POET-DSM Advanced Biofuels LLC Project Liberty Pathway for Ethanol Derived from Corn Stover at Liberty, Iowa

Calculation and Input Changes to the CA- GREET Model
CA-GREETv.2.0 (29 September 2015)
http://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm

Pursuant to title 17, section 95486 (b)(1) of the California Code of Regulations, alternative models were additionally utilized to compute the life cycle GHG emissions impacts of the proposed pathways. The applicant has conducted its analysis of direct effects on carbon intensity for this pathway using the CA-GREET v2.0 (29 Sep. 2015) model. The standard inputs, parameters, and calculations specified in CA-GREETv2.0 remain unchanged, except as noted in the tables below. The modification and correction table below outlines the computation changes to the model. The input table below specifies the spreadsheet location of the CA-GREETv2.0 and other parameters that were claimed as confidential business information or trade secret by the applicant, but it does not disclose the actual value of such inputs and parameters because they are claimed to be confidential business information or trade secret.

CA-GREET2.0 (29Sep15) Modifications and Corrections	
CA-GREETv2.0 Worksheet Location(s)	**Purpose**
EtOH!CI657:CO681	Added section to facilitate Liberty corn stover data entry. All cells highlighted in yellow are for scenario-related input only. All other cells are either static or calculated. The user should enter the desired scenario number in cell CK657. The corn stover input section then imports the required from the scenario data section.
EtOH!CI686:CR705	Added section to summarize GREET-based results (for reference only).
EtOH!CI707:CN753	Added section to show the ethanol production results based on corn stover.
EtOH!CI755:CW773	Added section to show the detailed results based on the corn stover.
EtOH!CI777:CQ820	Added section to hold the scenario data and perform intermediate calculations. The user should only change these values to modify a scenario.
EtOH!CJ822:CL829	Added section to hold the fuel LHVs and plastic emission factors.
EtOH!CJ831:CO843	Added section to compute the biomass ethanol share based on an energy basis.
EtOH!CL432	Corrected error in GREET2.0 (formula used yield for miscanthus instead of corn stover).
EtOH!CN429:CN433	Corrected error in GREET2.0 (formulas used yield for miscanthus instead of corn stover).
EtOH!HB333:HB395	Added section to hold and transmit the ash and sulfur cake transport emission factors.
Liberty Chemicals!D6:L83	Added tab to hold and/or compute the chemical and net wrap (plastic) emissions.
T&D!BQ3:BQ8	Added section to store sulfur cake and ash truck capacity.
T&D!HS105	Corrected error in GREET2.0 (formula ignored input rail distance; substituted 1400 miles instead).
T&D!JA102:JA144	Added section to compute the ash and sulfur cake transport emission factors.
T&D Flowcharts!A1965:H1968	Added section to acquire and transmit the ash and sulfur cake plant to landfill one-way distance.

CA-GREET2.0 (29Sep15) Input Changes			
CA-GREETv2.0 Worksheet Location	**Parameter**	**CA-GREETv2.0 Default Cell Value**	**Project Liberty Corn Stover Pathway Value**
EtOH!CS357	Mass share of total biomass used for ethanol	100%	[redacted]
EtOH!H219	Cellulase (ton/dry ton substrate)	0.01	[redacted]
EtOH!H220	Yeast (ton/dry ton substrate)	0.00249	[redacted]
EtOH!H221	Sulfuric acid (H2SO4, kg/dry ton substrate)	27.70	[redacted]
EtOH!H222	Ammonia (NH3, kg/dry ton substrate)	3.32	[redacted]
EtOH!H223	NaOH (kg/dry ton substrate)	9.42	[redacted]
EtOH!H224	CaO (kg/dry ton substrate)	6.09	[redacted]
EtOH!H225	Urea (kg/dry ton substrate)	1.66	[redacted]
EtOH!L325	NG large industrial boiler share	50%	[redacted]
EtOH!L326	NG small industrial boiler share	50%	[redacted]
EtOH!P43	Farm handling dry matter loss	2%	[redacted]
EtOH!P49	Storage dry matter loss	8.40%	[redacted]
Fuel_Prod_TS!AQ257	Corn stover yield (gal/bu)	80	[redacted]
Fuel_Prod_TS!AR264	Corn stover yield (gal/bu)	80	[redacted]
Inputs!F464	Corn stover moisture	12%	[redacted]
Petroleum!B291	CI of anhydrous ethanol (including ILUC)	69.80	[redacted]
T&D_Flowcharts!F1405	Adjusted corn stover transport distance (miles)	53.31	[redacted]
T&D_Flowcharts!F1530	Ethanol rail transport distance (miles)	0	[redacted]
T2 Calculator!B10	Feedstock regional crude oil mix (menu selection)	N/A	[redacted]
T2 Calculator!B6	Feedstock (menu selection)	N/A	[redacted]
T2 Calculator!B9	Feedstock regional electricity mix (menu selection)	N/A	[redacted]
T2 Calculator!C6	Fuel pathway (menu selection)	N/A	[redacted]
T2 Calculator!E10	Fuel production regional crude oil mix (menu selection)	N/A	[redacted]
T2 Calculator!E9	Fuel production regional electricity mix (menu selection)	N/A	[redacted]