

**Testimony of Carlos A. Riva
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Before the House Agriculture Committee
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Introduction

Mr. Chairman, Mr. Ranking Member and members of the Committee, thank you very much for inviting me here today. My name is Carlos Riva and I am President and CEO of Verenium Corporation. I am very honored to have this opportunity to speak with you about my company's vision for advanced biofuels, and the great promise they hold for reducing the carbon footprint of our automotive fuels sector. These new fuel technologies hold tremendous potential to enhance our nation's energy independence, promote economic renewal and spur job creation in rural areas, as well as to generate significant reductions in overall carbon emissions. But we are all aware of concerns that have been voiced about the fairness and workability of the EPA's new RFS2 proposed rule. This morning, I would like to offer my own thoughts on how Congress and the Administration can move forward, in a way that supports all of these goals including carbon emissions reduction, but with a regulatory approach that is more effective and less burdensome to this emerging industry at this critical stage.

Overview of Verenium

Let me begin with a brief description of Verenium. We are a leading developer of cellulosic ethanol process technology and specialty enzymes. We have positioned ourselves to be among the first major producers of cellulosic ethanol in the U.S. Building on a 15-year history, we have pursued a methodical approach to developing and scaling our technology, which is based on breakthrough early research at Florida State University and work at several National Laboratories. In the two years since the announcement of the merger that formed our company as the first pure-play public cellulosic ethanol company, we have raised and invested nearly \$300 million to develop and advance our biofuels process technology. Roughly 90% of this funding has been raised from private sources, including more than \$110 million through a landmark technology development alliance and commercial joint venture with BP. We have also won nearly \$30 million of cost-shared support in several competitive DOE funding solicitations.

Last year, Verenium completed construction of one of the nation's first true demonstration-scale cellulosic ethanol production facilities in Jennings, Louisiana. This \$80 million, 1.4 million gallon per year facility is now fully commissioned and undergoing process optimization. It serves as a centerpiece of our ongoing research and development efforts into new feedstocks and process innovations. Let me extend an invitation to any members of the committee who wish to visit it to see what I believe is the leading edge demonstration of cellulosic ethanol process technology at scale in the United States. More recently, in February, the BP/Verenium joint venture announced plans for a first commercial-scale facility to be constructed in Highlands County, Florida, with a targeted in-service date of 2012. A second commercial-scale project in the Gulf Coast is also in advanced development.

The RFS2 Proposed Rule: Initial Observations

Mr. Chairman, let me briefly address the new proposed rule that led to the convening of this hearing. Many have voiced concerns about the interpretation that EPA appears to have placed on Congress's direction in the Energy Independence & Security Act of 2007. The RFS2 rule aims to implement the mandate for production of 36 billion gallons of renewable fuel annually by 2022. We are all just becoming familiar with this 1000-page rule. However, the initial industry reaction is that it is unduly prescriptive, and overly focused on claims of indirect land use impacts of biofuels while overlooking the market-mediated impacts of other fuel pathways. Let me be clear that our company has long been on record in the California Low Carbon Fuel Standard proceeding, as opposing the selective enforcement of penalties on biofuels based on such claimed indirect effects, so this is a matter of great concern to me.

At the same time, I understand the genesis of concern about this issue. The world did in fact witness widespread clearing of land in Indonesian rain forests a few years ago to make way for palm plantations designed to meet the European biodiesel market. Clearly, we must take steps to ensure that similar strategies are not employed to meet the needs of the US biofuels marketplace to meet the mandates of RFS2.

But I have every confidence that there are more effective, and much less invasive, ways to ensure that the legitimate goal of this provision in EISA can be met. The best way forward, I believe, is to encourage the advanced biofuels industry to innovate and evolve solutions using the right combinations of technologies, lands, feedstocks and processes. Rather than extending existing methods to new areas, we need to look at optimizing the production of food and biomass feedstocks from the lands that support each most effectively, wherever they are found. I have every confidence that, by following this path, we can actually reduce the pressures that drive concern about international land use change. This is an algebraic problem with several variables, not an arithmetical zero-sum game. If we approach it creatively, we can achieve the highly desired outcome of more food, more fuel and lower carbon emissions.

How should EPA's proposed rule be specifically modified? In my view, as of today, and for the immediate future, there are not, and will not be, any "significant" indirect impacts from advanced biofuels production – the literal test required by the terms of EISA. This conclusion is valid by definition, I would contend, because there is zero commercial-scale production of such fuels today, and there are only trivial quantities of advanced biofuels production in prospect in the immediate 3-5 year time horizon. We have the time to get this right, and we must get it right. Now is the time for policymakers to do everything possible to encourage the advanced biofuels industry to take root and grow, so that we may gain the experience necessary to assess its prospective impacts based on facts rather than speculation. It would be fully consistent with the test required by EISA, in my view, for EPA to defer adopting any calculation of land use impacts until a specific milestone is met, for example, the first 500 million gallons of advanced biofuels production capacity is actually in place. This approach of regulatory forbearance would give the first commercial producers of advanced biofuels the room needed to experiment, innovate and attract capital – which will be critical if this industry is to succeed.

Once there is an actual base of experience, it will be possible to devise rules, if necessary, that are sensible, relevant and responsive to actual circumstances. From the outset, agencies like DOE and USDA, that are involved in supporting advanced biofuels commercial-scale deployments, should encourage project developers to use strategies aimed at optimizing land use and feedstock production. I would not be opposed to putting producers on notice that poor land use decisions in the first projects undertaken during this early period would likely increase the threat of direct regulation of future projects later on. But a more flexible approach of this nature would spur progress by putting the focus on innovation, rather than narrowing choices of

available pathways to production. The approach I am recommending, I believe, is the way to figure out the pathways to advanced biofuels production that are truly scalable and sustainable.

Verenium's Strategy for Biofuels Production

Having offered this regulatory perspective as background, I would now like to offer a fuller discussion of Verenium's experience and thinking on feedstock issues, and to describe how these have led us to frame our own approach to building a sustainable, commercial cellulosic ethanol industry.

A few points about our commercialization program stand out. For example, we have chosen to focus on the use of high-biomass grassy feedstocks that do not compete with food. We have developed a preference for perennial crops that do not require annual tilling. These crops can be grown inexpensively and on a sustainable basis in many areas throughout the warm, moist Gulf Coast region in the Southeastern U.S. We are looking for opportunities to work with growers who can produce these crops on previously-cultivated land, including land that is fallow, in pasture, degraded and not suitable for food agriculture.

At our Highlands Ethanol facility in Florida, our plan is to grow energy cane. This is a high-fiber cultivar of cane, developed at Louisiana State University in the 1970s, that has been shown to produce up to 18-20 tons per acre. At projected conversion rates, this rate of growth could result in per-acre ethanol yields of up to 1500-2000 gallons. This level of production is several times higher, on a per-acre basis, than is possible with conventional crops on prime acreage in the nation's grain belt.

Verenium's technology is not limited to this or any other specific crop. In fact the Verenium process can use a wide variety of other feedstocks. In the Southeast, it could be applied on sugarcane bagasse, woody biomass or sorghum. In other regions, it could be adapted to biomass sources such as switchgrass or corn stover in other regions. We found it notable, though, that neither energy cane nor sugarcane bagasse was identified among the pathways identified by EPA or the CARB. In fact, the California Air Resources Board's draft rule projected that cellulosic ethanol would result in yields in the range of only 250 gallons per acre. The CARB estimate is only a small fraction of the per-acre yields that we believe are possible with the approach I have outlined.

Verenium's core process technology is based on a low-energy, enzymatic or biochemical pathway to biomass conversion. Compared to proven thermochemical approaches that have been in use for decades, the biochemical pathway is less mature, and is still being perfected. Yet, as a company with expertise in enzyme screening and expression, we believe this approach offers the best long-term promise in several critical dimensions, e.g., overall energy efficiency, reduced carbon intensity, and the potential for achieving the lowest long-term cost of production. Finally, Verenium's basic technology platform is designed around the conversion of all available sugars – both five-carbon and six-carbon sugars found in cellulose and hemicellulose, further increasing yields and enhancing the energy and carbon balance of production.

Verenium's focus on commercialization has also led our company us to become highly focused on feedstock logistics. There are many technology pathways for converting biomass to biofuel in the laboratory. But in the long run, the difference between profit and loss will be one's ability to cultivate, harvest, transport, store and process feedstocks in large volume, economically.

We believe it is important not to underestimate the complexity of the challenge of commercializing advanced biofuels production. There are no shortcuts to commercial success. Rather, we have taken the time to verify our cellulosic ethanol technology at the bench and pilot scale, and are now doing so at the demonstration scale at our Jennings facility before embarking on a first commercial-scale facility through our commercial joint venture with BP. We believe this patient, methodical approach will enable us to be among the first companies to achieve full-scale, continuous production of cellulosic ethanol in the United States if not the world.

Advanced Biofuels Industry Requirements – Near-Term and Long-Term

In the remaining portion of my testimony, I would like to offer a few further thoughts about actions the government can take to enhance the prospects for success of the advanced biofuels industry, both in the near term and in the long term. The 36 billion gallon mandate in the new RFS includes 21 billion gallons to be produced from cellulosic and advanced biofuels. Given that there is no commercial cellulosic biofuel production in place at present, and a target of 1 billion gallons by 2013 (more than all current US biodiesel production), it is natural to ask: what are the most effective remaining steps that must be taken to ensure that the first generation of commercial cellulosic biorefineries are in operation in the next 2-3 years? Likewise, what do we need to do to ensure that the industry fully develops so that it can supply 16 billion gallons of cellulosic biofuels by 2022?

Earlier this month, the Obama Administration took a critical step forward by establishing a new Interagency Working Group with the goal of clearly aligning the activities of USDA, DOE and EPA to support the objective of rapid commercialization of advanced biofuels. This clear alignment of purpose among these three agencies, I believe, will be of critical help in achieving the overall goals shared by Congress and the Administration.

Near-term needs. To ensure success, I believe that the federal government needs to be a full financial partner in these early commercialization efforts. Under the best of circumstances, commercial lenders are leery of financing pre-commercial energy technologies. The current economy makes it essentially impossible to obtain commercial financing for advanced biofuels projects; there is essentially no alternative to government financing for these first-of-a-kind plants. While USDA's loan guarantee program framework is a good start, the 80 percent federal limitation has made it essentially unusable for most cellulosic ethanol projects. Companies like Verenium are going to struggle to find 20 percent private project financing.

We would also urge USDA to expedite its implementation of the Title 9 Farm Bill bioenergy programs written into law in the 2008 Farm Bill. These are important and promising new programs that could provide critical help on the feedstock end, by spurring grower interest in shifting into bioenergy crops. It is especially important to get the Biomass Crop Assistance Program up and running, as it will help growers to overcome a natural degree of resistance to shifting into non-traditional energy crops that do not receive traditional crop protections.

In addition to these recommendations, we have voiced support for a recommendation put forth to the Ways and Means Committee under which cellulosic biorefineries would have the option to monetize their investment tax credit in the same fashion as was put into place for wind and solar energy producers in the recent stimulus bill. Such a mechanism would offer immediate value

and would be more certain to stimulate biorefinery development than tax credit mechanisms that only generate value when they offset taxable income.

Long-term needs. It is impossible to overestimate the importance of stability and continuity in the RFS policy enacted into law in the Energy Independence and Security Act of 2007. This law serves as a foundation for the advanced biofuels industry. It must remain durable if the advanced biofuels industry is to attract the billions of dollars of investment capital required to prove out and scale up the opportunity.

Finally, it is essential to the long-term health of the biofuels industry that Congress formulate an approach for addressing the “blendwall” problem. While EISA is intended to drive our industry toward increased production capacity, the EPA 10% blending limitation acts effectively as a quota on ethanol use. I would note that, even the currently-pending waiver request for approval of blending to the level of E15 were granted in full, it would not begin to address the long-term problem of market uncertainty facing the advanced biofuels industry. Thus, I believe it is critical for Congress to focus on steps to develop the infrastructure required to expand the use of ethanol above and beyond the blend market. Specifically, I would urge Congress to move promptly to adopt the Open Fuel Standard, which requires flexible fuel capability for a rising fraction of new vehicles sold in the United States. In parallel, I would urge Congress to enact rules and funding mechanisms aimed at further accelerating the installation of E85 dispensing infrastructure, especially in areas of the country beyond the grain belt where most E85 infrastructure is currently concentrated.

Conclusion

In closing, Mr. Chairman, I would like to express my deep appreciation to you and to the other members of this Committee for the opportunity to testify today. Recognizing the concern we share about the potential impact of new regulations on land use for biofuels production, I would reiterate my view that a more flexible approach is warranted for now to enable our industry to gain needed experience. All of us are concerned about passing along a healthy environment to our children. We are also concerned about achieving all of the other critical goals of advanced biofuels deployment – including energy security, economic renewal and jobs creation. All of these goals are important. None can be entirely subordinated to the others. I have every confidence that with a more flexible approach, we can work together to achieve a future with greater economic opportunity for our nation as well as more food, more fuel and lower carbon emissions.

This concludes my testimony. Thank you and I look forward to the opportunity to address your questions.