with all local, State, and federal rules and permits."

Meeting the 2026 sustainability requirements will be a significant challenge for biofuel producers. Biofuel producers purchase grain from hundreds if not thousands of farms. A portion of the corn is sourced via direct contract with individual farmers. However, there are also many cases where sourced corn will pass through one or more grain elevators on the way to biorefineries. To comply with the 2026 requirements each farm, and corn elevator, supplying corn to biofuel producers will have to establish feedstock source tracking. Subsequently, feedstock sourcing must undergo third party verification beginning in 2028. The third-party verification process represents another daunting challenge as there may not be enough accredited third-party verifiers to complete the process by the time supply contracts are being negotiated for 2028 biofuel production.

Regarding cost of compliance, RTC includes the following statement "Staff estimates that annual implementation costs for the full sustainability requirements will be $4.7 million per year for the industry, an average of roughly $39,000 per company based on the number of biofuel producers in 2023." However, details regarding the basis for the $4.7 million dollar estimate are not provided.

The cost of meeting just the 2026 sustainability requirements will be substantial. Biofuel producers will need to employ personnel to ensure that feedstock is sourced from verified farmers and that all local, state, and federal regulations are being followed. This assurance will likely require the biofuel producers to hire new personnel focused on this task. In addition, there is likely to be investments in software upgrades for tracking this information. It is difficult to estimate the costs of software, but a rough estimate of personnel costs can be obtained. There are currently 192 unique facility IDs in the U.S. with ethanol or biodiesel pathways, per CARB data (LCFS Pathway Certified Carbon Intensities, 2025). For a conservative estimate, it is assumed that one full-time employee (FTE) could be responsible for two facilities (i.e. 0.5 FTE per facility) and that the work could be done by entry level employees with a college degree at an annual salary of 70,000 per year (College graduate salaries: 2025 projections, 2025). The total and annual cost of these additional employees is calculated at $6.7 million per year.

Then, substantial additional costs will accrue from third-party verification of farms and elevators in the supply chain process. Although the cost of validation could be negotiated between the parties, it is reasonable to assume that the biofuel producers will cover the costs of certification of farms and potentially grain elevators. If the costs of third-party validation, software, and additional training is accounted for, it is likely that the annual cost of compliance could exceed $12 million from employee, software, and verification costs alone.

Additionally, because the regulations do not allow a mass-balance approach to feedstock traceability, substantial additional costs will be incurred across the supply chain to implement physical separation of grain—assuming market participants are even able to comply with those requirements.

To achieve chain of custody traceability biofuel producers and grain elevators would be required to install and operate equipment that will allow for the separation of feedstock from LCFS certified farms from feedstock obtained from non-certified farms. In addition, biofuel producers would be required to add and operate equipment that will allow for the isolation of fuel produced for the California market from fuel produced from non-certified feedstock destined for consumption in other States and/or export for international consumption.

The estimated $4.7 million per year annual cost to industry contained in the RTC (page 441) seems to account only for from small portion of operational expenses incurred by producers and does not include capital and operating costs incurred by grain elevators that would allow for isolation of feedstock traceable to certified farms from feedstock from obtained from uncertified farms. The same is true regarding capital costs required by biofuel producers to isolate and load for transport biofuel produced from certified feedstock from biofuel produced from non-certified feedstock.

Significant capital costs for biofuels producers include additional items such as:

- **Process Vessels and Equipment:** Including fermentation tanks, stills and heat exchangers to allow for separate production of biofuels destined for the California market
- **Grain Storage Bins and/or Buildings:** To maintain separation of LCFS certified feedstock used in the production of ethanol for the California market.
- **Storage Tanks:** To isolate product prior to loadout for transport to the California market.
- **Process Control Panels and Software:** For operating equipment dedicated to ethanol the California production line.

Significant operating costs for biofuels producers include:

- **Additional Personne**l: For operating equipment dedicated to biofuels destined to the California market.
- **Costs to Assure Verification of Feedstock:** See previous discussion regarding the 2026 requirements as these costs will extend indefinitely and may be substantially larger once

third-party verification including auditing for compliance with a wide range of laws, plus as-yet unknown environmental practices.

Significant capital and operating costs for grain elevators include additional items such as:

- **Additional Personnel:** To oversee deliveries, track grain, and ensure that feedstock separation is maintained.
- **Additional Storage Bins and Related Equipment:** For maintaining separation of certified feedstock from non-certified feedstock

On top of all these categories of expenses are costs to farmers with grown grain that meets LCFS standards. Since the regulations do not specifically prescribe what those practices are, it is impossible to accurately assess such costs.

In sum, estimating the full cost of supply chain traceability requires estimating the capital and operational expenditures incurred by all participants in the supply chain. In 2009 Informa Economics performed a study focused on understanding the economic impact of traceability standards like those included in the LCFS amendments that were being considered for the Renewable Fuel Standard (RFS) (Voegele, 2009). As part of this study, Informa conducted a survey that included a survey of 12 companies that represented 20% of the ethanol production capacity at the time and 12 grain elevators that represented a wide array of operations in different regions of the country to gauge their opinions of the expected cost of the new requirements. The study ultimately found that upfront capital expenditures would be nearly $30 million and the annual recurring compliance cost $420 million (Voegele, 2009). This study was produced 16 years ago, assuming a conservate inflation rate of 2.5%, these capital and annual recurring cost estimates in present value dollars are calculated at $44 million and $621 million.[1]

Although there are likely differences between the traceability requirements considered by the RFS and those in the LCFS amendments, coupled with a more complete estimate of the costs throughout the supply chain, it appears that the $4.7 million annual operating cost provided in the RTC is a gross underestimate. A survey, such as the one performed by Informa (including farms), would be required to obtain a more representative estimate of the cost impact of the LCFS traceability requirements. In the absence of such a survey and given the information contained in the Informa study, it is reasonable to conclude that capital expenditures to achieve compliance with the LCFS traceability requirements will be on the order of tens of millions of dollars and that annual operating expenditures will be on the order of hundreds of millions of dollars.

[1] It should also be noted that the Informa study did not include the capital and annual compliance costs incurred by farmers to achieve and maintain certification.

Economic Impact on the California Market

The likely impact to the California market associated with the LCFS traceability requirements is that the volume of ethanol available to this market that meet the LCFS requirements will be substantially reduced unless all supply chain participants are able to recover a significant premium to offset these costs (likely in the form of higher fuel prices for consumers). Estimating the actual impact requires partial equilibrium analysis to estimate the interactions of supply and demand within the ethanol market or possibly general equilibrium analysis to understand how changes in the ethanol market interconnect with other markets simultaneously (e.g., the domestic and international market for animal feed. Without such an analysis, it is not possible to quantify with confidence the impact of the LCFS requirements on the volume of ethanol available to the California market and the associated price point. However, it is possible that volume reduction or price increases will be substantial.

Sincerely,

MANAGING PRINCIPAL

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Timothy J. Havranek, MBA, PMP

Managing Principal

PROFESSIONAL PROFILE

Mr. Timothy Havranek has 35 years of professional experience in environmental economics and strategic business services industry. He has extensive experience in the application of multi-criteria decision analysis and probabilistic modeling for a wide range of environmental and capital projects, including sediment dredging, mine closures, remediation, restoration, decommissioning, and alternative energy projects. He is skilled at the application of economic principles to environmental issues and finding ways to efficiently allocate resources while protecting the environment and improving business operations. Mr. Havranek has managed numerous large-scale environmental projects, working with multiple site owners, regulatory agencies, and environmental remediation firms to develop strategic and sustainable business liability and asset management solutions that minimize environmental and social risk.

Mr. Havranek is the author of two books. His most recent book, coauthored with Doug MacNair, PhD is *Multicriteria Decision Making – Systems Modeling, Risk Assessment and Financial Analysis for Technical Projects* published in 2023 by De Gruyter. His previous book is *Modern Project Management Techniques for the Environmental Remediation Industry*, published in 1999 by CRC Press.

CREDENTIALS AND PROFESSIONAL HONORS

M.B.A., Concentrations in Strategy and Finance, Carnegie Mellon University, Pittsburgh, Pennsylvania, 2006

B.S., Petroleum Engineering, Marietta College, Marietta, Ohio, 1982

Certified Project Management Professional (PMP) No. 981

RELEVANT EXPERIENCE

Economic Analysis / Modeling / Strategic Business Consulting Experience

Economic Analysis EPA Proposed Rule on Financial Responsibility Under CERCLA - Four industry associations involved in the Chemical Manufacturing industry required a technical review/critique of EPA's Proposed Rule on Financial Responsibility Requirements Under CERCLA Section 108(b) for Facilities in the Chemical Manufacturing Industry (85 FR 10128 February 21, 2020. As lead economist Mr. Havranek performed a detailed economic analysis of the effect of proposed ruling on the chemical manufacturing industry.

This analysis demonstrated the extent to which financial assurance requirements under the Resource Conservation and Recovery Act (RCRA), and financial disclosure requirements imposed by Securities and Exchange Commission (SEC) regulations and Generally Accepted Accounting Principles (GAAP), already effectively require companies within the chemical industry to provide financial assurance for potential cleanup obligations. The proposed rule was not implemented, and the report was referenced in the decision not to do so.

Non-Traditional Assets Impact Analysis – Performed a high-level review and economic analysis on behalf of a fortune 500 oil and gas company regarding the impact SEC-Climate Disclosures and new USEPA regulations. The non-traditional assets included fresh water, water storge, fisheries and aquaculture, and timber. The oil and gas company utilized the results of the analysis as part of their strategic planning and overall management of external risks.

Economic Analysis EPA's Proposed Renewable Fuel Standard (RFS) 2023- 2025 - In the role of lead economist working while working as an employee of Ramboll USA on behalf of an Industry Association of Biofuel Manufacturers, Mr. Havranek performed a review and summary of available research regarding the economic impact of proposed rule and the accompanying Draft Regulatory Impact Analysis (DRIA) along with many of the cited articles. His work included the development of analytical models with the purpose of confirming and/or refuting information in the DRIA and work performed by other researchers. His work helped demonstrate that that the RFS program has limited to no minimal to now effect on corn prices or LUC in the United States. Timothy assisted in the drafting of Ramboll's summary report regarding this project and later presentation of the results to the EPA. His work also included subsequent review of economic documents related to the EPA Biological Evaluation (BE) and a presentation to the EPA completed in March of 2024.

Multi-criteria Decision Analysis in Support of Sediment Early Action, —Created a model to select the optimum remedial alternative in terms or evaluation criteria and project uncertainties for a large port on the western seaboard. Included short- and long-term costs, revenue generation, agency and community acceptance, human health risks, and site disruption costs in the evaluation criteria. Used model results to convince upper-level management, regulatory agencies, and various project stakeholders that the best, most cost effective and protective alternative was selected.

Multi-criteria Decision Analysis for Plant Closure and Redevelopment —Assisted in the process of planning the decommissioning of a large automotive manufacturing plant. Presented the client with a decision model that had to account for the typical short-term decommissioning and environmental costs, but also the long-term socioeconomic and "reputational-risk" costs because of the interests and influence of stakeholders outside the client firm. Included decommissioning and environmental costs, revenue from property sale, financial risks, socioeconomic impacts, regulatory acceptance, and media reaction in the evaluation criteria. Helped to identify the most favorable alternative, considering all criteria, using transparent systematic processes through the multi-criteria decision analysis process. This recommended alternative has an expected value savings of approximately $20 million when compared to the alternative that was under consideration prior to the decision analysis.

Mine Restoration Multi-criteria Decision Analysis, —Used multi-criteria decision analysis to evaluate mine operations and environmental remediation alternatives for a large copper mine. Analyzed three alternatives, including closure in 1 year, continued operations for the next 20 years, and then closing and expanding mine operations. Included community acceptance, cleanup standards achieved (residential/industrial), net present value, cash flow, and time frame for site resolution in the evaluation criteria. Indicated through the model that continued operations until 2017 is the preferred alternative, and that it represents an expected net present value savings of in excess of $50 million over the next best alternative (closure in 1 year).

Net Environmental and Community Benefit Analysis (NECBA) for Mining Reclamation Project, Confidential—Developing a tool that integrates the NECBA approach into the EPA Green Remediation Initiative and the CERCLA remediation nine criteria analysis to help a client analyze alternative mining reclamation strategies. The goal is to provide state and federal regulators with a rigorous, defensible analysis of alternatives that accurately captures the environmental, social, and economic impact of the strategies.

NECBA for Solar Project, Confidential—Working with an energy company to assess the potential value of a demonstration solar facility at desert mining site. The analysis is assessing potential financial, environmental, and community impacts of alternative sizes for the project and developing a strategy for addressing regulatory approvals. The NECBA Model is a form of multi-criteria decision analysis and provides a systematic, transparent method to quantify the impacts of alternate strategies.

Airport Deicing System Multi-criteria Decision Analysis, Confidential—Developed a multi-criteria decision analysis model to evaluate different deicing alternatives at a West Coast airport terminal. Evaluated six alternatives in terms of cost, risk, and stakeholder criteria, including compliance, cost effectiveness, effect on operations, and stakeholder acceptability (regulatory, community, airlines), within a Monte Carlo uncertainty analysis framework. Evaluated results using criteria weights associated with three stakeholder groups. Identified an alternative acceptable to all three stakeholder groups. Although the alternative represented an increased expected value cost of nearly $2.5 million over the least cost alternative, the stakeholders were willing to invest the additional funds to better satisfy identified criteria and objectives.

Portfolio Probabilistic Modeling, Oil and Gas Company, Confidential—Developed a probabilistic model to estimate remediation costs for approximately 2,100 active sites and 900 future sites. This model built upon work performed by the client and other consultants. Used linear regression techniques to develop mathematical functions to represent the potential range of costs at each site in the portfolio. Compiled these mathematical functions into a cost model, and ran a simulation to generate cost versus probability curves and descriptive statistics for each group of sites and the portfolio.

Portfolio Probabilistic Modeling, Regional Utility Company, Pittsburgh, Pennsylvania—Utilized a combination of decision trees and spreadsheet Monte Carlo simulation to estimate environmental liabilities at 12 former manufactured gas plants. This modeling identified the opportunity to reduce environmental reserves by more than $10 million, and provided the client with a ranking of sites to better focus efforts on those sites involving the highest degree of risks and costs.

Environmental Remediation Experience

CERCLA Feasibility Study, Paoli, Pennsylvania—Served as project manager for a CERCLA remedial investigation and feasibility study, primarily required because of PCB contamination, of a 28-acre active railyard facility. The study addressed elements of RCRA and TSCA regulations as well. Project consisted of technology screening, six treatability studies, and the development/evaluation of remedial alternatives for soil, sediment, groundwater, and surface water. The findings of the feasibility study led EPA to approve stabilization/solidification as the remedial technology of choice to address soil impacts. Approval of this technology saved the customer more than $15 million over EPA's originally most-favored technology, dechlorination by potassium polyethylene glycol.

RCRA Facility Investigation, Gainesville, Virginia—Served as project manager for a site investigation, interim measures, risk assessment, and a corrective measures study of a 420-acre defense facility contaminated with volatile and semivolatile organic compounds and metals. Saved approximately $250,000 on investigation cost with a subsequent $1 million savings on total project costs due to the investigative techniques researched and recommended. Successfully and cost effectively addressed governmental and social concerns regarding deep groundwater contamination.

RCRA Interim Measures, Sharon, Pennsylvania—Served as project manager for the design, installation, and operation of an *in situ* soil venting system for a 6-acre facility that required immediate intervention due to chlorinated impacts in soil and groundwater. Although prior theoretical calculations had estimated volatile organic compound removal at a rate of 10 pounds per day, the installed system achieved volatile organic compound removal at three times that rate. The project approach led to $400,000 in savings on an estimated $700,000 project.

Pennsylvania Department of Environmental Protection (PADEP) Project, Pittsburgh, Pennsylvania—Served as project manager for the required investigation and the determination of remedial action due to numerous site contaminants including petroleum hydrocarbons, chlorinated solvents, lead, and arsenic at a 12-acre grease manufacturing plant. Project consisted of strategic planning, site investigation, a feasibility study, groundwater monitoring, and interim measures. Saved an estimated $300,000 in project cleanup costs due to the identification of asphalt incorporation for impacted soil remediation. Also developed a 3-year remedial plan that stayed within 2 percent of original annual budget through the identification of asphalt incorporation for impacted soil remediation.

CERCLA Project, Union City, Indiana—Served as project manager for the site investigation, technology evaluation, feasibility study, pilot testing, and remediation of a 14-acre electric motor manufacturing plant. Addressed regulatory concerns that required the accelerated installation of an interim remediation system. Completed the project within budget and a tight deadline using a concurrent engineering approach, as well as selection and implementation of high-vacuum dual-phase extraction technology.

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PROFESSIONAL AFFILIATIONS

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