Kelly, Shaheerah

From: Eric Albright [ealbright@environcorp.com]
Sent: Monday, September 23, 2013 11:10 AM
To: Kelly, Shaheerah
Cc: Rios, Gerardo; Christenson, Kara; Shane Young
Subject: RE: SPI-Anderson - response to Sep. 19 information request
Attachments: SPI-Anderson_GHG_BACT-cost_information.xlsx

Shaheerah:

The spreadsheet referenced in the responses is attached.

Please let me know you have any questions.

Eric

From: Eric Albright
Sent: Monday, September 23, 2013 10:47 AM
To: 'Kelly, Shaheerah'
Cc: Rios, Gerardo; Christenson, Kara; Shane Young
Subject: SPI-Anderson - response to Sep. 19 information request

Shaheerah:

Attached are responses to the request for additional information received from EPA Region 9 by email on September 19 concerning Sierra Pacific Industry's cogeneration project (PSD Permit Number SAC 12-01).

Thanks, and, if you have any questions, please call me at the number below, or Shane Young of SPI at (530) 378-8356.

Eric

Eric Albright, PE | Senior Manager
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From: Kelly, Shaheerah [mailto:Kelly.Shaheerah@epa.gov]
Sent: Thursday, September 19, 2013 7:14 AM
To: Shane Young; Dave Brown; Eric Albright
Cc: Rios, Gerardo; Christenson, Kara
Subject: RE: PSD

Good morning,

Thanks again for the previous submittal sent to EPA on September 13. We need a bit more information to assist us in our analysis. Below is the additional information needed.

1. The approximate cost of a cost of a new lumber mill and cogeneration facility. This would be helpful for comparison to the cost of the post-combustion CCS system.
2. The GHG BACT analysis identifies the following control as an available method for reducing N2O emissions: Addition of a N2O-abating SCR system. Please provide cost information, including cost effectiveness data in $/ton, for the assessment of this control option in Step 4 of the GHG analysis.
3. Please provide the actual cost calculations (e.g., spreadsheets) for the cost estimates previously provided for post-combustion CCS and catalytic destruction, as well as for the addition of a N2O-abating SCR system.

I look forward to your response. Feel free to contact me for questions.

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Shaheerah Kelly
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From: Shane Young [mailto:SWyoung@spi-ind.com]
Sent: Wednesday, September 18, 2013 9:34 AM
To: Kelly, Shaheerah
Cc: 'Eric Albright (ealbright@environcorp.com)'
Subject: PSD

Good morning Shaheerah,

I wanted to follow up on our conversation Monday regarding the responses to EPA's questions pertaining to SPI Anderson PSD permit. You had mentioned a couple of questions that you had and were going to send an e-mail to Eric and myself. How is this coming? As I mentioned, given the urgency of this permit anything you need please get it to us as soon as possible so we can address and get back to you.

Regards

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CO_2 Pipeline Data

Pipeline Length	175.26	miles
Pipeline Diameter	6	inches
Number of Injection Wells	0	
Depth of Well	N/A	feet
	N/A	meters

Transport Cost Breakdown

Cost Type	Units	Cost	
Pipeline Captial Costs			
Materials	*$ Diameter (inches), Length (miles)*	$70,350 + $2.01 x L x (330.5 x D^2 + 686.7 x D + 26,960)	$ 15,210,392
Labor	*$ Diameter (inches), Length (miles)*	$371,850 + $2.01 x L x (343.2 x D^2 + 2,074 x D + 170,013)	$ 68,998,850
Miscellaneous	*$ Diameter (inches), Length (miles)*	$147,250 + $1.55 x L x (8,417 x D + 7,234)	$ 15,831,408
Right of Way	*$ Diameter (inches), Length (miles)*	$51,200 + $1.28 x L x (577 x D + 29,788)	$ 7,510,266
Other Capital Costs			
CO2 Surge Tank	*$*		$ 1,244,724
Pipeline Control System	*$*		$ 111,907
Total Capital Cost			
			$ 108,907,547
Annualized Captial Cost			
			$10,280,102
Annual O&M Cost			
Fixed O&M	*$/mile/year*		$ 1,512,844
Total Annual Cost			
			$11,792,946

Ref: Exhibit 2 Pipeline Cost Breakdown from March 2013 NETL Document Quality Guidelines for Energy System Studies Estimating Carbon Dioxide Transport and Storage Costs DOE/NETL 2013/1614

I	n	(1+I)^n	CRF
0.07	20	3.869684	0.094393
0.07	10	1.967151	0.142378
0.07	5	1.402552	0.243891
0.07	3	1.225043	0.381052
0.07	2	1.1449	0.553092

N2O-ABATING SCR COST ESTIMATE
FOR BIOMASS-FIRED COGENERATION UNIT

Sierra Pacific Industries Biomass-Fired Cogeneration Project
Anderson, California

CAPITAL COSTS			
DIRECT COSTS		**COST**	**Source**
I. Purchased Equipment			
a. Primary Equipment		$174,250	FERCo (2010)/BASF (2013)
b. Instrumentation (0.1*a)		$17,425	OAQPS
c. Sales tax (0.08*a)		$13,940	OAQPS
d. Freight (0.05*a)		$8,713	OAQPS
Total Purchases Equipment Cost [TEC]		$214,328	Calculation
II. Direct Installation Costs			
a. Foundations and Supports (0.08*TEC)		$17,146	OAQPS
b. Handling and Erection (0.14*TEC)		$30,006	OAQPS
c. Electrical (0.04*TEC)		$8,573	OAQPS
d. Piping (0.02*TEC)		$4,287	OAQPS
e. Insulation for Ductwork (0.01*TEC)		$2,143	OAQPS
f. Painting (0.01*TEC)		$2,143	OAQPS
Total Direct Costs [TDC](I+II)		$64,298	Calculation
INDIRECT COSTS			
III. Indirect Installation			
a. Engineering and Supervision (0.10*TEC)		$21,433	OAQPS
b. Construction and Field Expenses (0.05*TEC)		$10,716	OAQPS
c. Contractor Fee (0.10*TEC)		$21,433	OAQPS
d. Contingencies (0.03*TEC)		$6,430	OAQPS
IV. Other Indirect Costs			
a. Startup and Testing (0.03*TEC)		$6,430	OAQPS
b. Working Capital (30 days of direct operating costs [I-VII below/12])		$61,097	OAQPS
Total Indirect Costs [TIC](III+IV)		$127,539	Calculation
Total Capital Costs [TCC] (TEC+TDC+TIC)		$406,164	Calculation
Total Annualized Capital Costs [TACC] (20 years @ 7% interest)		**$38,339**	Calculation
DIRECT AND INDIRECT ANNUALIZED COSTS			
DIRECT OPERATING COSTS (DOC)			
I. Labor for operations ($30/person-hour)(1 hr/shift)(3 shifts/day)(365 day/yr)		$32,850	Engineering Estimate
II. Supervisory Labor (0.15* operations labor)		$4,928	OAQPS
III. Maintenance Labor ($35/person-hour)(1 hr/shift)(3 shifts/day)(365 day/yr)		$32,850	Engineering Estimate
IV. Replacement Parts			
a. Catalyst (2 sets every year), $129,000 per year		$258,000	Engineering Estimate
b. Other (100% of maintance labor)		$32,850	OAQPS
V. Utility costs (Elect.) = (500kW)($0.05/kW-hr)(8,760 hr/yr)		$219,000	Engineering Estimate
VI. Ammonia costs (anhydrous) =(21 lb/hr)*(8760 hr/yr)*($0.83/lb)		$152,687	Engineering Estimate
VII. Lost revenue during downtime (3 per year @ $150,000 per shutdown)		$450,000	
INDIRECT OPERATING COSTS (IOC)			
VIII. Overhead (0.6*O&M costs(I-III of DOC)		$42,377	OAQPS
IX. Administration (0.02*TCC)		$8,123	OAQPS
X. Insurance (0.01*TCC)		$4,062	OAQPS
Total Direct and Indirect Annualized Costs [TDIAC] (DOC+IOC)		**$1,237,726**	Calculation
TOTAL ANNUALIZED COSTS OXIDATION CATALYST [TAC $_{OC}$] (TACC+TDIAC)		**$1,276,065**	Calculation
Ucontrolled N2O emissions as CO2e	tons/year	5,884.3	Calculation
Emissions w/N2O-abating SCR as CO2e	tons/year	588.4	BASF (2013)
Reduction from baseline	Percent	90.0	Calculation
Total Emissions Reduction	tons/year	5,295.8	Calculation
Cost per ton Conrolled	***$/ton***	**$ 241**	Calculation

OAQPS "EPA Air Pollution Cost Manual" Sixth Edition, January 2002, EPA/452/B-02-001
Office of Air Quaility Planning and Standards (OAQPS).

COST PER TON OF GHG CONTROLLED
TO INSTALL A CATALYTIC DESTRUCTION SYSTEM

Sierra Pacific Industries Biomass-Fired Cogeneration Project
Anderson, California

CAPITAL COSTS			
DIRECT COSTS		**COST**	**Source**
I. Purchased Equipment			
a. Primary Equipment		$1,006,000	PPC (2010)
b. Instrumentation (0.1*a)		$100,600	OAQPS
c. Sales tax (0.08*a)		$80,480	OAQPS
d. Freight (0.05*a)		$50,300	OAQPS
Total Purchases Equipment Cost [TEC]		$1,237,380	Calculation
II. Direct Installation Costs			
a. Foundations and Supports (0.08*TEC)		$98,990	OAQPS
b. Handling and Erection (0.14*TEC)		$173,233	OAQPS
c. Electrical (0.04*TEC)		$49,495	OAQPS
d. Piping (0.02*TEC)		$24,748	OAQPS
e. Insulation for Ductwork (0.01*TEC)		$12,374	OAQPS
f. Painting (0.01*TEC)		$12,374	OAQPS
Total Direct Costs [TDC](I+II)		$371,214	Calculation
INDIRECT COSTS			
III. Indirect Installation			
a. Engineering and Supervision (0.10*TEC)		$123,738	OAQPS
b. Construction and Field Expenses (0.05*TEC)		$61,869	OAQPS
c. Contractor Fee (0.10*TEC)		$123,738	OAQPS
d. Contingencies (0.03*TEC)		$37,121	OAQPS
IV. Other Indirect Costs			
a. Startup and Testing (0.03*TEC)		$37,121	OAQPS
b. Working Capital (30 days of direct operating costs [I-VII below/12])		$99,512	OAQPS
Total Indirect Costs [TIC](III+IV)		$483,100	Calculation
Total Capital Costs [TCC] (TEC+TDC+TIC)		$2,091,694	Calculation
Total Annualized Capital Costs [TACC] (20 years @ 7% interest)		**$197,441**	Calculation
DIRECT AND INDIRECT ANNUALIZED COSTS			
DIRECT OPERATING COSTS (DOC)			
I. Labor for operations ($30/person-hour)(0.25 hr/shift)(3 shifts/day)(365 day/yr)		$8,213	Engineering Estimate
II. Supervisory Labor (0.15* operations labor)		$1,232	OAQPS
III. Maintenance Labor ($35/person-hour)(1 hr/shift)(3 shifts/day)(365 day/yr)		$32,850	Engineering Estimate
IV. Replacement Parts			
a. Catalyst (2 sets every year), $450,000 per year		$900,000	FERCo (2010)
b. Other (100% of maintance labor)		$32,850	OAQPS
V. Utility costs (Elect.) = (500kW)($0.05/kW-hr)(8,760 hr/yr)		$219,000	Engineering Estimate
(reheat fuel) = none		$0	
VI. Ammonia costs (none)		$0	
VII. Lost revenue during downtime (6 per year @ $150,000 per shutdown)		$900,000	Engineering Estimate
INDIRECT OPERATING COSTS (IOC)			
VIII. Overhead (0.6*O&M costs(I-III of DOC)		$25,377	OAQPS
IX. Administration (0.02*TCC)		$41,834	OAQPS
X. Insurance (0.01*TCC)		$20,917	OAQPS
Total Direct and Indirect Annualized Costs [TDIAC] (DOC+IOC)		**$2,182,272**	Calculation
TOTAL ANNUALIZED COSTS OXIDATION CATALYST [TAC_{OC}] (TACC+TDIAC)		**$2,379,713**	Calculation
Ucontrolled GHG emissions as CO2e	tons/year	433,000.0	Calculation
Emissions w/catalytic destruction as CO2e	tons/year	426,000.0	Calculation
Reduction from baseline	Percent	1.6	Calculation
Total Emissions Reduction	tons/year	7,000.0	Calculation
Cost per ton Conrolled	***$/ton***	**$ 340**	Calculation

OAQPS "EPA Air Pollution Cost Manual" Sixth Edition, January 2002, EPA/452/B-02-001
Office of Air Quaility Planning and Standards (OAQPS).