

US EPA ARCHIVE DOCUMENT



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27 June 2014

Mr. Jeff Robinson
Air Permits Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202

**RE: Updated Cost Calculations for Carbon Capture and Sequestration (CCS)
Greenhouse Gas Prevention of Significant Deterioration Permit
Natgasoline LLC Gas-to-Gasoline Project, Beaumont, Texas**

Dear Mr. Robinson:

On behalf of Natgasoline LLC (Natgasoline), Weston Solutions, Inc. (WESTON®) submits the enclosed updated cost calculations for carbon capture and sequestration (CCS). These updated CCS cost calculations are to support the Best Available Control Technology (BACT) evaluation for draft Prevention of Significant Deterioration (PSD) Greenhouse Gas (GHG) permit for the proposed Natgasoline gas-to-gasoline project in Beaumont, Texas.

These attached updated CCS cost calculations are based on the "Report of the Interagency Task Force on Carbon Capture" dated August 2010 and provided to your attention as we discussed by telephone yesterday. We included footnotes and technical explanations with the attached updated CCS cost calculations. We propose that these updated cost calculations confirm that CCS should not be required as BACT because the calculated CCS capital costs are more than 100% of the total projected capital cost for the entire proposed Natgasoline project; and therefore, CCS is not considered economically reasonable.

An earlier version of CCS cost calculations for the Natgasoline LLC project were provided to EPA as an attachment to my letter dated 10 January 2014 to the attention of Ms. Bonnie Braganza. The earlier CCS cost calculations are now confirmed to be inconsistent with other indicative CCS costs information that we have obtained. The attached CCS cost calculations are provided for greater consistency with CCS cost calculations that EPA has approved for more recently issued GHG permits.



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If you have any questions regarding this submittal, please contact me at (512) 651-7148 or via email at Blake.Soyars@westonsolutions.com.

Very truly yours,

WESTON SOLUTIONS, INC.

A handwritten signature in blue ink that reads "Blake Soyars".

Blake Soyars, P.E.

Client Service Manager

Attachment

cc: Mr. Kevin Struve – Natgasoline LLC, Beaumont, TX
Dr. Wolff Balthasar – GIGAS GmbH; Bad Homburg, Germany

Natgasoline LLC - Beaumont Plant

Estimated Cost for Construction and Operation of a Post-Combustion CCS System

All "Tons" Refer to Short Tons: 1 Short Ton = 2,000 lbs = 0.907185 metric tons

CCS System Component		CCS Cost Factor ¹ (Based on Tons of CO ₂ Controlled)	CO ₂ Controlled ²	Transport Distance ³	Annualized Cost of CCS	Capital Recovery Factor ⁴	Capital Cost of CCS
		(A)	(B)	(C)	(D)	(E)	= (D) / (E)
CO ₂ Capture & Compression Facilities		\$103.42 per ton of CO ₂	1,076,092 tons/year	-	\$111,288,431 /year = (A) * (B)	0.0944	\$1,178,902,874
CO ₂ Transport Facilities	Minimum	\$0.91 per ton of CO ₂ per 100 km	1,076,092 tons/year	1 km	\$9,762 /year = (A)*(B)*(C)/(100 km)	0.0944	\$103,413
	Maximum	\$2.72 per ton of CO ₂ per 100 km	1,076,092 tons/year	1 km	\$29,286 /year = (A)*(B)*(C)/(100 km)	0.0944	\$310,238
	Average	\$1.81 per ton of CO ₂ per 100 km	1,076,092 tons/year	1 km	\$19,524 /year = (A)*(B)*(C)/(100 km)	0.0944	\$206,825
CO ₂ Storage Facilities ⁵	Minimum	\$0.51 per ton of CO ₂	1,076,092 tons/year	-	\$546,680 /year = (A) * (B)	0.0944	\$5,791,102
	Maximum	\$18.14 per ton of CO ₂	1,076,092 tons/year	-	\$19,524,286 /year = (A) * (B)	0.0944	\$206,825,066
	Average	\$9.33 per ton of CO ₂	1,076,092 tons/year	-	\$10,035,483 /year = (A) * (B)	0.0944	\$106,308,084

Calculated CCS Cost Summary = (Capture and Compression) + (Transport) + (Storage)	Cost Type	Annualized Cost Totals	Cost/Ton of CO ₂ Controlled ⁶	Capital Cost Totals
	-	(F)	= (F) / (B)	(G)
	Minimum	\$111,844,873 /year	\$104 /ton	\$1,184,797,389
	Maximum	\$130,842,004 /year	\$122 /ton	\$1,386,038,177
	Average	\$121,343,439 /year	\$113 /ton	\$1,285,417,783
Total Proposed Project Capital Cost without CCS (Estimate) =				\$1,100,000,000
Percentage of CCS Capital Cost Compared to Total Plant Capital Cost Without CCS = 100% * (G) / (Total Proposed Project Capital Without CCS)				Minimum
				Maximum
				Average
				108%
				126%
				117%

Notes:

- 1 - These cost calculations are based on the "Report of the Interagency Task Force on Carbon Capture and Storage" dated August 2010. Metric ton values were converted to short ton values.
- 2 - Tons of CO₂ controlled is based on 90% of combined annual potential to emit from reformer and auxiliary boiler stacks.
- 3 - The length of the CO₂ transport pipeline is estimated to be approximately 1 km based on the close proximity between plan location and Denbury Resources Inc. CO₂ pipeline.
- 4 - The capital recovery factor is calculated based on 7% interest rate and 20 year equipment life. Corrosive properties of CCS process fluids will limit equipment lifespan.
- 5 - These costs do not include long-term liability costs associated with geologic storage of CO₂, which is expected to be a significant additional cost in practice.
- 6 - "Cost/Ton of CO₂ Controlled" does not consider the additional CO₂ that would be emitted from an additional gas-fired steam boiler, which would be necessary to supply steam for the CCS process. The additional CO₂ from the steam boiler would substantially decrease the net CO₂ tons/year reduction benefit from installing the CCS process. Therefore, these values substantially underestimate the CO₂ control cost on a net ton reduction basis.