EIT VOC Control Email Diamond Gneration Mariposa Energy.txt

From: Prasad Raju 6332
Sent: Tuesday, May 18, 2010 2:05 PM
To: Bo Buchynsky; 'Gary Normoyle'; 'Jerry.Salamy@CH2M.com'
Cc: Gregg Harwood 6360; Whitney Mereness 6342; Harry Hall 6238
Subject: FW: Diamond Gneration, Mariposa Energy

Based on this morning conference call, we have obtained the following information from Express (EIT)
on VOC reduction from 3ppmvd to 1ppmvd. Express confirmation is based on backup calculations
performed with BASF oxidation catalyst.

Trust this answers your query.

Regards

Prasad Raju
POWER Engineers Inc
Boise, Idaho
Tel No: 208 288 6332

From: Brian Crockett [mailto:bcrockett@expresstechtulsa.com]
Sent: Tuesday, May 18, 2010 1:51 PM
To: Prasad Raju 6332
Cc: 'Phil Childers'
Subject: Diamond Gneration, Mariposa Energy

Based on a CO out of 1.5 ppmvd@15% O2; a VOC reduction from a inlet of 3 ppmvd@15% O2 to an
outlet of 1 ppmvd@15% O2 is achievable with the following capital and operating cost impact:

1) An increase in initial capital costs of $50,000.00 per unit with no change in replacement period.
2) An increase in total system pressure loss of less than 0.2″ WC.
3) An increase in tempering air fan power consumption of 0.32 KW.

Brian Crockett
Product Manager
Express Integrated Technologies LLC
Office 918-622-1420
Direct 918-728-7738
Cell 918-859-4445

TABLE 3
BAAQMD Mariposa Energy Project

POC Catalyst Control Costs Base Case 3 PPMVD to 1 PPMVD
CAPITAL COST SUMMARY

Average/Total Cost Effectiveness analysis

DIRECT CAPITAL COSTS (2009 $)		Explanation of Cost Estimates per Turbine
1. Purchased Equipment:		Base Cost
A) Pollution Control Equipment	$50,000	EIT Email dated May 18, 2010.
B) Instrumentation & Controls(No CEMS)	$0	EPA1998 10% of Base Cost (assumed $0 for incremental assessment)
C) Freight & Taxes	$0	8% Taxes; 5% Freight; on 1A & 1B
Total Purchased Equip. Costs (TEC):	$50,000	Sum 1A,1B,1C
2. Installation Costs:		
A) Foundation & Supports	$0	EPA1998 8% of TEC
B) Erection and Handling	$0	EPA1998 14% of TEC (assumed $0 for incremental assessment)
C) Electrical	$0	EPA1998 4% of TEC
D) Piping	$0	EPA1998 2% of TEC
E) Insulation	$0	1% of TEC
F) Painting	$0	EPA1998 1% of TEC
G) Site Preparation	$0	0% of TEC
Total Installation Costs (TINC):	$0	Sum 2A,2B,2C,2D,2E,2F,2G
Total Direct Capital Costs (TDCC):	$50,000	Sum TEC,TINC
INDIRECT CAPITAL COSTS		
1. Engineering & Supervision	$5,000	EPA1998 10% of TEC
2. Construction and Field Exp.	$2,500	OAQPS 5% of TEC
3. Contractor Fees	$5,000	OAQPS 10% of TEC
4. Start-up	$1,000	OAQPS 2% of TEC
5. Performance Testing	$500	OAQPS 1% of TEC
Total Indirect Capital Costs (TICC):	$14,000	Sum 1,2,3,4,5
Total Direct & Indirect Capital Costs (TDICC):	$64,000	Sum TDCC,TICC
Contingency (@12%):	$7,680	12% TDICC (std engineering accuracy)
TOTAL CAPITAL COSTS (TCC):	$71,680	Sum TDICC,Contingency

TABLE 3
ANNUAL OPERATING COST SUMMARY

DIRECT OPERATING COSTS (2003 $)		Explanation of Cost Estimates per Turbine
1. Operating Labor	$15,148	EPA1998 3 hr/day, @41.50 hr
2. Supervisory Labor	$2,272	OAQPS 15% Operating Labor
3. Maintenance Labor & Materials	$7,574	2 hr/day, $41.50/hr, + 100% materials (estimated at $0)
4. Electricity Expense ($0.0527/kWh)		
5. Catalyst Cost (replace)	$0	NA
6. Fuel Penalty ($0.0041/scf gas)	$2,243	0.15% fuel increse/inch wc, assumed 1.0" bp
7. Annual Catalyst Cost	$0	Initial Catalyst will last 15 year period
Total Direct Operating Costs (TDOC):	$27,236	Sum 1 through 7
INDIRECT OPERATING COSTS		
1. Overhead	$9,089	OAQPS 60% Total Labor
Total Indirect Operating Costs (TIOC):	$9,089	Sum 1
CAPITAL CHARGES COSTS		
1. Property Tax	$717	OAQPS 1% TCC
2. Insurance	$717	OAQPS 1% TCC
3. General Administrative	$1,434	OAQPS 2% TCC
4. Capital Recovery Cost (7%, 15 years)	$7,870	10.98%, TCC
Total Capital Charges Costs (TCCC):	$10,738	Sum 1,2,3,4
TOTAL ANNUALIZED OPERATING COSTS:	$47,062	Sum TDOC,TIOC,TCCC

		Per Turbine
Base Uncontrolled Case	3.0	ppm (GE Guarantee)
Annual Emission Rate	3.5	TPY (3.74 Lb POC/Hr * 3.0 ppm POC/6.4 ppm POC * 4000 hr/yr * 2000 lb/ton)
Controlled Case Emissions		
POC Concentration	1.0	ppm (3-hour)
Annual Emission Rate:	1.2	TPY (3.5 TPY * 1 ppm POC /3 ppm POC)
POC Reduction from Uncontrolled Case:	2.34	tpy
Control Cost Effectiveness:	**$20,134**	per ton

References:
OAQPS - OAQPS Cost Control Manual, 5th ED., February 1996.
EPA1998 - Cost Effectiveness fo Oxidation Catalyst Control of HAP Emissions from Stationary Combustion Turbines, * EPA memo dated 12-30-99, Emissions Stds Division, Docket A-95-51, and May 14, 1999 memo on Stationary CT control cost options.