



Big Sandy Plant Unit 2
ORDER-OF-MAGNITUDE FGD COST ESTIMATE

Prepared for:
Kentucky Power Company (Owner)
and American Electric Power Service Corporation

Project No. 12721-000
September 10, 2010

Draft Report for WFGD, DFGD, IAQCS
and NID Technologies

Volume 1 – Summary Report



55 East Monroe Street
Chicago, IL 60603-5780 USA

Issue Summary Page

Revision Number	Date	Purpose	Prepared By	Reviewed By	Approved By	Pages Affected
A	7/29/10	Review (Wet & Dry)	D. Anderson	D. F. Franczak	S. R. Bertheau	All
			J. Hughes	W. J. Staehlin		
			K. Nomanbhoy	P. Fisher		
			M. Ozan			
			C. Woods			
B	8/11/10	Review (IAQCS & NID)	D. Anderson	D. F. Franczak	S. R. Bertheau	All
			J. Hughes	W. J. Staehlin		
			K. Nomanbhoy	P. Fisher		
			M. Ozan			
			C. Woods			



Issue Summary Page Cont.

C	9/10/10	Review (WFGD, DFGD, IAQCS & NID)	D. Anderson J. Hughes K. Nomanbhoy M. Ozan C. Woods	D. F. Franczak W. J. Staehlin P. Fisher	S. R. Bertheau	All
---	---------	--	---	---	----------------	-----



VOLUME 1 TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	ES-1
1 INTRODUCTION	1
2 TECHNICAL BASIS.....	3
2.1 FGD Technology Process Flow Diagrams	4
2.2 Site Plan and General Arrangement Drawings.....	4
2.3 Mass Balances	4
2.4 Water Balances	5
2.5 Electrical One-Lines	5
3 COMMERCIAL BASIS.....	5
3.1 Capital Cost Estimate Outline.....	5
3.2 Capital Cost Estimate Accuracy Range.....	5
3.3 Equipment/Material Cost.....	6
3.4 Construction Labor Wages.....	7
3.5 Assumptions	14
3.6 Capital Cost Estimate Summary	15
3.7 Capital Cost Estimate Comparisons	16
4 O&M COST ESTIMATES	16
5 PROJECT SCHEDULES.....	16
6 REFERENCES.....	17

Table of Contents (Cont.)

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
1-1	Order of Magnitude/Relative Capital Installed Cost Estimate Specification
1-2	Capital Cost Estimate Outline
1-3	AACE International Recommended Practice No. 18R-97, February 2, 2005
1-4	Contingency Analysis Summary
1-5	Union Labor Rate Summary
1-6	Capital Cost Estimate Summaries 1. WFGD Base Case Only 2. DFGD Base Case Only w/o ESP 3. IAQCS Base Case Only w/o ESP 4. NID Base Case Only w/o ESP
1-7	O&M Cost Estimate Summary
1-8	WFGD Technology Comparison
1-9	DFGD Technology Comparison
1-10	IAQCS Technology Comparison
1-11	NID Technology Comparison

EXECUTIVE SUMMARY

The purpose of this study is to establish the Order-of-Magnitude FGD Cost Estimate to assist American Electric Power (AEP) with the selection of an FGD technology for Big Sandy Plant Unit 2.

Order-of-Magnitude FGD Cost Estimates were prepared for the following four FGD Technologies:

- **Wet (WFGD):** Wet FGD Spray Tower and Integrated Wet ESP
- **Dry (DFGD):** Dry FGD Spray Dryer Absorber (SDA) and Fabric Filter (FF)
- **IAQCS:** Integrated Air Quality Control System (IAQCS) Dry SDA/FF and Wet FGD Spray Tower

NID: Dry FGD NID and Fabric Filter For each technology, capital cost estimates were prepared for fuel specifications with sulfur content of 1.7, 3.0, 4.5 and 7.5 lb SO₂/MMbtu. A base fuel was selected for each technology and a capital cost estimate was prepared for each assuming an Engineer, Procure, Construct (EPC) contracting approach. Adjustments were then made to the base cost estimate to develop the remaining fuel estimates for that specific technology. The cost estimates also consider both the existing ESP in and removed from service for the Dry, IAQCS and NID technologies. The ESP is required to remain in service for the WFGD technology for protection from erosion and wear of the ID fans and FGD system components (pumps, piping, nozzles, etc.).

The estimates were based upon the AEP Order of Magnitude/Relative Capital Installed Cost Estimate Specification (BS2-FGDSCE-052010, Rev. 1) which provided design basis and performance requirements and conceptual design deliverables prepared by S&L for each technology. The conceptual deliverables, consisting of project general arrangements, process flow diagrams, mass balances, water balances and single lines, formed the basis for development of preliminary major equipment sizes and commodity estimates. Attention was focused on the significant elements that changed from one fuel to another, such as storage, handling and disposal of reagent and byproduct materials. The OEM equipment costs were taken from recent vendor quotes and adjusted for Big Sandy specifications, schedule and unit size.

The IAQCS system was evaluated assuming a phased implementation in order to make it more competitive at lower sulfur fuel cases. The DFGD portion would be installed initially and for estimate purposes the

WFGD followed 5 years later for the 1.7 lb and 3.0 lb SO₂/MMbtu fuels. For the higher sulfur fuels both systems would be constructed to meet the earlier completion date.

The results of the capital cost estimates prepared for the WFGD, DFGD, IAQCS and NID technologies are tabulated in the following tables. Costs are tabulated without (Table ES-1) and with (Table ES-2) escalation and contingency. These total costs include costs provided by AEP for the wet and dry chimney installation and CEM equipment. The estimates exclude AEP costs for associated project work (new landfill, haul road, coal blending equipment etc.) which are typically not included in FGD cost estimates.

DRAFT COPY



Table ES-1

TECHNOLOGY CAPITAL COST ESTIMATE COMPARISON SUMMARY
(EXCLUDES ESCALATION AND CONTINGENCY)

Technology	ESP Option	1.7 lb/MMbtu	3.0 lb/MMbtu	4.5 lb/MMbtu	7.5 lb/MMbtu
WFGD	ESP	\$617,031,100	\$625,465,400	\$631,805,100	\$639,763,000
DFGD	ESP	\$423,505,200	\$433,859,900	N/A	N/A
	N/ESP	\$420,086,200	\$430,099,900	N/A	N/A
IAQCS	ESP				
	N/ESP				
NID	ESP	\$390,264,600	\$396,951,100	\$412,540,400	\$463,425,900
	N/ESP	\$380,011,400	\$387,790,200	\$403,062,500	\$454,587,100

ESP = ESP In-Service N/ESP = ESP Out-of-Service

Table ES-2

TECHNOLOGY CAPITAL COST ESTIMATE COMPARISON SUMMARY
(INCLUDES ESCALATION AND CONTINGENCY)

Technology	ESP Option	1.7 lb/MMbtu	3.0 lb/MMbtu	4.5 lb/MMbtu	7.5 lb/MMbtu
WFGD	ESP	\$761,524,000	\$722,222,600	\$781,239,000	\$789,763,700
DFGD	ESP	\$517,264,900	\$530,206,600	N/A	N/A
	N/ESP	\$513,293,300	\$525,096,100	N/A	N/A
IAQCS	ESP				
	N/ESP				
NID	ESP	\$481,797,500	\$489,846,100	\$509,075,900	\$571,797,900
	N/ESP	\$469,053,000	\$477,867,300	\$496,469,800	\$560,242,100

ESP = ESP In-Service N/ESP = ESP Out-of-Service

Variable and fixed O&M costs were determined for each technology and fuel specification in accordance with the economic basis agreed to with AEP. These costs are tabulated in Table ES-3. See Exhibit 1-7 for a breakdown of these costs including auxiliary power values.

Table ES-3

FIXED & VARIABLE O&M COST COMPARISON SUMMARY

Technology	Fuel lb SO₂/MMbtu	ESP Option	Total Cost Fixed O&M	Total Cost Variable O&M
WFGD	1.7	ESP	\$5,268,000	\$4,808,000
	3.0	ESP	\$5,565,000	\$8,076,000
	4.5	ESP	\$5,853,000	\$10,871,000
	7.5	ESP	\$6,165,000	\$15,986,000
DFGD	1.7	N/ESP	\$4,292,000	\$16,253,000
	3.0	N/ESP	\$4,392,000	\$28,708,000
	1.7	ESP	\$4,292,000	\$15,099,000
	3.0	ESP	\$4,392,000	\$30,474,000
IAQCS (Phase 1 - DFGD Only)	1.7	N/ESP	\$4,292,000	\$16,253,000
	3.0	N/ESP	\$4,392,000	\$28,708,000
	4.5	N/ESP	N/A	N/A
	7.5	N/ESP	N/A	N/A
	1.7	ESP	\$4,292,000	\$15,099,000
	3.0	ESP	\$4,392,000	\$30,474,000
	4.5	ESP	N/A	N/A
	7.5	ESP	N/A	N/A

Technology	Fuel lb SO ₂ /MMbtu	ESP Option	Total Cost Fixed O&M	Total Cost Variable O&M
IAQCS (Phase 2 - DFGD + WFGD and Non- Phased)	1.7	N/ESP	\$8,396,000	\$10,725,000
	3.0	N/ESP	\$8,525,000	\$14,483,000
	4.5	N/ESP	\$8,650,000	\$17,782,000
	7.5	N/ESP	\$8,785,000	\$23,880,000
	1.7	ESP	\$8,396,000	\$8,054,000
	3.0	ESP	\$8,525,000	\$12,057,000
	4.5	ESP	\$8,650,000	\$15,583,000
	7.5	ESP	\$8,785,000	\$21,513,000
NID	1.7	N/ESP	\$4,846,000	\$18,139,000
	3.0	N/ESP	\$4,956,000	\$29,864,000
	4.5	N/ESP	\$5,066,000	\$40,961,000
	7.5	N/ESP	\$5,286,000	\$58,143,000
	1.7	ESP	\$4,846,000	\$15,565,000
	3.0	ESP	\$4,956,000	\$27,593,000
	4.5	ESP	\$5,066,000	\$38,926,000
	7.5	ESP	\$5,286,000	\$56,066,000

ESP = ESP In-Service N/ESP = ESP Out-of-Service

One EPC project schedule was developed for each technology, with exception of the IAQCS which has two due to both phased and non-phased options being considered. Level 2 project schedules are provided in the report. Using the results of the capital cost estimates and the EPC project schedules a preliminary project monthly cash flow was developed for each technology. The schedule and cost information is summarized in Tables ES-4, ES-5, ES-6, ES-7 and ES-8, which provide key milestone dates and annual cash flow data. Two tables are provided for the IAQCS technology to clearly define the phased and non-phased approaches.

Table ES-4

WFGD MILESTONE SCHEDULE AND CASH FLOW SUMMARY

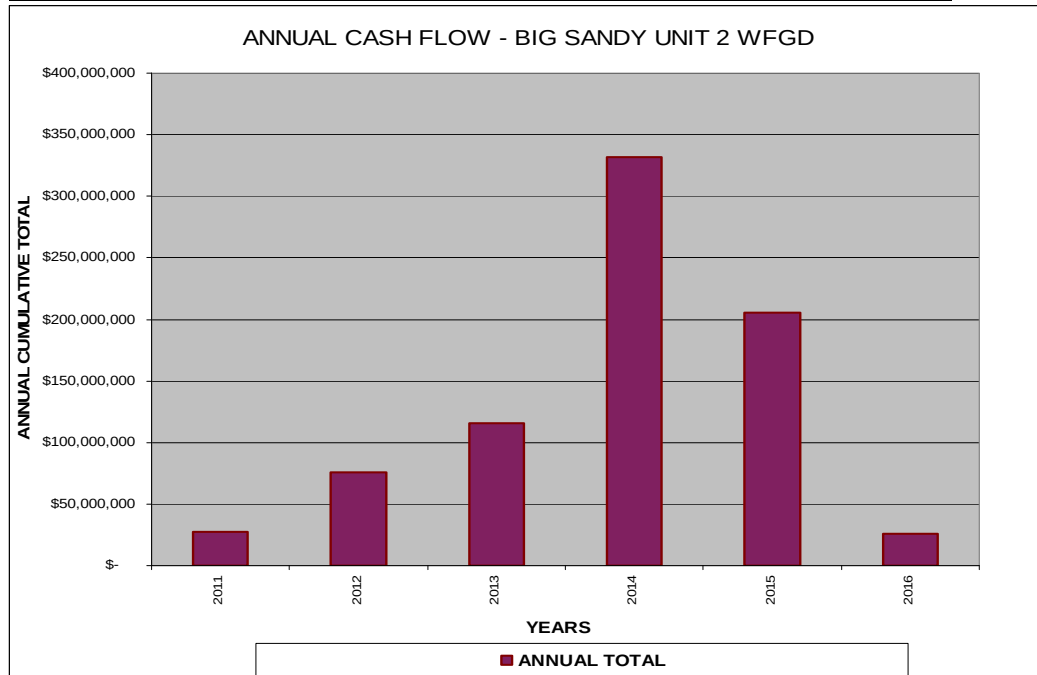


Table ES-5

DFGD MILESTONE SCHEDULE AND CASH FLOW SUMMARY

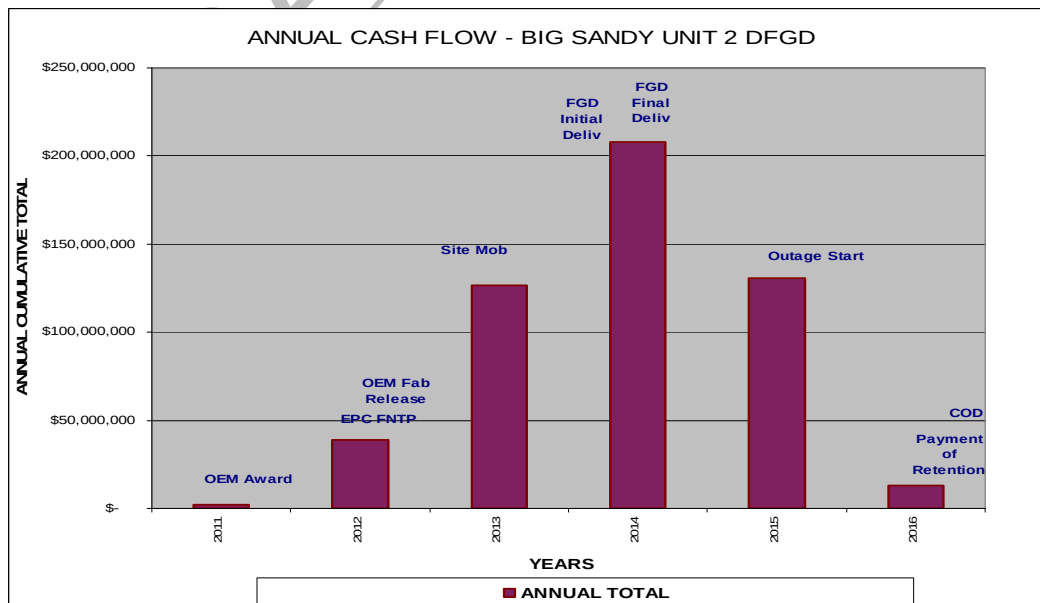


Table ES-6
IAQCS (PHASED) MILESTONE SCHEDULE AND CASH FLOW SUMMARY

(LATER)

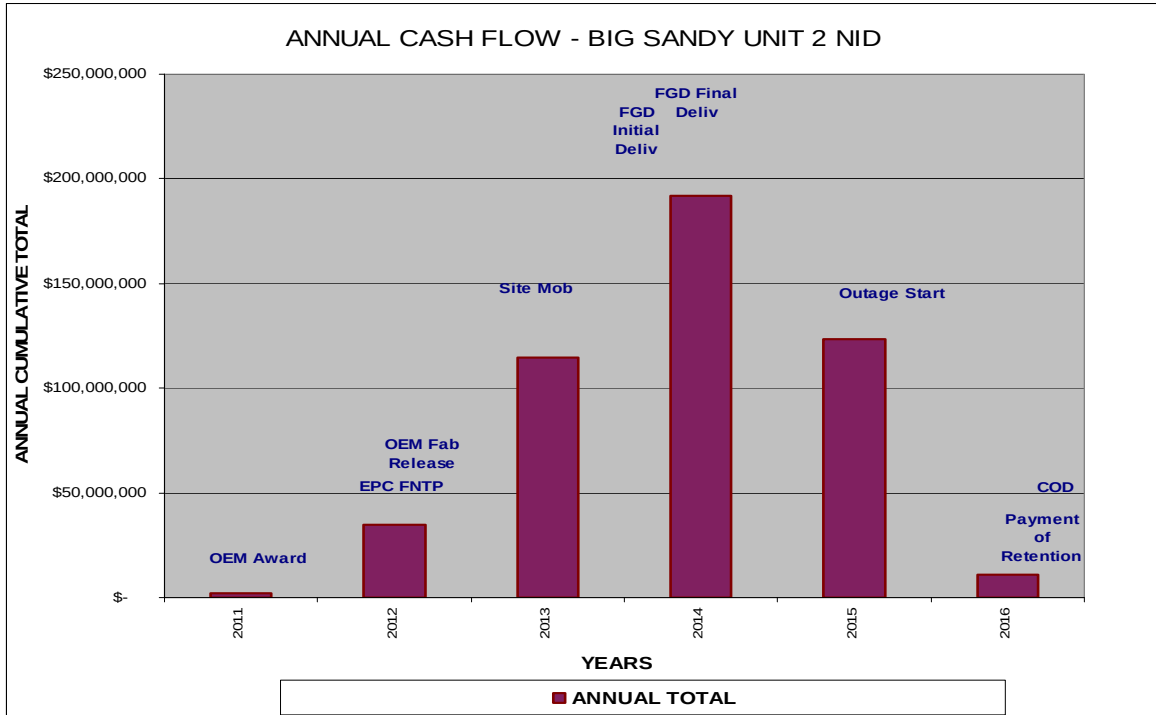
Table ES-7
IAQCS (NON-PHASED) MILESTONE SCHEDULE AND CASH FLOW SUMMARY

(LATER)

Table ES-8

ES-7

NID MILESTONE SCHEDULE AND CASH FLOW SUMMARY



The technical and commercial basis to develop the capital and O&M cost estimates is defined in the following report.

1.0 INTRODUCTION

The purpose of this document is to establish the Basis of the Order-of-Magnitude FGD Cost Estimate to assist American Electric Power (AEP) with the selection of an FGD technology for Big Sandy Plant Unit 2. It is also intended to organize and present the deliverables for each technology that are used to develop the Order-of-Magnitude FGD Cost Estimates. This document will define the project scope of work for each technology, the organization of the capital cost estimate structure and the technical and commercial basis used to develop the Capital and O&M Cost Estimates. It will also define the assumptions used in preparing the cost estimates.

The Order-of-Magnitude FGD Cost Estimate Report is comprised of five (5) volumes as follows:

<u>Volume</u>	<u>Description</u>
1	Summary Report
2	WFGD Technology
3	DFGD Technology
4	IAQCS Technology
5	NID Technology

Order-of-Magnitude FGD Cost Estimates were prepared for the following four FGD Technologies:

- **Wet (WFGD):** Wet FGD Spray Tower and Integrated Wet ESP
- **Dry (DFGD):** Dry FGD Spray Dryer Absorber (SDA) and Fabric Filter (FF)
- **IAQCS:** Integrated Air Quality Control System (IAQCS) Dry SDA/FF and Wet FGD Spray Tower
- **NID:** Dry FGD NID and Fabric Filter

For each technology, cost estimates were prepared considering fuel specifications with sulfur content of 1.7, 3.0, 4.5 and 7.5 lb SO₂/MMBtu (as applicable). A base fuel was selected for each technology and a capital cost estimate was prepared for each assuming an Engineer, Procure, Construct (EPC) contracting approach. Adjustments were then made to the base cost estimate to develop the remaining fuel estimates for that specific technology. The cost estimates also consider both the existing ESP in and removed from

service for the Dry, IAQCS and NID technologies. The ESP is required to remain in service for the WFGD technology for protection from erosion and wear of the ID fans and FGD system components (pumps, piping, nozzles, etc.).

The estimates were based upon conceptual design deliverables prepared by S&L for each technology and the AEP Order of Magnitude/Relative Capital Installed Cost Estimate Specification (BS2-FGDSCE-052010, Rev. 1) which provided design basis and performance requirements. The conceptual deliverables, consisting of project general arrangements, process flow diagrams, mass balances, water balances and single lines, formed the basis for development of preliminary major equipment sizes and commodity estimates. Attention was focused on the significant elements that changed from one fuel to another, such as storage, handling and disposal of reagent and byproduct materials. The OEM equipment costs were taken from recent vendor quotes and adjusted for Big Sandy specifications, unit capacity, and escalated to 2010 dollars.

The IAQCS system was evaluated assuming a phased implementation in order to make it more competitive at lower sulfur fuel cases. The DFGD portion would be installed initially and for estimate purposes the WFGD followed 5 years later for the 1.7 lb and 3.0 lb SO₂/MMBtu fuels. For the non-phased higher sulfur fuels both systems would be constructed to meet the earlier completion date. In the phased approach the future WFGD infrastructure was considered in the site layout and estimate development for the DFGD Phase. For example, costs for the limestone rail hopper foundation installation were included in the DFGD Phase in order to avoid impacting lime delivery during the WFGD installation in Phase II. The non-phased site layout was optimized to reduce ductwork costs by swapping the chimney and WFGD absorber locations. In addition to higher ductwork costs the phased approach also has significantly higher escalation costs due to the staggered schedule.

Table 1-1 illustrates the total of twenty four (24) cost estimates that were prepared.

Table 1-1
EPC COST ESTIMATES

Technology	1.7 lb SO ₂ /MMbtu	3.0 lb SO ₂ /MMbtu	4.5 lb SO ₂ /MMbtu	7.5 lb SO ₂ /MMbtu
Wet	Wet Est-2	Wet Est-3	Wet Base Est-1	Wet Est-4
Dry (ESP)	Dry Est-2A	Dry Base Est-1A	N/A	N/A
Dry (N/ESP)	Dry Est-2B	Dry Base Est-1B	N/A	N/A
IAQCS (ESP)	IAQCS Est-2A	IAQCS Est-3A	IAQCS Base Est-1A	IAQCS Est-4A
IAQCS (N/ESP)	IAQCS Est-2B	IAQCS Est-3B	IAQCS Base Est-1B	IAQCS Est-4B
NID (ESP)	NID Est-2A	NID Base Est-1A	NID Est-3A	NID Est-4A
NID (N/ESP)	NID Est-2B	NID Base Est-1B	NID Est-3B	NID Est-4B

ESP= ESP In Service

N/ESP = ESP Out of Service

2.0 TECHNICAL BASIS

The Design Basis used to establish the project scope of work is fully defined in the AEP Specification BS2-FGDSCE-052010 Revision 1, titled Order of Magnitude/Relative Capital Installed Cost Estimate Specification (Exhibit 1-1). Additional Design Basis documents were provided by AEP for use in establishing the design and scope and are not attached to this report. Table 2-1 identifies the AEP Design Basis documents utilized in this study.

Table 2-1
DESIGN BASIS DOCUMENTS

SPECIFICATION	DESCRIPTION
BS2-FGDSCE-052010	Order of Magnitude/Relative Capital Installed Cost Estimate Specification
GESP-06-004	Civil Design Criteria
SES-7018	Structural Design Criteria for Fossil Fuel Project
DC-NGDE-002	Architectural Design Criteria
DC-MECH-001	Mechanical Design Criteria
DC-ELEC-001-00	Fleet Plant Electrical Design Criteria
DC-FGD/SCR-004-03	Fleet FGD/SCR Control and Instrumentation Design Criteria
-----	Engineering Services Technically Approved Suppliers List (3/2/10)

The Order-of-Magnitude FGD Cost Estimates were also based on the Big Sandy Plant Unit 2 FGD Retrofit Project conceptual design developed during the course of the study. These conceptual design

deliverables are tabulated in the Project Deliverable Index within each technology volume and described below.

2.1 FGD Technology Process Flow Diagrams

Conceptual Process Flow Diagrams were prepared for each technology to identify the major components of the specific FGD system and the supporting systems, such as material handling, wastewater treatment systems, service water systems, etc. These documents were developed early in the estimating process to define the basic scope of each technology. They were utilized to develop the general arrangements, preliminary equipment lists and sparing philosophy. The Process Flow Diagrams for the Wet, Dry, IAQCS and NID Technologies are included as Attachments 2-1, 3-1, 4-1 and 5-1 respectively.

2.2 Site Plan and General Arrangement Drawings

Conceptual Site Plan and General Arrangement Drawings for each technology were prepared to identify the general arrangement and layout of the specific FGD system at the Big Sandy Plant. These drawings conceptually show the arrangement of the FGD Island and supporting systems/equipment. The General Arrangements were a critical part of the commodity development for the cost estimates. The Site Plan and General Arrangement Drawings for the Wet, Dry, IAQCS and NID Technologies are included as Attachments 2-2, 3-2, 4-2 and 5-2 respectively.

2.3 Mass Balances

Mass Balances were prepared for each technology and consider three separate variables; flue gas, solids and water. The Mass Balances also consider the existing cold-side ESP in-service and out of service (as applicable). The Mass Balances were utilized in the development of equipment sizing and O&M costs. The Mass Balances for the Wet, Dry, IAQCS and NID Technologies are included as Attachments 2-3, 3-3, 4-3 and 5-3 respectively..

2.4 Water Balances

Water Balances were prepared for each technology to show the source of FGD system make-up water. The Water Balances also consider the existing cold-side ESP in-service and out of service (as applicable). The Water Balances, similar to the Mass Balances, were utilized in the development of equipment sizing and O&M costs. The Water Balances for the Wet, Dry, IAQCS and NID Technologies are included as Attachments 2-4, 3-4, 4-4 and 5-4 respectively.

2.5 Electrical One-Lines

The existing electrical one-lines and switchyard one-lines were reviewed to establish options for the auxiliary power required for each technology. Conceptual load lists were prepared for each technology based on in-house data from other projects. The electrical one-lines were utilized to define the basic scope of the electrical system. Electrical equipment sizing and associated costs were then determined for the estimates. The Electrical One-Lines for the Wet, Dry, IAQCS and NID Technologies are included as Attachments 2-5, 3-5, 4-5 and 5-5 respectively.

3.0 COMMERCIAL BASIS

3.1 Capital Cost Estimate Outline

The Capital Cost Estimate prepared for the Big Sandy Plant FGD Project is organized by Area/Equipment. The cost estimate structure is defined in Exhibit 1-2.

3.2 Capital Cost Estimate Accuracy Range

3.2.1 Cost Estimate Classification

The capital cost estimate prepared for the Big Sandy Plant FGD Project was classified in accordance with AACE International Recommended Practice No. 18R-97 dated February 2, 2005 (refer to Exhibit 3-2). As a recommended practice of AACE International, the Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to project cost estimates.

Based on the current level of project definition for the Big Sandy Plant FGD Project, (1% to 15% of full project definition), the capital cost estimate was categorized as a Class 4 estimate in accordance with the

AACE International Recommended Practice No. 18R-97. Therefore, the expected accuracy range of the cost estimate typically varies in the low and high ranges as follows:

Low: -15% to -30%
High: +20% to +50%

The Estimate Input Checklist (Figure 2B of AACE International 18R-97) and Maturity Matrix (Figure 4 of AACE International 18R-97) were utilized to further justify the estimate Class 4 determination.

3.2.2 Contingency Analysis

The capital cost estimate contingency was determined using the range estimating process and Monte Carlo analysis. The Palisade Corporation @RISK software program was used to perform the risk analysis using Monte Carlo simulation. Range estimating (1) determines the probability of having a cost overrun, (2) identifies how large the overrun can be, and (3) identifies how much contingency to add to the cost estimate to reduce the residual risk to an acceptable level. Range estimates were determined for each of the cost elements in the cost estimate reflecting the confidence in the cost estimate. Risk drivers included OEM costs, BOP quantities, relocation/reinforcement costs. Refer to Exhibit 1-4 for the Contingency Analysis summary and other reports that established the contingency used.

3.3 Equipment/Material Cost

- 3.3.1 The OEM equipment pricing for the WFGD, DFGD and NID Technologies are from a 2009 Alstom bid for a confidential client. The bid was an “engineer and furnish only” proposal for a project in which S&L was involved. The costs were adjusted to meet the Big Sandy project specifications. For example the WFGD vessel costs were increased to account for the C-276 materials specified in the design basis specification. The installation labor costs were added based upon manhour data furnished by various equipment manufacturers and once again was adjusted to meet the Big Sandy specifications and location. This pricing was then benchmarked on a \$/kW basis against other S&L FGD projects over the last 4 years. Note that the NID benchmarking was done through comparison to similar Circulating Dry

Scrubber (CDS) projects. The IAQCS FGD was estimated as a combination of wet and dry systems with adjustments in lime consumption for the non-phased installation. The other equipment and material costs included in the capital cost estimate (for S&L estimated items) is based on recent vendor proposals, S&L's in-house cost database, vendor catalogs or published estimating manuals and adjusted, as required, for capacity, size, or material type.

3.4 Construction Labor Wage

Crew labor rates (Crew Hourly Rate) for the cost estimate are from the TriState Union Wage Rates from Huntington, West Virginia as provided by AEP. State specific Workman Comp % Rates were provided by AEP. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew rates detailed in the cost estimate (See Exhibit 3-4: Union Labor Rate Summary). A 1.10 regional labor productivity multiplier is included based on Compass International Global Construction Yearbook, 2010 Edition plus and additional 5% for safety related issues for a total productivity multiplier of 1.15.

3.4.1 Labor Work Schedule and Incentives

The estimate assumes a 5x10 work week.

A productivity penalty of +8% (in hours) and premium time cost (1-1/2 times the base rate) between the 40 single and 50 single shift will be included.

Per-diem subsistence will be excluded for craft labor.

3.4.2 Base Craft Rates

The base labor crafts used for the capital cost estimate are defined in page 1 of Exhibit 1-5.

3.4.3 Labor Crews

The construction/erection labor cost is based on the use of applicable construction crews required for the scope of work of this project.

3.4.4 Crew Mixes

Major crew mixes used in the cost estimates are defined in page 2 of Exhibit 1-5.

3.4.5 Quantity Sources

Quantities of pieces of equipment and/or bulk material commodities used in this cost estimate are intended to be reasonable and representative of projects of this type. Material quantities were estimated from the site plan and general arrangement drawings, sketches and past project data provided by the S&L Engineers. Equipment quantities were defined in the AEP estimate specification and the conceptual process flow diagrams.

3.4.6 Construction Indirects

Allowances are included in the cost estimate as direct costs as noted for the following:

- Freight: 5% of the total equipment and material costs.
- Heavy Construction Equipment/Crane: Is based upon 9 months of heavy crane usage at \$75,000 per month crane rental with a crane crew of 4 persons full time for this duration. Cost of small cranes and machinery is included in the wage rates.
- Mobilization and Demobilization: included in labor wage rates as 3.52% of total payroll wages + other + construction equipment (refer to Union Labor Rate Summary – Exhibit 1-5)
- Scaffolding: 5% of total material and labor costs.
- Consumables: 0.5% of total material and labor cost
- Loss of Productivity due to working 5-10's for extended periods and Premium Time Pay will be included as noted in 3.4.1 above
- Per Diem Costs: Excluded from the estimate as noted in 3.4.1 above.
- General and Administrative Costs: Excluded from the estimate per AEP direction.
- Profit: Excluded from the estimate per AEP direction.

Contractor allowance percentages noted above are base estimating percentages used for this type of major construction project on an Order-of-Magnitude estimate. These percentages are applied across the entire estimate and are not intended to be representative of individual estimate work areas.

3.4.7 Engineering/Design/Procurement Services

Sargent & Lundy has included estimated costs for Engineering, Design, Procurement Services and Project Management and Administrative Services. In addition costs for Training Services, and Outside Contractors are included as separate line items.

3.4.8 Construction Management/Field Engineering

Construction Management/Field Engineering is estimated at 3% of total direct and construction indirect costs.

3.4.9 Start-Up Commissioning

Start-Up/Commissioning is estimated at 1% of total direct and construction indirect costs.

3.4.10 Craft Startup Support

A fixed allowance for Craft Startup Support is included.

3.4.11 Initial Fills

Initial Fills are estimated at 0.3% of total direct and construction indirect costs.

3.4.12 Owners Costs

Owner costs are not included and will be provided by AEP for the following:

- Project Engineering
- Project Administration
- Owner Construction Management
- Owner Startup & Commissioning
- Permits & Fees
- Air Modeling
- Legal Fees

3.4.13 Sales/Use Tax

Sales/Use Tax is not included in the cost estimate.

3.4.14 Escalation

S&L has been monitoring over 200 U.S. indices from nine sources to track past escalation. These include indices for various pieces of equipment, various types of material, labor by city, and other items relevant to power plants. Some of the equipment includes heat exchangers, pumps, and transformers. Some of the material types tracked includes structural steel, pipe, and conduit.

Data for up to the last ten years is used to calculate past escalation. Then using the most current data as a base the average annual escalation is calculated over various time periods from the last six months, last one year, last two years, last three years, etc., up to the last ten years. We then used that past escalation to help predict future escalation while realizing that past escalation is not an indication of future escalation; but it is an appropriate benchmark along with knowledge of the current market to make predictions. Since anything can occur in a short time frame it is not uncommon to see wide escalation fluctuations for the data of less than about three years. After about three years the data is usually more stable and can start to show a long term trend. Also since three years is a reasonable time frame for purchases to be made on many projects this data point is usually used as the starting point for making predictions before current market conditions are factored in. Since using only one data source is very risky, multiple indices from various sources are evaluated and their average is used in the calculation of past escalation.

The average escalation for the last three years is used as the starting point for making predictions before current market conditions are factored in. In addition to this the average escalation for the last five years is used to make escalation predictions after three years in the future before current market conditions are factored in. Based upon this evaluation along with input from AEP we have used the following escalation percentages:

Equipment: 4.0%/yr of total equipment cost escalated for five years (2011-2015).

Material: 2.0%/yr of total material cost escalated for four years (2012-2015)

Labor: 2.5%/yr of total labor cost escalated for five years (2011-2015)

Indirects: 2.5%/yr of total indirect costs escalated for five years (2011-2015).

For the IAQCS technology, due to the phased and non-phased approach, escalation is calculated as follows:

For the Dry FGD portion:

Equipment: 4.0%/yr of total equipment cost escalated for five years (2011-2015). Due to assumed equipment procurement cycle of average 2.5 years, actual escalation in the cost estimate is based on January 2011 to July 2013.

Material: 2.0%/yr of total material cost escalated for five years (2011-2015). Due to assumed material procurement cycle of 3.5 years, actual escalation in the cost estimate is based on January 2011 to July 2014.

Labor: 2.5%/yr of total labor cost escalated for five years (2011-2015). Due to significant craft labor loading that is typical during the first 12 months following mobilization, actual escalation in the cost estimate is based on January 2011 to July 2014 (3.5 years).

Indirects: 2.5%/yr of total indirect cost escalated for five years (2011-2015). Similar to Labor escalation, escalation for indirects in the cost estimate is based on January 2011 to July 2014 (3.5 years).

For the Wet FGD portion:

Equipment: 3.0%/yr of total equipment cost escalated for 10 years (2011-2020). Due to assumed equipment procurement cycle of average 2.5 years, starting on January 2016, actual escalation in the cost estimate is based on January 2011 to July 2018.

Material: 2.0%/yr of total material cost escalated for five years (2011-2015). Due to assumed material procurement cycle of 3.5 years, starting on January 2016, actual escalation in the cost estimate is based on January 2011 to July 2019.

Labor: 2.5%/yr of total labor cost escalated for five years (2011-2015). Due to significant craft labor loading that is typical during the first 12 months following mobilization, actual escalation in the cost estimate is based on January 2011 to July 2018 (7.5 years).

Indirects: 2.5%/yr of total indirect cost escalated for five years (2011-2015). Similar to Labor escalation, escalation for indirects in the cost estimate is based on January 2011 to July 2018 (7.5 years).

3.4.15 Contingency

After completion of the cost estimate a Risk Analysis was performed to develop the contingency to be applied to the cost estimates. Cost categories were defined for establishing target, maximum and minimum values depending on the confidence of achieving the target costs. For each category a range (minimum and maximum values) was determined based on level of design, equipment pricing, material / commodity pricing, labor pricing, and volatility in equipment, material, and labor pricing. These ranges were then entered into a software program utilizing Monte Carlo Simulation to determine an overall contingency for the project. The Monte Carlo Simulation is based on running 10,000 iterations where the inputs are randomly generated from probability distribution curves to simulate the process of sampling. The output is a curve where a point on the curve gives % confidence factor and corresponding overall dollar amount for the project to meet that confidence factor. The software program also provides an output listing contingency % in terms of total direct and indirect costs. For this project we used 95% confidence factor to determine contingency dollars. Commercially available “@Risk” program was used to perform the risk analysis. Refer to Exhibit 1-4 for the contingency analysis summary.

3.4.16 AFUDC

Costs associated with AFUDC are not included.

3.4.17 Scope Excluded

The following additional scope items are not included.

- New landfill

- By-product disposal at landfill
- Private haul road to landfill (includes bridge)
- New coal handling equipment required for coal blending
- New coal storage/reclaim system

Table 3-1
INDIRECTS COMPARISON – BASE CASE TECHNOLOGIES

<u>Item Description</u>	WFGD BASE EST-1 4.5 LB SO ₂ /MMBTU	DFGD BASE EST - 1B (N/ESP) 3.0 LB SO ₂ /MMBTU	FGD PROJECT - IAQCS BASE (TBD)	NID BASE EST-1B (N/ESP) 3.0 LB SO ₂ /MMBTU
OVERTIME TOTAL LABOR COSTS FOR 50 HR WEEK	\$262,116,856	\$161,322,374		\$147,726,180
OVERTIME TOTAL LABOR COSTS FOR 40 HR WEEK	\$224,773,800	\$139,051,600		\$127,343,400
ADDITIONAL CRANE ALLOWANCE	\$1,337,400	\$2,333,520		\$1,337,400
COST DUE TO OVERTIME INEFFICIENCY - 8%	\$18,212,000	\$10,810,000		\$9,915,000
COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - 10% ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED	\$19,131,056	\$11,460,774		\$10,467,780
CONSUMABLES - 0.5% of ACCT NO. 90	\$1,438,284	\$926,813		\$850,770
FREIGHT ON MATERIAL - 5% of ACCT NO. 90	\$3,944,645	\$2,331,050		\$2,156,025
<u>Item Description</u>	WFGD BASE EST-1 4.5 LB SO ₂ /MMBTU	DFGD BASE EST - 1B (N/ESP) 3.0 LB SO ₂ /MMBTU	FGD PROJECT - IAQCS BASE (TBD)	NID BASE EST-1B (N/ESP) 3.0 LB SO ₂ /MMBTU
FREIGHT ON EQUIPMENT - 5% of ACCT NO. 90	\$7,082,845	\$5,426,355		\$4,530,575
SCAFFOLDING - 5% OF ACCT NO. 90	\$14,382,835	\$4,634,065		\$8,507,695
CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - 15% of ACCT NO. 90	\$43,148,505	\$27,804,390		\$25,523,085
ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$30,000,000	\$25,000,000		\$25,000,000
CONSTRUCTION MANAGEMENT	\$17,169,900	\$11,402,300		\$10,335,400
S-U / COMMISSIONING	\$5,723,300	\$3,800,800		\$3,445,100
CRAFT START-UP SUPPORT	\$2,649,200	\$1,638,400		\$1,500,500



INITIAL FILLS	\$1,717,000	\$1,140,200		\$1,033,500
CONTINGENCY	\$92,638,200	\$64,186,900		\$56,485,500
ESCALATION	\$56,795,700	\$29,787,000		\$33,591,600

Note: Acct. 90 is the Total Direct and Construction Indirect Costs

3.5 Assumptions

3.5.1 All utilities such as electricity and water, required for the construction of this project, will be furnished by the owner and made available for use by the installation contractors.

3.5.2 All fuel required for construction equipment will be the responsibility of the installation contractors. This cost is included in the estimate wage rates.

3.5.3 Initial fills for testing and startup are furnished by the owner and include the following:

- Lime
- Limestone
- Service Water

3.5.4 Consumables are included as a line item in the estimates totaling 0.5% of Total Direct and Construction Indirect Costs and are comprised of the following:

- Welding Rods
- Solder and Flux
- Tapes of all Types
- Splicing Materials
- Cable-Pulling Compounds
- Sealing Compounds
- Cleaning Fluids

3.5.5 Expendables are included in the labor rates and are comprised of the following:

- Sandpapers
- Emery Cloth
- Rags
- Twine

3.6 Capital Cost Estimate Summary

Refer to the following Exhibits for the summaries.

- Wet FGD Base Case Capital Cost Estimate Summary (Exhibit 1-6.1)
- Dry FGD Base Case w/o ESP Capital Cost Estimate Summary (Exhibit 1-6.2)
- IAQCS FGD Base Case w/o ESP Capital Cost Estimate Summary (Exhibit 1-6.3)
- NID FGD Base Case w/o ESP Capital Cost Estimate Summary (Exhibit 1-6.4)

For detailed capital cost estimates see the individual technology volumes 2 through 5.

3.7 Capital Cost Estimate Comparison

The cost estimates prepared for each technology were summarized in a roll-up of individual accounts for comparison purposes. The cost differences between fuels were noted and technical items which account for the differences in cost between the options are tabulated. See Exhibits 1-8 (WFGD), 1-9 (DFGD), 1-10 (IAQCS) and 1-11 (NID).

4.0 O&M COST ESTIMATES

The O&M Cost Estimate Summary for the WFGD, DFGD, IAQCS and NID Technologies are provided in Exhibit 1-7. The detailed O&M Cost Estimates for the WFGD, DFGD, IAQCS and NID Technologies are provided in the individual technology volumes in Attachments 2-5, 3-5, 4-5 and 5-5 respectively. A comparative summary of fixed and variable O&M costs is also provided in the executive summary table ES-3.

5.0 PROJECT SCHEDULE

An EPC Project Schedule was developed for each base case technology. For Technologies with two base cases only the ESP out of service base case schedule was prepared since the differences between the ESP in service and out of service are negligible. For the IAQCS technology separate project schedules were prepared for the phased and non-phased options. The level 2 project schedules are provided in the individual technology volumes. See Attachments 2-15 (WFGD), 3-15 (DFGD), 4-23 (IAQCS Non-Phased), 4-24 (IAQCS Phased) and 5-23 (NID).

Based on the capital cost estimate and the EPC project schedule a cash flow was developed for each technology (Base cost estimate ESP out of service case only). A summary page for each technology containing key milestone dates and an annual cash flow are provided in Tables ES-4 through ES-8. The monthly project cash flows are included in the individual technology volumes. (Refer to Exhibits 2-6 (WFGD), 3-6 (DFGD), 4-6 (IAQCS) and 5-6 (NID)).

6.0 REFERENCES

- 6.1 Order of Magnitude/Relative Capital Installed Cost Estimate Specification, BS2-FGDSCE-052010, Rev. 1, Dated June 21, 2010. Attached as Exhibit 1-1
- 6.2 AACE INTERNATIONAL Recommended Practice No. 18R-97 (February 2, 2005): Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Process Industries. Attached as Exhibit 1-3



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-1
Order of Magnitude/Relative Capital Installed
Cost Estimate Specification

DRAFT COPY



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-2
Capital Cost Estimate Outline

DRAFT COPY

EXHIBIT 1-2
CAPITAL COST ESTIMATE OUTLINE
DIRECT COSTS

PROJECT DIRECT COSTS					
ACCT	COST ESTIMATE CATEGORY	EQUIPMENT/MATERIAL COST RESPONSIBILITY	CONSTRUCTION/ERECTION COST RESPONSIBILITY	ESTIMATE BASIS	NOTES
1.0	ID FANS	S&L	S&L	Previous OEM proposals and S&L Estimates	1
2.0	WET ESP	S&L	S&L	Previous OEM proposals and S&L Estimates	
3.0	NEW STACK	AEP	AEP		
4.0	LIMESTONE HANDLING SYSTEM	S&L	S&L	Previous OEM proposals and S&L Estimates	
5.0	REAGENT PREPARATION ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimates	
6.0	BYPRODUCT DEWATERING ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimate	
7.0	ABSORBER ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimates	1, 2
8.0	FGD WASTE WATER TREATMENT PLANT	S&L	S&L	Previous OEM proposals and S&L Projects	
9.0	COMPRESSED AIR SYSTEM	S&L	S&L	Past & Current S&L Projects	

EXHIBIT 1-2

CAPITAL COST ESTIMATE OUTLINE

DIRECT COSTS

PROJECT DIRECT COSTS					
ACCT	COST ESTIMATE CATEGORY	EQUIPMENT/MATERIAL COST RESPONSIBILITY	CONSTRUCTION/ERECTION COST RESPONSIBILITY	ESTIMATE BASIS	NOTES
10.0	SERVICE WATER SYSTEM	S&L	S&L	Past & Current S&L Projects	
11.0	POTABLE WATER SYSTEM	S&L	S&L	Past & Current S&L Projects	
12.0	FGD SUBSTATION	S&L	S&L	Past & Current S&L Projects	
13.0	FGD DCS SYSTEM	S&L	S&L	Past S&L Projects Adjusted to Meet AEP Design Criteria	
14.0	CEM SYSTEM	AEP	AEP		
15.0	RAIL INFRASTRUCTURE	S&L	S&L		
16.0	SITE IMPROVEMENTS - CIVIL WORK	S&L	S&L		
17.0	BOP ITEMS	S&L	S&L		
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	S&L	S&L	Site Plans	
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	AEP	AEP		

Notes: 1) Noise Mitigation costs were considered for ID fan insulation and lagging and blower bldg construction.
2) Ductwork costs are based upon general arrangement layouts.

EXHIBIT 1-2

[illegible]



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-3
AACE International
Recommended Practice No. 18R-97,
February 2, 2005

DRAFT COPY

AACE International Recommended Practice No. 18R-97

**COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN
ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR
THE PROCESS INDUSTRIES**

TCM Framework: 7.3 – Cost Estimating and Budgeting

DRAFT COPY

Acknowledgments:

Peter Christensen, CCE (Author)
Larry R. Dysert, CCC (Author)
Jennifer Bates, CCE
Dorothy J. Burton
Robert C. Creese, PE CCE
John K. Hollmann, PE CCE

Kenneth K. Humphreys, PE CCE
Donald F. McDonald, Jr. PE CCE
C. Arthur Miller
Bernard A. Pietlock, CCC
Wesley R. Querns, CCE
Don L. Short, II

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting



February 2, 2005

PURPOSE

As a recommended practice of AACE International, the Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to project cost estimates (i.e., cost estimates that are used to evaluate, approve, and/or fund projects). The Cost Estimate Classification System maps the phases and stages of project cost estimating together with a generic maturity and quality matrix, which can be applied across a wide variety of industries.

This addendum to the generic recommended practice provides guidelines for applying the principles of estimate classification specifically to project estimates for engineering, procurement, and construction (EPC) work for the process industries. This addendum supplements the generic recommended practice (17R-97) by providing:

- a section that further defines classification concepts as they apply to the process industries;
- charts that compare existing estimate classification practices in the process industry; and
- a chart that maps the extent and maturity of estimate input information (project definition deliverables) against the class of estimate.

As with the generic standard, an intent of this addendum is to improve communications among all of the stakeholders involved with preparing, evaluating, and using project cost estimates specifically for the process industries.

It is understood that each enterprise may have its own project and estimating processes and terminology, and may classify estimates in particular ways. This guideline provides a generic and generally acceptable classification system for process industries that can be used as a basis to compare against. It is hoped that this addendum will allow each user to better assess, define, and communicate their own processes and standards in the light of generally-accepted cost engineering practice.

INTRODUCTION

For the purposes of this addendum, the term process industries is assumed to include firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. The common thread among these industries (for the purpose of estimate classification) is their reliance on process flow diagrams (PFDs) and piping and instrument diagrams (P&IDs) as primary scope defining documents. These documents are key deliverables in determining the level of project definition, and thus the extent and maturity of estimate input information.

Estimates for process facilities center on mechanical and chemical process equipment, and they have significant amounts of piping, instrumentation, and process controls involved. As such, this addendum may apply to portions of other industries, such as pharmaceutical, utility, metallurgical, converting, and similar industries. Specific addendums addressing these industries may be developed over time.

This addendum specifically does not address cost estimate classification in nonprocess industries such as commercial building construction, environmental remediation, transportation infrastructure, “dry” processes such as assembly and manufacturing, “soft asset” production such as software development, and similar industries. It also does not specifically address estimates for the exploration, production, or transportation of mining or hydrocarbon materials, although it may apply to some of the intermediate processing steps in these systems.

The cost estimates covered by this addendum are for engineering, procurement, and construction (EPC) work only. It does not cover estimates for the products manufactured by the process facilities, or for research and development work in support of the process industries. This guideline does not cover the

significant building construction that may be a part of process plants. Building construction will be covered in a separate addendum.

This guideline reflects generally-accepted cost engineering practices. This addendum was based upon the practices of a wide range of companies in the process industries from around the world, as well as published references and standards. Company and public standards were solicited and reviewed by the AACE International Cost Estimating Committee. The practices were found to have significant commonalities that are conveyed in this addendum.

COST ESTIMATE CLASSIFICATION MATRIX FOR THE PROCESS INDUSTRIES

The five estimate classes are presented in figure 1 in relationship to the identified characteristics. Only the level of project definition determines the estimate class. The other four characteristics are secondary characteristics that are generally correlated with the level of project definition, as discussed in the generic standard. The characteristics are typical for the process industries but may vary from application to application.

This matrix and guideline provide an estimate classification system that is specific to the process industries. Refer to the generic standard for a general matrix that is non-industry specific, or to other addendums for guidelines that will provide more detailed information for application in other specific industries. These will typically provide additional information, such as input deliverable checklists to allow meaningful categorization in those particular industries.

ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

- Notes:
- [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.
 - [b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Figure 1. – Cost Estimate Classification Matrix for Process Industries

CHARACTERISTICS OF THE ESTIMATE CLASSES

The following charts (figures 2a through 2e) provide detailed descriptions of the five estimate classifications as applied in the process industries. They are presented in the order of least-defined estimates to the most-defined estimates. These descriptions include brief discussions of each of the estimate characteristics that define an estimate class.

For each chart, the following information is provided:

- **Description:** a short description of the class of estimate, including a brief listing of the expected estimate inputs based on the level of project definition.
- **Level of Project Definition Required:** expressed as a percent of full definition. For the process industries, this correlates with the percent of engineering and design complete.
- **End Usage:** a short discussion of the possible end usage of this class of estimate.
- **Estimating Methods Used:** a listing of the possible estimating methods that may be employed to develop an estimate of this class.
- **Expected Accuracy Range:** typical variation in low and high ranges after the application of contingency (determined at a 50% level of confidence). Typically, this results in a 90% confidence that the actual cost will fall within the bounds of the low and high ranges.
- **Effort to Prepare:** this section provides a typical level of effort (in hours) to produce a complete estimate for a US\$20,000,000 plant. Estimate preparation effort is highly dependent on project size, project complexity, estimator skills and knowledge, and on the availability of appropriate estimating cost data and tools.
- **ANSI Standard Reference (1989) Name:** this is a reference to the equivalent estimate class in the existing ANSI standards.
- **Alternate Estimate Names, Terms, Expressions, Synonyms:** this section provides other commonly used names that an estimate of this class might be known by. These alternate names are not endorsed by this Recommended Practice. The user is cautioned that an alternative name may not always be correlated with the class of estimate as identified in the chart.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended—sometimes requiring less than an hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation. Level of Project Definition Required: 0% to 2% of full project definition. End Usage: Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	Estimating Methods Used: Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected Accuracy Range: Typical accuracy ranges for Class 5 estimates are - 20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. Effort to Prepare (for US\$20MM project): As little as 1 hour or less to perhaps more than 200 hours, depending on the project and the estimating methodology used. ANSI Standard Reference Z94.2-1989 Name: Order of magnitude estimate (typically -30% to +50%). Alternate Estimate Names, Terms, Expressions, Synonyms: Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.

Figure 2a. – Class 5 Estimate

CLASS 4 ESTIMATE	
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems, and preliminary engineered process and utility equipment lists. Level of Project Definition Required: 1% to 15% of full project definition. End Usage: Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	Estimating Methods Used: Class 4 estimates virtually always use stochastic estimating methods such as equipment factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques. Expected Accuracy Range: Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. Effort to Prepare (for US\$20MM project): Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used. ANSI Standard Reference Z94.2-1989 Name: Budget estimate (typically -15% to + 30%). Alternate Estimate Names, Terms, Expressions, Synonyms: Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.

Figure 2b. – Class 4 Estimate

CLASS 3 ESTIMATE	
Description: Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineered process and utility equipment lists. Level of Project Definition Required: 10% to 40% of full project definition. End Usage: Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimates" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.	Estimating Methods Used: Class 3 estimates usually involve more deterministic estimating methods than stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project. Expected Accuracy Range: Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. Effort to Prepare (for US\$20MM project): Typically, as little as 150 hours or less to perhaps more than 1,500 hours, depending on the project and the estimating methodology used. ANSI Standard Reference Z94.2-1989 Name: Budget estimate (typically -15% to + 30%). Alternate Estimate Names, Terms, Expressions, Synonyms: Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.

Figure 2c. – Class 3 Estimate

CLASS 2 ESTIMATE	
Description: Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the “bid” estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, piping and instrument diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc. Level of Project Definition Required: 30% to 70% of full project definition. End Usage: Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program.	Estimating Methods Used: Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. Expected Accuracy Range: Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. Effort to Prepare (for US\$20MM project): Typically, as little as 300 hours or less to perhaps more than 3,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. ANSI Standard Reference Z94.2-1989 Name: Definitive estimate (typically -5% to + 15%). Alternate Estimate Names, Terms, Expressions, Synonyms: Detailed control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.

Figure 2d. – Class 2 Estimate

CLASS 1 ESTIMATE	
Description: Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. Level of Project Definition Required: 50% to 100% of full project definition. End Usage: Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.	Estimating Methods Used: Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities. Expected Accuracy Range: Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. Effort to Prepare (for US\$20MM project): Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. ANSI Standard Reference Z94.2 Name: Definitive estimate (typically -5% to + 15%). Alternate Estimate Names, Terms, Expressions, Synonyms: Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Figure 2e. – Class 1 Estimate

COMPARISON OF CLASSIFICATION PRACTICES

Figures 3a through 3c provide a comparison of the estimate classification practices of various firms, organizations, and published sources against one another and against the guideline classifications. These tables permits users to benchmark their own classification practices.



AACE Classification Standard	ANSI Standard Z94.0	AACE Pre-1972	Association of Cost Engineers (UK) ACostE	Norwegian Project Management Association (NFP)	American Society of Professional Estimators (ASPE)
Class 5	Order of Magnitude Estimate -30/+50	Order of Magnitude Estimate	Order of Magnitude Estimate Class IV -30/+30	Concession Estimate	Level 1
				Exploration Estimate	
				Feasibility Estimate	
Class 4	Budget Estimate -15/+30	Study Estimate	Study Estimate Class III -20/+20	Authorization Estimate	Level 2
Class 3		Preliminary Estimate	Budget Estimate Class II -10/+10	Master Control Estimate	Level 3
Class 2	Definitive Estimate -5/+15	Definitive Estimate	Definitive Estimate Class I -5/+5	Current Control Estimate	Level 4
Class 1		Detailed Estimate			Level 5
					Level 6

Figure 3a. – Comparison of Classification Practices

INCREASING PROJECT DEFINITION

AACE Classification Standard	Major Consumer Products Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)
Class 5	Class S Strategic Estimate	Class V Order of Magnitude Estimate	Class A Prospect Estimate	Class V
			Class B Evaluation Estimate	
Class 4	Class 1 Conceptual Estimate	Class IV Screening Estimate	Class C Feasibility Estimate	Class IV
			Class D Development Estimate	
Class 3	Class 2 Semi-Detailed Estimate	Class III Primary Control Estimate	Class E Preliminary Estimate	Class III
Class 2	Class 3 Detailed Estimate	Class II Master Control Estimate	Class F Master Control Estimate	Class II
Class 1		Class I Current Control Estimate	Current Control Estimate	

Figure 3b. – Comparison of Classification Practices



AACE Classification Standard	J.R. Heizelman, 1988 AACE Transactions [1]	K.T. Yeo, The Cost Engineer, 1989 [2]	Stevens & Davis, 1988 AACE Transactions [3]	P. Behrenbruck, Journal of Petroleum Technology, 1993 [4]
Class 5	Class V	Class V Order of Magnitude	Class III*	Order of Magnitude
Class 4	Class IV	Class IV Factor Estimate	Class II	Study Estimate
Class 3	Class III	Class III Office Estimate		Budget Estimate
Class 2	Class II	Class II Definitive Estimate		
Class 1	Class I	Class I Final Estimate	Class I	Control Estimate

[1] John R. Heizelman, ARCO Oil & Gas Co., 1988 AACE Transactions, Paper V3.7

[2] K.T. Yeo, The Cost Engineer, Vol. 27, No. 6, 1989

[3] Stevens & Davis, BP International Ltd., 1988 AACE Transactions, Paper B4.1 (* Class III is inferred)

[4] Peter Behrenbruck, BHP Petroleum Pty., Ltd., article in Petroleum Technology, August 1993

Figure 3c. – Comparison of Classification Practices

ESTIMATE INPUT CHECKLIST AND MATURITY MATRIX

Figure 4 maps the extent and maturity of estimate input information (deliverables) against the five estimate classification levels. This is a checklist of basic deliverables found in common practice in the process industries. The maturity level is an approximation of the degree of completion of the deliverable. The degree of completion is indicated by the following letters.

- None (blank): development of the deliverable has not begun.
- Started (S): work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.
- Preliminary (P): work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.
- Complete (C): the deliverable has been reviewed and approved as appropriate.

General Project Data:	ESTIMATE CLASSIFICATION				
	CLASS 5	CLASS 4	CLASS 3	CLASS 2	CLASS 1
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production/Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
Engineering Deliverables:					
Block Flow Diagrams	S/P	P/C	C	C	C
Plot Plans		S	P/C	C	C
Process Flow Diagrams (PFDs)		S/P	P/C	C	C
Utility Flow Diagrams (UFDs)		S/P	P/C	C	C
Piping & Instrument Diagrams (P&IDs)		S	P/C	C	C
Heat & Material Balances		S	P/C	C	C
Process Equipment List		S/P	P/C	C	C
Utility Equipment List		S/P	P/C	C	C
Electrical One-Line Drawings		S/P	P/C	C	C
Specifications & Datasheets		S	P/C	C	C
General Equipment Arrangement Drawings		S	P/C	C	C
Spare Parts Listings			S/P	P	C
Mechanical Discipline Drawings			S	P	P/C
Electrical Discipline Drawings			S	P	P/C
Instrumentation/Control System Discipline Drawings			S	P	P/C
Civil/Structural/Site Discipline Drawings			S	P	P/C

Figure 4. – Estimate Input Checklist and Maturity Matrix

REFERENCES

ANSI Standard Z94.2-1989. **Industrial Engineering Terminology: Cost Engineering.**
AACE International Recommended Practice No.17R-97, **Cost Estimate Classification System.**

CONTRIBUTORS

Peter Christensen, CCE (Author)
Larry R. Dysert, CCC (Author)
Jennifer Bates, CCE

Dorothy J. Burton
Robert C. Creese, PE CCE
John K. Hollmann, PE CCE
Kenneth K. Humphreys, PE CCE
Donald F. McDonald, Jr. PE CCE
C. Arthur Miller
Bernard A. Pietlock, CCC
Wesley R. Querns, CCE
Don L. Short, II

DRAFT COPY



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-4
Contingency Analysis Summary

(LATER)

DRAFT COPY



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-5
Union Labor Rate Summary

DRAFT COPY

Exhibit 1-5
Union Labor Rate Summary

2010 BIG SANDY CRAFTS Union Labor Rates

Craft Rates								
Craft	Means Title	S&L Title	Base	W. Comp	Fringes	Travel	FICA	Craft Total
1	Insulation Worker		27.00	5.53	16.34	0.00	2.60	51.47
2	Boilermaker		31.04	6.35	18.06	0.00	2.91	58.36
3	Bricklayer		24.98	5.11	16.37	0.00	2.44	48.90
4	Carpenter		26.30	5.38	14.31	0.00	2.54	48.53
5	Cement Finisher	Cement Mason	25.25	5.17	15.22	0.00	2.46	48.10
6	Electrician		28.68	5.87	19.71	0.00	2.73	56.99
7	Elevator Constr		26.63	5.45	18.04	0.00	2.57	52.69
8	Glazier		26.63	5.45	18.04	0.00	2.57	52.69
9	Structural Steel Worker	Ironworker	26.63	5.45	18.04	0.00	2.57	52.69
10	Common Bldg Laborer	Laborer, Bulding	22.90	4.69	12.37	0.00	2.28	42.24
11	Common Bldg Laborer	Laborer, Chimney	22.90	4.69	12.37	0.00	2.28	42.24
12	Com Bldg Lab, Air Tool	Laborer, Jackhammer	22.90	4.69	12.37	0.00	2.28	42.24
13	Plasterers Helper	Laborer, Plasterer	22.90	4.69	12.37	0.00	2.28	42.24
14	Lather		22.77	4.66	11.10	0.00	2.27	40.80
15	Equip Oper - Med	Lineman	24.32	4.98	13.02	0.00	2.39	44.71
16	Mill Wright		28.04	5.74	14.86	0.00	2.68	51.32
17	Equip Oper - Light	Oper Engr, Air Comp.	20.65	4.23	13.02	0.00	2.11	40.01
18	Equip Oper - Oiler	Oper Eng, Oiler	20.65	4.23	13.02	0.00	2.11	40.01
19	Equip Oper - Heavy	Loader > 2.5 Cu Yds	25.08	5.13	13.02	0.00	2.45	45.68
20	Equip Oper - Med	Loader < 2.5 Cu Yds	24.32	4.98	13.02	0.00	2.39	44.71
21	Equip Oper - Heavy	Oper Eng, Crane	25.08	5.13	13.02	0.00	2.45	45.68
22	Painter, Struct Steel	Painter	22.77	4.66	11.10	0.00	2.27	40.80
23	Pipefitter		24.63	5.04	19.35	0.00	2.42	51.44
24	Plumber		24.63	5.04	19.35	0.00	2.42	51.44
25	Roofer, Composition		24.30	4.97	11.18	0.00	2.39	42.84
26	Sheet Metal Worker		23.18	4.74	19.37	0.00	2.31	49.60
27	Tile Layer		24.98	5.11	16.37	0.00	2.44	48.90
28	Truck Driver - Heavy	Teamster	29.39	6.02	13.18	0.00	2.78	51.37
29	Waterproofer		22.77	4.66	11.10	0.00	2.27	40.80
30	Plasterer		22.77	4.66	11.10	0.00	2.27	40.80

Average 47.01

Big Sandy Plant Unit 2
Order-of Magnitude Cost Estimate
September 10, 2010

Site Overhead is increased to 38% for Sep Revision

Note 1: Equipment includes small tools and equipment such as air compressors, welding machies, JLG's, forklifts, chain hoists, etc. Heavy cranes and crawlers are not included but shown as separate line items in the cost estimate if needed.

Page 2 of 3

**EXHIBIT 1-5
Union Labor Rate Summary**

Big Sandy Plant Unit 2
Order-of-Magnitude Cost Estimate
September 10, 2010

**Sargent & Lundy Labor Rate
Make-Up and Calculations**

Indirect Cost Items

Total Payroll Wages	Base Hourly Rate		
	Payroll Taxes		
	Social Security - FICA	Calculated as a percent of Base	(Set by the Federal Government Annually)
	State Unemployment - SUI	Calculated as a percent of Base	(Set by each State Government and adjusted periodically)
	Federal Unemployment - FUI	Calculated as a percent of Base	(Set by the Federal Government and adjusted periodically)
	Total Payroll Taxes		
	Insurance		
Total Insurance Burden	Workmen's Compensation	Calculated as a percent of Base	(Set by each State and adjusted periodically)
	Total Insurance Burden		
	Fringe Benefits	Calculated as a percent of Base	(Set By Union/Project Agreements)

Other	Other		
	Expendable/Small Tools	6.00% Calculated as a percent of Base	(Set By Contractor)
	Show-up Time	2% Allowance	
	Working Foreman	0% Calculated as a percent of Base	
	General Liability	2.35% Calculated as a percent of Base	(Set by Contractor)

Construction Equipment	Fixed	Calculation based on Required Equipment x Rental Rate. Rental rate is based on monthly rate/173 to arrive at an hourly rate
-------------------------------	-------	--

Overheads		38% - This item is strictly all field overheads. (38% of Total Payroll Wages + Other + Construction Equipment)
Site Overheads	Indirects	
	Percentage breakdown of Site Overhead Factor	
	Job Supervision-Field Staff	4.29
	Administration-Field Staff	6.67
	Personnel Hiring	4.29
	Craft Superintendents	12.87
	Safety	4.17
	Purchasing/Expediting-Field Staff	2.98
	Material Control-Field Staff	1.40
	Engineering Liaison-Field Staff	0.53
	Project Controls-Field Staff	6.61
	Cost/Schedule Controls-Field Staff	4.41
	Quality Control Inspection-Field Staff	5.54
	Project Office Supplies-Field Staff	1.10
	Computer Expenses	2.58
	Service Trucks/Supplies	2.57
	Field and Shop Mechanics and Supplies	2.77
	Subcontract Administration	1.63
	Warehousing-Field Staff	1.46
	Field Surveying	2.66
	Water & Ice	0.44
	Sanitation and Cleanup	2.15
	Move In/Move Out	3.52
	Detours/Barricades/Flags	0.22
	Security	3.13
	Temp. Utilities/Distr/ hookup	1.47
	Temporary Site Improvement	0.39
	Temporary Facilities/Buildings	0.80
	Utilities Consumption	2.19
	Employee Expenses	16.31
	Legal Expenses/Claims	0.52
	Permits and Fees	0.07
	Timekeeping	0.26
	Total Indirect Labor Burdened	100.00



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-6.1
Capital Cost Estimate Summary
Wet FGD Base Case

DRAFT COPY

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.0	ID FANS					
1.1	ID FANS - OEM EQUIPMENT	1,700,000 ACFM WITH 18,000 HP MOTORS (\$675,000 EACH. INCLUDES HYDRAULIC OIL UNITS, SEAL AIR FAN SKIDS, VIBRATION MONITORING EQUIPMENT, FAN STALL EQUIPMENT, FIELD SERVICE REP FOR 140	\$ 6,588,000	\$ -	\$ 1,635,600	\$ 8,223,600
1.2	PIPING & SUPPORTS - MECHANICAL		\$ 29,000	\$ 21,400	\$ 95,700	\$ 146,100
1.3	DAMPERS		\$ 449,200	\$ -	\$ 210,600	\$ 659,800
1.4	EXPANSION JOINTS		\$ -	\$ 82,800	\$ 73,600	\$ 156,400
1.5	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 1,150,500	\$ 2,637,000	\$ 3,787,500
1.6	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	\$ -	\$ 513,300	\$ 516,400	\$ 1,029,700
1.7	ID FAN INSULATION & LAGGING	TOTAL FOR TWO FANS. PRICE REFLECTS ACOUSTICAL INSULATION	\$ -	\$ 168,000	\$ 217,200	\$ 385,200
1.8	DUCTWORK INSULATION & LAGGING		\$ -	\$ 289,100	\$ 566,200	\$ 855,300
1.9	SUPPORT STEEL - FOUNDATIONS		\$ -	\$ 73,600	\$ 134,000	\$ 207,600
1.10	ID FAN PDC / CONTROL ROOM - FOUNDATIONS		\$ -	\$ 122,100	\$ 196,100	\$ 318,200
1.11	ID FAN PDC / CONTROL ROOM - CONCRETE PIERS	28 PIERS	\$ -	\$ 20,700	\$ 61,800	\$ 82,500
1.12	ID FAN - FOUNDATIONS	TOTAL FOR TWO FANS	\$ -	\$ 229,300	\$ 387,500	\$ 616,800
1.13	SWITCHGEAR		\$ 700,000	\$ -	\$ 36,400	\$ 736,400
1.14	MCC		\$ 123,600	\$ -	\$ 11,300	\$ 134,900

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.15	ID FAN PDC / CONTROL ROOM	25W X 70' X 13'H	\$ 875,000	\$ -	\$ 63,800	\$ 938,800
1.16	138 kV PANELS - RELAY		\$ 100,000	\$ -	\$ 9,100	\$ 109,100
1.17	2000A, 15KV CABLE BUS & TERMINATIONS		\$ 132,600	\$ 7,200	\$ 127,500	\$ 267,300
1.18	MIMIC PANELS		\$ 17,500	\$ -	\$ 6,800	\$ 24,300
1.19	EMERGENCY POWER SYSTEM		\$ 285,500	\$ -	\$ 38,900	\$ 324,400
1.20	GROUNDING		\$ 3,800	\$ -	\$ 14,800	\$ 18,600
1.21	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 30,000	\$ 29,500	\$ 85,500
1.22	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 372,900	\$ 1,787,900	\$ 2,160,800
1.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	\$ -	\$ 12,500	\$ 35,300	\$ 47,800
1.24	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ -	\$ 112,200	\$ 112,200
1.25	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 41,000	\$ 114,900	\$ 155,900
1.26	DUCT BANK	37"H X 62.5"W (75'+150'=225')	\$ -	\$ 73,400	\$ 2,000	\$ 75,400
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 9,330,200	\$ 3,207,800	\$ 9,122,100	\$ 21,660,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 466,500	\$ 818,000	\$ 3,496,300	\$ 4,780,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 9,796,700	\$ 4,025,800	\$ 12,618,400	\$ 26,440,900
2.0	WET ESP					
2.1	MECHANICAL EQUIPMENT	INCLUDES: INTEGRAL ESP WITH THE ABSORBER, ADDITIONAL SUPPORT STRUCTURES FOR INTEGRATED ESP DESIGN, AND ALL ASSOCIATED INTEGRAL PIPING.	\$ 41,021,000	\$ -	\$ 35,778,200	\$ 76,799,200
2.2	ADDITIONAL COST FOR C276 SHELL MATERIAL ABOVE THE PRICE OF A2205 ABSORBER SHELL	LABOR COST REFLECTS DIFFICULTY FACTOR WORKING WITH C276 VS. A2205	\$ -	\$ 12,300,000	\$ 6,286,700	\$ 18,586,700

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
2.3	PIPING & SUPPORTS - MECHANICAL		\$ 30,200	\$ 115,300	\$ 362,600	\$ 508,100
2.4	WET ESP - FOUNDATIONS	INCLUDED WITH ABSORBER FOUNDATIONS				
2.5	ELECTRICAL	INCLUDED WITH ABSORBER ISLAND SECTION 7.0				
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 41,051,200	\$ 12,415,300	\$ 42,427,500	\$ 95,894,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,052,600	\$ 3,165,900	\$ 16,262,000	\$ 21,480,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	WET ESP	\$ 43,103,800	\$ 15,581,200	\$ 58,689,500	\$ 117,374,500
3.0	NEW STACK					
3.1	CONCRETE STACK (WET)	PROVIDED BY AEP	\$ 780,000	\$ 15,000,000	\$ 15,700,000	\$ 31,480,000
4.0	LIMESTONE HANDLING SYSTEM					
4.1	MATERIAL HANDLING EQUIPMENT		\$ 4,690,100	\$ 845,000	\$ 3,544,400	\$ 9,079,500
4.2	FIRE PROTECTION SYSTEM FOR BELT CONVEYORS	DELUGE SYSTEM, DRY PIPE, SENSORS, ACTIVATION VALVE AND FM APPROVED PANEL - SUBCONTRACT PRICE FOR ALL CONVEYORS INCLUDES LABOR	\$ 660,000	\$ -	\$ -	\$ 660,000
4.3	PIPING - MECHANICAL		\$ 4,800	\$ 1,700	\$ 13,200	\$ 19,700
4.4	CONVEYOR STRUCTURE SUPPORT STEEL	THREE-COAT SHOP PAINT	\$ -	\$ 290,000	\$ 291,800	\$ 581,800
4.5	CONVEYOR SUPPORT STEEL - FOUNDATIONS		\$ -	\$ 16,000	\$ 45,500	\$ 61,500
4.6	RAILCAR LIMESTONE UNLOADING HOPPER, CONVEYOR TUNNEL AND ESCAPE TUNNEL - FOUNDATIONS		\$ -	\$ 542,000	\$ 1,330,800	\$ 1,872,800
4.7	LIMESTONE TRANSFER TOWER - FOUNDATIONS		\$ -	\$ 15,400	\$ 28,200	\$ 43,600
4.8	LIMESTONE TRANSFER CONVEYOR - FOUNDATIONS		\$ -	\$ 62,000	\$ 116,600	\$ 178,600

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.9	LIMESTONE RECLAIM HOPPER, CONVEYOR TUNNEL AND ESCAPE TUNNEL - FOUNDATIONS		\$ -	\$ 542,000	\$ 1,330,800	\$ 1,872,800
4.10	LIMESTONE UNLOADING PDC - FOUNDATIONS		\$ -	\$ 24,100	\$ 42,000	\$ 66,100
4.11	LIMESTONE UNLOADING PDC - CONCRETE PIERS	10 PIERS	\$ -	\$ 6,900	\$ 20,600	\$ 27,500
4.12	LIMESTONE RECLAIM PDC - FOUNDATIONS		\$ -	\$ 16,800	\$ 30,100	\$ 46,900
4.13	LIMESTONE RECLAIM PDC - CONCRETE PIERS	10 PIERS	\$ -	\$ 6,900	\$ 20,600	\$ 27,500
4.14	TRANSFORMERS	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 170,000	\$ -	\$ 63,700	\$ 233,700
4.15	SWITCHGEAR	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 156,800	\$ -	\$ 14,600	\$ 171,400
4.16	LIMESTONE UNLOADING PDC	18W X 50' X 10'H	\$ 450,000	\$ -	\$ 32,800	\$ 482,800
4.17	LIMESTONE RECLAIM PDC	15W X 30' X 10'H	\$ 225,000	\$ -	\$ 16,400	\$ 241,400
4.18	MCC	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 123,600	\$ -	\$ 7,200	\$ 130,800
4.19	CABLE BUS DUCT	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 134,700	\$ 5,400	\$ 187,900	\$ 328,000
4.20	MIMIC PANELS		\$ 17,500	\$ -	\$ 4,500	\$ 22,000
4.21	EMERGENCY POWER SYSTEM	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 216,300	\$ -	\$ 49,100	\$ 265,400
4.22	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 67,500	\$ 52,200	\$ 145,700
4.23	GROUNDING	LIMESTONE UNLOADING & RECLAIM AREAS	\$ 24,100	\$ -	\$ 62,200	\$ 86,300
4.24	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 758,600	\$ 3,283,700	\$ 4,042,300
4.25	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	\$ -	\$ 33,400	\$ 94,100	\$ 127,500
4.26	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 130,600	\$ 715,400	\$ 846,000
4.27	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 140,800	\$ 395,100	\$ 535,900
4.28	DUCT BANK	DUCT BANK WITH 12-5" CONDUIT, 37"H X 62.5"W (325'+50'=375')	\$ -	\$ 122,400	\$ 3,400	\$ 125,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.29	FOUNDATIONS FOR TRANSFORMERS	LIMESTONE UNLOADING & RECLAIM AREAS	\$ -	\$ 3,500	\$ 10,300	\$ 13,800
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 6,898,900	\$ 3,631,000	\$ 11,807,200	\$ 22,337,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 344,900	\$ 925,900	\$ 4,526,000	\$ 5,796,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIMESTONE HANDLING SYSTEM	\$ 7,243,800	\$ 4,556,900	\$ 16,333,200	\$ 28,133,900
5.0	REAGENT PREPARATION ISLAND					
5.1	MECHANICAL EQUIPMENT	INCLUDES LIMESTONE FEEDERS, FROM THE DAY SILOS THROUGH THE SLURRY STORAGE TANKS AND TRANSFER PUMPS WITH INTEGRAL PIPING	\$ 15,167,000	\$ -	\$ 12,266,800	\$ 27,433,800
5.2	REAGENT PREPARATION BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES	\$ 28,000	\$ -	\$ 12,300	\$ 40,300
5.3	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
5.4	PIPING - MECHANICAL		\$ 278,900	\$ 205,000	\$ 587,300	\$ 1,071,200
5.5	LIMESTONE SLURRY TANKS - FOUNDATIONS		\$ -	\$ 166,400	\$ 278,300	\$ 444,700
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS		\$ -	\$ 682,000	\$ 1,072,100	\$ 1,754,100
5.7	REAGENT PREPARATION BUILDING	120' L X 130' W X 130' H	\$ 269,400	\$ 4,865,000	\$ 4,251,600	\$ 9,386,000
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING		\$ -	\$ 13,800	\$ 25,100	\$ 38,900
5.9	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
5.10	GROUNDING		\$ 2,000	\$ -	\$ 7,900	\$ 9,900
5.11	ELECTRICAL CABLE AND RACEWAY	INCLUDED IN ABSORBER ISLAND SECTION 7.0	\$ -	\$ -	\$ -	\$ -

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 15,809,300	\$ 6,067,200	\$ 18,610,500	\$ 40,487,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 790,500	\$ 1,547,100	\$ 7,133,100	\$ 9,470,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 16,599,800	\$ 7,614,300	\$ 25,743,600	\$ 49,957,700
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY DEWATERING INCLUDING HYDROCLONES, PUMPS, INTEGRAL PIPING, BELT VACUUM FILTERS, AND DISCHARGE CONVEYORS	\$ 8,701,000	\$ -	\$ 6,644,500	\$ 15,345,500
6.2	PIPING - MECHANICAL		\$ 282,700	\$ 1,202,400	\$ 2,577,100	\$ 4,062,200
6.3	MATERIAL HANDLING EQUIPMENT		\$ 724,000	\$ 5,000	\$ 604,400	\$ 1,333,400
6.4	FIRE PROTECTION SYSTEM FOR BELT CONVEYORS	DELUGE SYSTEM, DRY PIPE, SENSORS, ACTIVATION VALVE AND FM APPROVED PANEL - SUBCONTRACT PRICE FOR ALL CONVEYORS INCLUDES LABOR	\$ 170,000	\$ -	\$ -	\$ 170,000
6.5	BYPRODUCT DEWATERING BUILDING SUMP PUMPS & AGITATORS		\$ 40,000	\$ -	\$ 16,900	\$ 56,900
6.6	CONVEYOR STRUCTURE SUPPORT STEEL	THREE-COAT SHOP PAINT	\$ -	\$ 99,000	\$ 99,600	\$ 198,600
6.7	BYPRODUCT STACKOUT CONVEYOR - FOUNDATIONS		\$ -	\$ 30,100	\$ 59,300	\$ 89,400

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT AREA SLAB	\$ -	\$ 1,155,700	\$ 1,779,300	\$ 2,935,000
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 224,400	\$ 361,700
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 291,400	\$ 456,200	\$ 747,600
6.12	BYPRODUCT DEWATERING BUILDING	120' L X 75' W X 65' H	\$ 145,200	\$ 1,595,300	\$ 1,495,900	\$ 3,236,400
6.13	PIPE SUPPORT PAD		\$ -	\$ 13,800	\$ 25,000	\$ 38,800
6.14	TRANSFORMERS		\$ 170,000	\$ -	\$ 54,600	\$ 224,600
6.15	SWITCHGEAR	480V LOW VOLTAGE SWITCHGEAR, PRICE PER SECTION	\$ 196,000	\$ -	\$ 104,700	\$ 300,700
6.16	CABLE BUS DUCT		\$ 269,400	\$ 10,800	\$ 375,800	\$ 656,000
6.17	MCC		\$ 123,600	\$ -	\$ 6,300	\$ 129,900
6.18	MIMIC PANELS		\$ 17,500	\$ -	\$ 1,600	\$ 19,100
6.19	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
6.20	GROUNDING		\$ 5,500	\$ -	\$ 18,600	\$ 24,100
6.21	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
6.22	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 310,500	\$ 1,278,800	\$ 1,589,300
6.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	\$ -	\$ 13,900	\$ 39,200	\$ 53,100
6.24	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 73,100	\$ 533,900	\$ 607,000
6.25	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 99,200	\$ 278,400	\$ 377,600
6.26	FOUNDATIONS FOR TRANSFORMERS		\$ -	\$ 3,500	\$ 10,300	\$ 13,800
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 11,005,200	\$ 5,701,000	\$ 17,006,000	\$ 33,712,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 550,300	\$ 1,453,800	\$ 6,518,600	\$ 8,522,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 11,555,500	\$ 7,154,800	\$ 23,524,600	\$ 42,234,800
7.0	ABSORBER ISLAND					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
7.1	MECHANICAL EQUIPMENT	INCLUDES ABSORBER MODULE (A2205) WITH INTERNALS, INLET DUCT ONLY THROUGH WET/DRY INTERFACE, PIPING INSIDE ABSORBER BUILDING TO TERMINAL POINTS, RECYCLE PUMPS, OXIDATION BLOWERS, MIST ELIMINATOR AND WASH PUMPS AND OTHER MISC. EQUIPMENT AND	\$ 41,363,000	\$ -	\$ 40,889,400	\$ 82,252,400
7.2	ADDITIONAL COST FOR C276 ABSORBER SHELL MATERIAL ABOVE THE PRICE OF A2205 ABSORBER SHELL	LABOR COST REFLECTS DIFFICULTY FACTOR WORKING WITH C276 VS. A2205	\$ -	\$ 14,940,000	\$ 7,636,100	\$ 22,576,100
7.3	ABSORBER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES	\$ 28,000	\$ -	\$ 12,300	\$ 40,300
7.4	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
7.5	EMERGENCY DIESEL DRIVEN QUENCH PUMP	WITH FUEL DAY TANK. FOUNDATIONS INCLUDED WITH ABSORBER BUILDING FOUNDATIONS	\$ 150,000	\$ -	\$ 30,700	\$ 180,700
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM EQUIPMENT COST. NO BOP PIPING	\$ -	\$ -	\$ -	\$ -
7.7	ABSORBER VESSEL - FOUNDATIONS		\$ -	\$ 366,900	\$ 609,400	\$ 976,300
7.8	ABSORBER BUILDING - FOUNDATIONS		\$ -	\$ 579,500	\$ 908,200	\$ 1,487,700
7.9	ABSORBER BUILDING	150' L X 90' W X 60' H	\$ 164,500	\$ 2,622,800	\$ 2,402,700	\$ 5,190,000
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING		\$ -	\$ 7,700	\$ 14,100	\$ 21,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 37,000	\$ 63,200	\$ 100,200
7.12	OXIDATION AIR BLOWER BUILDING	30' L X 30' W X 25' H	\$ 33,800	\$ 191,000	\$ 201,400	\$ 426,200
7.13	PIPE SUPPORT PAD - OXIDATION BUILDING		\$ -	\$ 7,700	\$ 13,100	\$ 20,800
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 3,558,800	\$ 8,156,900	\$ 11,715,700
7.15	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	\$ -	\$ 1,586,300	\$ 1,595,900	\$ 3,182,200
7.16	DUCTWORK INSULATION & LAGGING		\$ -	\$ 1,261,200	\$ 2,470,200	\$ 3,731,400
7.17	FOUNDATIONS FOR DUCT SUPPORT STEEL		\$ -	\$ 69,000	\$ 126,000	\$ 195,000
7.18	TRANSFORMERS		\$ 1,181,000	\$ -	\$ 263,900	\$ 1,444,900
7.19	SWITCHGEAR		\$ 1,838,400	\$ -	\$ 1,118,900	\$ 2,957,300
7.20	CABLE BUS & TERMINATIONS		\$ 1,658,300	\$ 46,600	\$ 2,982,700	\$ 4,687,600
7.21	MCC		\$ 432,600	\$ -	\$ 22,100	\$ 454,700
7.22	MIMIC PANELS		\$ 17,500	\$ -	\$ 4,000	\$ 21,500
7.23	GROUNDING		\$ 16,000	\$ -	\$ 46,100	\$ 62,100
7.24	LIGHTING/ TRANSFORMERS & PANELS		\$ 164,500	\$ 165,000	\$ 171,300	\$ 500,800
7.25	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
7.26	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 1,421,900	\$ 5,191,200	\$ 6,613,100
7.27	HIGH VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 58,400	\$ 164,700	\$ 223,100
7.28	MEDIUM VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 114,600	\$ 431,700	\$ 546,300
7.29	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 795,900	\$ 1,500,700	\$ 2,296,600
7.30	CONTROL & INSTRUMENT CABLE		\$ -	\$ 512,000	\$ 1,436,700	\$ 1,948,700
7.31	FOUNDATION FOR TRANSFORMERS		\$ -	\$ 59,000	\$ 173,700	\$ 232,700
7.32	TRANSFORMER FIRE WALLS		\$ -	\$ 3,500	\$ 9,600	\$ 13,100
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 47,167,900	\$ 28,404,800	\$ 78,675,900	\$ 154,248,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,033,400	\$ 7,243,200	\$ 30,940,700	\$ 41,217,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,201,300	\$ 35,648,000	\$ 109,616,600	\$ 195,465,900
8.0	FGD WASTE WATER TREATMENT PLANT					
8.1	WWT MECHANICAL EQUIPMENT:		\$ 4,500,000	\$ -	\$ 1,073,300	\$ 5,573,300

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
8.2	PIPING - MECHANICAL		\$ 46,800	\$ 281,200	\$ 888,700	\$ 1,216,700
8.3	PUMPS		\$ 58,000	\$ 29,300	\$ 74,100	\$ 161,400
8.4	TANKS		\$ -	\$ 2,385,000	\$ 792,000	\$ 3,177,000
8.5	PRIMARY CLARIFIER - FOUNDATIONS		\$ -	\$ 23,400	\$ 47,300	\$ 70,700
8.6	SECONDARY CLARIFIER - FOUNDATIONS		\$ -	\$ 23,400	\$ 47,300	\$ 70,700
8.7	RECLAIM WATER TANKS - FOUNDATIONS	TOTAL FOR TWO TANKS	\$ -	\$ 26,000	\$ 47,600	\$ 73,600
8.8	EQUALIZATION TANKS - FOUNDATIONS	TOTAL FOR TWO TANKS	\$ -	\$ 5,400	\$ 11,000	\$ 16,400
8.9	MAINTENANCE STORAGE TANK - FOUNDATIONS		\$ -	\$ 100,000	\$ 163,900	\$ 263,900
8.10	WWT BUILDING - FOUNDATIONS		\$ -	\$ 301,900	\$ 494,800	\$ 796,700
8.11	WWT BUILDING	125' L X 90' W X 25' H	\$ 42,000	\$ 885,100	\$ 855,600	\$ 1,782,700
8.12	PIPE SUPPORT PAD		\$ -	\$ 13,800	\$ 24,800	\$ 38,600
8.13	MCC		\$ 61,800	\$ -	\$ 3,600	\$ 65,400
8.14	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
8.15	GROUNDING		\$ 5,500	\$ -	\$ 18,600	\$ 24,100
8.16	LIGHTING / TRANSFORMERS & PANELS		\$ 52,000	\$ 60,000	\$ 59,100	\$ 171,100
8.17	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 511,400	\$ 1,992,800	\$ 2,504,200
8.18	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 148,000	\$ 184,100	\$ 332,100
8.19	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 102,400	\$ 287,300	\$ 389,700
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,874,400	\$ 4,896,300	\$ 7,090,300	\$ 16,861,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 243,700	\$ 1,248,600	\$ 2,718,100	\$ 4,210,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD WASTE WATER TREATMENT PLANT	\$ 5,118,100	\$ 6,144,900	\$ 9,808,400	\$ 21,071,400
9.0	COMPRESSED AIR SYSTEM					
9.1	AIR COMPRESSOR & AUXILIARIES		\$ 399,000	\$ -	\$ 112,500	\$ 511,500
9.2	PIPING - MECHANICAL		\$ 938,000	\$ 1,019,200	\$ 4,148,200	\$ 6,105,400
9.3	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,337,000	\$ 1,019,200	\$ 4,260,700	\$ 6,616,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 66,900	\$ 259,900	\$ 1,632,600	\$ 1,959,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 1,403,900	\$ 1,279,100	\$ 5,893,300	\$ 8,576,300
10.0	SERVICE WATER SYSTEM					
10.1	PUMPS		\$ 160,000	\$ -	\$ 73,600	\$ 233,600
10.2	PIPING - MECHANICAL		\$ 478,800	\$ 1,205,400	\$ 2,725,900	\$ 4,410,100
10.3	PIPING - FIRE PROTECTION SYSTEM		\$ 266,200	\$ 143,400	\$ 537,600	\$ 947,200
10.4	TANKS		\$ -	\$ 152,500	\$ -	\$ 152,500
10.5	SERVICE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 17,300	\$ 35,000	\$ 52,300
10.6	MAKE UP WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 11,600	\$ 24,500	\$ 36,100
10.7	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 905,000	\$ 1,530,200	\$ 3,396,600	\$ 5,831,800
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 45,300	\$ 390,200	\$ 1,301,600	\$ 1,737,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 950,300	\$ 1,920,400	\$ 4,698,200	\$ 7,568,800
11.0	POTABLE WATER SYSTEM					
11.1	PUMPS		\$ 30,000	\$ -	\$ 18,400	\$ 48,400
11.2	PIPING - MECHANICAL		\$ 137,000	\$ 120,800	\$ 389,400	\$ 647,200
11.3	TANKS		\$ -	\$ 8,500	\$ -	\$ 8,500
11.4	POTABLE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 5,200	\$ 8,800	\$ 14,000
11.5	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 167,000	\$ 134,500	\$ 416,600	\$ 718,100

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 8,400	\$ 34,300	\$ 159,500	\$ 202,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 175,400	\$ 168,800	\$ 576,100	\$ 920,200
12.0	FGD SUBSTATION					
12.1	138/13.8 KV STATION SERVICE TRANSFORMERS		\$ 1,390,500	\$ -	\$ 218,500	\$ 1,609,000
12.2	138KV MAIN FEEDER & TERMINATIONS		\$ 264,000	\$ -	\$ 254,000	\$ 518,000
12.3	SWITCHGEAR		\$ 124,200	\$ -	\$ 85,200	\$ 209,400
12.4	DUCTBANKS		\$ -	\$ 108,200	\$ 154,100	\$ 262,300
12.5	GROUNDING		\$ 10,100	\$ -	\$ 26,800	\$ 36,900
12.6	OUTDOOR LIGHTING		\$ 25,000	\$ -	\$ 56,800	\$ 81,800
12.7	FOUNDATION FOR AUX TRANSFORMER		\$ -	\$ 63,200	\$ 170,800	\$ 234,000
12.8	FIRE WALL FOR AUX TRANSFORMER		\$ -	\$ 21,300	\$ 63,600	\$ 84,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,813,800	\$ 192,700	\$ 1,029,800	\$ 3,036,300
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 90,700	\$ 49,100	\$ 395,172	\$ 535,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 1,904,500	\$ 241,800	\$ 1,425,000	\$ 3,571,300
13.0	FGD DCS SYSTEM					
13.1	DCS	4000 I/O POINTS	\$ -	\$ 3,000,000	\$ 1,016,900	\$ 4,016,900
13.2	DCS - VENDOR FIELD SUPPORT	200 MANDAYS @ \$1500/DAY - SHOWN AS SUBCONTRACT COST	\$ 300,000	\$ -	\$ -	\$ 300,000
13.3	LOCALLY MOUNTED INSTRUMENTS		\$ -	\$ 827,800	\$ 1,085,600	\$ 1,913,400
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 300,000	\$ 3,827,800	\$ 2,102,500	\$ 6,230,300
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 15,000	\$ 976,100	\$ 806,100	\$ 1,797,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD DCS SYSTEM	\$ 315,000	\$ 4,803,900	\$ 2,908,600	\$ 8,027,400

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
14.0	CEM SYSTEM					
14.1	CEM SYSTEM	PROVIDED BY AEP	\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000
15.0	RAIL INFRASTRUCTURE					
15.1	EXISTING RAILROAD IMPROVEMENTS	FOR FULL RAILCAR STORAGE TRACK IMPROVEMENTS - 3250 LF	\$ -	\$ 660,200	\$ 689,200	\$ 1,349,400
15.2	EXISTING RAILROAD IMPROVEMENTS	FOR LOOP TRACK UPGRADE - 5000 LF	\$ -	\$ 1,008,800	\$ 1,055,600	\$ 2,064,400
15.3	NEW RAILROAD TRACK	INCLUDES, 132LB RAIL, 7" TIMBERS, TIE PLATES, SPIKES, BOLTS, 12" SUBBALLAST, 12" BALLAST, 12 OZ/SY GEOTEXTILE MEMBRANE, 12" SUBGRADE PREP	\$ -	\$ 252,000	\$ 213,100	\$ 465,100
15.4	FIELD FABRICATED TURNOUTS	#8 TURNOUT	\$ -	\$ 90,000	\$ 54,800	\$ 144,800
15.5	RAIL SCALE	SUBCONTRACT COST, INCLUDES FOUNDATIONS	\$ 212,500	\$ -	\$ -	\$ 212,500
15.6	NEW CONCRETE ENCASEMENT	OVER AND AROUND DUCT BANK CONNECTING THE PLANT TO SWITCHYARD. THIS IS UNDER THE NEW TRACKWORK	\$ -	\$ 33,100	\$ 67,700	\$ 100,800
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,100	\$ 2,080,400	\$ 4,337,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 521,200	\$ 797,500	\$ 1,329,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,300	\$ 2,877,900	\$ 5,666,400
16.0	SITE IMPROVEMENTS - CIVIL WORK					
16.1	SITE GRADING		\$ -	\$ -	\$ 516,000	\$ 516,000
16.2	ROADS & SURFACING		\$ -	\$ 605,100	\$ 833,500	\$ 1,438,600
16.3	LIMESTONE HANDLING & STORAGE		\$ -	\$ 340,100	\$ 541,700	\$ 881,800
16.4	GYP SUM HANDLING & STORAGE		\$ -	\$ 1,147,200	\$ 1,784,100	\$ 2,931,300
16.5	GYP SUM RUNOFF POND		\$ 60,000	\$ 110,400	\$ 312,600	\$ 483,000
16.6	BYPRODUCT POND PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.7	NEW CONCRETE ENCASEMENT	8' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 15,200	\$ 31,500	\$ 46,700
16.8	TRUCK WASH AREA - CONCRETE PAD		\$ -	\$ 41,900	\$ 70,400	\$ 112,300
16.9	TRUCK WASH AREA - ENCLOSURE		\$ -	\$ 67,400	\$ 95,300	\$ 162,700
16.10	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.11	STORMWATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE	\$ -	\$ 472,500	\$ 480,800	\$ 953,300
16.12	STORMWATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.13	STORM WATER POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.14	OILY WATER SEWER		\$ 4,500	\$ 80,600	\$ 186,100	\$ 271,200
16.15	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.16	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.17	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.18	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 700,000	\$ 828,000	\$ 1,528,000
16.19	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 180,000	\$ 405,200	\$ 585,200
16.20	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 45,000	\$ 101,300	\$ 146,300
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 574,500	\$ 3,959,200	\$ 6,950,900	\$ 11,484,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 28,700	\$ 1,009,600	\$ 2,663,800	\$ 3,702,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 603,200	\$ 4,968,800	\$ 9,614,700	\$ 15,186,800
17.0	BOP ITEMS					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	\$ -	\$ 78,000	\$ 243,100	\$ 321,100
17.2	HEAT TRACING		\$ -	\$ 332,700	\$ 474,800	\$ 807,500
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 186,600	\$ 715,700	\$ 902,300
17.4	HOISTS & TROLLEYS		\$ 180,000	\$ 210,000	\$ 245,300	\$ 635,300
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	\$ -	\$ 140,000	\$ 583,500	\$ 723,500
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 19,600	\$ 30,100
17.7	EYE WASH STATIONS		\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS		\$ -	\$ 420,000	\$ 343,500	\$ 763,500
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,382,800	\$ 2,656,200	\$ 4,249,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 352,614	\$ 1,018,141	\$ 1,381,255
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,735,400	\$ 3,674,300	\$ 5,630,300
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500
18.4	OUTAGE TIE-IN DUCTWORK	ALLOWANCE FOR 85 TON DUCTWORK	\$ -	\$ 276,300	\$ 722,700	\$ 999,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 479,000	\$ 1,130,600	\$ 1,609,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 122,100	\$ 433,000	\$ 555,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 601,100	\$ 1,563,600	\$ 2,164,800
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					
19.1	ARSENIC, ASBESTOS , LEAD ABATEMENT	ALLOWANCE PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 750,000
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 143,696,900	\$ 94,432,900	\$ 224,773,800	\$ 463,653,600
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,757,800	\$ 20,117,700	\$ 80,802,000	\$ 108,677,600
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 151,454,700	\$ 114,550,600	\$ 305,575,800	\$ 572,331,200
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 17,169,900
	S-U / COMMISSIONING					\$ 5,723,300
	CRAFT START-UP SUPPORT					\$ 2,649,200
	INITIAL FILLS					\$ 1,717,000
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	OWNERS COST - % of ACCT NOS. 92, 93.1, 93.2, 93.3, 93.4					\$ -

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 630,290,600
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,514,500
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 938,990
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 575,510
	CONTINGENCY	14.7				\$ 92,638,200
	ESCALATION					\$ 56,795,700
	EQUIPMENT					\$ 15,758,900
	MATERIAL					\$ 8,221,000
	LABOR					\$ 27,583,900
	INDIRECTS					\$ 5,231,900
	INTEREST DURING CONSTRUCTION (AFUDC)					
	TOTAL PROJECT COST					\$ 781,239,000
	REFERENCE COSTS:					
A	ESP STRUCTURAL INTEGRITY MODS	ALLOWANCE FOR 150 TON FRAMING REINFORCEMENT	\$ -	\$ 435,000	\$ 2,188,200	\$ 2,623,200
B	REMOVE BOOSTER AIR FANS		\$ -	\$ -	\$ 111,000	\$ 111,000



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-6.2
Capital Cost Estimate Summary
Dry FGD Base Case w/o ESP

DRAFT COPY

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.0	ID FANS					
1.1	ID FANS - OEM EQUIPMENT	1,870,000 ACFM WITH 19,200 HP MOTORS (\$750,000 EACH). INCLUDES HYDRAULIC OIL UNITS, SEAL AIR FAN SKIDS, VIBRATION MONITORING EQUIPMENT, FAN STALL EQUIPMENT, FIELD SERVICE REP FOR 140 DAYS	\$ 6,738,000	\$ -	\$ 1,635,600	\$ 8,373,600
1.2	PIPING & SUPPORTS - MECHANICAL		\$ 21,800	\$ 28,700	\$ 120,500	\$ 171,000
1.3	DAMPERS		\$ 781,000	\$ -	\$ 352,600	\$ 1,133,600
1.4	EXPANSION JOINTS		\$ -	\$ 131,100	\$ 116,500	\$ 247,600
1.5	DUCTWORK	FABRIC FILTER OUTLET TO ID FANS AND FROM ID FANS TO STACK - INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 2,600,000	\$ 5,959,400	\$ 8,559,400
1.6	DUCT SUPPORT STEEL	THREE COAT SHOP PAINT	\$ -	\$ 1,160,000	\$ 1,167,000	\$ 2,327,000
1.7	ID FAN INSULATION & LAGGING	TOTAL FOR TWO FANS. PRICING REFLECTS ACOUSTICAL INSULATION	\$ -	\$ 168,000	\$ 217,200	\$ 385,200
1.8	DUCTWORK INSULATION & LAGGING	INCLUDES INSULATION FOR SPRAY DRYER OUTLET DUCT TO FABRIC FILTERS SUPPLIED WITH THE OEM EQUIPMENT	\$ -	\$ 864,000	\$ 1,692,200	\$ 2,556,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.9	DUCT SUPPORT STEEL - FOUNDATIONS		\$ -	\$ 295,500	\$ 532,700	\$ 828,200
1.10	ID FAN FOUNDATIONS INCLUDING ID FAN AUX EQUIPMENT		\$ -	\$ 106,000	\$ 185,600	\$ 291,600
1.11	ID FAN DFGD CONTROL ROOM - FOUNDATIONS		\$ -	\$ 122,100	\$ 196,100	\$ 318,200
1.12	ID FAN DFGD CONTROL ROOM	SUBCONTRACT PRICE INCLUDES LABOR. COMPLETE WITH HVAC, FINISHES AND SANITARY FACILITIES	\$ -	\$ 1,250,000	\$ -	\$ 1,250,000
1.13	MCC		\$ 120,000	\$ -	\$ 7,200	\$ 127,200
1.14	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV - 6600' ID FAN	\$ -	\$ 61,200	\$ 172,500	\$ 233,700
1.15	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 121,000	\$ 988,200	\$ 1,109,200
1.16	EMERGENCY POWER SYSTEM		\$ 285,500	\$ -	\$ 38,900	\$ 324,400
1.17	GROUNDING		\$ 23,300	\$ -	\$ 59,100	\$ 82,400
1.18	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 30,000	\$ 29,500	\$ 85,500
1.19	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 326,300	\$ 1,792,700	\$ 2,119,000
1.20	LOW VOLTAGE POWER CABLE & TERMINATIONS		\$ -	\$ 229,800	\$ 547,600	\$ 777,400
1.21	DUCT BANK		\$ -	\$ 186,800	\$ 347,700	\$ 534,500
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 7,995,600	\$ 7,680,500	\$ 16,158,800	\$ 31,834,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 399,800	\$ 1,766,500	\$ 5,396,000	\$ 7,562,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 8,395,400	\$ 9,447,000	\$ 21,554,800	\$ 39,397,200
2.0	FABRIC FILTERS					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
2.1	MECHANICAL EQUIPMENT	A SINGLE FABRIC FILTER (225" X 130") UNIT INCLUDING ALL INTERNAL FABRIC FILTER ELEMENTS SUCH AS BAGS, CAGES, ASH HOPPERS, 2 BROKEN BAG DETECTORS PER COMPARTMENT	\$ 19,761,000	\$ -	\$ 12,604,200	\$ 32,365,200
2.2	INSULATION FOR FABRIC FILTER	SUBCONTRACT COST INCLUDES LABOR	\$ 2,430,000	\$ -	\$ -	\$ 2,430,000
2.3	PENTHOUSE FOR FABRIC FILTER	SUPPORT STEEL AND PRLINS INCLUDED WITH OEM EQUIPMENT	\$ 70,200	\$ 787,000	\$ 1,007,600	\$ 1,864,800
2.4	BOTTOM ENCLOSURE FOR BAGHOUSE		\$ 60,000	\$ 1,204,000	\$ 1,359,800	\$ 2,623,800
2.5	PIPING & SUPPORTS - MECHANICAL		\$ 30,900	\$ 101,400	\$ 209,500	\$ 341,800
2.6	FABRIC FILTER - FOUNDATIONS		\$ -	\$ 550,700	\$ 973,600	\$ 1,524,300
2.7	FABRIC FILTER - SUPPORT STEEL AND ACCESS GALLERY		\$ -	\$ 360,000	\$ 1,186,700	\$ 1,546,700
2.8	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND 7.0	\$ -	\$ -	\$ -	\$ -
2.9	LIGHT FIXTURE		\$ -	\$ 16,500	\$ 10,000	\$ 26,500
2.10	GROUNDING		\$ 7,300	\$ -	\$ 17,500	\$ 24,800
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 22,359,400	\$ 3,019,600	\$ 17,368,900	\$ 42,747,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 1,118,000	\$ 694,500	\$ 6,019,100	\$ 7,831,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FABRIC FILTERS	\$ 23,477,400	\$ 3,714,100	\$ 23,388,000	\$ 50,579,500
3.0	NEW STACK					
3.1	CONCRETE STACK (DRY)	PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 17,600,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.0	LIME HANDLING SYSTEM					
4.1	LIME STORAGE SILO		\$ 5,762,000	\$ -	\$ -	\$ 5,762,000
4.2	LIME UNLOADING SYSTEM	INCLUDES PNEUMATIC HANDLING SYSTEM, THREE VACUUM EXHAUSTER, TWO FILTER SEPARATORS	\$ 640,000	\$ -	\$ 408,900	\$ 1,048,900
4.3	PIPING - MECHANICAL		\$ 29,000	\$ 15,600	\$ 77,900	\$ 122,500
4.4	LIME STORAGE SILO ACCESS STAIR TOWER	THREE COAT SHOP PAINT	\$ -	\$ 145,000	\$ 145,900	\$ 290,900
4.5	PIPE RACK FOR LIME HANDLING, WASTE ASH HANDLING AND MISC MECHANICAL PIPING	THREE COAT SHOP PAINT	\$ -	\$ 783,000	\$ 787,800	\$ 1,570,800
4.6	RAIL CAR UNLOADING AREA - FOUNDATIONS	20 X 250 - NO SIDING	\$ -	\$ 85,300	\$ 158,400	\$ 243,700
4.7	LIME UNLOADING BLOWER / ELECTRICAL BUILDING - FOUNDATIONS		\$ -	\$ 160,700	\$ 281,500	\$ 442,200
4.8	LIME UNLOADING BLOWER / ELECTRICAL BUILDING	130' L X 30' W X 30' H	\$ 75,000	\$ 351,500	\$ 24,400	\$ 450,900
4.9	CONCRETE PIT FOR THE ELEVATOR		\$ -	\$ 2,300	\$ 6,900	\$ 9,200
4.10	LIME STORAGE SILO - FOUNDATIONS		\$ -	\$ 469,600	\$ 774,300	\$ 1,243,900
4.11	LIME STORAGE SILO ACCESS STAIR TOWER - FOUNDATIONS		\$ -	\$ 14,200	\$ 26,200	\$ 40,400
4.12	PIPE RACK - FOUNDATIONS		\$ -	\$ 94,200	\$ 208,200	\$ 302,400
4.13	TRANSFORMERS	SUS TRANSFORMERS: 33F, 33G, 13.8KV-480V	\$ 170,000	\$ -	\$ 54,600	\$ 224,600
4.14	SWITCHGEAR	480V LOW VOLTAGE (33F/G), SWITCHGEAR	\$ 196,000	\$ -	\$ 104,700	\$ 300,700
4.15	CABLE BUS DUCT		\$ 134,700	\$ 10,800	\$ 200,200	\$ 345,700
4.16	MCC		\$ 61,800	\$ -	\$ 3,600	\$ 65,400
4.17	MIMIC PANELS		\$ 17,500	\$ -	\$ 1,400	\$ 18,900
4.18	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
4.19	GROUNDING		\$ 13,300	\$ -	\$ 41,300	\$ 54,600
4.20	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
4.21	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 296,400	\$ 1,429,900	\$ 1,726,300

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.22	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV, 12000' UNIT 2 + 3600' LIME UNLOAD	\$ -	\$ 144,600	\$ 407,800	\$ 552,400
4.23	MEDIUM VOLTAGE POWER CABLE & TERMINATION	1/C # 350KCMIL-5KV	\$ -	\$ 66,200	\$ 282,300	\$ 348,500
4.24	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 93,000	\$ 143,200	\$ 236,200
4.25	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 26,200	\$ 73,600	\$ 99,800
4.26	DUCT BANK	DUCT BANK WITH 4-5" & 4-3" CONDUITS, 2.38' H X 3.79' W	\$ -	\$ 61,100	\$ 152,100	\$ 213,200
4.27	FOUNDATIONS FOR TRANSFORMERS	FOR XFMR 33F, 33G, INCLUDES MUD MAT	\$ -	\$ 3,500	\$ 10,300	\$ 13,800
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 7,259,600	\$ 2,958,200	\$ 5,934,300	\$ 16,152,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 363,000	\$ 680,400	\$ 2,015,300	\$ 3,058,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIME HANDLING SYSTEM	\$ 7,622,600	\$ 3,638,600	\$ 7,949,600	\$ 19,210,700
5.0	LIME SLAKER BUILDING					
5.1	MECHANICAL EQUIPMENT	INCLUDES:CHAIN CONVEYOR, SLAKERS THROUGH THE LIME SLURRY PUMPS, PIPING, AND LIME SLURRY STORAGE TANKS.	\$ 7,985,000	\$ -	\$ 4,942,500	\$ 12,927,500
5.2	LIME SLAKER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES	\$ 28,000	\$ -	\$ 12,300	\$ 40,300
5.3	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
5.4	PIPING - MECHANICAL		\$ 117,800	\$ 111,400	\$ 381,100	\$ 610,300
5.5	LIME SLURRY TANKS - FOUNDATIONS		\$ -	\$ 166,400	\$ 278,300	\$ 444,700

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PER

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
5.6	LIME SLAKER BUILDING - FOUNDATIONS		\$ -	\$ 119,200	\$ 194,200	\$ 313,400
5.7	LIME SLAKER BUILDING	135' L X 30' W X 50' H	\$ 40,500	\$ 803,300	\$ 740,500	\$ 1,584,300
5.8	ELECTRICAL	INCLUDED WITH LIME HANDLING SYSTEM, ACCOUNT 4.0	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 8,183,300	\$ 1,200,300	\$ 6,553,500	\$ 15,937,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 409,200	\$ 276,100	\$ 2,281,000	\$ 2,966,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIME SLAKER BUILDING	\$ 8,592,500	\$ 1,476,400	\$ 8,834,500	\$ 18,903,300
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS					
6.1	BYPRODUCT WASTE ASH HANDLING - MECHANICAL EQUIPMENT	INCLUDES PNEUMATIC HANDLING SYSTEM, THREE PRESSURE BLOWERS, ONE BIN VENT FILTER, ASH UNLOADING SYSTEM	\$ 2,047,000	\$ -	\$ 1,380,000	\$ 3,427,000
6.2	ECONOMIZER ASH HANDLING - MECHANICAL EQUIPMENT	INCLUDES JET PUMPS AND PIPING / SUPPORTS TO THE BOTTOM ASH POND	\$ 400,000	\$ 50,000	\$ 327,100	\$ 777,100
6.3	BUILDING SUMP PUMPS	FOR BUILDINGS - DUPLEX. INCLUDES CHECK & ISOLATION VALVES.	\$ 28,000	\$ -	\$ 12,300	\$ 40,300
6.4	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
6.5	PIPING - MECHANICAL		\$ 142,800	\$ 240,900	\$ 759,100	\$ 1,142,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.6	BYPRODUCT WASTE SILO	CONCRETE SILO 65' DIA X 111' H - 4700 TONS - SUBCONTRACT COST INCLUDES LABOR	\$ 2,630,000	\$ -	\$ -	\$ 2,630,000
6.7	SDA RECYCLE SILO	INCLUDED WITH OEM EQUIPMENT	\$ -	\$ -	\$ -	\$ -
6.8	SDA FLY ASH SILO	NOT REQUIRED - ECONOMIZER FLY ASH SLUICED TO BOTTOM ASH POND	\$ -	\$ -	\$ -	\$ -
6.9	WASTE ASH STORAGE SILO - FOUNDATIONS		\$ -	\$ 186,400	\$ 311,300	\$ 497,700
6.10	FLY ASH SILO - FOUNDATIONS	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.11	FLY ASH BLOWER AND ELECTRICAL BUILDING - FOUNDATIONS	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.12	FLY ASH BLOWER AND ELECTRICAL BUILDING	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.13	RECYCLE ASH BUILDING - FOUNDATIONS		\$ -	\$ 234,300	\$ 373,100	\$ 607,400
6.14	RECYCLE ASH BUILDING	100' L X 65' W X 50' H	\$ 58,500	\$ 1,306,700	\$ 1,194,500	\$ 2,559,700
6.15	MCC	480V MCC PER LINE UP	\$ 120,000	\$ -	\$ 7,300	\$ 127,300
6.16	EMERGENCY POWER SYSTEM		\$ 185,500	\$ -	\$ 40,000	\$ 225,500
6.17	LIGHTING/ TRANSFORMERS & PANELS		\$ 18,500	\$ 75,000	\$ 53,200	\$ 146,700
6.18	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 32,800	\$ 177,400	\$ 210,200
6.19	LOW VOLTAGE POWER CABLE & TERMINATION	#4/0 - #12 AWG-600V	\$ -	\$ 80,900	\$ 100,600	\$ 181,500
6.20	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 38,400	\$ 313,700	\$ 352,100
6.21	GROUNDING		\$ -	\$ 4,500	\$ 10,900	\$ 15,400
6.22	DUCT BANK	DUCT BANK WITH 12-5" & 6-3" CONDUITS, 5.2' H X 2.08" W	\$ -	\$ 111,500	\$ 184,000	\$ 295,500
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 5,642,300	\$ 2,361,400	\$ 5,249,100	\$ 13,252,800
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 282,100	\$ 543,100	\$ 1,822,500	\$ 2,647,700

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 5,924,400	\$ 2,904,500	\$ 7,071,600	\$ 15,900,500
7.0	ABSORBER ISLAND					
7.1	MECHANICAL EQUIPMENT	INCLUDES: ABSORBER MODULES AND ATOMIZERS WITH LUBE OIL, DUCT WORK FROM THE ABSORBERS TO THE FABRIC FILTER, AND COMPLETE RECYCLE SYSTEM WITH PIPING INSIDE FGD BUILDINGS.	\$ 39,438,000	\$ -	\$ 24,186,100	\$ 63,624,100
7.2	ELEVATOR	MAINTENANCE ELEVATOR - SUBCONTRACT COST INCLUDES LABOR	\$ 325,000	\$ -	\$ -	\$ 325,000
7.3	BUILDING SUMP PUMPS	FOR BUILDINGS - DUPLEX. INCLUDES CHECK & ISOLATION VALVES.	\$ 28,000	\$ -	\$ 12,300	\$ 40,300
7.4	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
7.5	PIPING - MECHANICAL		\$ 142,800	\$ 36,900	\$ 227,900	\$ 407,600
7.6	SDA SUPERSTRUCTURE		\$ 75,000	\$ 764,900	\$ 1,227,300	\$ 2,067,200
7.7	SDA BOTTOM ENCLOSURE - SUPPORT STEEL, GIRTS AND SIDING	TOTAL FOR THREE ABSORBERS	\$ -	\$ 362,100	\$ 385,200	\$ 747,300
7.8	SDA SHELL / ROOF INSULATION	61,000 SF. SUBCONTRACT COST INCLUDES LABOR	\$ 1,830,000	\$ -	\$ -	\$ 1,830,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
7.9	SDA - SUPPORT STEEL & ACCESS GALLERY		\$ -	\$ 711,000	\$ 1,884,100	\$ 2,595,100
7.10	EXPANSION JOINTS		\$ -	\$ 195,500	\$ 173,800	\$ 369,300
7.11	DUCTWORK		\$ -	\$ 6,175,000	\$ 15,736,600	\$ 21,911,600
7.12	DUCT SUPPORT STEEL	THREE COAT SHOP PAINT	\$ -	\$ 2,755,000	\$ 2,771,700	\$ 5,526,700
7.13	DUCTWORK INSULATION & LAGGING		\$ -	\$ 2,040,000	\$ 3,995,500	\$ 6,035,500
7.14	CONCRETE PIT FOR ELEVATOR		\$ -	\$ 2,800	\$ 8,200	\$ 11,000
7.15	SPRAY DRYER ABSORBER - FOUNDATIONS	TOTAL FOR THREE TOWERS	\$ -	\$ 1,678,600	\$ 2,975,600	\$ 4,654,200
7.16	SDA PDC - FOUNDATION		\$ -	\$ 85,600	\$ 152,700	\$ 238,300
7.17	SDA PDC BUILDING	60' L X 40' W X 13' H. SUBCONTRACT PRICE INCLUDES LABOR	\$ -	\$ 1,200,000	\$ -	\$ 1,200,000
7.18	FOUNDATIONS FOR SUPPORT STEEL		\$ -	\$ 69,000	\$ 126,000	\$ 195,000
7.19	TRANSFORMERS		\$ 770,000	\$ -	\$ 145,600	\$ 915,600
7.20	SWITCHGEAR		\$ 1,082,000	\$ -	\$ 569,000	\$ 1,651,000
7.21	CABLE BUS & TERMINATIONS		\$ 1,082,500	\$ 35,800	\$ 1,853,300	\$ 2,971,600
7.22	MCC		\$ 185,400	\$ -	\$ 8,200	\$ 193,600
7.23	MIMIC PANELS		\$ 17,500	\$ -	\$ 4,500	\$ 22,000
7.24	GROUNDING		\$ -	\$ 16,000	\$ 46,100	\$ 62,100
7.25	LIGHTING/ TRANSFORMERS & PANELS		\$ 156,000	\$ 150,000	\$ 159,100	\$ 465,100
7.26	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
7.27	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 1,574,900	\$ 7,540,300	\$ 9,115,200
7.28	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL- 15KV	\$ -	\$ 53,300	\$ 150,300	\$ 203,600
7.29	MEDIUM VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 82,500	\$ 243,200	\$ 325,700
7.30	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 409,900	\$ 537,400	\$ 947,300
7.31	CONTROL & INSTRUMENT CABLE		\$ -	\$ 99,200	\$ 278,400	\$ 377,600
7.32	DUCT BANK		\$ -	\$ 137,900	\$ 364,600	\$ 502,500
7.33	FOUNDATION FOR TRANSFORMERS		\$ -	\$ 49,800	\$ 145,800	\$ 195,600
7.34	TRANSFORMER FIRE WALLS	FOR 21A & 21B	\$ -	\$ 3,500	\$ 9,600	\$ 13,100
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 45,252,500	\$ 18,689,200	\$ 65,947,400	\$ 129,889,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,072,600	\$ 4,298,500	\$ 23,898,500	\$ 31,269,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 48,325,100	\$ 22,987,700	\$ 89,845,900	\$ 161,158,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
8.0	ACTIVATED CARBON INJECTION SYSTEM					
8.1	ACI MECHANICAL EQUIPMENT:		\$ 2,805,900	\$ -	\$ 888,300	\$ 3,694,200
8.2	PIPING - MECHANICAL		\$ 29,800	\$ 149,800	\$ 377,100	\$ 556,700
8.3	ACI SYSTEM - FOUNDATIONS		\$ -	\$ 41,500	\$ 79,200	\$ 120,700
8.4	MCC		\$ 61,800	\$ -	\$ 3,600	\$ 65,400
8.5	GROUNDING		\$ 5,500	\$ -	\$ 18,600	\$ 24,100
8.6	LIGHTING / TRANSFORMERS & PANELS		\$ 26,000	\$ 15,000	\$ 20,400	\$ 61,400
8.7	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 84,600	\$ 276,700	\$ 361,300
8.8	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 30,400	\$ 62,900	\$ 93,300
8.9	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 16,000	\$ 44,900	\$ 60,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 2,929,000	\$ 321,300	\$ 1,726,800	\$ 4,977,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 146,500	\$ 73,900	\$ 591,400	\$ 811,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ACTIVATED CARBON INJECTION SYSTEM	\$ 3,075,500	\$ 395,200	\$ 2,318,200	\$ 5,788,900
9.0	COMPRESSED AIR SYSTEM					
9.1	AIR COMPRESSOR & AUXILIARIES		\$ 664,000	\$ -	\$ 155,400	\$ 819,400
9.2	PIPING - MECHANICAL		\$ 320,600	\$ 399,200	\$ 1,096,000	\$ 1,815,800
9.3	AIR COMPRESSOR BUILDING - FOUNDATIONS		\$ -	\$ 96,100	\$ 174,000	\$ 270,100
9.4	AIR COMPRESSOR BUILDING	100' L X 600' W X 20' H	\$ -	\$ 510,000	\$ -	\$ 510,000
9.5	LIGHTING/ TRANSFORMERS & PANELS		\$ 11,000	\$ 10,500	\$ 11,400	\$ 32,900
9.6	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND 7.0	\$ -	\$ -	\$ -	\$ -
9.7	GROUNDING		\$ 4,500	\$ -	\$ 10,900	\$ 15,400

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,000,100	\$ 1,015,800	\$ 1,447,700	\$ 3,463,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 50,000	\$ 233,600	\$ 494,800	\$ 778,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 1,050,100	\$ 1,249,400	\$ 1,942,500	\$ 4,242,100
10.0	SERVICE WATER SYSTEM					
10.1	PUMPS		\$ 216,000	\$ -	\$ 94,100	\$ 310,100
10.2	PIPING - MECHANICAL		\$ 183,400	\$ 624,600	\$ 1,092,000	\$ 1,900,000
10.3	PIPING - FIRE PROTECTION SYSTEM		\$ 181,200	\$ 284,600	\$ 673,300	\$ 1,139,100
10.4	TANKS		\$ -	\$ 234,000	\$ -	\$ 234,000
10.5	SERVICE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 17,300	\$ 35,000	\$ 52,300
10.6	MAKE UP WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 22,200	\$ 44,400	\$ 66,600
10.7	ELECTRICAL	INCLUDED IN ABSORBER ISLAND 7.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 580,600	\$ 1,182,700	\$ 1,938,800	\$ 3,702,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 29,000	\$ 272,000	\$ 658,800	\$ 959,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 609,600	\$ 1,454,700	\$ 2,597,600	\$ 4,661,900
11.0	POTABLE WATER SYSTEM					
11.1	PUMPS		\$ 30,000	\$ -	\$ 18,400	\$ 48,400
11.2	PIPING - MECHANICAL		\$ 99,500	\$ 200,400	\$ 530,700	\$ 830,600
11.3	TANKS		\$ -	\$ 8,500	\$ -	\$ 8,500
11.4	POTABLE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 5,200	\$ 8,800	\$ 14,000
11.5	ELECTRICAL	INCLUDED IN ABSORBER ISLAND 7.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 129,500	\$ 214,100	\$ 557,900	\$ 901,500

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 6,500	\$ 49,200	\$ 188,900	\$ 244,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 135,975	\$ 263,343	\$ 746,838	\$ 1,146,156
12.0	FGD SUBSTATION					
12.1	TRANSFORMERS		\$ 1,560,500	\$ -	\$ 273,100	\$ 1,833,600
12.2	TRANSFORMER PDC	15W X 45' X 10'H. SUBCONTRACT PRICE INCLUDES LABOR	\$ 202,500	\$ -	\$ -	\$ 202,500
12.3	TRANSFORMER PDC - FOUNDATION		\$ -	\$ 73,200	\$ 131,700	\$ 204,900
12.4	138KV MAIN FEEDER & TERMINATIONS		\$ 264,000	\$ -	\$ 254,000	\$ 518,000
12.5	SWITCHGEAR		\$ 930,000	\$ -	\$ 136,200	\$ 1,066,200
12.6	MCC	480V MCC, PER LINE UP	\$ 60,000	\$ -	\$ 3,600	\$ 63,600
12.7	CABLE BUS		\$ 181,100	\$ 18,000	\$ 290,200	\$ 489,300
12.8	PANELS - RELAY		\$ 117,500	\$ -	\$ 13,600	\$ 131,100
12.9	UPS SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
12.10	GROUNDING		\$ 23,300	\$ -	\$ 59,100	\$ 82,400
12.11	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 30,000	\$ 29,500	\$ 85,500
12.12	OUTDOOR LIGHTING	NEW AUX YARD LIGHTING - ALLOWANCE	\$ 25,000	\$ -	\$ 56,800	\$ 81,800
12.13	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 372,900	\$ 1,787,900	\$ 2,160,800
12.14	DUCT BANK		\$ -	\$ 26,200	\$ 54,300	\$ 80,500
12.15	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 112,200	\$ 194,700	\$ 306,900
12.16	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 21,800	\$ 61,100	\$ 82,900
12.17	FOUNDATION FOR AUX TRANSFORMER		\$ -	\$ 70,200	\$ 183,600	\$ 253,800
12.18	FIREWALL FOR TRANSFORMERS		\$ -	\$ 3,000	\$ 5,200	\$ 8,200
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 3,498,200	\$ 727,500	\$ 3,559,000	\$ 7,784,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 174,900	\$ 167,300	\$ 1,198,518	\$ 1,540,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 3,673,100	\$ 894,800	\$ 4,757,500	\$ 9,325,500
13.0	FGD DCS SYSTEM					
13.1	DCS	3200 I/O POINTS	\$ 2,400,000	\$ -	\$ 813,600	\$ 3,213,600
13.2	DCS - VENDOR FIELD SUPPORT	200 MANDAYS @ \$1500/DAY - SHOWN AS SUBCONTRACT COST	\$ 300,000	\$ -	\$ -	\$ 300,000
13.3	LOCALLY MOUNTED INSTRUMENTS		\$ -	\$ 709,500	\$ 930,500	\$ 1,640,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 2,700,000	\$ 709,500	\$ 1,744,100	\$ 5,153,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 135,000	\$ 163,200	\$ 607,300	\$ 905,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD DCS SYSTEM	\$ 2,835,000	\$ 872,700	\$ 2,351,400	\$ 6,059,100
14.0	CEM SYSTEM					
14.1	CEM	PROVIDED BY AEP	\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000
15.0	TRUCK & RAIL INFRASTRUCTURE					
15.1	EXISTING RAILROAD IMPROVEMENTS	FOR FULL RAILCAR STORAGE TRACK IMPROVEMENTS - 3250 LF	\$ -	\$ 660,200	\$ 689,200	\$ 1,349,400
15.2	EXISTING RAILROAD IMPROVEMENTS	FOR LOOP TRACK UPGRADE - 5000 LF	\$ -	\$ 1,008,800	\$ 1,055,600	\$ 2,064,400

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
15.3	NEW RAILROAD TRACK	INCLUDES, 132LB RAIL, 7" TIMBERS, TIE PLATES, SPIKES, BOLTS, 12" SUBBALLAST, 12" BALLAST, 12 OZ/SY GEOTEXTILE MEMBRANE, 12" SUBGRADE PREP	\$ -	\$ 252,000	\$ 213,100	\$ 465,100
15.4	FIELD FABRICATED TURNOUTS	#8 TURNOUT	\$ -	\$ 90,000	\$ 54,800	\$ 144,800
15.5	RAIL SCALE	SUBCONTRACT COST, INCLUDES FOUNDATIONS	\$ 212,500	\$ -	\$ -	\$ 212,500
15.6	NEW CONCRETE ENCASEMENT	OVER AND AROUND DUCT BANK CONNECTING THE PLANT TO SWITCHYARD. THIS IS UNDER THE NEW TRACKWORK EXTENSION	\$ -	\$ 33,200	\$ 67,700	\$ 100,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,200	\$ 2,080,400	\$ 4,337,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 470,200	\$ 725,500	\$ 1,206,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	TRUCK & RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,514,400	\$ 2,805,900	\$ 5,543,400
16.0	SITE IMPROVEMENTS - CIVIL WORK					
16.1	SITE GRADING		\$ -	\$ -	\$ 538,800	\$ 538,800
16.2	ROADS & SURFACING		\$ -	\$ 918,600	\$ 1,237,000	\$ 2,155,600

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.3	NEW CONCRETE ENCASEMENT	16' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 144,300	\$ 262,700	\$ 407,000
16.4	TRUCK WASH AREA - CONCRETE PAD		\$ -	\$ 41,900	\$ 70,400	\$ 112,300
16.5	TRUCK WASH AREA - ENCLOSURE		\$ -	\$ 67,400	\$ 95,300	\$ 162,700
16.6	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.7	PROCESS WATER STORAGE BASIN		\$ 60,000	\$ 110,400	\$ 312,100	\$ 482,500
16.8	PROCESS WATER STORAGE BASIN PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.9	STORMWATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 499,500	\$ 508,300	\$ 1,007,800
16.10	STORMWATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.11	STORM WATER POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.12	OILY WATER SEWER		\$ 4,500	\$ 105,000	\$ 223,600	\$ 333,100
16.13	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.14	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.15	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.16	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 700,000	\$ 828,000	\$ 1,528,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.17	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 180,000	\$ 414,200	\$ 594,200
16.18	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 45,000	\$ 103,600	\$ 148,600
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 574,500	\$ 2,965,900	\$ 5,358,400	\$ 8,898,800
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 28,700	\$ 682,200	\$ 1,796,600	\$ 2,507,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 603,200	\$ 3,648,100	\$ 7,155,000	\$ 11,406,300
17.0	BOP ITEMS					
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	\$ -	\$ 34,000	\$ 106,000	\$ 140,000
17.2	HEAT TRACING		\$ -	\$ 175,600	\$ 248,500	\$ 424,100
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 134,200	\$ 514,800	\$ 649,000
17.4	HOISTS & TROLLEYS		\$ 180,000	\$ 210,000	\$ 245,300	\$ 635,300

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	\$ -	\$ 122,500	\$ 510,600	\$ 633,100
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 19,600	\$ 30,100
17.7	EYE WASH STATIONS		\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS		\$ -	\$ 360,000	\$ 294,400	\$ 654,400
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,051,800	\$ 1,969,900	\$ 3,231,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 241,914	\$ 700,787	\$ 953,201
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,293,700	\$ 2,670,700	\$ 4,184,900
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500
18.4	OUTAGE TIE-IN DUCTWORK	ALLOWANCE FOR 85 TON DUCTWORK	\$ -	\$ 276,300	\$ 738,700	\$ 1,015,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 479,000	\$ 1,146,600	\$ 1,625,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 110,200	\$ 372,800	\$ 483,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 589,200	\$ 1,519,400	\$ 2,108,600
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
19.1	ARSENIC, ASBESTOS , LEAD ABATEMENT	ALLOWANCE PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 750,000
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 109,787,100	\$ 47,161,000	\$ 139,051,600	\$ 314,349,700
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 6,236,400	\$ 10,722,800	\$ 48,767,800	\$ 65,727,000
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 116,023,500	\$ 57,883,800	\$ 187,819,400	\$ 380,076,700
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 25,000,000
	CONSTRUCTION MANAGEMENT					\$ 11,402,300
	S-U / COMMISSIONING					\$ 3,800,800
	CRAFT START-UP SUPPORT					\$ 1,638,400
	INITIAL FILLS					\$ 1,140,200
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	OWNERS COST	BY AEP				\$ -
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 423,758,400
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,508,300
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 935,146
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 573,154
	CONTINGENCY	15.1				\$ 64,186,900
	ESCALATION					\$ 29,787,000
	EQUIPMENT					\$ 12,108,100
	MATERIAL					\$ 2,937,700
	LABOR					\$ 11,959,700

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM
COST ESTIMATE SUMMARY

Estimate No.: 30713B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	INDIRECTS					\$ 2,781,500
	INTEREST DURING CONSTRUCTION (AFUDC)	BY AEP				
	TOTAL PROJECT COST					\$ 519,240,600
	REFERENCE COSTS:					
A	ESP DEMOLITION	ALLOWANCE FOR 1000T STRUCTURE	\$ -	\$ -	\$ 832,300	\$ 832,300
B	REMOVE BOOSTER AIR FANS	ALLOWANCE FOR 150 TON FRAMING REINFORCEMENT	\$ -	\$ -	\$ 111,000	\$ 111,000



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-6.3
Capital Cost Estimate Summary
IAQCS FGD Base case w/o ESP

DRAFT COPY



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-6.4
Capital Cost Estimate Summary
NID FGD Base Case w/o ESP

DRAFT COPY

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.0	ID FANS					
1.1	ID FANS - OEM EQUIPMENT	1,875,000 ACFM WITH 19,500 HP MOTORS (\$750,000 EACH). INCLUDES HYDRAULIC OIL UNITS, SEAL AIR FAN SKIDS, VIBRATION MONITORING EQUIPMENT, FAN STALL EQUIPMENT, FIELD SERVICE REP FOR 140 DAYS	\$ 6,920,000	\$ -	\$ 1,674,400	\$ 8,594,400
1.2	PIPING & SUPPORTS - MECHANICAL		\$ 21,800	\$ 28,700	\$ 120,500	\$ 171,000
1.3	DAMPERS		\$ 553,500	\$ -	\$ 263,200	\$ 816,700
1.4	EXPANSION JOINTS		\$ -	\$ 131,100	\$ 116,500	\$ 247,600
1.5	DUCTWORK	NID MODULE OUTLET TO ID FANS AND FROM ID FANS TO STACK - INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 2,600,000	\$ 5,959,400	\$ 8,559,400
1.6	DUCT SUPPORT STEEL	THREE COAT SHOP PAINT	\$ -	\$ 1,160,000	\$ 1,167,000	\$ 2,327,000
1.7	ID FAN INSULATION & LAGGING	TOTAL FOR TWO FANS. PRICING REFLECTS ACOUSTICAL INSULATION	\$ -	\$ 200,000	\$ 258,500	\$ 458,500

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.8	DUCTWORK INSULATION & LAGGING	INCLUDES INSULATION FOR SPRAY DRYER OUTLET DUCT TO NID MODULES SUPPLIED WITH THE OEM EQUIPMENT	\$ -	\$ 864,000	\$ 1,692,200	\$ 2,556,200
1.9	DUCT SUPPORT STEEL - FOUNDATIONS		\$ -	\$ 295,500	\$ 532,700	\$ 828,200
1.10	ID FAN FOUNDATIONS INCLUDING ID FAN AUX EQUIPMENT		\$ -	\$ 106,000	\$ 185,600	\$ 291,600
1.11	NID CONTROL & SWITCHGEAR BUILDING - FOUNDATIONS		\$ -	\$ 273,800	\$ 433,700	\$ 707,500
1.12	NID CONTROL & SWITCHGEAR BUILDING	SUBCONTRACT PRICE INCLUDES LABOR. COMPLETE WITH HVAC, FINISHES AND SANITARY FACILITIES	\$ -	\$ 3,937,500	\$ -	\$ 3,937,500
1.13	TRANSFORMERS		\$ 770,000	\$ -	\$ 145,600	\$ 915,600
1.14	SWITCHGEAR		\$ 1,082,000	\$ -	\$ 569,000	\$ 1,651,000
1.15	CABLE BUS & TERMINATIONS		\$ 756,300	\$ 35,800	\$ 1,316,200	\$ 2,108,300
1.16	MCC		\$ 120,000	\$ -	\$ 7,200	\$ 127,200
1.17	MIMIC PANELS		\$ 17,500	\$ -	\$ 4,500	\$ 22,000
1.18	EMERGENCY POWER SYSTEM		\$ 285,500	\$ -	\$ 38,900	\$ 324,400
1.19	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C 750KCMIL- 13.8KV	\$ -	\$ 186,300	\$ 283,200	\$ 469,500
1.20	MEDIUM VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 91,600	\$ 393,700	\$ 485,300
1.21	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 543,000	\$ 794,800	\$ 1,337,800
1.22	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 345,000	\$ 2,818,200	\$ 3,163,200
1.23	GROUNDING		\$ 11,100	\$ -	\$ 37,200	\$ 48,300
1.24	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 30,000	\$ 29,500	\$ 85,500
1.25	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 1,569,000	\$ 7,502,000	\$ 9,071,000
1.26	DUCT BANK		\$ -	\$ 40,800	\$ 280,000	\$ 320,800
1.27	FOUNDATION FOR TRANSFORMERS		\$ -	\$ 64,600	\$ 168,200	\$ 232,800
1.28	FIREWALL FOR TRANSFORMERS		\$ -	\$ 3,200	\$ 8,300	\$ 11,500

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 10,563,700	\$ 12,505,900	\$ 26,800,200	\$ 49,869,800
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 528,200	\$ 3,189,000	\$ 9,621,100	\$ 13,338,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 11,091,900	\$ 15,694,900	\$ 36,421,300	\$ 63,208,100
2.0	NID MODULES					
2.1	MECHANICAL EQUIPMENT	A 12-MODULE NID SYSTEM (160' X 160') INCLUDING LIME DAY SILOS, HYDRATORS, MIXERS, J-DUCTS, FABRIC FILTER MODULES, ALL INTERNAL ELEMENTS (BAGS, CAGES, ASH HOPPERS, 2 BROKEN BAG DETECTORS / COMPARTMENT), ASH RECYCLE SYSTEM, VACUUM PIPING, AND ALL INTERNAL PIPING & DUCTWORK FOR THE VARIOUS MODULES.	\$ 50,231,000	\$ -	\$ 42,381,900	\$ 92,612,900
2.2	INSULATION FOR NID MODULES	SUBCONTRACT COST INCLUDES LABOR	\$ 2,419,200	\$ -	\$ -	\$ 2,419,200
2.3	PENTHOUSE FOR NID MODULES	14 FT HIGH, 25600 SF	\$ 58,100	\$ 1,316,900	\$ 1,747,600	\$ 3,122,600
2.4	BOTTOM ENCLOSURE FOR NID MODULES	40 FT HIGH	\$ 92,200	\$ 2,428,900	\$ 2,544,900	\$ 5,066,000
2.5	PIPING & SUPPORTS - MECHANICAL		\$ 125,200	\$ 174,500	\$ 385,900	\$ 685,600
2.6	DUCTWORK		\$ -	\$ 4,797,000	\$ 10,995,100	\$ 15,792,100
2.7	DUCT SUPPORT STEEL	THREE COAT SHOP PAINT	\$ -	\$ 2,140,200	\$ 2,153,200	\$ 4,293,400

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
2.8	DUCTWORK INSULATION & LAGGING		\$ -	\$ 1,632,000	\$ 3,196,400	\$ 4,828,400
2.9	NID MODULE- FOUNDATIONS		\$ -	\$ 1,087,000	\$ 1,682,500	\$ 2,769,500
2.10	NID MODULE - SUPPORT STEEL AND ACCESS GALLERY		\$ -	\$ 1,152,000	\$ 2,863,700	\$ 4,015,700
2.11	GROUNDING		\$ -	\$ 16,000	\$ 46,100	\$ 62,100
2.12	LIGHTING/ TRANSFORMERS & PANELS		\$ 156,000	\$ 150,000	\$ 159,100	\$ 465,100
2.13	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ID FANS, 1.0	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 53,081,700	\$ 14,894,500	\$ 68,156,400	\$ 136,132,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,329,100	\$ 3,798,100	\$ 25,728,500	\$ 32,855,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	NID MODULES	\$ 56,410,800	\$ 18,692,600	\$ 93,884,900	\$ 168,988,300
3.0	NEW STACK					
3.1	CONCRETE STACK (DRY)	PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 17,600,000
4.0	LIME HANDLING SYSTEM					
4.1	LIME STORAGE SILO		\$ 5,992,400	\$ -	\$ -	\$ 5,992,400
4.2	LIME UNLOADING SYSTEM	INCLUDE PNEUMATIC HANDLING SYSTEM, THREE VACUUM EXHAUSTER, TWO FILTER SEPARATORS	\$ 700,000	\$ -	\$ 449,800	\$ 1,149,800
4.3	LIME TRANSPORT SYSTEM TO DAY BINS	INCLUDE PNEUMATIC HANDLING SYSTEM, THREE VACUUM EXHAUSTERS, TWO FILTER SEPARATORS	\$ 1,100,000	\$ -	\$ 654,200	\$ 1,754,200
4.4	PIPING - MECHANICAL		\$ 88,700	\$ 130,300	\$ 342,600	\$ 561,600
4.5	LIME STORAGE SILO ACCESS STAIR TOWER		\$ -	\$ 159,500	\$ 160,500	\$ 320,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.6	PIPE RACK FOR LIME HANDLING, WASTE HANDLING AND MISC MECHANICAL PIPING	THREE COAT SHOP PAINT	\$ -	\$ 1,885,000	\$ 1,896,400	\$ 3,781,400
4.7	RAIL CAR UNLOADING AREA - FOUNDATIONS	20' X 120' - NO SIDING	\$ -	\$ 42,700	\$ 79,300	\$ 122,000
4.8	LIME UNLOADING BLOWER / ELECTRICAL BUILDING - FOUNDATIONS		\$ -	\$ 69,600	\$ 130,200	\$ 199,800
4.9	LIME UNLOADING BLOWER / ELECTRICAL BUILDING	100' L X 30' W X 30' H	\$ 75,000	\$ 335,000	\$ 24,400	\$ 434,400
4.10	CONCRETE PIT FOR THE ELEVATOR		\$ -	\$ 2,300	\$ 6,900	\$ 9,200
4.11	LIME STORAGE SILO - FOUNDATIONS	INCLUDES FOUNDATIONS FOR LIME TRANSPORT SYSTEM PRESSURE BLOWERS	\$ -	\$ 368,100	\$ 613,200	\$ 981,300
4.12	LIME STORAGE SILO ACCESS STAIR TOWER - FOUNDATIONS		\$ -	\$ 14,200	\$ 26,200	\$ 40,400
4.13	PIPE RACK - FOUNDATIONS		\$ -	\$ 239,600	\$ 519,100	\$ 758,700
4.14	TRANSFORMERS	SUS TRANSFORMERS: 33F, 33G, 13.8KV-480V, 3PHASE, 3 WINDING XFMR	\$ 170,000	\$ -	\$ 54,600	\$ 224,600
4.15	SWITCHGEAR	480V LOW VOLTAGE (33F/G), SWITCHGEAR	\$ 196,000	\$ -	\$ 104,700	\$ 300,700
4.16	CABLE BUS DUCT		\$ 134,700	\$ 10,800	\$ 200,200	\$ 345,700
4.17	MCC		\$ 61,800	\$ -	\$ 3,600	\$ 65,400
4.18	MIMIC PANELS		\$ 17,500	\$ -	\$ 1,400	\$ 18,900
4.19	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
4.20	GROUNDING		\$ 13,300	\$ -	\$ 41,300	\$ 54,600
4.21	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
4.22	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 296,400	\$ 1,429,900	\$ 1,726,300
4.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 2/0-15KV	\$ -	\$ 23,400	\$ 87,800	\$ 111,200
4.24	MEDIUM VOLTAGE POWER CABLE & TERMINATION	1/C # 2/0-5KV	\$ -	\$ 9,500	\$ 47,900	\$ 57,400
4.25	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 132,200	\$ 260,800	\$ 393,000
4.26	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 57,600	\$ 161,600	\$ 219,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.27	DUCT BANK	DUCT BANK WITH 4-5" & 4-3" CONDUITS, 2.38' H X 3.79' W	\$ -	\$ 61,100	\$ 152,100	\$ 213,200
4.28	FOUNDATIONS FOR TRANSFORMERS	FOR XFMR 33F, 33G, INCLUDES MUD MAT	\$ -	\$ 3,500	\$ 10,300	\$ 13,800
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 8,709,700	\$ 3,975,800	\$ 7,587,900	\$ 20,273,400
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 435,500	\$ 1,013,800	\$ 2,748,700	\$ 4,198,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIME HANDLING SYSTEM	\$ 9,145,200	\$ 4,989,600	\$ 10,336,600	\$ 24,471,500
5.0	LIME SLAKER BUILDING	NOT REQUIRED FOR NID				
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS					
6.1	BYPRODUCT WASTE HANDLING - MECHANICAL EQUIPMENT	INCLUDES PNEUMATIC HANDLING SYSTEM, THREE PRESSURE BLOWERS, ONE BIN VENT FILTER, ASH UNLOADING SYSTEM	\$ 2,822,000	\$ -	\$ 1,609,000	\$ 4,431,000
6.2	ECONOMIZER ASH HANDLING - MECHANICAL EQUIPMENT	INCLUDES JET PUMPS AND PIPING / SUPPORTS TO THE BOTTOM ASH POND	\$ 400,000	\$ -	\$ 296,400	\$ 696,400
6.3	BUILDING SUMP PUMPS	FOR BUILDINGS - DUPLEX. INCLUDES CHECK & ISOLATION VALVES.	\$ 28,000	\$ -	\$ 12,300	\$ 40,300

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.4	AGITATOR FOR SUMP PUMPS	5 HP	\$ 12,000	\$ -	\$ 4,600	\$ 16,600
6.5	PIPING - MECHANICAL		\$ 142,800	\$ 131,000	\$ 408,700	\$ 682,500
6.6	BYPRODUCT WASTE SILO	CONCRETE SILO 60' DIA X 143' H - 5400 TONS - SUBCONTRACT COST INCLUDES LABOR	\$ 2,430,000	\$ -	\$ -	\$ 2,430,000
6.7	RECYCLE SILO	NOT REQUIRED FOR NID	\$ -	\$ -	\$ -	\$ -
6.8	FLY ASH SILO	NOT REQUIRED - ECONOMIZER FLY ASH SLUICED TO BOTTOM ASH POND	\$ -	\$ -	\$ -	\$ -
6.9	BYPRODUCT WASTE STORAGE SILO - FOUNDATIONS		\$ -	\$ 162,400	\$ 273,700	\$ 436,100
6.10	FLY ASH SILO - FOUNDATIONS	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.11	BYPRODUCT TRANSPORT BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 97,600	\$ 161,900	\$ 259,500
6.12	BYPRODUCT TRANSPORT BLOWER BUILDING	90' L X 30' W X 20' H	\$ 40,000	\$ 241,500	\$ 26,200	\$ 307,700
6.13	FLY ASH BLOWER AND ELECTRICAL BUILDING - FOUNDATIONS	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.14	FLY ASH BLOWER AND ELECTRICAL BUILDING	NOT REQUIRED	\$ -	\$ -	\$ -	\$ -
6.15	LOAD OUT AREA PDC	SUBCONTRACT PRICE INCLUDES LABOR. COMPLETE WITH HVAC, & FINISHES.	\$ -	\$ 300,000	\$ -	\$ 300,000
6.16	MCC	480V MCC PER LINE UP	\$ 120,000	\$ -	\$ 7,300	\$ 127,300
6.17	EMERGENCY POWER SYSTEM		\$ 185,500	\$ -	\$ 40,000	\$ 225,500
6.18	LIGHTING/ TRANSFORMERS & PANELS		\$ 18,500	\$ 75,000	\$ 53,200	\$ 146,700
6.19	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 32,800	\$ 177,400	\$ 210,200
6.20	GROUNDING		\$ -	\$ 4,500	\$ 10,900	\$ 15,400
6.21	MEDIUM VOLTAGE POWER CABLE & TERMINATION	1/C # 2/0-5KV	\$ -	\$ 9,500	\$ 47,900	\$ 57,400
6.22	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 63,300	\$ 143,000	\$ 206,300
6.23	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 20,800	\$ 58,400	\$ 79,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.24	DUCT BANK	DUCT BANK WITH 4-5" & 4-3" CONDUITS	\$ -	\$ 6,200	\$ 10,600	\$ 16,800
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 6,198,800	\$ 1,144,600	\$ 3,341,500	\$ 10,684,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 309,900	\$ 291,900	\$ 1,240,600	\$ 1,842,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 6,508,700	\$ 1,436,500	\$ 4,582,100	\$ 12,527,400
7.0	ABSORBER ISLAND	NOT REQUIRED FOR NID				
8.0	ACTIVATED CARBON INJECTION SYSTEM					
8.1	ACI MECHANICAL EQUIPMENT:		\$ 2,805,900	\$ -	\$ 888,300	\$ 3,694,200
8.2	PIPING - MECHANICAL		\$ 29,800	\$ 149,800	\$ 377,100	\$ 556,700
8.3	ACI SYSTEM - FOUNDATIONS		\$ -	\$ 41,500	\$ 79,200	\$ 120,700
8.4	MCC		\$ 61,800	\$ -	\$ 3,600	\$ 65,400
8.5	GROUNDING		\$ 5,500	\$ -	\$ 18,600	\$ 24,100
8.6	LIGHTING / TRANSFORMERS & PANELS		\$ 26,000	\$ 15,000	\$ 20,400	\$ 61,400
8.7	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 84,600	\$ 276,700	\$ 361,300
8.8	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 16,000	\$ 62,900	\$ 78,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 2,929,000	\$ 306,900	\$ 1,726,800	\$ 4,962,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 146,500	\$ 78,300	\$ 634,600	\$ 859,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ACTIVATED CARBON INJECTION SYSTEM	\$ 3,075,500	\$ 385,200	\$ 2,361,400	\$ 5,822,000
9.0	COMPRESSED AIR SYSTEM					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
9.1	AIR COMPRESSOR & AUXILIARIES		\$ 848,000	\$ -	\$ 184,600	\$ 1,032,600
9.2	PIPING - MECHANICAL		\$ 320,600	\$ 344,800	\$ 875,600	\$ 1,541,000
9.3	AIR COMPRESSOR BUILDING - FOUNDATIONS		\$ -	\$ 249,800	\$ 395,800	\$ 645,600
9.4	AIR COMPRESSOR BUILDING	120' L X 60' W X 20' H	\$ -	\$ 612,000	\$ -	\$ 612,000
9.5	LIGHTING/ TRANSFORMERS & PANELS		\$ 11,000	\$ 10,500	\$ 11,400	\$ 32,900
9.6	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ID FANS, 1.0	\$ -	\$ -	\$ -	\$ -
9.7	GROUNDING		\$ 4,500	\$ -	\$ 10,900	\$ 15,400
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,184,100	\$ 1,217,100	\$ 1,478,300	\$ 3,879,500
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 59,200	\$ 310,400	\$ 549,500	\$ 919,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 1,243,300	\$ 1,527,500	\$ 2,027,800	\$ 4,798,600
10.0	SERVICE WATER SYSTEM					
10.1	PUMPS		\$ 186,000	\$ -	\$ 90,000	\$ 276,000
10.2	PIPING - MECHANICAL		\$ 298,400	\$ 342,800	\$ 688,300	\$ 1,329,500
10.3	PIPING - FIRE PROTECTION SYSTEM		\$ 181,200	\$ 284,600	\$ 673,300	\$ 1,139,100
10.4	TANKS		\$ -	\$ 234,000	\$ -	\$ 234,000
10.5	SERVICE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 41,100	\$ 73,300	\$ 114,400
10.6	MAKE UP WATER TANK & PUMP - FOUNDATION		\$ -	\$ 27,300	\$ 48,800	\$ 76,100
10.7	ELECTRICAL	INCLUDED IN ID FANS, 1.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 665,600	\$ 929,800	\$ 1,573,700	\$ 3,169,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 33,300	\$ 237,100	\$ 575,300	\$ 845,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 698,900	\$ 1,166,900	\$ 2,149,000	\$ 4,014,700
11.0	POTABLE WATER SYSTEM					

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
11.1	PUMPS		\$ 30,000	\$ -	\$ 18,400	\$ 48,400
11.2	PIPING - MECHANICAL		\$ 99,500	\$ 181,900	\$ 448,200	\$ 729,600
11.3	TANKS		\$ -	\$ 8,500	\$ -	\$ 8,500
11.4	POTABLE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 5,200	\$ 8,800	\$ 14,000
11.5	ELECTRICAL	INCLUDED IN ID FANS, 1.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 129,500	\$ 195,600	\$ 475,400	\$ 800,500
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 6,500	\$ 49,900	\$ 173,300	\$ 229,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 136,000	\$ 245,500	\$ 648,700	\$ 1,030,200
12.0	FGD SUBSTATION					
12.1	TRANSFORMERS		\$ 1,560,500	\$ -	\$ 273,100	\$ 1,833,600
12.2	TRANSFORMER PDC	15W X 45' X 10'H. SUBCONTRACT PRICE INCLUDES LABOR	\$ 202,500	\$ -	\$ -	\$ 202,500
12.3	TRANSFORMER PDC - FOUNDATION		\$ -	\$ 73,200	\$ 131,700	\$ 204,900
12.4	138KV MAIN FEEDER & TERMINATIONS		\$ 264,000	\$ -	\$ 254,000	\$ 518,000
12.5	SWITCHGEAR		\$ 914,200	\$ -	\$ 121,600	\$ 1,035,800
12.6	MCC	480V MCC, PER LINE UP	\$ 60,000	\$ -	\$ 3,600	\$ 63,600
12.7	CABLE BUS		\$ 181,100	\$ 18,000	\$ 290,200	\$ 489,300
12.8	PANELS - RELAY		\$ 100,000	\$ -	\$ 9,100	\$ 109,100
12.9	MIMIC PANELS		\$ 17,500	\$ -	\$ 4,500	\$ 22,000
12.10	EMERGENCY POWER SYSTEM		\$ 108,300	\$ -	\$ 24,400	\$ 132,700
12.11	GROUNDING		\$ 23,300	\$ -	\$ 59,100	\$ 82,400
12.12	LIGHTING/ TRANSFORMERS & PANELS		\$ 26,000	\$ 30,000	\$ 29,500	\$ 85,500
12.13	OUTDOOR LIGHTING	NEW AUX YARD LIGHTING ALLOWANCE	\$ 25,000	\$ -	\$ 56,800	\$ 81,800
12.14	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 372,900	\$ 1,787,900	\$ 2,160,800
12.15	DUCT BANK		\$ -	\$ 26,200	\$ 54,300	\$ 80,500
12.16	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL- 15KV	\$ -	\$ 16,700	\$ 47,100	\$ 63,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
12.17	LOW VOLTAGE POWER CABLE & TERMINATION		\$ -	\$ 96,600	\$ 147,700	\$ 244,300
12.18	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	\$ -	\$ 21,800	\$ 61,100	\$ 82,900
12.19	FOUNDATION FOR AUX TRANSFORMER		\$ -	\$ 70,200	\$ 183,600	\$ 253,800
12.20	FIREWALL FOR TRANSFORMERS		\$ -	\$ 4,300	\$ 7,600	\$ 11,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 3,482,400	\$ 729,900	\$ 3,546,900	\$ 7,759,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 174,100	\$ 186,100	\$ 1,282,979	\$ 1,643,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 3,656,500	\$ 916,000	\$ 4,829,900	\$ 9,402,400
13.0	FGD DCS SYSTEM					
13.1	DCS	3200 I/O POINTS	\$ 2,400,000	\$ -	\$ 813,600	\$ 3,213,600
13.2	DCS - VENDOR FIELD SUPPORT	200 MAN DAYS @ \$1500/DAY - SHOWN AS SUBCONTRACT COST	\$ 300,000	\$ -	\$ -	\$ 300,000
13.3	LOCALLY MOUNTED INSTRUMENTS		\$ -	\$ 650,400	\$ 852,900	\$ 1,503,300
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 2,700,000	\$ 650,400	\$ 1,666,500	\$ 5,016,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 135,000	\$ 165,900	\$ 622,300	\$ 923,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD DCS SYSTEM	\$ 2,835,000	\$ 816,300	\$ 2,288,800	\$ 5,940,100
14.0	CEM SYSTEM					
14.1	CEM SYSTEM	PROVIDED BY AEP	\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000
15.0	TRUCK & RAIL INFRASTRUCTURE					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
15.1	EXISTING RAILROAD IMPROVEMENTS	FOR FULL RAILCAR STORAGE TRACK IMPROVEMENTS - 3250 LF	\$ -	\$ 660,200	\$ 689,200	\$ 1,349,400
15.2	EXISTING RAILROAD IMPROVEMENTS	FOR LOOP TRACK UPGRADE - 5000 LF	\$ -	\$ 1,008,800	\$ 1,055,600	\$ 2,064,400
15.3	NEW RAILROAD TRACK	INCLUDES, 132LB RAIL, 7" TIMBERS, TIE PLATES, SPIKES, BOLTS, 12" SUB BALLAST, 12" BALLAST, 12 OZ/SY GEOTEXTILE MEMBRANE, 12" SUBGRADE PREP	\$ -	\$ 252,000	\$ 213,100	\$ 465,100
15.4	FIELD FABRICATED TURNOUTS	#8 TURNOUT	\$ -	\$ 90,000	\$ 54,800	\$ 144,800
15.5	RAIL SCALE	SUBCONTRACT COST, INCLUDES FOUNDATIONS	\$ 212,500	\$ -	\$ -	\$ 212,500
15.6	NEW CONCRETE ENCASEMENT	OVER AND AROUND DUCT BANK CONNECTING THE PLANT TO SWITCHYARD. THIS IS UNDER THE NEW TRACK WORK EXTENSION	\$ -	\$ 33,200	\$ 67,700	\$ 100,900
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,200	\$ 2,080,400	\$ 4,337,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 521,300	\$ 777,500	\$ 1,309,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	TRUCK & RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,500	\$ 2,857,900	\$ 5,646,500
16.0	SITE IMPROVEMENTS - CIVIL WORK					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.1	SITE GRADING		\$ -	\$ -	\$ 555,200	\$ 555,200
16.2	ROADS & SURFACING		\$ -	\$ 1,204,900	\$ 1,667,500	\$ 2,872,400
16.3	NEW CONCRETE ENCASEMENT	16' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 36,500	\$ 66,500	\$ 103,000
16.4	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.5	PROCESS WATER STORAGE BASIN		\$ 60,000	\$ 81,600	\$ 240,300	\$ 381,900
16.6	PROCESS WATER STORAGE BASIN PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.7	STORM WATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 526,500	\$ 535,800	\$ 1,062,300
16.8	STORM WATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.9	STORM WATER RUNOFF POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.10	OILY WATER SEWER		\$ 4,500	\$ 112,600	\$ 236,000	\$ 353,100
16.11	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.12	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.13	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.14	EROSION & SEDIMENT CONTROL		\$ -	\$ 12,400	\$ 20,400	\$ 32,800
16.15	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 700,000	\$ 828,000	\$ 1,528,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.16	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 180,000	\$ 414,200	\$ 594,200
16.17	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 45,000	\$ 103,600	\$ 148,600
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 574,500	\$ 3,053,300	\$ 5,431,900	\$ 9,059,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 28,700	\$ 778,600	\$ 1,954,200	\$ 2,761,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 603,200	\$ 3,831,900	\$ 7,386,100	\$ 11,821,300
17.0	BOP ITEMS					
17.1	PIPE INSULATION		\$ -	\$ 34,000	\$ 106,000	\$ 140,000
17.2	HEAT TRACING		\$ -	\$ 175,600	\$ 248,500	\$ 424,100
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 170,900	\$ 655,800	\$ 826,700
17.4	HOISTS & TROLLEYS		\$ 150,000	\$ 175,000	\$ 204,400	\$ 529,400
17.5	MISC AUX STEEL FOR PIPE SUPPORTS		\$ -	\$ 122,500	\$ 510,600	\$ 633,100

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 19,600	\$ 30,100
17.7	EYE WASH STATIONS		\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS		\$ -	\$ 300,000	\$ 245,300	\$ 545,300
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 180,000	\$ 993,500	\$ 2,020,900	\$ 3,194,400
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 9,000	\$ 253,343	\$ 776,879	\$ 1,039,221
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 189,000	\$ 1,246,800	\$ 2,797,800	\$ 4,233,600
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500
18.4	OUTAGE TIE-IN DUCTWORK	ALLOWANCE FOR 85 TON DUCTWORK	\$ -	\$ 276,300	\$ 738,700	\$ 1,015,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 479,000	\$ 1,146,600	\$ 1,625,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 122,100	\$ 401,400	\$ 523,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 601,100	\$ 1,548,000	\$ 2,149,200
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
19.1	ARSENIC, ASBESTOS , LEAD ABATEMENT	ALLOWANCE PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 750,000
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 91,871,500	\$ 43,660,500	\$ 127,343,400	\$ 281,225,400
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 5,205,600	\$ 10,995,700	\$ 47,087,000	\$ 63,288,300
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 97,077,100	\$ 54,656,200	\$ 174,430,400	\$ 344,513,700
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 25,000,000
	CONSTRUCTION MANAGEMENT					\$ 10,335,400
	S-U / COMMISSIONING					\$ 3,445,100
	CRAFT START-UP SUPPORT					\$ 1,500,500
	INITIAL FILLS					\$ 1,033,500
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	OWNERS COST	BY AEP				\$ -
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 386,528,200
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,262,000
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 782,440
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 479,560
	CONTINGENCY	14.6				\$ 56,485,500
	ESCALATION					\$ 33,591,600

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727B
Project No.: 12721-000
Date: 9/10/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	EQUIPMENT					\$ 10,130,900
	MATERIAL					\$ 3,922,500
	LABOR					\$ 15,745,600
	INDIRECTS					\$ 3,792,600
	INTEREST DURING CONSTRUCTION (AFUDC)	BY AEP				
	TOTAL PROJECT COST					\$ 477,867,300
	REFERENCE COSTS:					
A	ESP DEMOLITION					\$ 832,300
B	REMOVE BOOSTER AIR FANS					\$ 111,000



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-7
O&M Cost Estimate Summary

DRAFT COPY

Exhibit 1-7. O&M Cost Estimate Summary

Fuel	WFGD				DFGD			
	1.7	3.0	4.5	7.5	1.7 w/o ESP	3.0 w/o ESP	1.7 w/ ESP	3.0 w/ ESP
Fixed O&M (\$/year)								
Operating Labor	1,248,000	1,248,000	1,248,000	1,248,000	832,000	832,000	832,000	832,000
Maintenance Material	2,412,000	2,590,000	2,763,000	2,950,000	2,076,000	2,136,000	2,076,000	2,136,000
Maintenance Labor	1,608,000	1,727,000	1,842,000	1,967,000	1,384,000	1,424,000	1,384,000	1,424,000
Total Fixed O&M (\$/year)	5,268,000	5,565,000	5,853,000	6,165,000	4,292,000	4,392,000	4,292,000	4,392,000
Variable O&M (\$/year)								
Reagent Cost	2,534,000	4,729,000	6,618,000	9,940,000	8,601,000	19,605,000	9,924,000	23,281,000
Activated Carbon	NA	NA	NA	NA	2,344,000	2,319,000	2,267,000	2,243,000
FGD Byproduct Disposal Cost	1,290,000	2,528,000	3,604,000	5,408,000	4,148,000	5,612,000	1,793,000	3,817,000
Makeup Water Cost	685,000	650,000	618,000	626,000	509,000	521,000	464,000	482,000
Wastewater Treatment Chemicals	299,000	169,000	31,000	12,000	NA	NA	NA	NA
Bags and Cages Replacement	NA	NA	NA	NA	651,000	651,000	651,000	651,000
Total Variable O&M excluding Auxiliary Power (\$/year)	4,808,000	8,076,000	10,871,000	15,986,000	16,253,000	28,708,000	15,099,000	30,474,000
Auxiliary Power at Full Load (MW)								
Overall Draft (Furnace to Stack)	26	26	26	26	23	23	27	27
FGD Draft Only	8	8	9	10	8	8	8	8
FGD Equipment Load	7	10	11	18	4	5	4	5
Existing ESP	4	4	4	4	0	0	4	4
WESP	3	3	3	3	NA	NA	NA	NA
Total Auxiliary Power at Full Load (MW)	40	43	44	51	27	28	35	36

Note: NA = Not Applicable

Exhibit 1-7. O&M Cost Estimate Summary

Fuel	IAQCS (Phase One)				IAQCS (Phase Two)			
	1.7 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	1.7 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP
Fixed O&M (\$/year)								
Operating Labor	832,000	832,000	NA	NA	1,664,000	1,664,000	1,664,000	1,664,000
Maintenance Material	2,076,000	2,136,000	NA	NA	4,039,000	4,117,000	4,191,000	4,272,000
Maintenance Labor	1,384,000	1,424,000	NA	NA	2,693,000	2,744,000	2,795,000	2,849,000
Total Fixed O&M (\$/year)	4,292,000	4,392,000	NA	NA	8,396,000	8,525,000	8,650,000	8,785,000
Variable O&M (\$/year)								
Limestone Reagent Cost	NA	NA	NA	NA	2,376,000	4,558,000	6,442,000	9,685,000
Lime Reagent Cost	8,601,000	19,605,000	NA	NA	661,000	1,225,000	1,713,000	2,574,000
Activated Carbon	2,344,000	2,319,000	NA	NA	2,344,000	2,319,000	2,315,000	2,293,000
WFGD Byproduct Disposal Cost	NA	NA	NA	NA	1,215,000	2,425,000	3,472,000	5,227,000
DFGD Byproduct Disposal Cost	4,148,000	5,612,000	NA	NA	2,732,000	2,553,000	2,426,000	2,670,000
Total Makeup Water Cost	509,000	521,000	NA	NA	746,000	752,000	763,000	780,000
Wastewater Treatment Chemicals	NA	NA	NA	NA	NA	NA	NA	NA
Bags and Cages Replacement	651,000	651,000	NA	NA	651,000	651,000	651,000	651,000
Total Variable O&M excluding Auxiliary Power (\$/year)	16,253,000	28,708,000	NA	NA	10,725,000	14,483,000	17,782,000	23,880,000
Auxiliary Power at Full Load (MW)								
Overall Draft (Furnace to Stack)	23	23	NA	NA	29	29	29	29
IAQCS Draft Only	8	8	NA	NA	14	14	15	16
FGD Equipment Load	4	5	NA	NA	11	15	17	24
Existing ESP	0	0	NA	NA	0	0	0	0
WESP	NA	NA	NA	NA	NA	NA	NA	NA
Total Auxiliary Power at Full Load (MW)	27	28	NA	NA	40	44	46	53

Note: NA = Not Applicable

Exhibit 1-7. O&M Cost Estimate Summary

Fuel	IAQCS (Phase One)				IAQCS (Phase Two)			
	1.7 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	1.7 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP
Fixed O&M (\$/year)								
Operating Labor	832,000	832,000	NA	NA	1,664,000	1,664,000	1,664,000	1,664,000
Maintenance Material	2,076,000	2,136,000	NA	NA	4,039,000	4,117,000	4,191,000	4,272,000
Maintenance Labor	1,384,000	1,424,000	NA	NA	2,693,000	2,744,000	2,795,000	2,849,000
Total Fixed O&M (\$/year)	4,292,000	4,392,000	NA	NA	8,396,000	8,525,000	8,650,000	8,785,000
Variable O&M (\$/year)								
Limestone Reagent Cost	NA	NA	NA	NA	2,376,000	4,558,000	6,442,000	9,685,000
Lime Reagent Cost	9,924,000	23,281,000	NA	NA	661,000	1,225,000	1,713,000	2,574,000
Activated Carbon	2,267,000	2,243,000	NA	NA	2,267,000	2,243,000	2,239,000	2,218,000
WFGD Byproduct Disposal Cost	NA	NA	NA	NA	1,216,000	2,426,000	3,472,000	5,228,000
DFGD Byproduct Disposal Cost	1,793,000	3,817,000	NA	NA	182,000	245,000	300,000	420,000
Total Makeup Water Cost	464,000	482,000	NA	NA	701,000	709,000	721,000	737,000
Wastewater Treatment Chemicals	NA	NA	NA	NA	NA	NA	NA	NA
Bags and Cages Replacement	651,000	651,000	NA	NA	651,000	651,000	651,000	651,000
Total Variable O&M excluding Auxiliary Power (\$/year)	15,099,000	30,474,000	NA	NA	8,054,000	12,057,000	15,538,000	21,513,000
Auxiliary Power at Full Load (MW)								
Overall Draft (Furnace to Stack)	27	27	NA	NA	34	34	34	34
IAQCS Draft Only	8	8	NA	NA	14	14	15	16
FGD Equipment Load	4	5	NA	NA	11	15	17	24
Existing ESP	4	4	NA	NA	4	4	4	4
WESP	NA	NA	NA	NA	NA	NA	NA	NA
Total Auxiliary Power at Full Load (MW)	35	36	NA	NA	49	53	55	62

Note: NA = Not Applicable

Exhibit 1-7. O&M Cost Estimate Summary

Fuel	NID							
	1.7 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	1.7 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP
Fixed O&M (\$/year)								
Operating Labor	1,040,000	1,040,000	1,040,000	1,040,000	1,040,000	1,040,000	1,040,000	1,040,000
Maintenance Material	2,284,000	2,350,000	2,416,000	2,548,000	2,284,000	2,350,000	2,416,000	2,548,000
Maintenance Labor	1,522,000	1,566,000	1,610,000	1,698,000	1,522,000	1,566,000	1,610,000	1,698,000
Total Fixed O&M (\$/year)	4,846,000	4,956,000	5,066,000	5,286,000	4,846,000	4,956,000	5,066,000	5,286,000
Variable O&M (\$/year)								
Reagent Cost	10,189,000	20,462,000	30,160,000	44,782,000	10,189,000	20,462,000	30,160,000	44,782,000
Activated Carbon	2,344,000	2,319,000	2,315,000	2,293,000	2,267,000	2,243,000	2,239,000	2,218,000
FGD Byproduct Disposal Cost	4,393,000	5,860,000	7,246,000	9,806,000	1,902,000	3,668,000	5,290,000	7,806,000
Makeup Water Cost	523,000	533,000	550,000	572,000	517,000	530,000	547,000	570,000
Wastewater Treatment Chemicals	NA	NA	NA	NA	NA	NA	NA	NA
Bags and Cages Replacement	690,000	690,000	690,000	690,000	690,000	690,000	690,000	690,000
Total Variable O&M excluding Auxiliary Power (\$/year)	18,139,000	29,864,000	40,961,000	58,143,000	15,565,000	27,593,000	38,926,000	56,066,000
Auxiliary Power at Full Load (MW)								
Overall Draft (Furnace to Stack)	23	23	23	23	27	27	27	27
FGD Draft Only	10	10	10	10	10	10	10	10
FGD Equipment Load	4	5	6	6	4	5	6	6
Existing ESP	0	0	0	0	4	4	4	4
WESP	NA	NA	NA	NA	NA	NA	NA	NA
Total Auxiliary Power at Full Load (MW)	27	28	29	29	35	36	37	37

Note: NA = Not Applicable



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-8
WFGD Technology Comparison

DRAFT COPY

WFGD		Est 2 - 1.7 lb SO2/Mmbtu	Est 3 - 3.0 lb SO2/Mmbtu	Base Est 1 4.5 lb SO2/Mmbtu	Est 4 - 7.5 lb SO2/Mmbtu	
Acc No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 26,440,900	\$ 26,440,900	\$ 26,440,900	\$ 26,440,900	Limestone handling system costs are the same for all fuels because the equipment is assumed the same and operating durations will be adjusted as required. As fuel sulfur content increases more limestone is required and more byproduct is produced, therefore the reagent prep island costs and byproduct handling costs are increased As the fuel sulfur content increases the liquid-to-gas ratio increases thereby increasing the size of the recirculation system and slightly increasing the Absorber Island costs.
2.0	WET ESP	\$ 117,374,500	\$ 117,374,500	\$ 117,374,500	\$ 117,374,500	
3.0	NEW STACK	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	
4.0	LIMESTONE HANDLING SYSTEM	\$ 28,133,900	\$ 28,133,900	\$ 28,133,900	\$ 28,133,900	
5.0	REAGENT PREPARATION ISLAND	\$ 42,835,000	\$ 46,800,700	\$ 49,957,700	\$ 53,319,200	
6.0	BYPRODUCT DEWATERING ISLAND	\$ 36,804,600	\$ 39,733,300	\$ 42,234,800	\$ 45,007,800	
7.0	ABSORBER ISLAND	\$ 193,598,300	\$ 194,696,700	\$ 195,465,900	\$ 196,426,200	
8.0	FGD WASTE WATER TREATMENT PLANT	\$ 21,071,400	\$ 21,071,400	\$ 21,071,400	\$ 21,071,400	
9.0	COMPRESSED AIR SYSTEM	\$ 8,576,300	\$ 8,576,300	\$ 8,576,300	\$ 8,576,300	
10.0	SERVICE WATER SYSTEM	\$ 7,568,800	\$ 7,568,800	\$ 7,568,800	\$ 7,568,800	
11.0	POTABLE WATER SYSTEM	\$ 920,200	\$ 920,200	\$ 920,200	\$ 920,200	Minor differences in BOP costs are due to increases in touchup painting that are a function of tons of structural steel in the estimate and the amount of equipment.
12.0	FGD SUBSTATION	\$ 3,571,300	\$ 3,571,300	\$ 3,571,300	\$ 3,571,300	
13.0	FGD DCS SYSTEM	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	
14.0	CEM SYSTEM	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	
15.0	RAIL INFRASTRUCTURE	\$ 5,666,400	\$ 5,666,400	\$ 5,666,400	\$ 5,666,400	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 15,186,800	\$ 15,186,800	\$ 15,186,800	\$ 15,186,800	
17.0	BOP ITEMS	\$ 5,597,600	\$ 5,611,200	\$ 5,630,300	\$ 5,658,600	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 2,164,800	\$ 2,164,800	\$ 2,164,800	\$ 2,164,800	
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	
	ENGINEERING, PROC., & PROJ. SERVICES	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	
	CONSTRUCTION	\$ 16,736,300	\$ 16,976,500	\$ 17,169,900	\$ 17,383,600	
	S-U / COMMISSIONING	\$ 5,578,800	\$ 5,658,800	\$ 5,723,300	\$ 5,794,500	
	CRAFT START-UP SUPPORT	\$ 2,598,200	\$ 2,627,100	\$ 2,649,200	\$ 2,673,500	
	INITIAL FILLS	\$ 1,673,600	\$ 1,697,700	\$ 1,717,000	\$ 1,738,400	
	OPERATOR & TRAINING	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS (NOISE &	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT	\$ 1,866,100	\$ 1,920,800	\$ 1,514,500	\$ 2,018,600	
	CONTINGENCY	\$ 89,116,700	\$ 90,572,700	\$ 92,638,200	\$ 92,439,700	
	ESCALATION	\$ 55,376,200	\$ 56,184,500	\$ 56,795,700	\$ 57,561,000	
	TOTAL PROJECT COST	\$ 761,524,000	\$ 772,222,600	\$ 781,239,000	\$ 789,763,700	



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-9 DFGD Technology Comparison

DRAFT COPY

EXHIBIT 1-9 DFGD TECHNOLOGY COMPARISON

DFGD		EST 2A ESP 1.7 LB SO2/MMBTU	EST 1A ESP 3.0 LB SO2/MMBTU	EST 2B N/ESP 1.7 LB SO2/MMBTU	EST 1B N/ESP 3.0 LB SO2/MMBTU	
Acc. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 39,464,900	\$ 39,464,900	\$ 39,993,200	\$ 39,993,200	The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans.
2.0	FABRIC FILTERS	\$ 50,537,000	\$ 50,327,400	\$ 51,430,600	\$ 51,089,200	The Fabric Filter equipment costs are slightly larger at the lower coal sulfur levels because there is more actual flow rate i.e. there is more bag area in the same footprint.
3.0	NEW STACK	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	The lime consumption rate is almost double for 3.0 vs. 1.7 with ESP. There is also a difference in lime consumptions between ESP and No ESP. Without the ESP the approach to saturation temperature is reduced which improves the lime utilization thereby leading to slightly less lime consumption. The lime equipment (blowers etc.) is the same regardless. The main delta is the storage equipment (i.e. Storage silo)
4.0	LIME HANDLING SYSTEM	\$ 15,098,200	\$ 20,825,300	\$ 14,669,000	\$ 19,433,000	
5.0	LIME SLAKER BUILDING	\$ 15,748,400	\$ 20,073,500	\$ 15,225,000	\$ 19,097,200	
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 18,604,200	\$ 19,341,800	\$ 14,925,100	\$ 16,090,800	With the ESP in service additional Fly Ash equipment is required including a silo for blending the fly ash with the byproduct. The silo sizes with the ESP in service are significantly smaller than without the ESP. This results from the fly ash being removed prior the waste being sent to the silo.
7.0	ABSORBER ISLAND	\$ 163,274,700	\$ 163,258,600	\$ 163,274,700	\$ 163,274,700	The absorber itself is sized on the actual flue gas flow rates which are roughly equivalent.
8.0	ACTIVATED CARBON INJECTION SYSTEM	\$ 5,840,100	\$ 5,840,100	\$ 5,840,100	\$ 5,840,100	
9.0	COMPRESSED AIR SYSTEM	\$ 4,303,600	\$ 4,303,600	\$ 4,303,600	\$ 4,303,600	
10.0	SERVICE WATER SYSTEM	\$ 4,740,000	\$ 4,740,000	\$ 4,740,000	\$ 4,740,000	
11.0	POTABLE WATER SYSTEM	\$ 1,165,456	\$ 1,165,456	\$ 1,165,456	\$ 1,165,456	
12.0	FGD SUBSTATION	\$ 9,432,600	\$ 9,432,600	\$ 9,432,600	\$ 9,432,600	
13.0	FGD DCS SYSTEM	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	
14.0	CEM SYSTEM	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	

EXHIBIT 1-9 DFGD TECHNOLOGY COMPARISON

DFGD		EST 2A ESP 1.7 LB SO2/MMBTU	EST 1A ESP 3.0 LB SO2/MMBTU	EST 2B N/ESP 1.7 LB SO2/MMBTU	EST 1B N/ESP 3.0 LB SO2/MMBTU	
Acc. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 11,615,000	\$ 11,615,000	\$ 11,615,000	\$ 11,614,400	
17.0	BOP ITEMS	\$ 4,260,400	\$ 4,260,400	\$ 4,260,400	\$ 4,260,400	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 2,149,200	\$ 2,149,200	\$ 2,110,200	\$ 2,149,200	
19.0	ARSENIC, ASBESTOS ,	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	
	CONSTRUCTION	\$ 11,353,800	\$ 11,648,200	\$ 11,256,400	\$ 11,541,300	
	S-U / COMMISSIONING	\$ 3,784,600	\$ 3,882,700	\$ 3,752,100	\$ 3,847,100	
	CRAFT START-UP	\$ 1,633,100	\$ 1,654,800	\$ 1,619,400	\$ 1,638,400	
	INITIAL FILLS	\$ 1,135,400	\$ 1,164,800	\$ 1,125,600	\$ 1,154,100	
	OPERATOR & TRAINING	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT	\$ 1,437,500	\$ 1,534,500	\$ 1,420,800	\$ 1,508,300	
	CONTINGENCY	\$ 64,314,800	\$ 65,904,800	\$ 64,026,600	\$ 64,916,400	
	ESCALATION	\$ 29,444,900	\$ 30,441,900	\$ 29,180,500	\$ 30,079,800	
	TOTAL PROJECT COST	\$ 517,264,900	\$ 530,206,600	\$ 513,293,300	\$ 525,096,100	



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-10
IAQCS Technology Comparison

DRAFT COPY



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
Draft (WFGD, DFGD, IAQCS & NID)
September 10, 2010

EXHIBIT 1-11
NID Technology Comparison

DRAFT COPY

EXHIBIT 1-11
NID TECHNOLOGY COMPARISON

NID		EST - 2A ESP 1.7 LB SO ₂ /MMBTU	BASE EST - 1A ESP 3.0 LB SO ₂ /MMBTU	EST - 3A ESP 4.5 LB SO ₂ /MMBTU	EST - 4A ESP 7.5 LB SO ₂ /MMBTU	EST - 2B ESP 1.7 LB SO ₂ /MMBTU	BASE EST - 1B ESP 3.0 LB SO ₂ /MMBTU	EST - 3B ESP 4.5 LB SO ₂ /MMBTU	EST - 4B ESP 7.5 LB SO ₂ /MMBTU	NOTES
Acc. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	
1.0	ID FANS	\$ 62,434,600	\$ 61,273,600	\$ 62,433,000	\$ 62,434,600	\$ 63,208,100	\$ 63,208,100	\$ 63,208,100	\$ 63,208,100	1
2.0	NID MODULES	\$175,284,900	\$176,572,700	\$182,900,500	\$221,153,600	\$ 167,877,400	\$168,988,300	\$175,470,800	\$ 214,715,600	2
3.0	NEW STACK	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	\$ 17,600,000	3
4.0	LIME HANDLING SYSTEM	\$ 20,485,000	\$ 24,678,900	\$ 31,964,400	\$ 39,185,400	\$ 20,351,000	\$ 24,471,500	\$ 31,697,800	\$ 39,174,900	
5.0	LIME SLAKER BUILDING: NOT REQ'D FOR NID									
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 13,358,200	\$ 15,365,000	\$ 16,154,800	\$ 18,181,800	\$ 11,125,100	\$ 12,527,400	\$ 13,303,100	\$ 15,371,700	4
7.0	ABSORBER ISLAND: NOT REQ'D FOR NID									
8.0	ACTIVATED CARBON INJECTION	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	\$ 5,822,000	
9.0	COMPRESSED AIR SYSTEM	\$ 4,798,600	\$ 4,798,600	\$ 4,794,000	\$ 4,798,600	\$ 4,798,600	\$ 4,798,600	\$ 4,798,600	\$ 4,798,600	
10.0	SERVICE WATER SYSTEM	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	\$ 4,014,700	
11.0	POTABLE WATER SYSTEM	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	\$ 1,030,200	
12.0	FGD SUBSTATION	\$ 9,402,400	\$ 9,402,400	\$ 9,408,200	\$ 9,402,400	\$ 9,402,400	\$ 9,402,400	\$ 9,402,400	\$ 9,402,400	
13.0	FGD DCS SYSTEM	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	\$ 5,940,100	
14.0	CEM SYSTEM	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	\$ 5,646,500	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 11,821,300	\$ 11,821,300	\$ 11,814,800	\$ 11,820,800	\$ 11,821,300	\$ 11,821,300	\$ 11,821,300	\$ 11,821,300	
17.0	BOP ITEMS	\$ 4,271,800	\$ 4,271,800	\$ 4,253,600	\$ 4,315,000	\$ 4,233,600	\$ 4,233,600	\$ 4,233,600	\$ 4,361,900	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	\$ 2,149,200	

EXHIBIT 1-11 **NID TECHNOLOGY COMPARISON**

NID		EST - 2A ESP 1.7 LB SO ₂ /MMBTU	BASE EST - 1A ESP 3.0 LB SO ₂ /MMBTU	EST - 3A ESP 4.5 LB SO ₂ /MMBTU	EST - 4A ESP 7.5 LB SO ₂ /MMBTU	EST - 2B ESP 1.7 LB SO ₂ /MMBTU	BASE EST - 1B ESP 3.0 LB SO ₂ /MMBTU	EST - 3B ESP 4.5 LB SO ₂ /MMBTU	EST - 4B ESP 7.5 LB SO ₂ /MMBTU	
Acc. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	NOTES
19.0	ARSENIC, ASBESTOS, LEAD ABATEMENT	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	
	OVERALL PROJECT									
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	
	CONSTRUCTION	\$ 10,407,600	\$ 10,597,400	\$ 11,041,100	\$ 12,490,600	\$ 10,113,900	\$ 10,335,400	\$ 10,769,900	\$ 12,237,500	
	S-U /	\$ 3,469,200	\$ 3,532,500	\$ 3,680,400	\$ 4,163,500	\$ 3,371,300	\$ 3,445,100	\$ 3,590,000	\$ 4,079,200	
	CRAFT START-UP	\$ 1,548,600	\$ 1,562,800	\$ 1,600,200	\$ 1,813,000	\$ 1,489,500	\$ 1,500,500	\$ 1,539,000	\$ 1,759,000	
	INITIAL FILLS	\$ 1,040,800	\$ 1,059,700	\$ 1,104,100	\$ 1,249,100	\$ 1,011,400	\$ 1,033,500	\$ 1,077,000	\$ 1,223,800	
	OPERATOR & TRAINING	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT	\$ 1,179,000	\$ 1,251,700	\$ 1,378,800	\$ 1,654,800	\$ 1,195,200	\$ 1,262,000	\$ 1,388,300	\$ 1,670,600	
	CONTINGENCY	\$ 57,861,200	\$ 58,551,800	\$ 60,595,200	\$ 67,660,600	\$ 56,146,800	\$ 56,485,500	\$ 58,316,600	\$ 65,662,300	
	ESCALATION	\$ 33,671,700	\$ 34,343,200	\$ 35,940,300	\$ 40,711,400	\$ 32,894,800	\$ 33,591,600	\$ 35,090,700	\$ 39,992,700	
	TOTAL PROJECT	\$481,797,500	\$489,846,100	\$509,075,900	\$571,797,900	\$ 469,053,000	\$477,867,300	\$496,469,800	\$ 560,242,100	

NOTES:

- 1) Acct. No. 1.0 - The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans
- 2) additional modules are required. The ductwork costs for ESP Out are less as a result of shorter ductwork lengths. There is a closer tie-in location.
- 3) Acct No: 4.0 - As fuel sulfur levels increase more lime is required therefore the lime handling system costs are increased.
- 4) Acct. No. : 6.0 - With the ESP in service fly ash must be pulled from a cell for blending with FGD byproduct. Significant additional equipment and a silo will be added for fly ash blending. In fact even though the byproduct quantities are increased in the no ESP case, the costs for the ESP options are higher due to this equipment addition. The silo sizes with the ESP in service are significantly smaller than without the ESP. This is a result of the fly ash being removed in the ESP prior to the FF.