Celanese

November 8, 2013

VIA FED EX

Aimee Wilson
Air Permits Section
U.S. EPA Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202

Re: Supplemental Information Regarding Celanese Clear Lake Plant Permit – No. PSD-TX-1296-GHG

Dear Aimee:

Celanese Ltd. ("Celanese") is submitting the following supplemental information to EPA Region 6 to provide clarification and address issues raised by the Sierra Club in comments to and in subsequent discussions with the Sierra Club regarding the draft PSD permit for GHG emissions for construction of a new methanol unit at Celanese's Clear Lake Plant in Pasadena, Texas (PSD-TX-1296).

Celanese's proposed process for methanol production at its Clear Lake Plant, a combined reforming process, is more efficient and would emit less CO_2 than the other methanol facilities recently permitted by EPA. In fact, as demonstrated by the enclosed graph, the combined reformer process would result in lower CO_2 emissions even if these other facilities added carbon capture and sequestration ("CCS") to control CO_2 emissions. The significant emissions reductions that will be achieved by using this technology will set the new Best Available Control Technology ("BACT").

CCS was rejected in step 4 of the BACT analysis for the Celanese methanol project. The Sierra Club raised several issues with the EPA's basis for that determination, including cost effectiveness, calculation of natural gas prices and adverse environmental impact. Celanese recognizes the importance of all three factors to EPA's analysis and recommends that EPA confirm that these factors form the bases of its BACT analysis.

1. Cost Effectiveness

The EPA's statement of basis for the Celanese methanol project includes two approaches for evaluating the cost effectiveness of CCS: dollar per ton ($/ton) of CO_2 removal and total cost of CCS. Using either approach, CCS is not a cost effective control for this project. However, we agree it would be most appropriate for EPA to rely on $/ton of CO_2 reduced for evaluating the cost effectiveness of CCS. Such an approach is more consistent with EPA's historical guidance. Therefore, Celanese asks that the EPA clarify that its cost effectiveness is based upon the $/ton analysis, not a comparison of CCS cost to overall project cost. An updated $/ton analysis is enclosed.

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2. Fuel costs

When analyzing the fuel costs associated with this project, Celanese assumed a natural gas price of $5/MMBtu. Sierra Club's comments noted that the Cost Manual does not allow for escalation of natural gas prices and that a current natural gas price should be used to calculate the cost of CCS. Celanese agrees that it is reasonable here to use current natural gas prices. The revised analysis uses a 12-month average from Henry Hub spot natural gas pricing (the 12 mos. average from 2012 is about $2.77/MMBtu). Using this cost would not change the outcome of the BACT analysis and would only reduce the projected cost of CO_2 reduction from $137/ton to $101/ton. CCS would still not be cost feasible at this price.

3. Adverse Environmental Impact

As the NSR Manual states, energy and environmental impacts are valid factors the EPA may consider when determining BACT. *See* NSR Manual at B. 46. Sierra Club's comments noted that the adverse impacts identified in the draft permit result from emission of criteria pollutants, which do not constitute an adverse environmental impact sufficient to reject a BACT alternative. The NSR Manual states that "the environmental impacts portion of the BACT analysis concentrates on impacts other than impacts on air quality (i.e. ambient concentrations)...." *Id.* Celanese agrees with Sierra Club that adding CCS to the project would not result in adverse environmental impacts.

The proper place for considering the increased emissions that would result from CCS is in the cost analysis. Adding CCS to the methanol project would increase NOx and VOC emissions, primarily from the boiler required for the amine system, and the Clear Lake Plant is located in an area that is nonattainment for ozone. Celanese has accounted for this impact by including the purchase of emissions reduction credits to offset these NOx and VOC emissions reductions credits in the $/ton analysis. Celanese asks EPA to clarify that adverse environmental impacts should not and have not been double counted.

Celanese hopes that this information will assist the EPA in clarifying its bases for the BACT determination in response to the Sierra Club's comments.

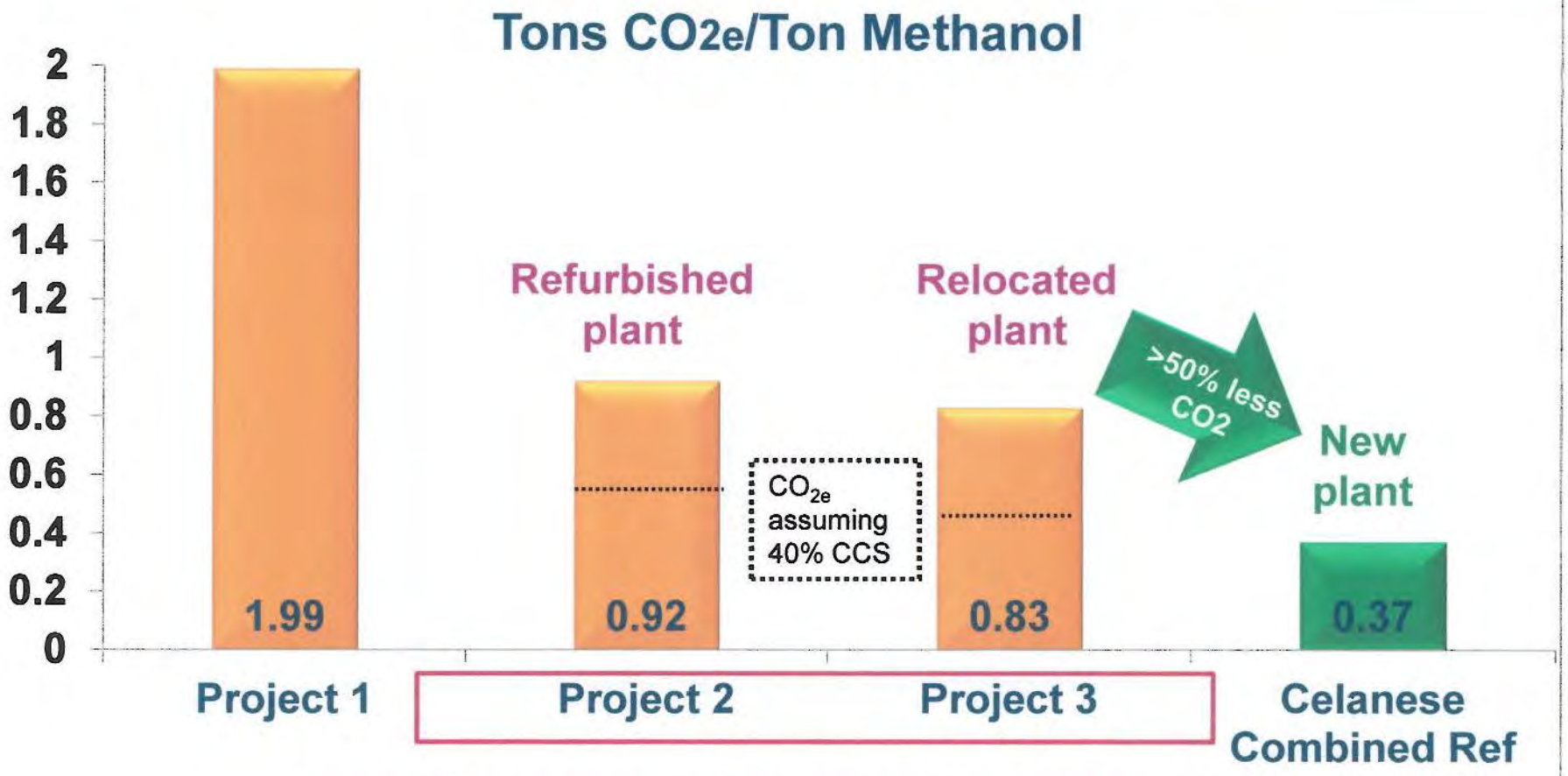
Best regards,

11/8/13

Paresh Bhakta
Site Director
Clear Lake Plant

Comparison of Reforming Processes

Celanese



Recently approved single reforming permits

Will be the lowest CO_{2e} emissions within the US

Revised Cost Effectiveness Analysis for Carbon Capture and Storage based on EOR

Cost Item	Celanese	Sierra Club	Celanese (updated)[1]	Celanese (updated)
CAPITAL ($)				
Amine Treating System/Compression	$ 95,313,792.00	$ 67,777,643.93	$ 97,000,000.00	$ 97,000,000.00
Plant Electrical Upgrades[2]	$ 6,000,000.00	$ -	$ 10,000,000.00	$ 10,000,000.00
Boiler for Amine Regeneration[3]	$ 19,000,000.00	$ -	$ 11,600,000.00	$ 11,600,000.00
Offsets	$ 5,000,000.00	$ -	$ 5,000,000.00	$ 5,000,000.00
Total Capital Amine/Compression	$ 125,313,792.00	$ 67,777,643.93	$ 123,600,000.00	$ 123,600,000.00
Annual Capital Amine/Compression	$ 4,166,667.00	$ 2,253,597.69	$ 8,040,353.04	$ 8,040,353.04
Annual Capital Pipeline	$ 566,924.00	$ 283,462.00	$ 1,106,375.30	$ 1,105,873.80
Annual Capital Geologic Storage	$ 362,011.00	$ 362,011.00	$ -	$ -
O&M ($/yr)				
Boiler natural gas	$ 16,575,000.00	$ -	$ 16,561,361.77	$ 9,174,987.57
MEA/Compression Electricity Cost	$ 3,581,526.00	$ 2,148,915.60	$ 3,939,486.12	$ 2,182,475.31
Boiler Electrical Cost	$ 358,474.00	$ -	Included above	Included above
Labor Capture & Compression[4]	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00
Maintenance, property tax, insurance	$ 3,720,000.00	$ 2,168,884.61	$ 3,720,000.00	$ 3,720,000.00
Pipeline	$ 215,800.00	$ 108,000.00	$ 215,800.00	$ 215,800.00
Storage	$ 3,825,511.00	$ 3,825,511.00	$ -	$ -
Total Annual Costs ($/yr)	**$ 34,371,913.00**	**$ 12,150,381.90**	**$ 34,583,376.23**	**$ 25,439,489.72**
CO2 Emissions Removed (ton/yr)	283,599.30	479,508.00	250,908.30	250,908.30
Cost Effectiveness ($/ton)	**$ 121.20**	**$ 25.34**	**$ 137.83**	**$ 101.39**

INPUTS

Electricity ($/MW-hr)	$	50.00	$	30.00	$	50.00	$ 27.70
Natural Gas ($/MMBtu)[5]	$	5.00			$	5.00	$ 2.77
CRF		3.32%		3.32%		6.51%	6.51%
Mainenance, Property, Taxes, Insurance		3.2%		3.2%		3.2%	3.2%
Electricity Demand (MW)		8.177		8.177		8.994	8.994

Notes:

[1] Equipment capital costs were revisited and the spreadsheet reflects the latest estimate, removed storage costs (not required if selling for use in Energy Oil Recovery ("EOR")), updated capital recovery factor per the NSR Workshop Manual, and based CO_2 emissions on a refined material balance around the reformer rather than permitted emissions.

[2]Implementing CCS technology at the proposed Celanese methanol unit would require the main electrical substation at the Celanese plant to be upgraded. Celanese's available (i.e. not currently being utilized or expected to be utilized) electrical capacity is 16 MVA. The methanol unit will require between 9-10 MVA. Thus, after the methanol unit is built, there will only be 6 MVA available for emergencies (i.e. if one of the transformers needs to be taken down). CCS would require 9 MVA. Therefore, Celanese does not have the current electrical capacity to accommodate both the methanol unit and CCS without an upgrade to the main substation.

[3]A new steam boiler would be required to operate CCS technology at the proposed Celanese methanol unit, as the facility does not have sufficient excess steam. Celanese estimates that CCS would require 317,000 lbs/hr of steam in order to regenerate MEA. Part of this steam could be sourced from the new methanol unit, which is estimated to generate additional steam of up to 210,000 lbs/hr at full rates, but the facility would still be approximately 100,000 lbs/hr short. Celanese's existing steam capacity is sized for its current plant operations, and thus does not have enough excess steam, at least not on a continuous basis, to support CCS. Thus, a new steam boiler would be required to ensure CCS operation.

In addition, the new boiler needed to support the CCS system would emit an estimated 14 tons/yr NOx and 7.4 tons/yr VOC. Because Celanese is located in an ozone non-attainment area, it would be required to obtain NOx and VOC off-sets at a ratio of 1.3:1. VOC and NOx credits have recently traded at between $100,000 - $103,000 per ton NOx and $200,000 - $270,000 per ton of VOC . At these prices and volumes, offsets would cost approximately $5 million.

[4] The Worley Parsons technical study submitted with the Celanese June 2013 GHG PSD permit application used a $90 per hour labor rate. In addition to the contractor hourly wages (i.e, $27.10 hr), this rate included: Contractor Benefits and Burdens, Contractor Small Tools and Consumables, Contractor Temporary Construction Facilities, Contractor Third Party Rental Equipment, Contractor Travel per Diem, Contractor Overtime Premium, Contractor Overhead Project, and Contractor Overhead for Purchased Materials. This combined cost reflects a more reasonable cost of CCS than a contractor hourly wage rate alone.

[5] Natural gas costs were updated from $5 to $2.77/MMBTU based upon the 12-month average for 2012 in Henry Hub. Natural gas costs impact the electrical costs which were updated from $50 to $27.7/MW-hr