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INDUSTRY ORGANIZATION

May 2, 2006

Regional Greenhouse Gas Initiative (RGGI) Staff Working Group
Connecticut Department of Environmental Protection
Phoenix Auditorium, 5th floor
79 Elm Street
Hartford, CT 06106-1650

Re: Biotechnology Industry Organization (BIO) comments for May 2, 2006 RGGI Stakeholder Meeting

Dear RGGI Staff Working Group Member,

The Biotechnology Industry Organization (BIO) appreciates the opportunity to submit comments for the Regional Greenhouse Gas Initiative (RGGI) stakeholder group meeting to be held on May 2, 2006. BIO is the world's largest biotechnology trade association, representing more than 1100 biotechnology companies, academic institutions, state biotechnology centers and related organizations in the U.S. and in 31 other nations. BIO members are involved in the research and development of health-care, agricultural, industrial, and environmental biotechnology products. BIO's Industrial and Environmental Section (IES) section represents life science, biotechnology and bio-industrial companies that apply biological solutions to improve manufacturing processes and products. Industrial biotechnology is a new tool that can be used in reducing greenhouse gas emissions.

The BIO IES supports the efforts of the RGGI in addressing the issue of climate change by developing a cap and trade program for greenhouse gas emissions from electric power plants, and is submitting comments in response to the second question to be addressed during the stakeholder meeting regarding recommendations for the states in finalizing the offsets component in the model rule.

In the current RGGI model rule, up to 3.3% of emissions from a particular source may be offset by investments in emission reduction or carbon sequestration outside the power sector. One specific option in the current rule for offset projects is the reduction or avoidance of CO2 emissions from natural gas, oil or propane end-use combustion due to end-use energy efficiency. Many industrial biotechnology processes and products produce reduced CO2 emissions and other greenhouse gases, representing an opportunity for these companies to participate in the RGGI program; however, the detailed language in the model rule restricts qualifying projects to "existing or new commercial or residential building(s)". We ask that the RGGI Staff Working Group consider expanding

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the current model rule to include the commercial utilization of industrial biotechnology products as eligible offset projects. The following is a brief description of industrial biotechnology and specific case studies that demonstrate the greenhouse gas emissions reductions that result from these processes.

Industrial Biotechnology – Current Case Studies

Industrial biotechnology companies utilize workhorses from nature, such as microorganisms and biological catalysts (enzymes) to improve efficiency and reduce environmental impact of industrial manufacturing. These companies apply innovative techniques of genomics, proteomics, and bioinformatics to maximize and optimize biochemical pathways in microbes which are then used to produce fuel from agricultural biomass, to make biobased products such as clothing and plastics, and for many other purposes aimed at making consumer products in a sustainable way.

These technologies can be applied to existing manufacturing processes or used to develop new products from renewable, "biobased" feedstocks. To demonstrate the diversity of industrial biotechnology applications, included below is a chart from an Organization for Economic Cooperation and Development (OECD) report that details 21 case studies of industrial biotechnology in use in the manufacturing sector. The report, entitled *The Application of Biotechnology to Sustainable Industry*, is attached for your information. In this study, many of these cases quantified CO2 emission reductions:

Industry/ Sector	Pharma	Fine Chemicals	Bulk Chemicals	Food & Feed	Textiles	Pulp & Paper	Minerals	Energy
Austria						1		
Canada						2		2
Germany	2			1	1			
Japan		1	1	1				
Netherlands	1			1			1	
S. Africa							1	
UK		1	2					1
USA			1					

Further analyses of specific industrial biotechnology processes and product life cycle demonstrate that these processes result in less expensive, more environmentally friendly products and a smaller CO2 footprint as compared to traditional methods. First, in many cases, industrial biotechnology uses renewable feedstocks instead of fossil fuels, thereby releasing less carbon dioxide into the atmosphere. Second, industrial biotech processes use less energy, which also contributes to lower carbon dioxide as compared to traditional manufacturing processes. Third, scientists are developing microorganisms that can sequester or consume carbon dioxide, which can result in further reductions.

Many industrial biotechnology companies are realizing substantial greenhouse gas emissions reductions in their manufacturing processes. Several examples include:

Biopolymers

- **NatureWorks LLC** produces a biopolymer called polylactic acid (PLA) that is made utilizing plant sugars extracted from corn. These sugars are fermented in a process similar to making yogurt, and the products are then transformed into the high-performance PLA polymer. PLA can be spun into fibers for use in clothing, carpeting, bedding and home furnishings, or can be molded into plastic products such as thin films, thermoformed food containers, and other packaging.

  PLA demonstrates many environmental and economic benefits as compared to petroleum-based plastics. PLA is currently being made from corn, a 100% annually renewable resource, is greenhouse gas neutral, and is compostable in commercial composting conditions. Additionally, PLA is competitively priced with traditional petroleum-based plastics used for packaging, an important factor especially considering today's increasing crude oil prices. Currently, Wal-Mart and NatureWorks are working to convert much of Wal-Mart's grocery retail packaging from petroleum-based plastics to NatureWorks PLA. This is part of Wal-Mart's long term sustainability initiative to reduce their overall environmental footprint announced by Lee Scott, the CEO of Wal-Mart Inc., last fall. The initial estimated greenhouse gas savings of some of these packaging changes is equivalent to a GHG savings of 11,957,000 pounds per year, or eliminating the CO2 emissions from driving a car 14,300,000 miles in one year.

- **DuPont** has successfully developed the technology to commercially produce its proprietary 1,3 propanediol (PDO) polymers from corn instead of petrochemicals. DuPont and Tate & Lyle PLC have announced the formation of a joint venture that will commercially produce PDO derived from corn (Bio-PDO™) to replace petrochemicals in the production of polymers for many end-use applications, including textiles, carpeting, plastics, and films. In this process, starch from corn kernels is processed by the corn wet mill into corn sugar, which is then fed to a proprietary process of fermentation, separation, and refining to produce Bio-PDO™. The first Bio-PDO™ plant is expected to go online in late 2006. Using this process requires 40% less energy than the equivalent petrochemical process. At full capacity, this manufacturing process will result in an energy savings of 10 million gallons of gasoline in one year.

Biofuels

- Several industrial biotechnology companies are involved in developing enzymes which are essential for the production of ethanol fuel from feedstocks such as corn, corn stover, wheat straw and switchgrass. Fuel ethanol, as compared to energy generated from petroleum, has the triple benefit of using a completely renewable resource, utilizing less energy to produce fuel, and resulting in lower greenhouse gas emissions when combusted.

The U.S. has a large supply of cellulosic biomass to meet energy needs sustainably, and enzymes developed through industrial biotechnology processes are integral to the development of this alternative fuel source. In addition to improving the current U.S. energy situation, the development of cellulosic ethanol can also boost economic activity by allowing farmers to harvest two crops from a single field. Production of cellulosic ethanol generates a net energy 8-10 times the input required to produce it, and results in reduced CO2 emissions by 90% as compared to oil.

Pharmaceutical/Vitamin Production

- Production of vitamin B2, an important food and feed supplement, was traditionally manufactured with glucose as a feedstock, followed by six chemical steps using hazardous chemicals. With the industrial biotechnology process, vitamin B2 is produced in one step from glucose. The process is significantly less chemical intensive, results in carbon dioxide emission reductions of 50%, and reduces energy demand by 20% as compared to the traditional method.

- Cephalosporin C, a class of antibiotics active against certain gram-negative bacteria, was originally produced in a 10-step, chemically intensive process. Through the use of a biocatalyst, this method can be replaced with a single-step fermentation process, reducing carbon dioxide emissions by 50% and energy demand by 20%.

These case studies provide compelling evidence that industrial biotechnology products and processes result in not only lower costs, but significantly reduced greenhouse gas emissions that are a valuable source of emission offsets in the RGGI. For additional reference, a report entitled *Applications of Biotechnology to Mitigation of Greenhouse Warming* is attached.

The BIO IES appreciates this opportunity to submit comments on behalf of industrial biotechnology company members for this stakeholder meeting, and requests that the RGGI extends its model rule to include the commercial use of industrial biotechnology products as eligible offset projects.

If you are interested in learning further detail on industrial biotechnology greenhouse gas reductions, and how these technologies may fit into the RGGI scheme, please do not hesitate to contact me at (202) 962-6640, or berickson@bio.org.

Sincerely,

Brent Erickson
Vice President, BIO IES

Attachments (2): The Application of Biotechnology to Industrial Sustainability
Applications of Biotechnology to Mitigation of Greenhouse Warming