ENVIRONMENTAL CONSEQUENCES OF CONVERSION PLANTS: OPTIONS FOR MANAGING TRADEOFFS

[FIRST SLIDE] As introduced, I work for the Central States Air Resource Agencies Association known as (CenSARA). The member states are the air quality regulatory agencies in the 9 central states as highlighted on this map. CenSARA provides training and air quality project management to these states. One such project was coordinating workshops in response to the permitting issues of biofuel conversion plants in the CenSARA region. CenSARA initially worked with state staff in both air and water quality.

[SECOND SLIDE] Of the 194 ethanol biorefineries (existing or under construction), 111 of those are located in CenSARA member states.

[SLIDE THREE] I listened carefully to the information presented yesterday by the Corn Growers Association stating that so much misinformation had been communicated in the press about ethanol production and the crops comprising the feedstock for ethanol production. One distinction I would make today is that this country has

not planned for the volume of water that goes into the production of ethanol inside the conversion plant itself. A typical 120 million gallons a year ethanol conversion plant operating 353 days a year could expect to use 565 million gallons per year of raw production water, and 460,000 gallons per year of on-site Potable Water. Like many others, state environmental regulatory agencies are concerned with the long-term sustainability of ground and surface water near these facilities. The water quality coming into the conversion plant determines the amount and types of chemical treatment that must be applied so that the water can be used in the production process. The least amount of treatment is when there are low total dissolved solids (TDS) and low mineral concentrations of iron and manganese. Source waters with high levels of TDS and minerals require chemical treatment that results in brine wastewater. With the formation of brine, the conversion plant must meet additional water quality discharge standards. Generally, the least expensive option is to dilute and release to a nearby stream. That option requires yet more water use. This method is not full proof as the stream flow year round is not constant. The conversion plant must adjust

pollutant concentration levels on a constant basis. Another brine disposal practice, pumping down a drilled and encased well shaft has unintended environmental consequences of possible migration into drinking water aquifers. A discharge to land is generally prohibited and a discharge to any area considered a wetland has to be mitigated. Discharges of any type from the conversion plant are regulated.

[SLIDE 4]

There are many air quality regulatory issues for conversion plants. There are differences in construction technology that pose unique air quality permitting challenges. I was particularly glad to hear from one of the largest ethanol producers yesterday that they believe they have perfected the ideal construction design that eliminates some of the air quality emissions from the conversion plant. Not only do states not permit equally, different types of construction design require separate engineering analysis before a permit can be written thereby increasing the amount of time before a permit is completed. Most conversion plants attempt to meet what is known as a “minor” source classification as there are less complicated rules and reporting requirements with that

classification. One of your handouts speaks to a very small subset of acronyms. Follow along if you will on the various requirements that biofuel conversion plants must meet. The conversion plant must meet MACT, NSPS, and NESHAPS. Translated means that environmental regulatory agencies need an accurate accounting of the types and amounts of emissions produced in a facility. Not only do we need to know process emissions, but we also need to know projected excess emissions during plant shut downs, start ups, and plant malfunctions. Some states require a calculation for particulate emissions from haul roads leading into the plant. Stack tests from existing biofuel conversion plants show the formation of acetaldehyde and other Hazardous Air Pollutants which triggers other permitting considerations. Most ethanol plants have two shut downs every year where the scrubbers are turned off and uncontrolled emissions from the fermenter are vented to the atmosphere for about 50+ hours. Those emissions when added to the process emissions generally make the conversion plant a major source. Bad batches or upsets at the conversion plant also release pollutants to the atmosphere. Loading rail cars or semi-tankers releases pollutants to

the atmosphere. Another component of air quality emissions at biofuel conversion plants involves the sulfur content in natural gas which generally has not been correctly identified and shown in permit applications.

Transportation of feedstock to a conversion plant that produces 125 million gallons per year takes approximately 40,000 semi truck loads generally down dirt roads and through small communities causing concern over road maintenance, traffic congestion, and esthetics.

Finally, permit engineering calculations show that ethanol conversion plants generate approximately 8 pounds of CO2, a greenhouse gas, for every 1 gallon of ethanol produced.

[SLIDE FIVE]

An environmental regulatory concern from biodiesel conversion plants is the production of glycerin. Land application of glycerin has been used to dispose of this by-product but that practice is not acceptable in many states. It's preferable for glycerin to be collected and then sold in a resale market. If that option is not available to the biodiesel conversion

plant, alternative disposal remedies are required which might entail paying for disposal.

[SLIDE SIX]

On the back side of your handout, there is a brief discussion of thermal oxidizers and regenerative thermal oxidizers known as TOs and RTOs. RTOs currently provide the best emission reductions from conversion plants when followed by scrubbers in the stack. The destruction efficiency of RTOs is approximately 98% of all pollutants. This is particularly effective for removing hazardous air pollutants. Scrubbers virtually eliminate particulate matter. A closed loop system at a conversion plant would use proximity to a confined animal feeding operation to capitalize on methane recovery from a manure pit to provide power for all or most of the needs of the facility. And the mash left over from biofuel production would be added to the feed stream for the animals.

[SLIDE SEVEN]

Also on your handout there is a listing of most of the air quality environmental regulatory requirements for conversion plants. EPA

regulations are promulgated under title 40 of the Code of Federal Regulations. One requirement is that facilities (all facilities) in an area that is designated as being in attainment for the National Ambient Air Quality Standards also known as NAAQS, must demonstrate that the emissions from a newly constructed facility will not be detrimental in maintaining the NAAQS. A PSD permit requires facilities to make that demonstration through air modeling.

[SLIDE EIGHT]

Where do we go from here? Understanding the total emissions from conversion plants requires stack testing across multiple process cycles which takes 3-6 days. It is expensive and time consuming. To date RTOs show good results for pollutant destruction. And RTOs followed by scrubbers show the best results for pollutant destruction. As we learned yesterday and today, there are several different designs for conversion plants each bringing different levels of environmental risks. State environmental regulatory agencies want to work with the agricultural community to ensure that biofuel production is a net benefit to the environment. The time to involve those agencies is when you are

just thinking about constructing a biofuel conversion plant. Many agencies offer a one-stop shop appointment where staff from all media (air, water, land) discuss your plans and respond to your questions. We look forward to being part of the renewable fuels future. Thank you.