PARSONS

Parsons Engineering Science, Inc. • A Unit of Parsons Infrastructure & Technology Group
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April 13, 2001

Mr. Bruce Moore
Supervisor, Air Quality Business Team
(Environmental Services)
Department of Water and Power
City of Los Angeles
111 N. Hope Street, Room 1050
Los Angeles, CA 90012

Subject: Cost Estimate to Provide BACT Analysis for Intermountain Power Service Corporation, Utah Power Plant

Dear Mr. Moore:

Parsons Engineering Science, Inc. (Parsons ES) is pleased to submit this cost estimate to perform a best available control technology (BACT) analysis for the Intermountain Power Service Corporation (IPSC) Modification Project at its Delta, Utah Power Plant. This power plant consists of two coal-fired units combusting low sulfur western coal.

IPSC plans a revamp of the Delta, Utah Power Plant that may include the replacement of the existing burners with new ultra low NOx three-stage burners. IPSC has reviewed this proposed project with the Utah Division of Air Quality (DAQ). The DAQ has requested IPSC conduct a BACT analysis for NOx control associated with the potential burner replacement project. Mr. Rand Crafts of IPSC has requested Parsons ES perform this BACT analysis for IPSC.

Parsons ES proposes to conduct the BACT analysis, which will include the feasibility and economic analysis. The technologies to be evaluated will include ultra low NOx burners, flue gas recirculation, selective non-catalytic reduction (SNCR), selective catalytic reduction (SCR) and Mobotec rotating overfire air (ROFA)/SNCR/SCR.

Parsons ES proposes to perform this work on a time and materials basis for not-to-exceed cost of $22,180. The estimated cost breakdown is presented in the attached cost estimate. This task will be performed under the terms and conditions of existing Agreement No. 10132. Parsons ES will use the same technical team members who performed the previous work for IPSC. Dr. Krishna Nand will be the Project Manager.

Mr. Bruce Moore
April 13, 2001

We appreciate the opportunity to continue serving the Los Angeles Department of Water and Power. Please feel free to contact Dr. Krishna Nand, our Project Manager at (626) 440-6043 if you have any questions or need additional information.

Sincerely,
PARSONS ENGINEERING SCIENCE, INC.

Paul Farmanian

Paul Farmanian, PE
Program Manager

cc: K. Deagon

Attachment

ATTACHMENT
COST ESTIMATE

INTERMOUNTAIN POWER SERVICE CORPOATION
BACT ANALYSIS COST ESTIMATE

TASK	LABOR CLASSIFICATION HOURS				COST
	Project Manager $121/hr	QA/QC Officer $121/hr	Engineer $97/hr	Sr. Specialist I $54/hr	
Labor					
Task 1 --BACT Analysis	160	20			$21,780
Total Labor	160	20	0	0	$21,780
ODCs					
Photocopy/Fax/Binders/Supplies					$400
Total ODCs					$400
Total					$22,180

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COST CALCULATION DETAILS (TABLE 3)

Technology	Pre-control NOx Emissions (tons/yr)	Absolute Emission Factor (% reduction)	Absolute Emission Reduction (tons/yr)	Minor Mod Emission Reduction (tons/yr	Capital Costs (MM$)	Unit Fixed O&M ($/yr)	Total Fixed O&M ($/KWh)	Unit Variable O&M ($/MWh)	Total Variable O&M	Life N (yrs)	Interest Rate (%)	CRF	Absolute Annualized Cost	Absolute Cost Effectiveness ($/ton removed)	Incremental Annualized Cost ($/yr)	Incremental Cost for Minor Mod ($/ton removed)
LNB	27,960	15	4,194		9.9	0.035	56,222	0	0	15	9	0.1241	1,284,405	306		
LNB w/OFA	27,960	50	13,980		22	0.048	77,640	0.131	1,853,000	15	9	0.1241	4,659,935	333		
SNCR	27,960	40	11,184		18.4	0.111	178,971	0.356	5,042,147	20	9	0.1095	7,236,773	647		
SCR	27,960	70	19,572		150	1.837	2,967,187	0.287	4,066,030	10	9	0.1558	30,406,230	1,554		
LNB	27,960			2777	9.9	0.035	56,222	0	0	15	9	0.1241			1,284,405	463
LNB w/OFA	27,960			2777	22	0.048	77,640	0.131	1,853,000	15	9	0.1241			4,659,935	1,678
SNCR	27,960			2777	18.4	0.111	178,971	0.089	1,259,119	20	9	0.1095			3,453,745	1,244
SCR	27,960			2777	150	1.837	2,967,187	0.14	1,980,636	10	9	0.1558			28,320,836	10,198

2yr Avg NOx emissions: 25,144 tons
Post-project uncontrolled NOx increase: 2,816 tons
Minor Mod Limit: 25144 + 40 tons (25,184)
Minimum Minor Mod decrease: 2,777 tons
Estimated Costs: Source Vendor Specific, with adjustments based on EPA's CUECost workbook.

			LNB	LNB w/OFA	SNCR	SCR
Fixed O&M	Oprtg Labor		22,489	31,056	98,550	518,882
	Maint Lbr & Cost		33,733	46,584	80,421	546,054
	Re-Capitaliztion Catalyst Bed					1,902,251
Unit O&M			0.03481	0.048074	0.110818	1.8372675
Variable O&M	Urea				5,032,800	
	Ammonia					2,362,500
	Disposal			520,000		38,440
	Power				1983	1,427,528
	Steam					237,562
	Water				7364	
	Lost Revenue			1,333,000		
Unit O&M			0	0.130978	0.356401	0.2874048

Capital Costs adjustments are from direct vendor information.

COST CALCULATION DETAILS (TABLE 3) **UTAH NOI/BACT METHOD**

Utah's Calculation: A = (B+C)/D, where

A = (Annualized cost per ton pollutant removed per year)

B = Annualized equipment cost $/yr (= PV{I/[1-(1+I)^-N]})

C = Annual operating costs (fixed O&M + variable O&M)

D= Emission reduction

Technology	Pre-control NOx Emissions (tons/yr)	Absolute Emission Factor (% reduction)	Absolute Emission Reduction (tons/yr)	Minor Mod Emission Reduction (tons/yr	Capital Costs (PV) (MM$)	Unit Fixed O&M ($/yr)	Total Fixed O&M ($/KWh)	Unit Variable O&M ($/MWh)	Total Variable O&M	Life N (yrs)	Interest Rate, i (%)	i/[1-(1+I)^-N]	Absolute Annualized Cost (B+C)	Absolute Cost Effectiveness ($/ton removed)	Incremental Annualized Cost ($/yr)	Incremental Cost for Minor Mod ($/ton removed)
LNB	27,960	15	4,194		9.9	0.035	56,222	0	0	15	9	0.1241	1,284,405	306		
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SCR	27,960	70	19,572		150	1.837	2,967,187	0.287	4,066,030	10	9	0.1558	30,406,230	1,554		
LNB	27,960			2777	9.9	0.035	56,222	0	0	15	9	0.1241			1,284,405	463
LNB w/OF	27,960			2777	22	0.048	77,640	0.131	1,853,000	15	9	0.1241			4,659,935	1,678
SNCR	27,960			2777	18.4	0.111	178,971	0.089	1,259,119	20	9	0.1095			3,453,745	1,244
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