



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 2 – WFGD Technology



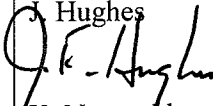
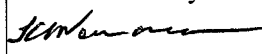
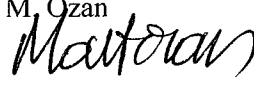
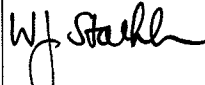
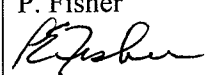
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Issue Summary Page

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
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			K. Nomanbhoy	P. Fisher		
			M. Ozan			
			C. Woods			



Issue Summary Page Cont.

C	9/10/10	Review WFGD	D. Anderson J. Hughes  K. Nomanbhoy  M. Ozan  C. Woods 	D. F. Franczak W. J. Staehlin  P. Fisher 	S. R. Bertheau	All
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* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

1.0 INTRODUCTION

The purpose of this document is to establish the Basis of the Order-of-Magnitude Wet FGD (WFGD) 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 the WFGD technology that were used to develop the Order-of-Magnitude FGD Cost Estimates. This document will define the project scope of work for the WFGD technology and the organization of the capital cost estimate structure. The technical and commercial basis used to develop the Capital and O&M Cost Estimates and the assumptions used in preparing them are defined in Volume 1, Summary Report.

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 the WFGD technology, cost estimates were prepared considering fuel specifications with sulfur content of 1.7, 3.0, 4.5 and 7.5 lb SO₂/MMbtu. A base fuel was selected and a capital cost estimate was prepared 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 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.

Table 1-1 illustrates the total of four (4) cost estimates that were prepared for the WFGD.

Table 1-1
EPC COST ESTIMATES

Technology	1.7 lb SO₂/MMbtu	3.0 lb SO₂/MMbtu	4.5 lb SO₂/MMbtu	7.5 lb SO₂/MMbtu
Wet	Wet Est-2	Wet Est-3	Wet Base Est-1	Wet Est-4

For details of the Technical and Commercial Basis of the entire study and the various technology cost comparisons, see Volume 1, Summary Report.

EXHIBIT 2-1
WFGD Project Deliverable Index

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VOLUME 2 - EXHIBIT 2-1
Project Deliverable Index
Wet FGD Technology

Document No.	Description	Attachment No.
MSK-WFGD-PFD-001_C	Wet FGD Process Flow Diagram – Sheet 1	2-1
MSK-WFGD-PFD-002_C	Wet FGD Process Flow Diagram – Sheet 2	2-1
MSK-WFGD-GA-001_C	Wet FGD Site Plan	2-2
MSK-WFGD-GA-002_B	Wet FGD General Arrangement - Plan	2-2
MSK-WFGD-GA-003_B	Wet FGD General Arrangement – Ductwork Elevations	2-2
MSK-WFGD-MB-001_C	Wet FGD Mass Balance Diagram – (1.75 lb/MMBtu Coal)	2-3
MSK-WFGD-MB-002_C	Wet FGD Mass Balance Diagram – (3.0 lb/MMBtu Coal)	2-3
MSK-WFGD-MB-003_C	Wet FGD Mass Balance Diagram – (4.5 lb/MMBtu Coal)	2-3
MSK-WFGD-MB-004_C	Wet FGD Mass Balance Diagram – (7.5 lb/MMBtu Coal)	2-3
MSK-WFGD-WB-NOTES-001_C	WFGD Water Balance Assumptions	2-4
MSK-WFGD-WB-001_C	Wet FGD Water Balance Diagram – (1.75 lb/MMBtu Coal)	2-4
MSK-WFGD-WB-002_C	Wet FGD Water Balance Diagram – (3.0 lb/MMBtu Coal)	2-4
MSK-WFGD-WB-003_C	Wet FGD Water Balance Diagram – (4.5 lb/MMBtu Coal)	2-4
MSK-WFGD-WB-004_C	Wet FGD Water Balance Diagram – (7.5 lb/MMBtu Coal)	2-4
ESK-WFGD-SL-Notes-001_B	Wet FGD Single Line Diagram Basic Description	2-5
ESK-WFGD-SL-001_B	Wet FGD Single Line Diagram	2-5
	Project Schedule (WFGD)	2-15



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

EXHIBIT 2-2
WFGD Capital Cost Estimate Outline

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EXHIBIT 2-2
WFGD 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 2-2
WFGD 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 2-2

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

EXHIBIT 2-3
WFGD Contingency Analysis

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

EXHIBIT 2-4
Capital Cost Estimate Comparison Summary - Wet FGD Options

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Order-of-Magnitude EPC Cost Estimate
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010
Revision A

Exhibit 2-4. WFGD OEM Cost Summary

	1.7	3.0	4.5	7.5	Comments
Reagent Prep	\$ 11,425,000	\$ 13,430,000	\$ 15,167,000	\$ 16,936,000	Vendor scope: - Limestone feeders from the day silos through the slurry storage tanks - Structural steel integral to the support of the vendor's equipment - Piping inside buildings to terminal points - Transfer pumps and all motors required by vendor scope of supply - Process instruments and control logic By others: - Piping from terminal points out to the plant - Conduit, cables, etc... to vendor's motors - Site grading, roads, foundations, etc... - Limestone conveyors, stacking storage areas, etc... - All required DCS upgrades
Absorber Island	\$ 40,589,000	\$ 41,029,000	\$ 41,363,000	\$ 41,668,000	Vendor scope: - Absorber module (A2205) with internals and wet ESP integral to the absorber - Inlet duct only through the C22 wet/dry interface - Piping inside buildings to terminal point - Recycle pumps, oxidation compressors, mist eliminator wash pumps, etc... with motors - Structural steel integral to the support of the vendor's equipment - Process instruments and control logic By others: - New ID fans - Duct from ID fans to wet/dry interface and duct from absorber module to stack breach - New wet stack - Piping from terminal points out to the plant - Conduit, cables, etc... to vendor's motors - Site grading, roads, foundations, etc... - All required DCS upgrades
Absorber Alloy	\$ 14,940,000	\$ 14,940,000	\$ 14,940,000	\$ 14,940,000	Additional cost for C276 absorber above the price of a A2205 absorber

AEP

Order-of-Magnitude EPC Cost Estimate
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010
Revision A

Exhibit 2-4. WFGD OEM Cost Summary

	1.7	3.0	4.5	7.5	Comments
Wet ESP	\$ 41,021,000	\$ 41,021,000	\$ 41,021,000	\$ 41,021,000	Vendor scope: - Integral wet ESP with the absorber - Additional support structures for integrated ESP design - All associated piping - Process instruments and control logic By others: - Piping from terminal points out to the plant - Conduit, cables, etc... to vendor's T/R sets - Site grading, roads, foundations, etc... - All required DCS upgrades
Alloy for Wet ESP	\$ 18,459,000	\$ 18,459,000	\$ 18,459,000	\$ 18,459,000	Additional cost for C276 wet ESP and absorber shell above the price of a A2205 absorber
De-watering	\$ 5,688,000	\$ 7,250,000	\$ 8,701,000	\$ 10,267,000	Vendor scope: - Primary & Secondary Dewatering from the hydroclone feed tanks to the hydroclones through the belt vacuum filters - Structural steel integral to the support of the vendor's equipment - Piping inside buildings to terminal point - All motors required by vendor scope of supply - Process instruments and control logic By others: - Piping from terminal points out to the plant - Conduit, cables, etc... to vendor's motors - Site grading, roads, foundations, etc... - Gypsum conveyors, stacking storage areas, etc... - All required DCS upgrades
Total	\$ 132,122,000	\$ 136,129,000	\$ 139,651,000	\$ 143,291,000	

Costs for the reagent preparation, absorber island, and dewatering equipment are based on a 2009 quote from Alstom. The previous quote was factored for the AEP Big Sandy Unit 2 capacity (865 MW) and adjusted for each sulfur.

The wet ESP pricing was based on a previous quote from 2002 that was adjusted to A2205 (20% of the total cost was C276 and the differential to A2205 is 2.25 times). Then the quote was escalated to today's dollars and adjusted for unit capacity.

EXHIBIT 2-4
Capital Cost Estimate Comparison Summary
Wet FGD Options

Attached are the capital cost estimate comparison summaries for the wet FGD options. The differences between these options are related to the following issues:

- As the sulfur content of the coal increases the following equipment and processes are impacted:
 - The limestone usage increases which correlates to increased limestone handling equipment costs.
 - To adequately scrub the higher sulfur coals, the liquid recirculation rate in the absorber must be increased. The higher liquid recirculation rates result in larger or more recirculation pumps and spray headers. The increase in auxiliaries results in a slightly higher overall absorber island cost as the fuel sulfur increases.
 - A higher byproduct rate results from an increase in fuel sulfur because the mass of sulfur removed increases. As more byproduct is produced, the costs for transport, dewatering and disposal are increased.

AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY						Estimate No.: 30709B Project No.: 12721-000 Date: 9/10/2010 Preparer: MNO Reviewer: JMK Approver: PEF					Est 1 Base Est 1 Est 2 (1.7 lb SO2/Mmbtu)	Est 1 Base Est 1 Est 3 (3.0 lb SO2/Mmbtu)	Est 1 Base Est 1 Est 4 (7.5 lb SO2/Mmbtu)	
						Base Est 1 4.5 lb SO2/Mmbtu	Est 2 - 1.7 lb SO2/Mmbtu	Est 3 - 3.0 lb SO2/Mmbtu	Est 4 - 7.5 lb SO2/Mmbtu			Remarks		
Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost					
1.0	ID FANS													
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 9,330,200	\$ 3,207,800	\$ 9,122,100	\$ 21,660,100	\$ 21,660,100	\$ 21,660,100	\$ 21,660,100	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 466,500	\$ 818,000	\$ 3,496,300	\$ 4,780,800	\$ 4,780,800	\$ 4,780,800	\$ 4,780,800	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 9,796,700	\$ 4,025,800	\$ 12,618,400	\$ 26,440,900	\$ 26,440,900	\$ 26,440,900	\$ 26,440,900	\$ -	\$ -	\$ -		
2.0	WET ESP													
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 41,051,200	\$ 12,415,300	\$ 42,427,500	\$ 95,894,000	\$ 95,894,000	\$ 95,894,000	\$ 95,894,000	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,052,600	\$ 3,165,900	\$ 16,262,000	\$ 21,480,500	\$ 21,480,500	\$ 21,480,500	\$ 21,480,500	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	WET ESP	\$ 43,103,800	\$ 15,581,200	\$ 58,689,500	\$ 117,374,500	\$ 117,374,500	\$ 117,374,500	\$ 117,374,500	\$ -	\$ -	\$ -		
3.0	NEW STACK												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.	
3.1	CONCRETE STACK (WET)	PROVIDED BY AEP	\$ 780,000	\$ 15,000,000	\$ 15,700,000	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	\$ -	\$ -	\$ -		
4.0	LIMESTONE HANDLING SYSTEM												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.	
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 6,898,900	\$ 3,631,000	\$ 11,807,200	\$ 22,337,100	\$ 22,337,100	\$ 22,337,100	\$ 22,337,100	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 344,900	\$ 925,900	\$ 4,526,000	\$ 5,796,800	\$ 5,796,800	\$ 5,796,800	\$ 5,796,800	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIMESTONE HANDLING SYSTEM	\$ 7,243,800	\$ 4,556,900	\$ 16,333,200	\$ 28,133,900	\$ 28,133,900	\$ 28,133,900	\$ 28,133,900	\$ -	\$ -	\$ -		
5.0	REAGENT PREPARATION ISLAND												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.	
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 15,809,300	\$ 6,067,200	\$ 18,610,500	\$ 40,487,000	\$ 34,416,600	\$ 37,780,700	\$ 43,355,800	\$ (6,070,400)	\$ (2,706,300)	\$ 2,868,800		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 790,500	\$ 1,547,100	\$ 7,133,100	\$ 9,470,700	\$ 8,418,400	\$ 9,020,000	\$ 9,963,400	\$ (1,052,300)	\$ (450,700)	\$ 492,700		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 16,599,800	\$ 7,614,300	\$ 25,743,600	\$ 49,957,700	\$ 42,835,000	\$ 46,800,700	\$ 53,319,200	\$ (7,122,700)	\$ (3,157,000)	\$ 3,361,500		
6.0	BYPRODUCT DEWATERING ISLAND												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.	
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 11,005,200	\$ 5,701,000	\$ 17,006,000	\$ 33,712,200	\$ 29,054,100	\$ 31,553,500	\$ 36,100,000	\$ (4,658,100)	\$ (2,158,700)	\$ 2,387,800		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 550,300	\$ 1,453,800	\$ 6,518,600	\$ 8,522,600	\$ 7,750,500	\$ 8,179,800	\$ 8,907,800	\$ (772,100)	\$ (342,800)	\$ 385,200		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 11,555,500	\$ 7,154,800	\$ 23,524,600	\$ 42,234,800	\$ 36,804,600	\$ 39,733,300	\$ 45,007,800	\$ (5,430,200)	\$ (2,501,500)	\$ 2,773,000		
7.0	ABSORBER ISLAND												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.	
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 47,167,900	\$ 28,404,800	\$ 78,675,900	\$ 154,248,600	\$ 152,697,500	\$ 153,607,000	\$ 155,030,600	\$ (1,551,100)	\$ (641,600)	\$ 782,000		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,033,400	\$ 7,243,200	\$ 30,940,700	\$ 41,217,300	\$ 40,900,800	\$ 41,089,700	\$ 41,395,600	\$ (316,500)	\$ (127,600)	\$ 178,300		

AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY						Estimate No.: 30709B Project No.: 12721-000 Date: 9/10/2010 Preparer: MNO Reviewer: JMK Approver: PER					Est 2 (1.7 lb SO2/Mmbtu) - Base Est 1	Est 3 (3.0 lb SO2/Mmbtu) - Base Est 1	Est 4 (7.5 lb SO2/Mmbtu) - Base Est 1	
						Base Est 1 4.5 lb SO2/Mmbtu	Est 2 - 1.7 lb SO2/Mmbtu	Est 3 - 3.0 lb SO2/Mmbtu	Est 4 - 7.5 lb SO2/Mmbtu				Remarks	
Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost					
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,201,300	\$ 35,648,000	\$ 109,616,600	\$ 195,465,900	\$ 193,598,300	\$ 194,696,700	\$ 196,426,200	\$ (1,867,600)	\$ (769,200)	\$ 960,300		
8.0	FGD WASTE WATER TREATMENT PLANT												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.	
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,874,400	\$ 4,896,300	\$ 7,090,300	\$ 16,861,000	\$ 16,861,000	\$ 16,861,000	\$ 16,861,000	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 243,700	\$ 1,248,600	\$ 2,718,100	\$ 4,210,400	\$ 4,210,400	\$ 4,210,400	\$ 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	\$ 21,071,400	\$ 21,071,400	\$ 21,071,400	\$ -	\$ -	\$ -		
9.0	COMPRESSED AIR SYSTEM													
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,337,000	\$ 1,019,200	\$ 4,260,700	\$ 6,616,900	\$ 6,616,900	\$ 6,616,900	\$ 6,616,900	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 66,900	\$ 259,900	\$ 1,632,600	\$ 1,959,400	\$ 1,959,400	\$ 1,959,400	\$ 1,959,400	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 1,403,900	\$ 1,279,100	\$ 5,893,300	\$ 8,576,300	\$ 8,576,300	\$ 8,576,300	\$ 8,576,300	\$ -	\$ -	\$ -		
10.0	SERVICE WATER SYSTEM													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 905,000	\$ 1,530,200	\$ 3,396,600	\$ 5,831,800	\$ 5,831,800	\$ 5,831,800	\$ 5,831,800	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 45,300	\$ 390,200	\$ 1,301,600	\$ 1,737,000	\$ 1,737,000	\$ 1,737,000	\$ 1,737,000	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 950,300	\$ 1,920,400	\$ 4,698,200	\$ 7,568,800	\$ 7,568,800	\$ 7,568,800	\$ 7,568,800	\$ -	\$ -	\$ -		
11.0	POTABLE WATER SYSTEM													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 167,000	\$ 134,500	\$ 416,600	\$ 718,100	\$ 718,100	\$ 718,100	\$ 718,100	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 8,400	\$ 34,300	\$ 159,500	\$ 202,100	\$ 202,100	\$ 202,100	\$ 202,100	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 175,400	\$ 168,800	\$ 576,100	\$ 920,200	\$ 920,200	\$ 920,200	\$ 920,200	\$ -	\$ -	\$ -		
12.0	FGD SUBSTATION													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,813,800	\$ 192,700	\$ 1,029,800	\$ 3,036,300	\$ 3,036,300	\$ 3,036,300	\$ 3,036,300	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 90,700	\$ 49,100	\$ 395,172	\$ 535,000	\$ 535,000	\$ 535,000	\$ 535,000	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 1,904,500	\$ 241,800	\$ 1,425,000	\$ 3,571,300	\$ 3,571,300	\$ 3,571,300	\$ 3,571,300	\$ -	\$ -	\$ -		
13.0	FGD DCS SYSTEM													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 300,000	\$ 3,827,800	\$ 2,102,500	\$ 6,230,300	\$ 6,230,300	\$ 6,230,300	\$ 6,230,300	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 15,000	\$ 976,100	\$ 806,100	\$ 1,797,100	\$ 1,797,100	\$ 1,797,100	\$ 1,797,100	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD DCS SYSTEM	\$ 315,000	\$ 4,803,900	\$ 2,908,600	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	\$ -	\$ -	\$ -		
14.0	CEM SYSTEM													
14.1	CEM SYSTEM	PROVIDED BY AEP	\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ -	\$ -	\$ -		
15.0	RAIL INFRASTRUCTURE													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,100	\$ 2,080,400	\$ 4,337,000	\$ 4,337,000	\$ 4,337,000	\$ 4,337,000	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 521,200	\$ 797,500	\$ 1,329,400	\$ 1,329,400	\$ 1,329,400	\$ 1,329,400	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,300	\$ 2,877,900	\$ 5,666,400	\$ 5,666,400	\$ 5,666,400	\$ 5,666,400	\$ -	\$ -	\$ -		
16.0	SITE IMPROVEMENTS - CIVIL WORK													
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 574,500	\$ 3,959,200	\$ 6,950,900	\$ 11,484,600	\$ 11,484,600	\$ 11,484,600	\$ 11,484,600	\$ -	\$ -	\$ -		

AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY						Estimate No.: 30709B Project No.: 12721-000 Date: 9/10/2010 Preparer: MNO Reviewer: JMK Approver: PER					Est 1 Base Est 1 (1.7 lb SO2/Mmbtu)	Est 1 Base Est 1 (3.0 lb SO2/Mmbtu)	Est 1 Base Est 1 (7.5 lb SO2/Mmbtu)	
						Base Est 1 4.5 lb SO2/Mmbtu	Est 2 - 1.7 lb SO2/Mmbtu	Est 3 - 3.0 lb SO2/Mmbtu	Est 4 - 7.5 lb SO2/Mmbtu					Remarks
Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost					
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 28,700	\$ 1,009,600	\$ 2,663,800	\$ 3,702,200	\$ 3,702,200	\$ 3,702,200	\$ 3,702,200	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 603,200	\$ 4,968,800	\$ 9,614,700	\$ 15,186,800	\$ 15,186,800	\$ 15,186,800	\$ 15,186,800	\$ -	\$ -	\$ -		
17.0	BOP ITEMS													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.
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,382,800	\$ 2,656,200	\$ 4,249,000	\$ 4,225,200	\$ 4,235,000	\$ 4,270,200	\$ (23,800)	\$ (14,000)	\$ 21,200		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 352,614	\$ 1,018,141	\$ 1,381,255	\$ 1,372,404	\$ 1,376,226	\$ 1,388,355	\$ (8,850)	\$ (5,029)	\$ 7,101		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,735,400	\$ 3,674,300	\$ 5,630,300	\$ 5,597,600	\$ 5,611,200	\$ 5,658,600	\$ (32,700)	\$ (19,100)	\$ 28,300		
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE													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.
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 479,000	\$ 1,130,600	\$ 1,609,600	\$ 1,609,600	\$ 1,609,600	\$ 1,609,600	\$ -	\$ -	\$ -		
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 122,100	\$ 433,000	\$ 555,200	\$ 555,200	\$ 555,200	\$ 555,200	\$ -	\$ -	\$ -		
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 601,100	\$ 1,563,600	\$ 2,164,800	\$ 2,164,800	\$ 2,164,800	\$ 2,164,800	\$ -	\$ -	\$ -		
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT													
19.1	ARSENIC, ASBESTOS , LEAD ABATEMENT	ALLOWANCE PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ -	\$ -	\$ -		
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 143,696,900	\$ 94,432,900	\$ 224,773,800	\$ 463,653,600	\$ 451,350,200	\$ 458,133,000	\$ 469,713,400	\$ (12,303,400)	\$ (5,520,600)	\$ 6,059,800		
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,757,800	\$ 20,117,700	\$ 80,802,000	\$ 108,677,600	\$ 106,527,900	\$ 107,751,500	\$ 109,741,000	\$ (2,149,700)	\$ (926,100)	\$ 1,063,400		
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 151,454,700	\$ 114,550,600	\$ 305,575,800	\$ 572,331,200	\$ 557,878,100	\$ 565,884,500	\$ 580,204,400	\$ (14,453,100)	\$ (6,446,700)	\$ 7,873,200		
	OVERALL PROJECT INDIRECT COSTS													
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ -	\$ -	\$ -		
	CONSTRUCTION MANAGEMENT					\$ 17,169,900	\$ 16,736,300	\$ 16,976,500	\$ 17,383,600	\$ (433,600)	\$ (193,400)	\$ 213,700		
	S-U / COMMISSIONING					\$ 5,723,300	\$ 5,578,800	\$ 5,658,800	\$ 5,794,500	\$ (144,500)	\$ (64,500)	\$ 71,200		
	CRAFT START-UP SUPPORT					\$ 2,649,200	\$ 2,598,200	\$ 2,627,100	\$ 2,673,500	\$ (51,000)	\$ (22,100)	\$ 24,300		
	INITIAL FILLS					\$ 1,717,000	\$ 1,673,600	\$ 1,697,700	\$ 1,738,400	\$ (43,400)	\$ (19,300)	\$ 21,400		
	OPERATOR & TRAINING MANUALS					\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ -	\$ -	\$ -		
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ -	\$ -	\$ -		
	OWNERS COST - % of ACCT NOS. 92, 93.1, 93.2, 93.3, 93.4					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 630,290,600	\$ 615,165,000	\$ 623,544,600	\$ 637,744,400	\$ (15,125,600)	\$ (6,746,000)	\$ 7,453,800		
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,514,500	\$ 1,866,100	\$ 1,920,800	\$ 2,018,600	\$ 351,600	\$ 406,300	\$ 504,100		
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 938,990	\$ 1,157,000	\$ 1,536,640	\$ 1,251,532	\$ 218,010	\$ 597,650	\$ 312,542		
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 575,510	\$ 709,100	\$ 960,400	\$ 767,068	\$ 133,590	\$ 384,890	\$ 191,558		
	CONTINGENCY	14.7				\$ 92,638,200	\$ 89,116,700	\$ 90,572,700	\$ 92,439,700	\$ (3,521,500)	\$ (2,065,500)	\$ (198,500)		
	ESCALATION					\$ 56,795,700	\$ 55,376,200	\$ 56,184,500	\$ 57,561,000	\$ (1,419,500)	\$ (611,200)	\$ 765,300		

AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY						Estimate No.: 30709B				Est 2 (1.7 lb SO2/Mmbtu) - Base Est 1	Est 3 (3.0 lb SO2/Mmbtu) - Base Est 1	Est 4 (7.5 lb SO2/Mmbtu) - Base Est 1	
						Project No.: 12721-000							
						Date: 9/10/2010							
						Preparer: MNO							
						Reviewer: JMK							
						Approver: PER							
						Base Est 1 4.5 lb SO2/Mmbtu	Est 2 - 1.7 lb SO2/Mmbtu	Est 3 - 3.0 lb SO2/Mmbtu	Est 4 - 7.5 lb SO2/Mmbtu				Remarks
Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost				
	EQUIPMENT					\$ 15,758,900	\$ 14,980,700	\$ 15,419,800	\$ 16,204,500	\$ (778,200)	\$ (339,100)	\$ 445,600	
	MATERIAL					\$ 8,221,000	\$ 8,180,400	\$ 8,209,500	\$ 8,252,900	\$ (40,600)	\$ (11,500)	\$ 31,900	
	LABOR					\$ 27,583,900	\$ 27,043,900	\$ 27,350,300	\$ 27,841,800	\$ (540,000)	\$ (233,600)	\$ 257,900	
	INDIRECTS					\$ 5,231,900	\$ 5,171,200	\$ 5,204,900	\$ 5,261,800	\$ (60,700)	\$ (27,000)	\$ 29,900	
	INTEREST DURING CONSTRUCTION (AFUDC)												
	TOTAL PROJECT COST					\$ 781,239,000	\$ 761,524,000	\$ 772,222,600	\$ 789,763,700	\$ (19,715,000)	\$ (9,016,400)	\$ 8,524,700	



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

EXHIBIT 2-5
WFGD O&M Cost Estimate Summary

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AEP

Order-of-Magnitude EPC Cost Estimate

Big Sandy Station – Unit 2

Project No. 12721-000

September 10, 2010

Revision B

Exhibit 2-5. WFGD O&M Cost Estimate Summary

Fuel	WFGD			
	1.7	3.0	4.5	7.5
Fixed O&M (\$/year)				
Operating Labor	1,248,000	1,248,000	1,248,000	1,248,000
Maintenance Material	2,412,000	2,590,000	2,763,000	2,950,000
Maintenance Labor	1,608,000	1,727,000	1,842,000	1,967,000
Total Fixed O&M (\$/year)	5,268,000	5,565,000	5,853,000	6,165,000
Variable O&M (\$/year)				
Reagent Cost	2,534,000	4,729,000	6,618,000	9,940,000
Activated Carbon	NA	NA	NA	NA
FGD Byproduct Disposal Cost	1,290,000	2,528,000	3,604,000	5,408,000
Makeup Water Cost	685,000	650,000	618,000	626,000
Wastewater Treatment Chemicals	299,000	169,000	31,000	12,000
Bags and Cages Replacement	NA	NA	NA	NA
Total Variable O&M excluding Auxiliary Power (\$/year)	4,808,000	8,076,000	10,871,000	15,986,000
Auxiliary Power at Full Load (MW)				
Overall Draft (Furnace to Stack)	26	26	26	26
FGD Draft Only	8	8	9	10
FGD Equipment Load	7	10	11	18
Existing ESP	4	4	4	4
WESP	3	3	3	3
Total Auxiliary Power at Full Load (MW)	40	43	44	51

Note: NA = Not Applicable



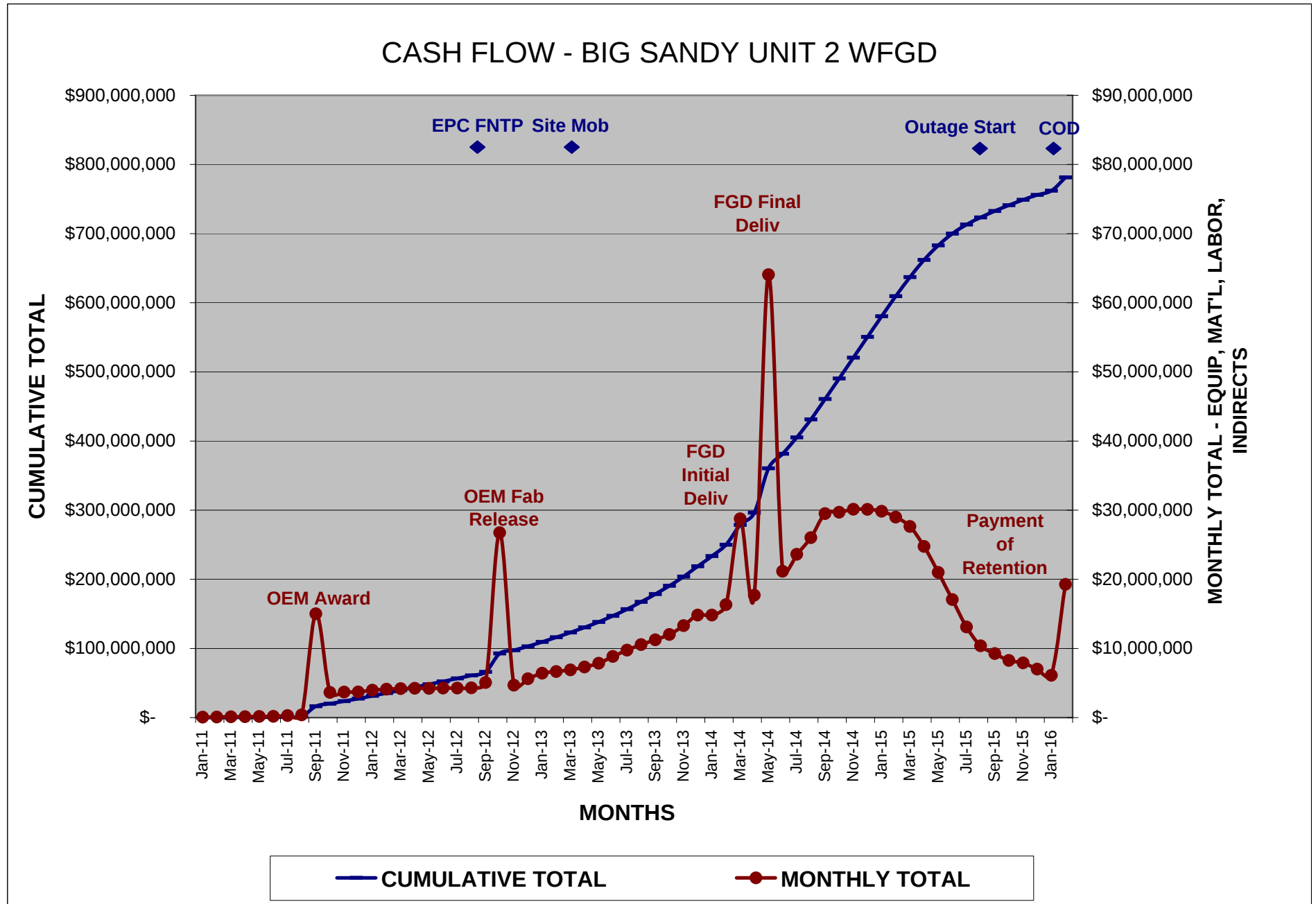
Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

EXHIBIT 2-6
WFGD Project Cash Flow

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Kentucky Power Company & American Electric Power Service Corporation
Big Sandy Unit 2
Wet FGD Base (4.5 Lb/MMBtu)
Cash Flows - Cumulative Total and Monthly Totals

Sargent & Lundy
Date: 9/10/10
Rev: B

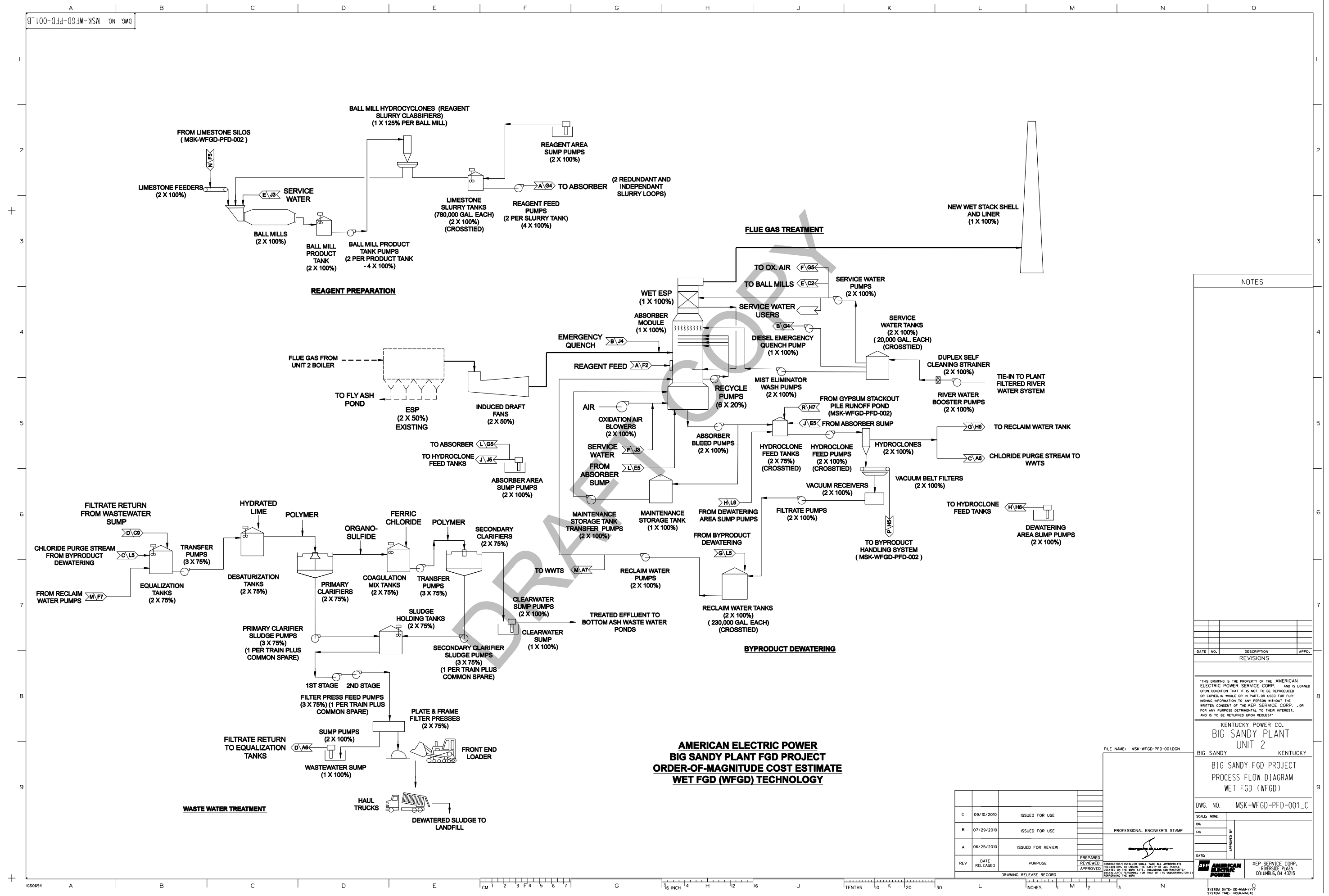




Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

ATTACHMENT 2-1
WFGD Process Flow Diagrams

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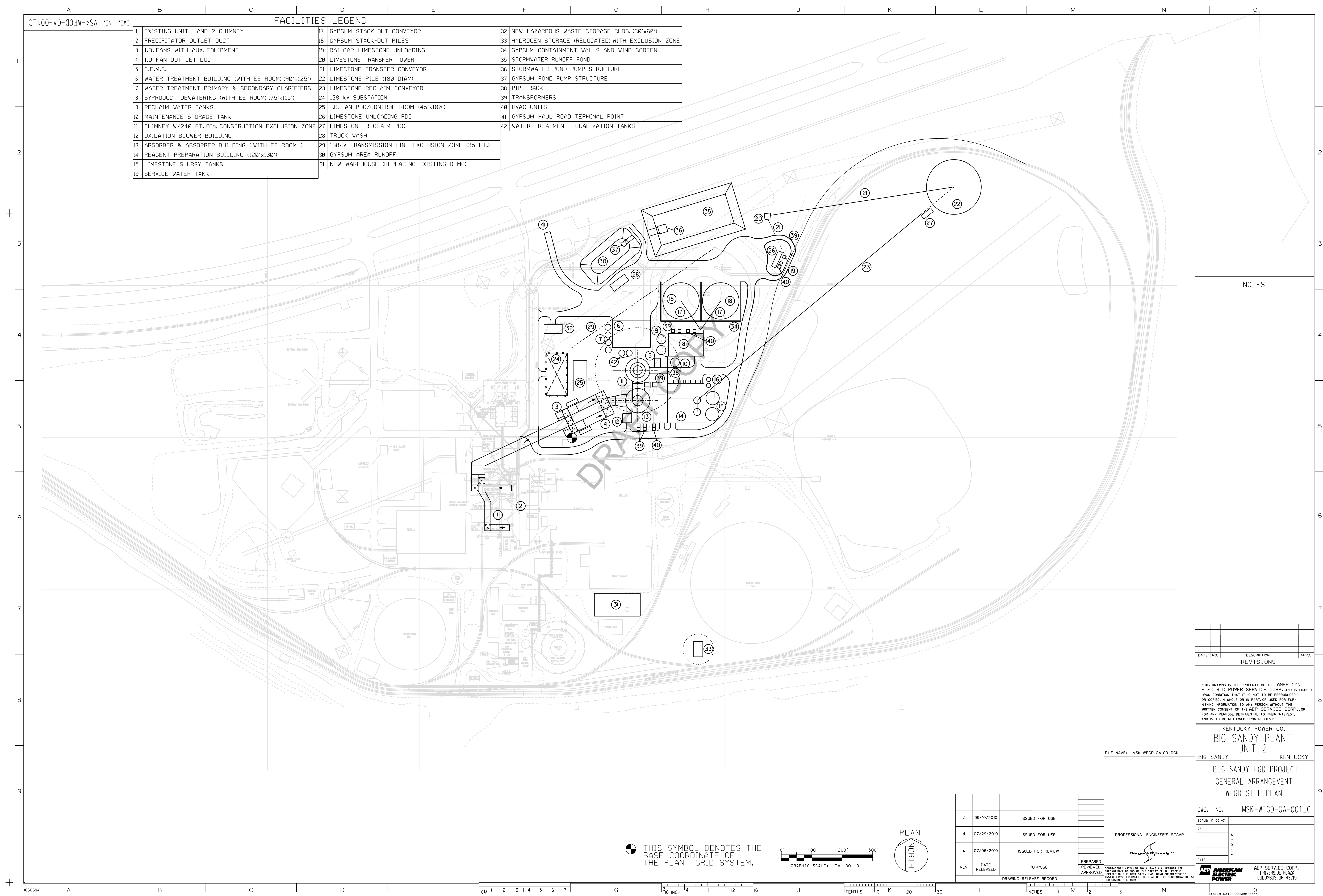


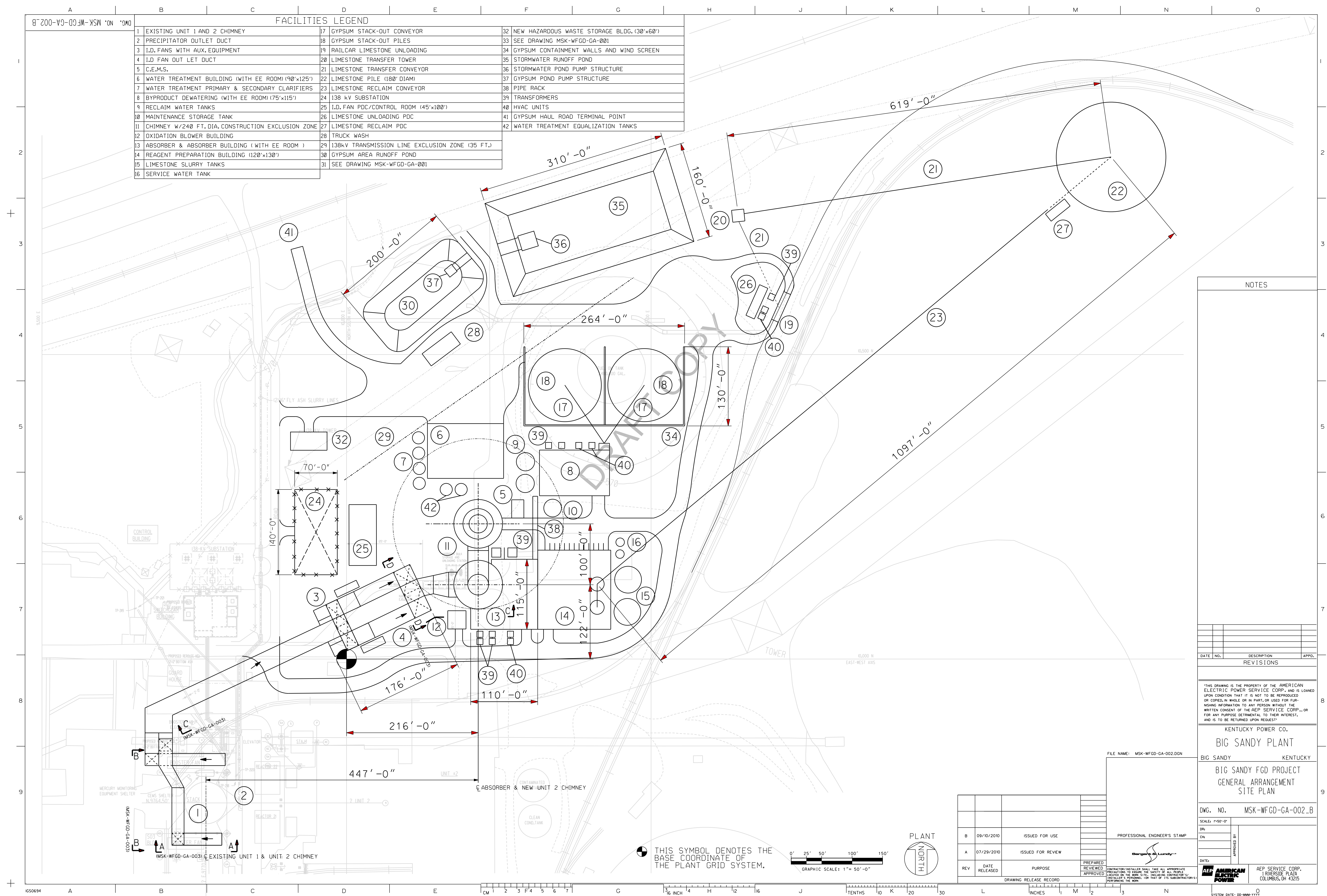


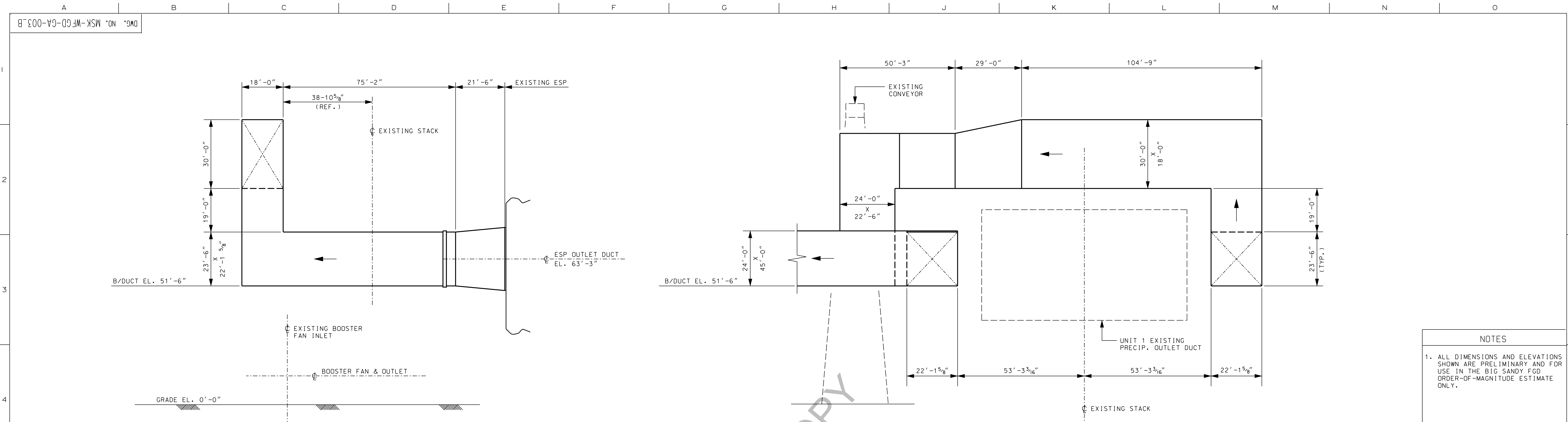
Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

ATTACHMENT 2-2
WFGD Site Plan and General Arrangement Drawings

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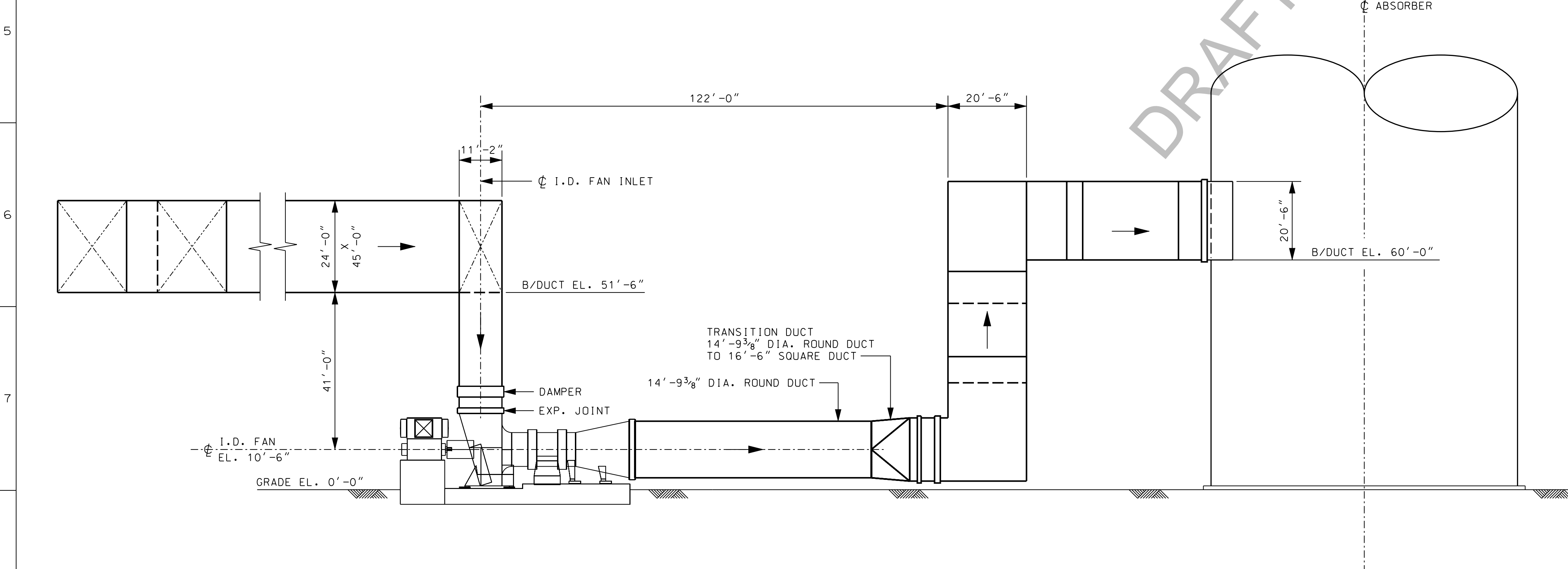




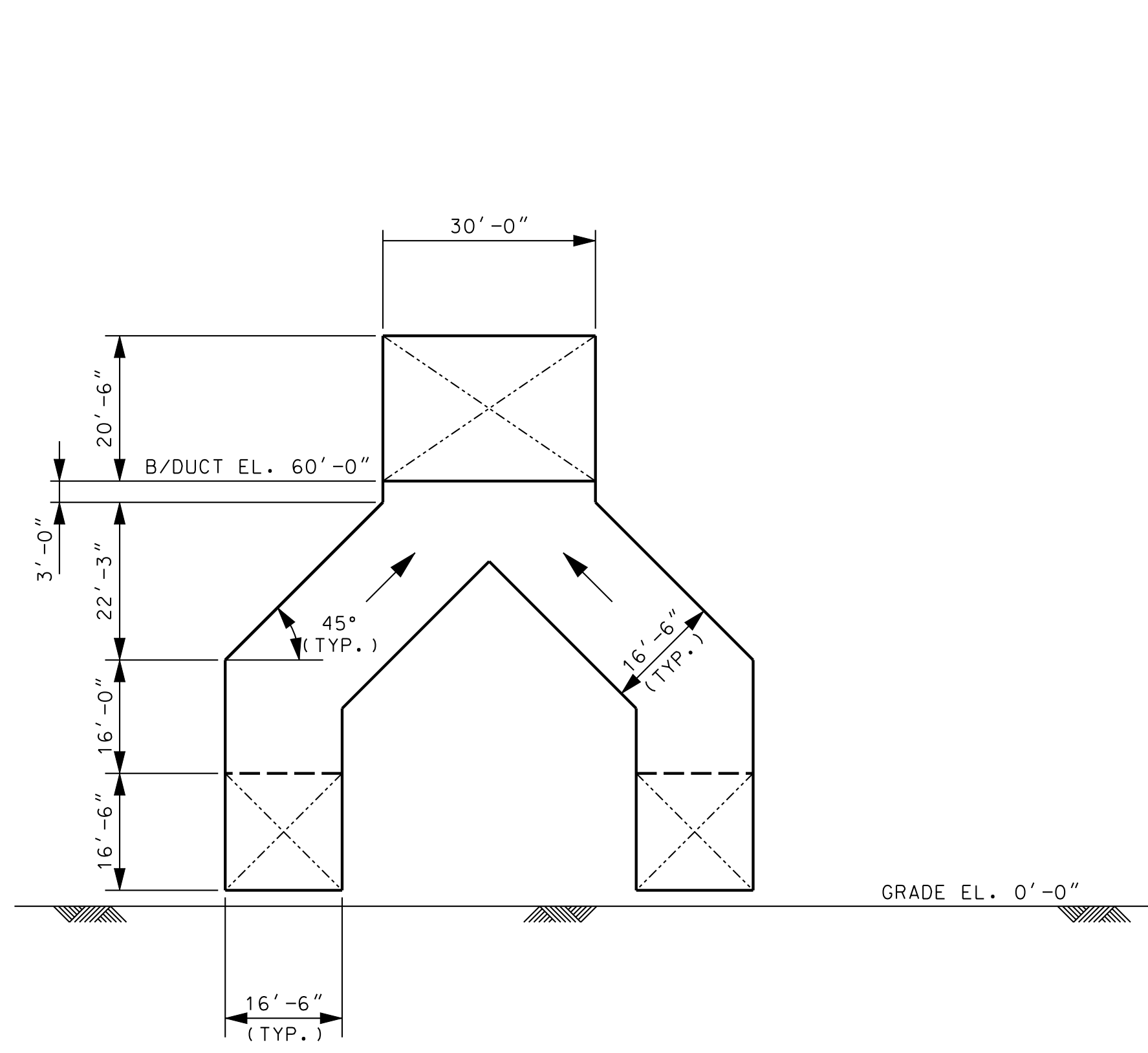


SECTION A-A (LOOKING NORTH)
MSK-WFGD-GA-002

SECTION B-B (LOOKING EAST)
MSK-WFGD-GA-002



SECTION C-C (LOOKING NORTH)
MSK-WFGD-GA-002



SECTION D-D (LOOKING EAST)
MSK-WFGD-GA-002

NOTES
1. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE PRELIMINARY AND FOR USE IN THE BIG SANDY FGD ORDER-OF-MAGNITUDE ESTIMATE ONLY.

DATE	NO.	DESCRIPTION	APPD.
REVISIONS			

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KENTUCKY POWER CO.
BIG SANDY PLANT
UNIT 2
BIG SANDY KENTUCKY

BIG SANDY FGD PROJECT
WFGD GA DUCT LAYOUT
SECTIONS

DWG. NO. MSK-WFGD-GA-003.B

SCALE: 3/4" = 1'-0"

APPROVED BY
DATE:

AMERICAN ELECTRIC POWER
AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

REV	DATE	RELEASED	PURPOSE	PREPARED	REVIEWED	APPROVED
B	09/10/2010		ISSUED FOR USE			
A	07/29/2010		ISSUED FOR REVIEW			

FILE NAME: MSK-WFGD-GA-003.DGN

PROFESSIONAL ENGINEER'S STAMP

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE EMPLOYED ON THE WORK SITE, INCLUDING CONTRACTOR'S, INSTALLER'S PERSONNEL AND THAT OF THE SUBCONTRACTORS' PERSONNEL ON THE WORK.

DRAWING RELEASE RECORD

SYSTEM DATE: DD-MMM-YY
SYSTEM TIME: HOUR:MINUTE

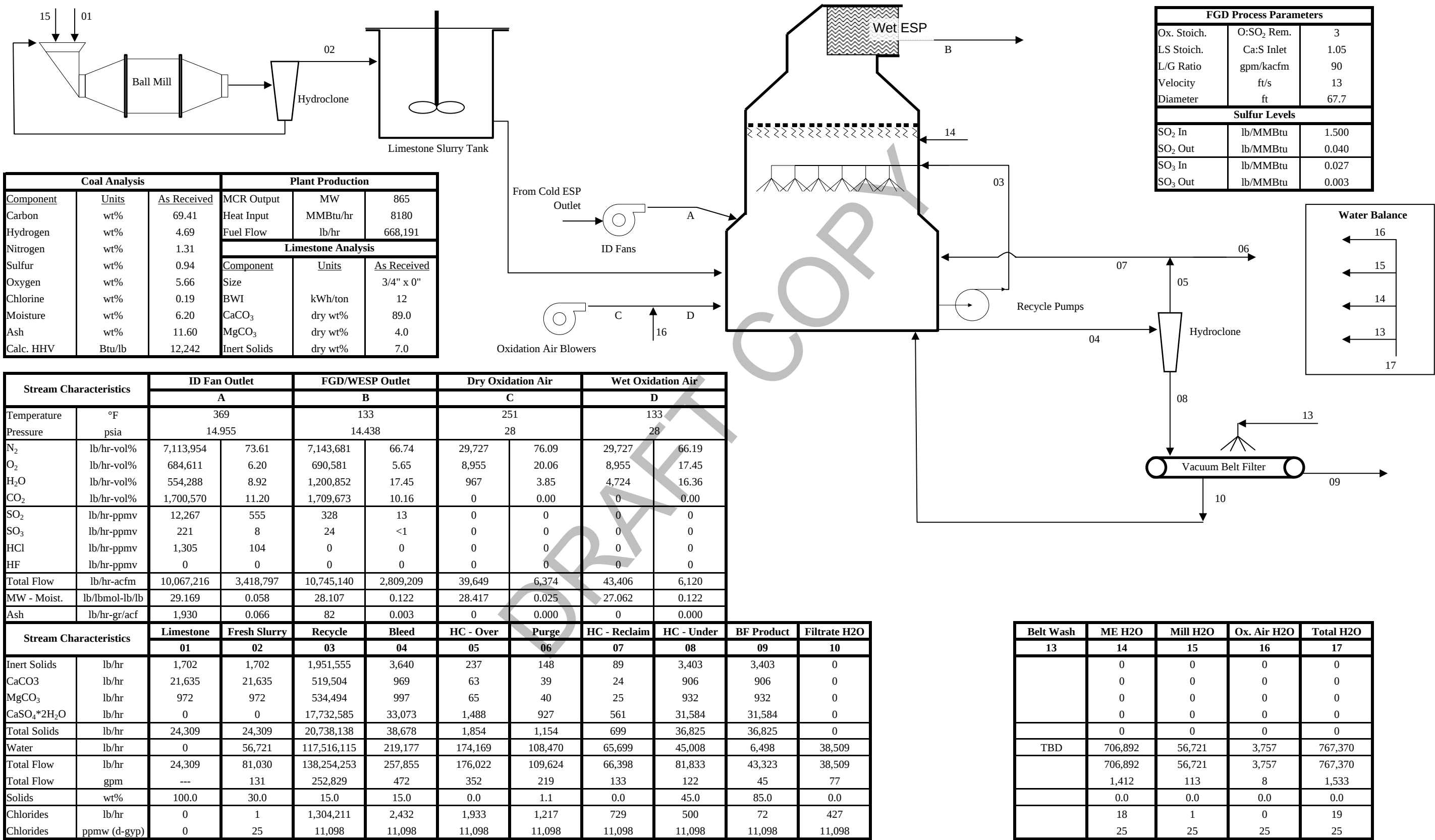


Big Sandy Unit 2
Kentucky Power Company
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Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

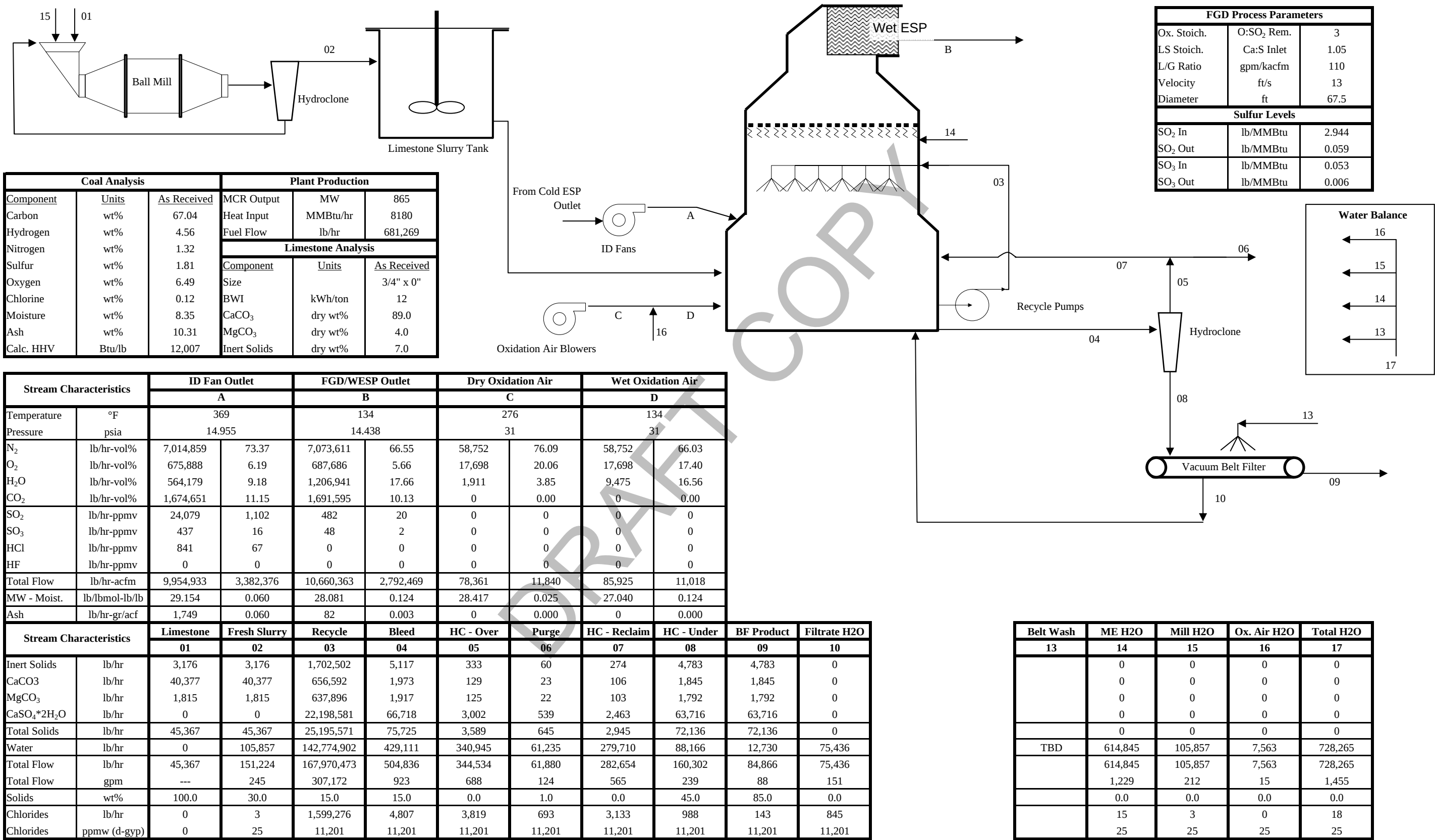
ATTACHMENT 2-3
WFGD Mass Balances

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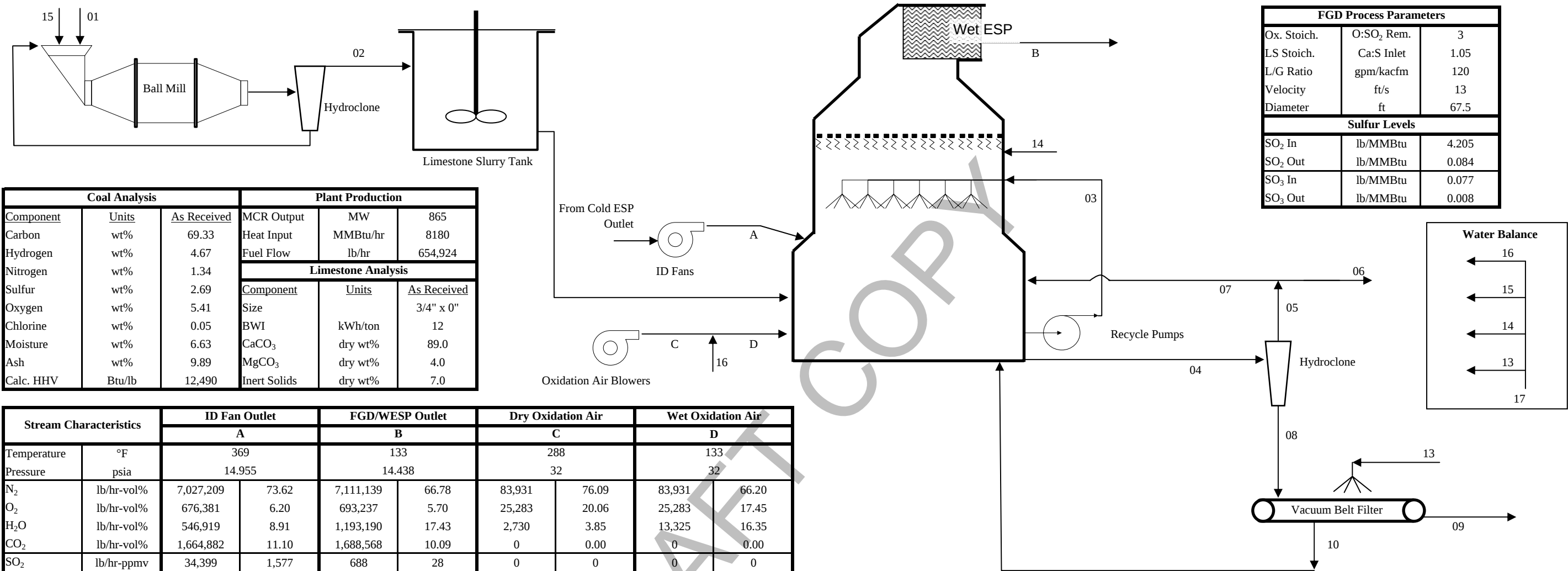
Mass Balance Wet FGD (WFGD) Technology -
1.7 lb SO₂/MMBtu Coal



Mass Balance Wet FGD (WFGD) Technology -
3.0 lb SO₂/MMBtu Coal



Mass Balance Wet FGD (WFGD) Technology -
4.5 lb SO₂/MMBtu Coal (Base Case)

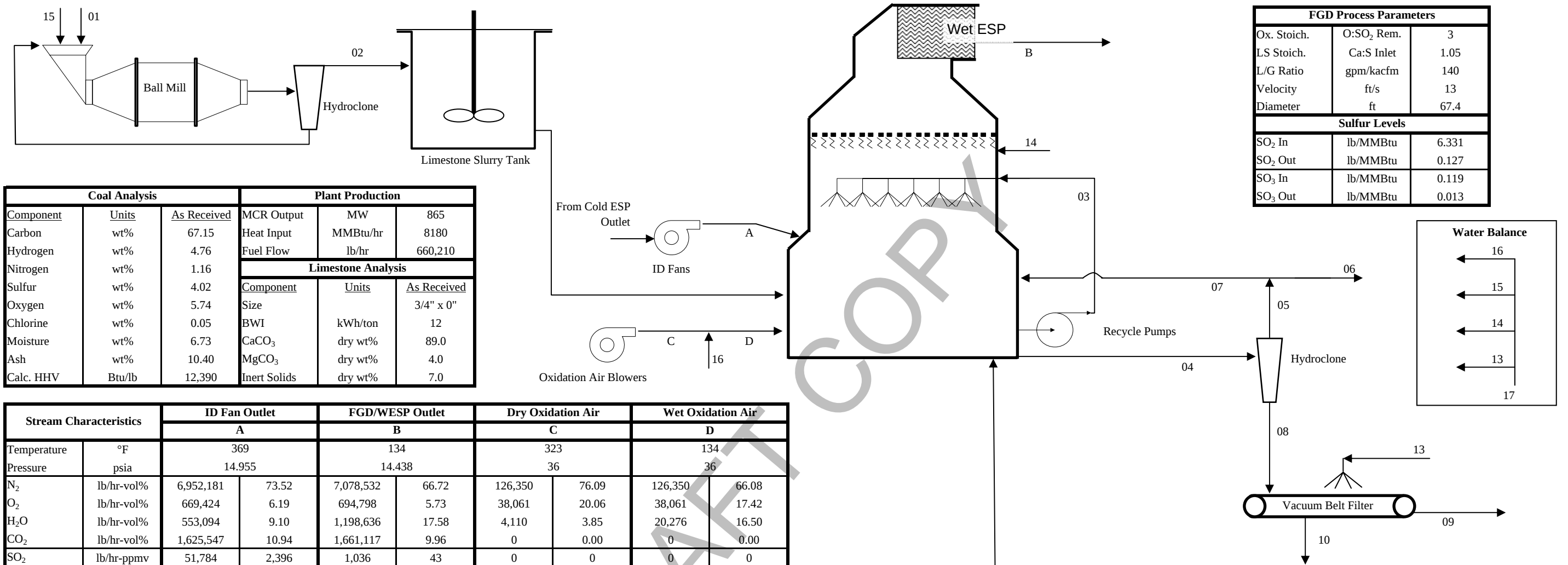


Coal Analysis			Plant Production		
Component	Units	As Received	MCR Output	MW	865
Carbon	wt%	69.33	Heat Input	MMBtu/hr	8180
Hydrogen	wt%	4.67	Fuel Flow	lb/hr	654,924
Nitrogen	wt%	1.34	Limestone Analysis		
Sulfur	wt%	2.69	Component	Units	As Received
Oxygen	wt%	5.41	Size		3/4" x 0"
Chlorine	wt%	0.05	BWI	kWh/ton	12
Moisture	wt%	6.63	CaCO ₃	dry wt%	89.0
Ash	wt%	9.89	MgCO ₃	dry wt%	4.0
Calc. HHV	Btu/lb	12,490	Inert Solids	dry wt%	7.0

Stream Characteristics		ID Fan Outlet		FGD/WESP Outlet		Dry Oxidation Air		Wet Oxidation Air	
		A		B		C		D	
Temperature	°F	369		133		288		133	
Pressure	psia	14.955		14.438		32		32	
N ₂	lb/hr-vol%	7,027,209	73.62	7,111,139	66.78	83,931	76.09	83,931	66.20
O ₂	lb/hr-vol%	676,381	6.20	693,237	5.70	25,283	20.06	25,283	17.45
H ₂ O	lb/hr-vol%	546,919	8.91	1,193,190	17.43	2,730	3.85	13,325	16.35
CO ₂	lb/hr-vol%	1,664,882	11.10	1,688,568	10.09	0	0.00	0	0.00
SO ₂	lb/hr-ppmv	34,399	1,577	688	28	0	0	0	0
SO ₃	lb/hr-ppmv	627	23	69	2	0	0	0	0
HCl	lb/hr-ppmv	337	27	0	0	0	0	0	0
HF	lb/hr-ppmv	0	0	0	0	0	0	0	0
Total Flow	lb/hr-acfm	9,950,754	3,376,684	10,686,892	2,794,503	111,944	16,432	122,539	14,992
MW - Moist.	lb/lbmol-lb/lb	29.191	0.058	28.101	0.122	28.417	0.025	27.063	0.122
Ash	lb/hr-gr/acf	1,613	0.056	82	0.003	0	0.000	0	0.000

Stream Characteristics		Limestone	Fresh Slurry	Recycle	Bleed	HC - Over	Purge	HC - Reclaim	HC - Under	BF Product	Filtrate H2O
		01	02	03	04	05	06	07	08	09	10
Inert Solids	lb/hr	4,444	4,444	1,625,853	6,381	416	10	406	5,965	5,965	0
CaCO ₃	lb/hr	56,500	56,500	726,100	2,850	186	4	181	2,664	2,664	0
MgCO ₃	lb/hr	2,539	2,539	690,948	2,712	177	4	173	2,535	2,535	0
CaSO ₄ *2H ₂ O	lb/hr	0	0	24,463,198	96,016	4,321	102	4,219	91,695	91,695	0
Total Solids	lb/hr	63,484	63,484	27,506,099	107,959	5,099	121	4,979	102,860	102,860	0
Water	lb/hr	0	148,128	155,867,893	611,769	486,051	11,489	474,562	125,718	18,152	107,566
Total Flow	lb/hr	63,484	211,612	183,373,992	719,728	491,150	11,610	479,540	228,578	121,012	107,566
Total Flow	gpm	---	343	335,340	1,316	981	23	958	341	126	215
Solids	wt%	100.0	30.0	15.0	15.0	0.0	1.0	0.0	45.0	85.0	0.0
Chlorides	lb/hr	0	4	1,805,642	7,087	5,631	134	5,498	1,456	210	1,246
Chlorides	ppmw (d-gyp)	0	25	11,584	11,584	11,584	11,584	11,584	11,584	11,584	11,584

Belt Wash	ME H2O	Mill H2O	Ox. Air H2O	Total H2O
13	14	15	16	17
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
TBD	533,672	148,128	10,595	692,396
	533,672	148,128	10,595	692,396
	1,066	296	21	1,383
	0.0	0.0	0.0	0.0
	13	4	0	17
	25	25	25	25



Stream Characteristics		ID Fan Outlet		FGD/WESP Outlet		Dry Oxidation Air		Wet Oxidation Air	
		A		B		C		D	
Temperature	°F	369		134		323		134	
Pressure	psia	14.955		14.438		36		36	
N ₂	lb/hr-vol%	6,952,181	73.52	7,078,532	66.72	126,350	76.09	126,350	66.08
O ₂	lb/hr-vol%	669,424	6.19	694,798	5.73	38,061	20.06	38,061	17.42
H ₂ O	lb/hr-vol%	553,094	9.10	1,198,636	17.58	4,110	3.85	20,276	16.50
CO ₂	lb/hr-vol%	1,625,547	10.94	1,661,117	9.96	0	0.00	0	0.00
SO ₂	lb/hr-ppmv	51,784	2,396	1,036	43	0	0	0	0
SO ₃	lb/hr-ppmv	973	36	107	4	0	0	0	0
HCl	lb/hr-ppmv	339	28	0	0	0	0	0	0
HF	lb/hr-ppmv	0	0	0	0	0	0	0	0
Total Flow	lb/hr-acfm	9,853,342	3,345,265	10,634,225	2,786,030	168,522	22,764	184,688	19,891
MW - Moist.	lb/lbmol-lb/lb	29.177	0.059	28.068	0.123	28.417	0.025	27.047	0.123
Ash	lb/hr-gr/acf	1,710	0.060	82	0.003	0	0.000	0	0.000

[illegible]

Belt Wash	ME H2O	Mill H2O	Ox. Air H2O	Total H2O
13	14	15	16	17
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
TBD	463,200	222,480	16,166	701,845
	463,200	222,480	16,166	701,845
	926	445	32	1,402
	0.0	0.0	0.0	0.0
	12	6	0	18
	25	25	25	25



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

**ATTACHMENT 2-4
WFGD Water Balances**

DRAFT COPY

Wet FGD Water Balance Assumptions

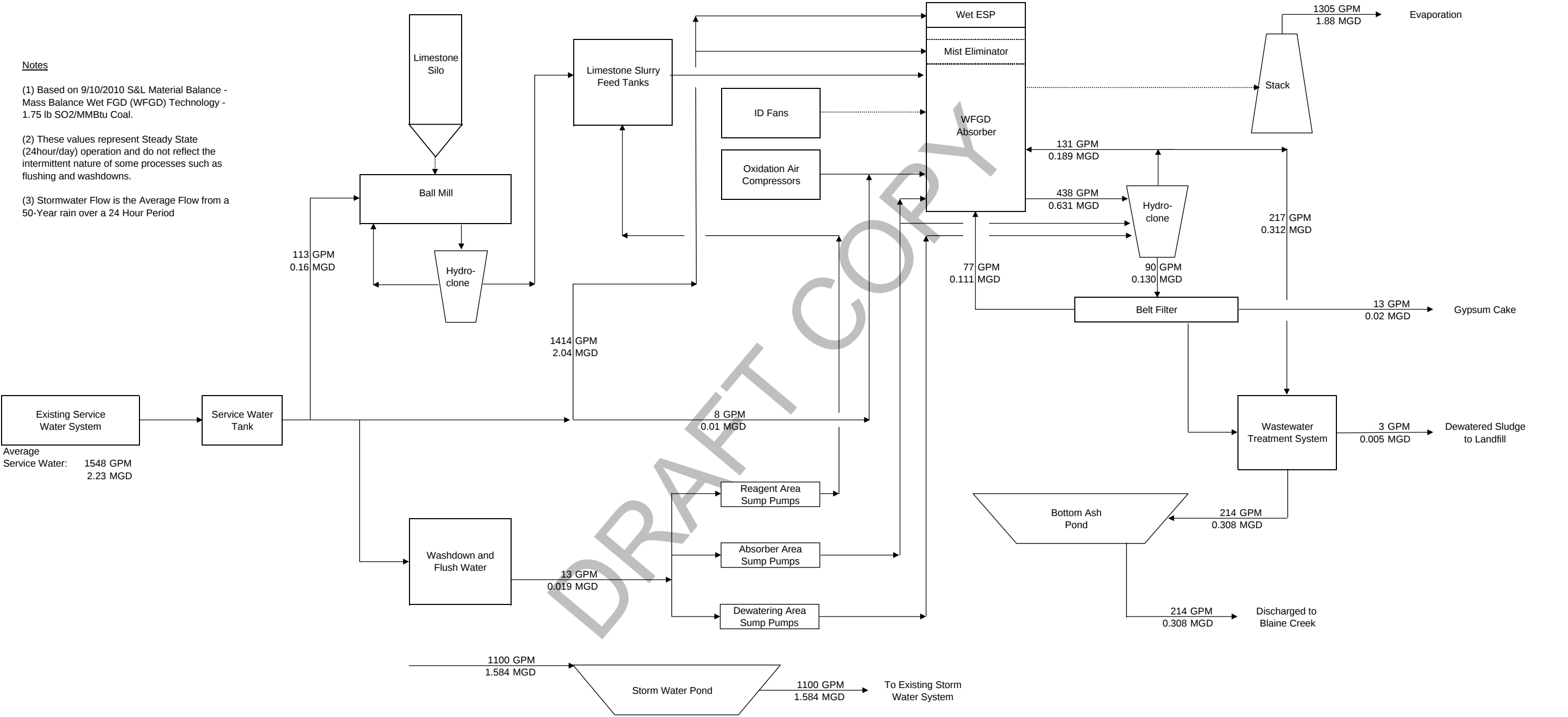
- (1) Service Water within the Wet FGD Island (to Ball Mill, to Mist Eliminator, to Oxidation Air, and from the Belt Filter and Absorber Blowdown) are from Mass Balances Dated 9/10/2010
- (2) Water for washdowns and flushes are based on assumed instantaneous flowrates and usages of 1230 GPM seven times a week for 15 minutes, and will be drained/pumped to the sump in that island and returned back into the process.
- (3) Water leaving the waste water treatment facility with the byproduct sludge (to the landfill) is based on a minimum of 40% solids in the filter cake.

Steady State vs Instantaneous Service Water Requirements

The average service water required is a steady state (or average) amount over the course of a year. Actual operation will occur in more of a batch mode, and as such, higher demands of service water will be needed over the course of a day (i.e., the ball mill requires a maximum of flow of service water on an instantaneous basis but only an average basis is depicted on the water balance).

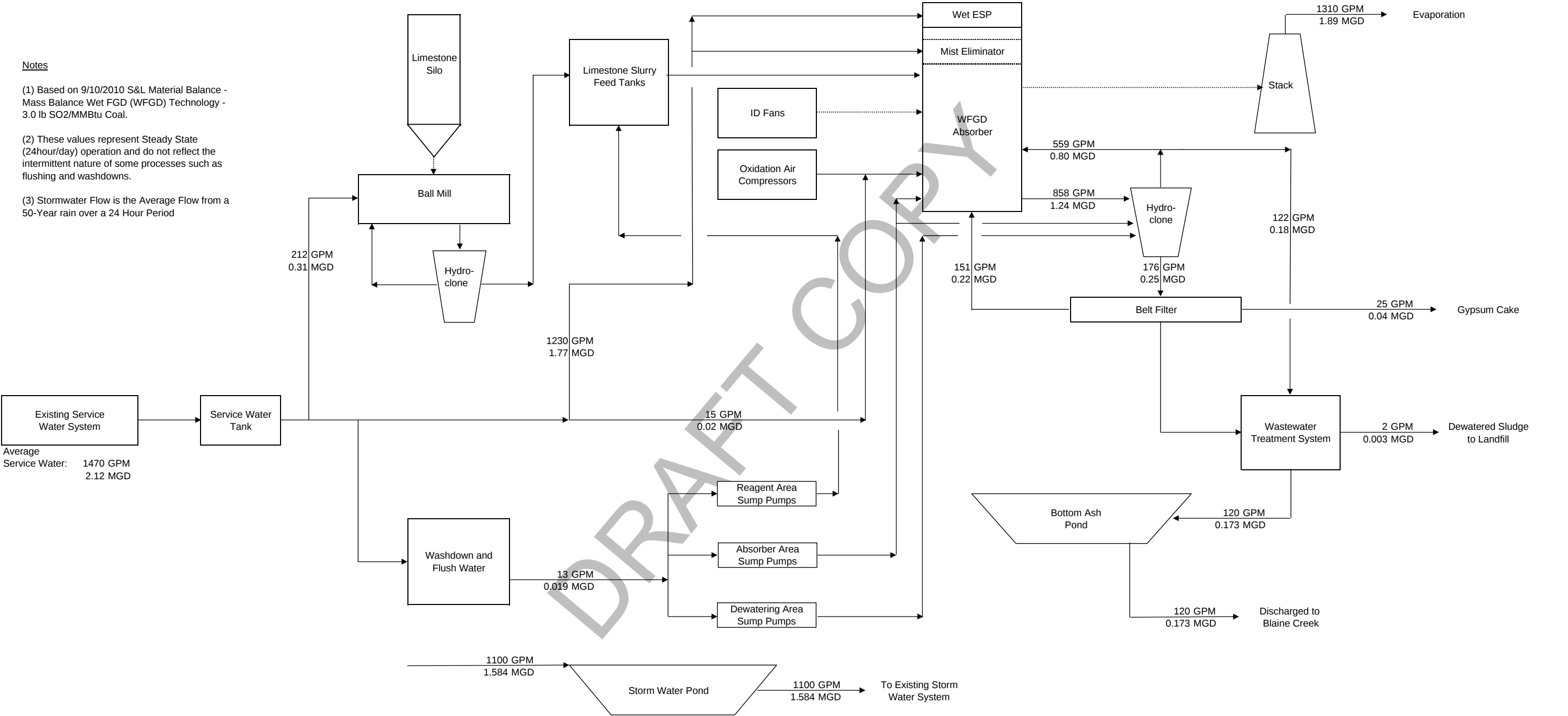
Big Sandy Wet FGD Water Balance
1.75 lb SO₂/MMBtu Coal

- Notes
- (1) Based on 9/10/2010 S&L Material Balance - Mass Balance Wet FGD (WFGD) Technology - 1.75 lb SO₂/MMBtu Coal.
- (2) These values represent Steady State (24hour/day) operation and do not reflect the intermittent nature of some processes such as flushing and washdowns.
- (3) Stormwater Flow is the Average Flow from a 50-Year rain over a 24 Hour Period



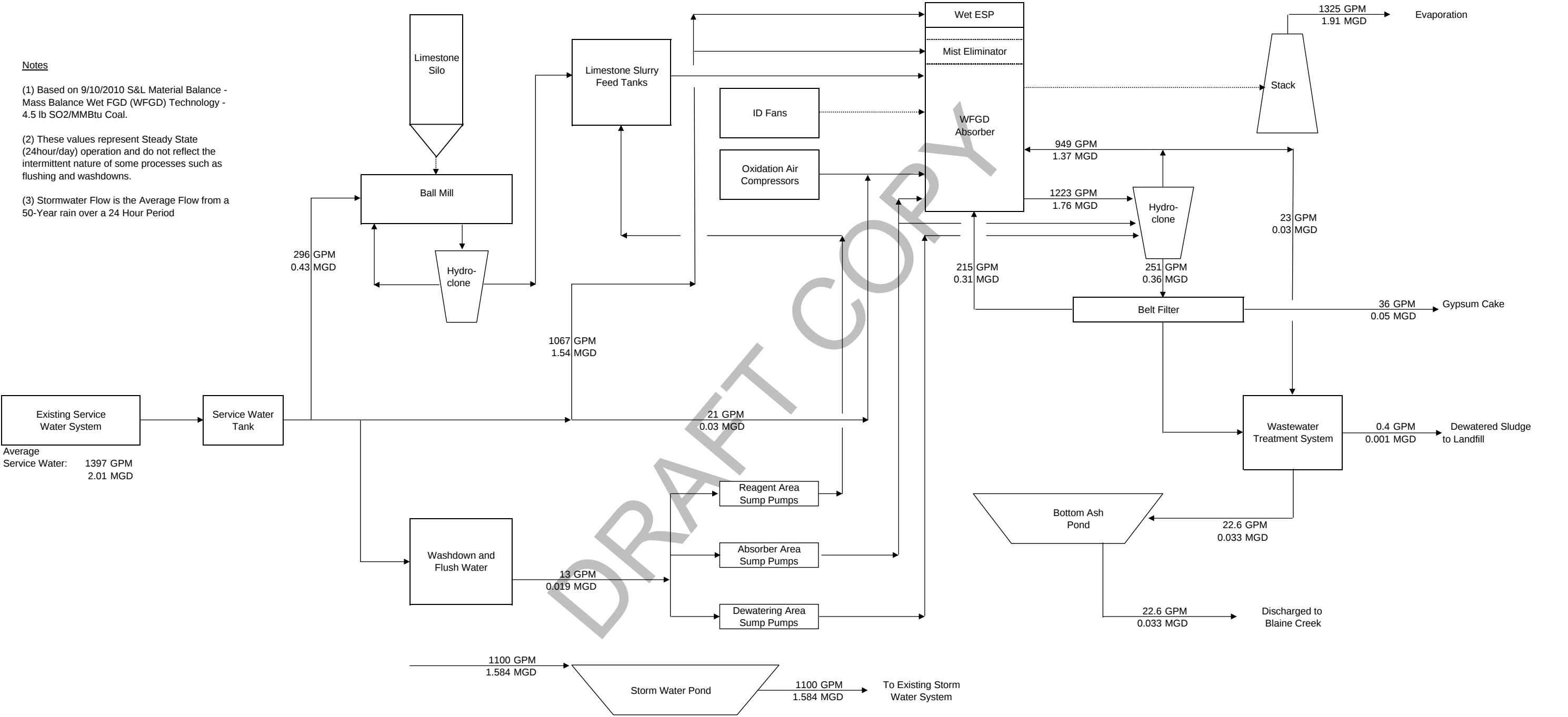
Big Sandy Wet FGD Water Balance
3.0 lb SO₂/MMBtu Coal

- Notes
- (1) Based on 9/10/2010 S&L Material Balance - Mass Balance Wet FGD (WFGD) Technology - 3.0 lb SO₂/MMBtu Coal.
- (2) These values represent Steady State (24hour/day) operation and do not reflect the intermittent nature of some processes such as flushing and washdowns.
- (3) Stormwater Flow is the Average Flow from a 50-Year rain over a 24 Hour Period

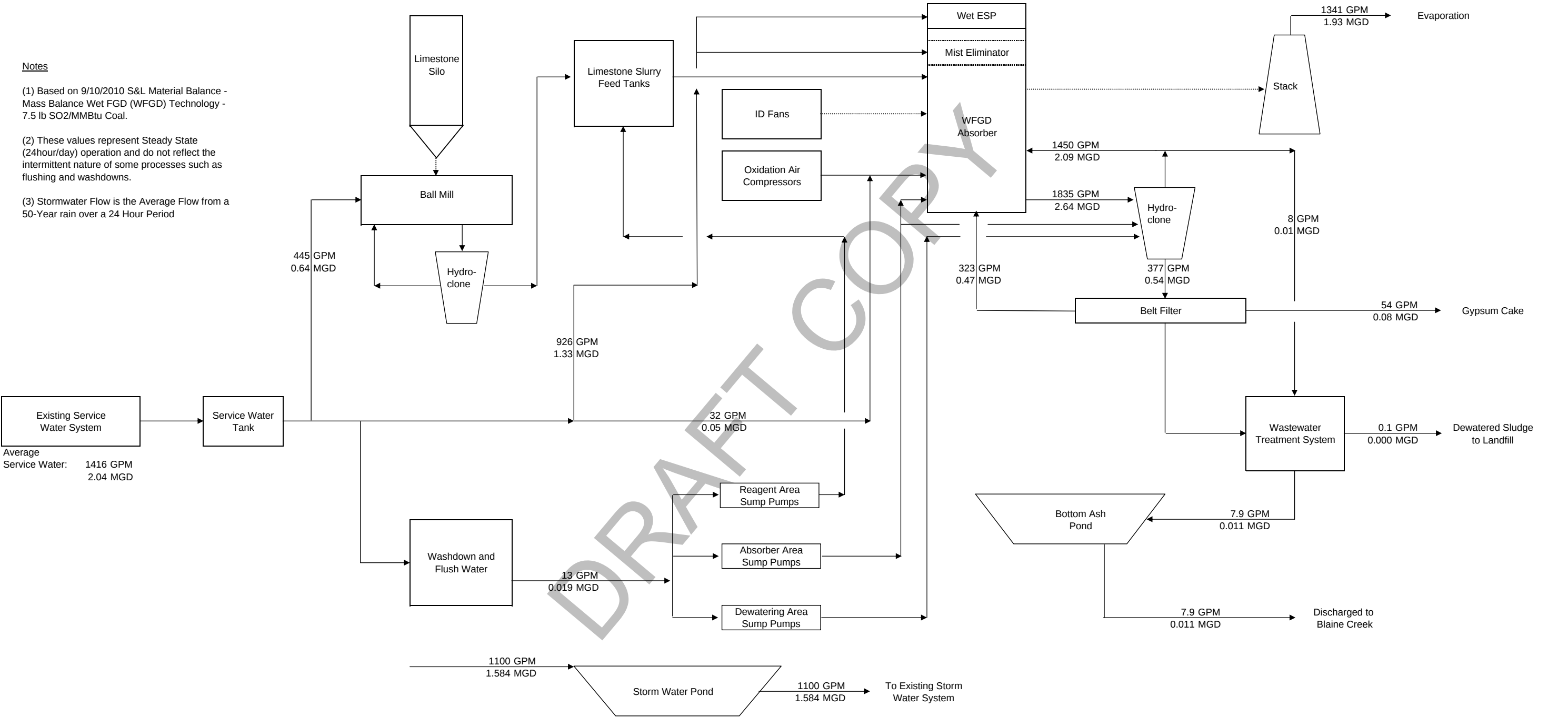


Big Sandy Wet FGD Water Balance
4.5 lb SO₂/MMBtu Coal

- Notes
- (1) Based on 9/10/2010 S&L Material Balance - Mass Balance Wet FGD (WFGD) Technology - 4.5 lb SO₂/MMBtu Coal.
- (2) These values represent Steady State (24hour/day) operation and do not reflect the intermittent nature of some processes such as flushing and washdowns.
- (3) Stormwater Flow is the Average Flow from a 50-Year rain over a 24 Hour Period



Big Sandy Wet FGD Water Balance
7.5 lb SO₂/MMBtu Coal





Big Sandy Unit 2
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WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

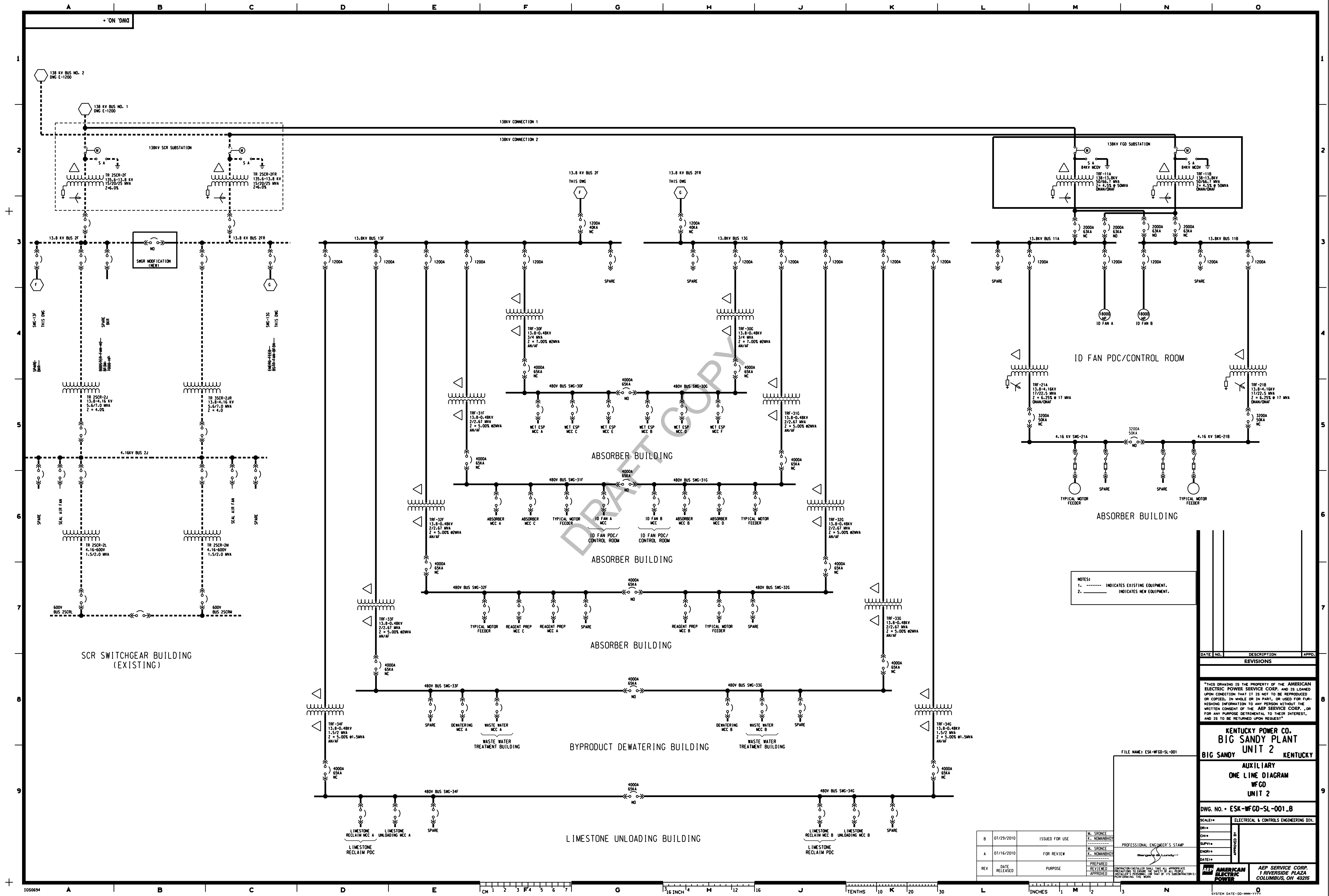
ATTACHMENT 2-5
WFGD Electrical One-Lines

DRAFT COPY

BASIC DESCRIPTION OF ONE LINE - WFGD

A. WET FGD SYSTEM

1. The preliminary ID fan size on which the one line has been developed is 18,000 HP.
2. The 138 kV voltage used in the study is 1.009 PU based on information received from the system planning group.
3. The 138 kV line to the existing SCR transformers will be tapped to feed new 138 kV – 13.8 kV FGD transformers.
4. The new 138 kV – 13.8 kV transformers will also feed the 4.16 kV FGD loads in addition to the ID fans.
5. The existing SCR switchgear which is fed from existing 138 kV – 13.8 kV transformers will be modified to include a tie breaker and will feed the 480 volt FGD loads.
6. The existing ID booster fans will be de-commissioned and their associated circuit breakers will be used to service the FGD loads as indicated on the one lines.



NOTES:
1. ----- INDICATES EXISTING EQUIPMENT.
2. ----- INDICATES NEW EQUIPMENT.

DATE	NO.	DESCRIPTION	APPROV.
REVISIONS			

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KENTUCKY POWER CO.
BIG SANDY PLANT
UNIT 2
BIG SANDY KENTUCKY

AUXILIARY
ONE LINE DIAGRAM
WFGD
UNIT 2

DWG. NO. • ESK-WFGD-SL-001_B

SCALE: 1" = 100'	ELECTRICAL & CONTROLS ENGINEERING DIV.
DRW: K. NOLANBOWEN	APPROVED BY: [Signature]
CHK: K. NOLANBOWEN	DATE: 07/29/2010
SUPV: K. NOLANBOWEN	
ENGR: K. NOLANBOWEN	
DATE: 07/29/2010	

REV	DATE	PURPOSE	PREPARED BY	REVIEWED BY	APPROVED BY
B	07/29/2010	ISSUED FOR USE	M. SHONKE	K. NOLANBOWEN	
A	07/16/2010	FOR REVIEW	M. SHONKE	K. NOLANBOWEN	
REV	DATE	PURPOSE	PREPARED BY	REVIEWED BY	APPROVED BY

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PERSONNEL AND EQUIPMENT DURING THE WORK.

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

SYSTEM DATE: 00-MIN-HOUR-SECOND
SYSTEM TIME: 00-MIN-HOUR-SECOND



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

ATTACHMENT 2-6
WFGD Detailed Capital Cost Estimate No. 30708 Base Est-1 (4.5 lb SO₂/MMbtu)

DRAFT COPY

				AEP											Estimate No.:	30708B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU											Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:												Reviewer:	JMK	
		Est=Estimated												Approver:	PEF	
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY				
		Q=Vendor Quote								Labor Productivity =		1.15				
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	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 DAYS	EST	2	EA	3,294,000		6,588,000	0	8000.00	18,400	MECH	88.89	1,635,600	8,223,600	
1.2	PIPING & SUPPORTS - MECHANICAL							29,000	21,400		0			95,700	146,100	
	SMALL BORE PIPING	ALLOWANCE FOR MISC SIZE <2" SS, SCH 80 WELDED	EST	300	LF		33.70	0	10,100	1.32	455	SPNG	94.41	43,000	53,100	
	SMALL BORE PIPING	2" SS, SCH 80 WELDED	EST	200	LF		48.80	0	9,800	1.44	331	SPNG	94.41	31,300	41,100	
	VALVE	2" GLOBE, 150# SS, WELDED	EST	20	EA	1,450		29,000	0	5.64	130	SPNG	94.41	12,200	41,200	
	PIPE SUPPORTS		EST	60	EA		25.00	0	1,500	1.50	104	MECH	88.89	9,200	10,700	
1.3	DAMPERS							449,200	0		0	MECH	88.89	210,600	659,800	
	INLET DAMPERS	2X50% DOUBLE LOUVER TYPE WITH SEAL AIR FANS TOTAL FOR TWO FANS	EST	432	SF	450		194,400	0	2.50	1,242	MECH	88.89	110,400	304,800	
	OUTLET DAMPERS	2X50% GUILLOTINE DAMPERS, WITH SEAL AIR FANS TOTAL FOR TWO FANS	EST	392	SF	650		254,800	0	2.50	1,127	MECH	88.89	100,200	355,000	
1.4	EXPANSION JOINTS		EST	360	LF		230.00	0	82,800	2.00	828	MECH	88.89	73,600	156,400	
1.5	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	EST	354	TN		3,250.00	0	1,150,500	60.00	24,426	FLDU	107.96	2,637,000	3,787,500	
1.6	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	EST	177	TN		2,900.00	0	513,300	24.00	4,885	STST	105.71	516,400	1,029,700	
1.7	ID FAN INSULATION & LAGGING	TOTAL FOR TWO FANS. PRICE REFLECTS ACOUSTICAL INSULATION	EST	4,200	SF		40.00	0	168,000	0.55	2,657	DINS	81.75	217,200	385,200	
1.8	DUCTWORK INSULATION & LAGGING		EST	24,090	SF		12.00	0	289,100	0.25	6,926	DINS	81.75	566,200	855,300	
1.9	SUPPORT STEEL - FOUNDATIONS							0	73,600		0			134,000	207,600	
	EXCAVATION / BACKFILL		EST	800	CY			0	0	0.15	138	EXFD	90.00	12,400	12,400	
	REINFORCING		EST	24	TN		1,150.00	0	28,000	20.00	561	REIN	78.27	43,900	71,900	
	FORMWORK		EST	1,200	SF		2.50	0	3,000	0.14	193	FORM	99.43	19,200	22,200	
	CONCRETE		EST	325	CY		105.00	0	34,100	1.50	561	CONP	79.64	44,600	78,700	
	MUD MAT		EST	42	CY		105.00	0	4,400	1.50	72	CONP	79.64	5,800	10,200	
	EMBEDDED STEEL		EST	1,625	LB		2.50	0	4,100	0.06	112	CARP	71.88	8,100	12,200	
1.10	ID FAN PDC / CONTROL ROOM - FOUNDATIONS							0	122,100		0			196,100	318,200	
	EXCAVATION / BACKFILL		EST	467	CY			0	0	0.15	81	EXFD	90.00	7,300	7,300	
	REINFORCING		EST	47	TN		1,150.00	0	54,100	20.00	1,081	REIN	78.27	84,600	138,700	
	FORMWORK		EST	870	SF		2.50	0	2,200	0.14	140	FORM	99.43	13,900	16,100	
	CONCRETE		EST	500	CY		105.00	0	52,500	1.50	863	CONP	79.64	68,700	121,200	
	MUD MAT		EST	67	CY		105.00	0	7,000	1.50	116	CONP	79.64	9,200	16,200	
	EMBEDDED STEEL		EST	2,500	LB		2.50	0	6,300	0.06	173	CARP	71.88	12,400	18,700	
1.11	ID FAN PDC / CONTROL ROOM - CONCRETE PIERS	28 PIERS	EST	90	CY		230.00	0	20,700	7.50	776	CONP	79.64	61,800	82,500	
1.12	ID FAN - FOUNDATIONS	TOTAL FOR TWO FANS						0	229,300		0			387,500	616,800	
	EXCAVATION / BACKFILL		EST	1,300	CY			0	0	0.15	224	EXFD	90.00	20,200	20,200	
	REINFORCING		EST	100	TN		1,150.00	0	115,000	20.00	2,300	REIN	78.27	180,000	295,000	
	FORMWORK		EST	2,400	SF		2.50	0	6,000	0.14	386	FORM	99.43	38,400	44,400	

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

				AEP										Estimate No.:	30708B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
		Est=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	TRANSFER PUMPS - 75%	3 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	SECONDARY CLARIFIER SLUDGE PUMPS - 75%	3 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	SECONDARY CLARIFIERS - LAMELLA MODEL 1-24-481	2 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	SLUDGE HOLDING TANKS - 75%	7' DIA. 2 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	FILTER PRESS FEED PUMPS - 75%	3 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	PLATE & FRAME FILTER PRESSES WITH CLOTH WASHERS - 75%	2 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	CLEARWATER SUMP PUMPS - 100%	2 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	LIME SILO (2235 CF) AND LIME FEED SYSTEM - 100%	1 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	POLYMER FEED PACKAGES FOR PRIMARY CLARIFIERS	3 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	COAGULANT FEED WITH LIQUID BULK TANK AND 3 METERING PUMPS	1 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	POLYMER FEED PACKAGES FOR SECONDARY CLARIFIERS	3 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	FILTRATE RETURN PUMPS - 100%	2 EA.	EST	1	LT			0	0		0	MECH	88.89	0	0
	PLANT INTERCONNECTING PIPING AND VALVES		EST	1	LT			0	0		0	MECH	88.89	0	0
	FIELD INSTRUMENTS		EST	1	LT			0	0		0	MECH	88.89	0	0
8.2	PIPING - MECHANICAL		EST	1	LT			46,800	281,200					888,700	1,216,700
	LARGE BORE PIPING	6" CS, RUBBER LINED	EST	1,200	LF		63.6	0	76,300	0.46	635	SPNG	94.41	59,900	136,200
	LARGE BORE PIPING	8" FRP	EST	1,400	LF		51.30	0	71,800	0.95	1,530	SPNG	94.41	144,400	216,200
	LARGE BORE PIPING	8" HDPE (UNDERGROUND)	EST	4,500	LF		14.1	0	63,500	0.83	4,295	SPNG	94.41	405,500	469,000
	LARGE BORE PIPING	12" HDPE (UNDERGROUND)	EST	1,000	LF		36.50	0	36,500	1.09	1,254	SPNG	94.41	118,300	154,800
	VALVE	6" GATE 150 #, CS, WELDED	EST	6	EA	3,500		21,000	0	10.80	75	SPNG	94.41	7,000	28,000
	VALVE	8" BFLY, 150 #, CS, FLANGED	EST	12	EA	1,400		16,800	0	9.10	126	SPNG	94.41	11,900	28,700
	VALVE	12" BFLY, 150 #, CS, FLANGED	EST	3	EA	3,000		9,000	0	14.60	50	SPNG	94.41	4,800	13,800
	EXCAVATION / BACKFILL	FOR UNDERGROUND PIPING	EST	2,917	CY			0	0	0.20	671	EXFD	90.00	60,400	60,400
	BEDDING	FOR UNDERGROUND PIPING	EST	389	CY		35.0	0	13,600	0.25	112	EXFD	90.00	10,100	23,700
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	260	EA		75.00	0	19,500	2.50	748	MECH	88.89	66,400	85,900
8.3	PUMPS							58,000	29,300					74,100	161,400
	BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES		2	EA	14,000		28,000	0	60.00	138	MECH	88.89	12,300	40,300
	TRANSFER PUMPS FROM EQUALIZATION TANKS TO DESATURIZATION TANKS - 75%	165 GPM, 10HP EACH		3	EA	10,000		30,000	0	40.00	138	MECH	88.89	12,300	42,300
	WASTEWATER SUMP	CONCRETE SUMP, 15' X 20' X 8' DEEP, IN THE WWT BUILDING, WITH PROVISIONS FOR TWO SUMP PUMPS (BY GRAVER)	EST	90	CY		325	0	29,300	6.00	621	CONP	79.64	49,500	78,800
8.4	TANKS							0	2,385,000					792,000	3,177,000
	RECLAIM WATER TANK	165,000 GAL, CS, 29' DIA X 33' - SUBCONTRACT PRICE INCLUDES LABOR WITH EXTERIOR PRIMED AND FIELD PAINTED	EST	2	EA		330000.0	0	660,000	0.00	0	TANK	89.16	0	660,000
	RECLAIM WATER TANK - INTERIOR LINING	FLAKECOAT VINYL ESTER TOTAL FOR TWO TANKS	EST	8,656	SF		15.0	0	129,800	0.35	3,484	PNTR	66.72	232,500	362,300

				AEP											Estimate No.:	30708B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU											Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:													Reviewer:	JMK
		Est=Estimated													Approver:	PEF
		Allow.=Allowance														
		Q=Vendor Quote														
										Wage Rates Based on:		BIG SANDY				
										Labor Productivity =		1.15				
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
8.11	WWT BUILDING	125' L X 90' W X 25' H						42,000	885,100					855,600	1,782,700	
	STRUCTURAL STEEL		EST	155	TN		2650	0	409,900	16.00	2,846	STST	105.71	300,900	710,800	
	INSULATED METAL SIDING		EST	10,750	SF		12	0	129,000	0.11	1,360	SDNG	93.41	127,000	256,000	
	ROLLING OVERHEAD DOOR		EST	640	SF		27	0	17,300	0.25	184	CARP	71.88	13,200	30,500	
	METAL ROOF DECKING		EST	11,250	SF		2.7	0	30,400	0.06	776	STST	105.71	82,100	112,500	
	RIGID ROOF INSULATION		EST	11,250	SF		2.4	0	27,000	0.02	194	ROOF	69.12	13,400	40,400	
	ROOFING (4-PLY TAR & GRAVEL)		EST	11,250	SF		1.55	0	17,400	0.04	518	ROOF	69.12	35,800	53,200	
	LIGHTWEIGHT CONCRETE FILL 1"		EST	35	CY		100	0	3,500	1.30	52	ROOF	69.12	3,600	7,100	
	ROOF FLASHING		EST	430	LF		14.45	0	6,200	0.12	59	ROOF	69.12	4,100	10,300	
	ROOF DRAINS		EST	1	LT		30000	0	15,000	225.00	259	PLMB	79.42	20,500	35,500	
	FLOOR DRAINS		EST	1	LT		35000	0	20,000	275.00	316	PLMB	79.42	25,100	45,100	
	FLOOR SLABS	NONE	EST	0	CY		210	0	0	7.50	0	CONP	79.64	0	0	
	FLOOR FINISHES	MAIN LEVEL	EST	7,313	SF		2.5	0	18,300	0.05	420	CONP	79.64	33,500	51,800	
	LOUVERS/WINDOWS/DOORS		EST	1,075	SF		40	0	43,000	0.35	433	CARP	71.88	31,100	74,100	
	ROOF VENTILATORS		EST	2	EA		15000	0	30,000	24.00	55	HVAC	81.24	4,500	34,500	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	2,250	SF		45	0	101,300	0.40	1,035	GALL	84.61	87,600	188,900	
	H&V		EST	1	LT	42000	16800	42,000	16,800	784.00	902	HVAC	81.24	73,200	132,000	
8.12	PIPE SUPPORT PAD							0	13,800					24,800	38,600	
	EXCAVATION / BACKFILL		EST	105	CY			0	0	0.15	18	EXFD	90.00	1,600	1,600	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	270	SF		2.50	0	700	0.14	43	FORM	99.43	4,300	5,000	
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000	
	EMBEDDED STEEL		EST	200	LB		2.50	0	500	0.06	14	CARP	71.88	1,000	1,500	
8.13	MCC							61,800	0					3,600	65,400	
	480V MCC	PER MCC LINEUP	EST	2	EA	30900		61,800	0	16.00	37	WIRE	98.84	3,600	65,400	
8.14	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700	
	DC PANEL BOADRD		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000	
	VRLA BATTERIES	8HR-400A, 480V	EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700	
8.15	GROUNDING							5,500	0					18,600	24,100	
	GROUND ROD	3/4" - 20' LONG	EST	8	EA	150		1,200	0	4.00	37	WIRE	98.84	3,600	4,800	
	500 MCM	BARE COPPER WIRE	EST	500	FT	7.65		3,800	0	0.12	69	WIRE	98.84	6,800	10,600	
	CADWELD		EST	32	EA	15		500	0	2.00	74	WIRE	98.84	7,300	7,800	
	GROUNDING TEST	TEST & DOCUMENTATIONS	EST	1	LT			0	0	8.00	9	WIRE	98.84	900	900	
8.16	LIGHTING / TRANSFORMERS & PANELS							52,000	60,000					59,100	171,100	
	LIGHT FIXTURES		EST	80	EA		750	0	60,000	4.00	368	WIRE	98.84	36,400	96,400	
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100	
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300	
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	2	EA	5000		10,000	0	16.00	37	WIRE	98.84	3,600	13,600	
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	2	EA	3500		7,000	0	12.00	28	WIRE	98.84	2,700	9,700	
8.17	RACEWAY, CABLE TRAY, & CONDUIT							0	511,400					1,992,800	2,504,200	
	12" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	1,250	LF		18.25	0	22,800	1.10	1,375	WIRE	98.84	135900	158,700	

[illegible]

				AEP											Estimate No.:	30708B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU											Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:													Reviewer:	JMK
		Est=Estimated													Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:			BIG SANDY			
		Q=Vendor Quote								Labor Productivity =			1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
	RECEIVERS	500 GAL WITH SAFETY RELIEF VALVE AND PRESSURE GAUGE	EST	2	EA	4500		9,000	0	20.00	46	MECH	88.89	4,100	13,100	
9.2	PIPING - MECHANICAL							938,000	1,019,200					4,148,200	6,105,400	
	LARGE BORE PIPING	3" CS, SCHEDULE 40, WELDED	EST	3,500	LF		18.3	0	64,100	1.34	5,394	SPNG	94.41	509,200	573,300	
	LARGE BORE PIPING	4" CS, SCHEDULE 40, WELDED	EST	450	LF		23.0	0	10,400	1.48	766	SPNG	94.41	72,300	82,700	
	LARGE BORE PIPING	3" SS, SCHEDULE 40, WELDED	EST	2,700	LF		49.0	0	132,300	1.63	5,061	SPNG	94.41	477,800	610,100	
	LARGE BORE PIPING	4" SS, SCHEDULE 40, WELDED	EST	450	LF		68.3	0	30,700	1.82	942	SPNG	94.41	88,900	119,600	
	VALVE	3" GATE, 150 #, CS, WELDED	EST	50	EA	1,350		67,500	0	5.60	322	SPNG	94.41	30,400	97,900	
	VALVE	4" GATE, 150 #, CS, WELDED	EST	25	EA	2,500		62,500	0	7.70	221	SPNG	94.41	20,900	83,400	
	VALVE	3" GATE, 150 #, SS, WELDED	EST	150	EA	2,363		354,400	0	6.72	1,159	SPNG	94.41	109,400	463,800	
	VALVE	4" GATE, 150 #, SS, WELDED	EST	25	EA	4,250		106,300	0	9.24	266	SPNG	94.41	25,100	131,400	
	SMALL BORE PIPING	ALLOWANCE FOR MISC SIZE SS, SCH 80 WELDED	EST	8,000	LF		33.70	0	269,600	1.32	12,144	SPNG	94.41	1,146,500	1,416,100	
	SMALL BORE PIPING	ALLOWANCE FOR MISC SIZE CS, SCH 80 WELDED	EST	8,000	LF		33.70	0	269,600	1.32	12,144	SPNG	94.41	1,146,500	1,416,100	
	SMALL BORE PIPING	2" CS, SCH 80 WELDED	EST	1,500	LF		16.80	0	25,200	1.05	1,811	SPNG	94.41	171,000	196,200	
	VALVE	<2" GLOBE, 150# CS, WELDED	EST	250	EA	450		112,500	0	3.40	978	SPNG	94.41	92,300	204,800	
	VALVE	<2" GLOBE, 150# SS, WELDED	EST	250	EA	750	750.00	187,500	187,500	4.08	1,173	SPNG	94.41	110,700	485,700	
	VALVE	2" GLOBE, 150# CS, WELDED	EST	50	EA	850		42,500	0	4.20	242	SPNG	94.41	22,800	65,300	
	VALVE	2.5" GLOBE, 150 #, CS, WELDED	EST	5	EA	955		4,800	0	4.70	27	SPNG	94.41	2,600	7,400	
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	596	EA		50.00	0	29,800	2.00	1,370	MECH	88.89	121,800	151,600	
9.3	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0														
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							1,337,000	1,019,200		45,284			4,260,700	6,616,900	
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS															
	ADDITIONAL CRANE ALLOWANCE								0					0	0	
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0	
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS											
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						3,938		94.09	370,000	370,000	
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						4,922			389,176	389,176	
	PER DIEM	NONE		0.00	HR						54,144			0	0	
	CONSUMABLES - % of ACCT NO. 90			0.5	%				5,096					21,304	26,400	
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				50,960						50,960	
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			66,850							66,850	
	SALES TAX - NOT INCLUDED														0	
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				50,960					213,035	263,995	
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				152,880					639,105	791,985	
	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	0					73,600	233,600	
	SERVICE WATER PUMPS	4000 GPM, 200 HP	EST	2	EA	60000		120,000	0	240.00	552	MECH	88.89	49,100	169,100	
	MAKE UP WATER PUMPS	100 GPM, 75 PSIG	EST	2	EA	20000		40,000	0	120.00	276	MECH	88.89	24,500	64,500	
10.2	PIPING - MECHANICAL		EST	1	LT			478,800	1,205,400					2,725,900	4,410,100	
	LARGE BORE PIPING	2.5" SS, SCHEDULE 40, WELDED	EST	1,200	LF		49.0	0	58,800	1.63	2,249	SPNG	94.41	212,400	271,200	
	LARGE BORE PIPING	4" SS, SCHEDULE 40, WELDED	EST	2,000	LF		68.3	0	136,600	1.82	4,186	SPNG	94.41	395,200	531,800	
	LARGE BORE PIPING	6" SS, SCHEDULE 40, WELDED	EST	2,400	LF		111.0	0	266,400	2.02	5,575	SPNG	94.41	526,400	792,800	
	LARGE BORE PIPING	8" SS, SCHEDULE 40, WELDED	EST	1,500	LF		179.9	0	269,900	2.49	4,295	SPNG	94.41	405,500	675,400	
	LARGE BORE PIPING	10" SS, SCHEDULE 40, WELDED	EST	920	LF		293.5	0	270,000	3.19	3,375	SPNG	94.41	318,600	588,600	

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		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	ADDITIONAL CRANE ALLOWANCE								0					0	0
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						3,156		93.59	295,000	295,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						3,945			310,248	310,248
	PER DIEM	NONE		0.00	HR						43,392			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				7,651					16,983	24,634
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				76,510						76,510
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			45,250							45,250
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				76,510					169,830	246,340
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				229,530					509,490	739,020
	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	0					18,400	48,400
	POTABLE WATER BOOSTER PUMPS	50 GPM, 5 HP	EST	2	EA	15000		30,000	0	90.00	207	MECH	88.89	18,400	48,400
11.2	PIPING - MECHANICAL		EST	1	LT			137,000	120,800					389,400	647,200
	LARGE BORE PIPING	4" SS, SCHEDULE 40, WELDED	EST	600	LF		68.3	0	41,000	1.82	1,256	SPNG	94.41	118,600	159,600
	LARGE BORE PIPING	4" HDPE (UNDERGROUND)	EST	1,500	LF		3.4	0	5,100	0.46	794	SPNG	94.41	74,900	80,000
	VALVE	4" GATE, 150 #, SS, WELDED	EST	20	EA	4,250		85,000	0	9.24	213	SPNG	94.41	20,100	105,100
	SMALL BORE PIPING	ALLOWANCE FOR MISC SIZE <2" SS, SCH 80 WELDED	EST	600	LF		33.70	0	20,200	1.32	911	SPNG	94.41	86,000	106,200
	SMALL BORE PIPING	2" COPPER	EST	250	LF		28.50	0	7,100	0.43	124	SPNG	94.41	11,700	18,800
	VALVE	2" GLOBE, 150# SS, WELDED	EST	10	EA	1,450		14,500	0	5.64	65	SPNG	94.41	6,100	20,600
	VALVE	<2" GLOBE, 150# SS, WELDED	EST	50	EA	750	750.00	37,500	37,500	4.08	235	SPNG	94.41	22,100	97,100
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	145	EA		50.00	0	7,300	2.00	334	MECH	88.89	29,600	36,900
	EXCAVATION / BACKFILL	FOR UNDERGROUND PIPING	EST	889	CY			0	0	0.20	204	EXFD	90.00	18,400	18,400
	BEDDING	FOR UNDERGROUND PIPING	EST	74	CY		35.0	0	2,600	0.25	21	EXFD	90.00	1,900	4,500
11.3	TANKS							0	8,500					0	8,500
	POTABLE WATER TANK	1,000 GAL, SS, 5' DIA X 8' - SUBCONTRACT PRICE INCLUDES LABOR	EST	1	EA		8500.0	0	8,500	0.00	0	TANK	89.16	0	8,500
11.4	POTABLE WATER TANK & PUMP - FOUNDATIONS							0	5,200					8,800	14,000
	EXCAVATION / BACKFILL		EST	20	CY			0	0	0.15	3	EXFD	90.00	300	300
	REINFORCING		EST	3.0	TN		1,150.00	0	3,500	20.00	69	REIN	78.27	5,400	8,900
	FORMWORK		EST	75	SF		2.50	0	200	0.14	12	FORM	99.43	1,200	1,400
	CONCRETE		EST	12	CY		105.00	0	1,300	1.50	21	CONP	79.64	1,600	2,900
	MUD MAT		EST	0	CY		105.00	0	0	1.50	0	CONP	79.64	0	0
	EMBEDDED STEEL		EST	60	LB		2.50	0	200	0.06	4	CARP	71.88	300	500
11.5	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0													
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							167,000	134,500		4,471			416,600	718,100
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE								0					0	0

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				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	ADDITIONAL CRANE ALLOWANCE								0					0	0
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						1,023		87.54	90,000	90,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						1,279			94,063	94,063
	PER DIEM	NONE		0.00	HR						14,066			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				964					5,149	6,113
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				9,635						9,635
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			90,690							90,690
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				9,635					51,490	61,125
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				28,905					154,470	183,375
	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														0
13.1	DCS	4000 I/O POINTS	EST	4,000	EA		750	0	3,000,000	2.50	11,500	INEL	88.43	1,016,900	4,016,900
13.2	DCS - VENDOR FIELD SUPPORT	200 MANDAYS @ \$1500/DAY - SHOWN AS SUBCONTRACT COST	EST	200	DAYS	1500		300,000	0		0	INEL	88.43	0	300,000
13.3	LOCALLY MOUNTED INSTRUMENTS							0	827,800					1,085,600	1,913,400
	LOCALLY MOUNTED INSTRUMENTS		EST	350	EA		2200	0	770,000	20.00	8,050	INEL	88.43	711,900	1,481,900
	INSTRUMENT RACKS	INCLUDEDWITH INSTRUMENTS													
	INSTRUMENT TUBING	ALLOWANCE	EST	10,500	LF		5.5	0	57,800	0.35	4,226	INEL	88.43	373,700	431,500
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							300,000	3,827,800		23,776			2,102,500	6,230,300
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE								0					0	0
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						2,068		88.43	183,000	183,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						2,584			192,044	192,044
	PER DIEM	NONE		0.00	HR						28,428			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				19,139					10,513	29,652
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				191,390						191,390
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			15,000							15,000
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				191,390					105,125	296,515
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				574,170					315,375	889,545
	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
14.0	CEM SYSTEM														0
14.1	CEM SYSTEM	PROVIDED BY AEP		1	LT	1260000	540000	1,260,000	540,000					310,000	2,110,000

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		Cost Type:												Reviewer:	JMK
		Est=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
17.2	HEAT TRACING							0	332,700					474,800	807,500
	CABLE	AVERAGE 6" PIPE SIZE	EST	5,000	LF		10.35	0	51,800	0.05	288	WIRE	98.84	28,400	80,200
	POWER CONNECTOR AND OTHER ACCESSORIES INCLUDING THERMOSTATS FOR HEAT TRACING (BY ZONES)		EST	91	EA		450	0	40,900	8.00	836	WIRE	98.84	82,700	123,600
	HEAT TRACING BALANCE OF PLANT INCL PANELS, POWER WIRING AND CONDUITS		EST	8	LT		30000	0	240,000	400.00	3,680	WIRE	98.84	363,700	603,700
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)							0	186,600					715,700	902,300
	TOUCH UP PAINT FOR SHOP PAINTED STEEL		EST	22,072	SF		3	0	66,200	0.15	3,807	PNTR	66.72	254,000	320,200
	TOUCH UP PAINT FOR EQUIPMENT		EST	15,000	SF		3	0	45,000	0.15	2,588	PNTR	66.72	172,600	217,600
	PAINTING CS PIPE ONLY	AVERAGE 6" PIPE SIZE, ALLOWANCE FOR 16,000 LF PIPE	EST	25,120	SF		3	0	75,400	0.15	4,333	PNTR	66.72	289,100	364,500
17.4	HOISTS & TROLLEYS							180,000	210,000					245,300	635,300
	MISC HOISTS & TROLLEYS	IN BUILDINGS FOR EQUIPMENT MAINTENANCE AND FOR ID FANS. INCLUDES TROLLEY BEAMS	EST	12	EA	15000	17500	180,000	210,000	200.00	2,760	MECH	88.89	245,300	635,300
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	EST	40	TN		3500	0	140,000	120.00	5,520	STST	105.71	583,500	723,500
17.6	MISC PIPE SUPPORT FOUNDATIONS							0	10,500					19,600	30,100
	EXCAVATION / BACKFILL		EST	65	CY			0	0	0.15	11	EXFD	90.00	1,000	1,000
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	260	SF		2.50	0	700	0.14	42	FORM	99.43	4,200	4,900
	CONCRETE		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000
	MUD MAT		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500
	EMBEDDED STEEL		EST	125	LB		2.50	0	300	0.06	9	CARP	71.88	600	900
17.7	EYE WASH STATIONS							30,000	5,000					30,700	65,700
	EYE WASH STATIONS	WITH 50 KW HEATERS	EST	5	EA	6000	1000	30,000	5,000	60.00	345	MECH	88.89	30,700	65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS							0	420,000					343,500	763,500
	STAND PIPE FOR BUILDINGS & LIMESTONE RECLAIM TUNNELS		EST	14	EA		30000	0	420,000	240.00	3,864	MECH	88.89	343,500	763,500
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							210,000	1,382,800		31,756			2,656,200	4,249,000
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE								0					0	0
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						2,761		83.64	231,000	231,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						3,452			242,620	242,620
	PER DIEM	NONE		0.00	HR						37,970			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				6,914					13,281	20,195
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				69,140						69,140
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			10,500							10,500
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				69,140					132,810	201,950
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				207,420					398,430	605,850
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							10,500	352,614					1,018,141	1,381,255

				AEP										Estimate No.:	30708B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
		Est=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE							675,000	0					662,400	1,337,400
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						200,266		97.91	18,212,000	18,212,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						250,333			19,131,056	19,131,056
	PER DIEM	NONE		0.00	HR						2,069,104			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				394,465					1,043,819	1,438,284
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				3,944,645						3,944,645
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			7,082,845							7,082,845
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				3,944,645					10,438,190	14,382,835
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				11,833,935					31,314,570	43,148,505
	CONTRACTOR'S PROFIT - % of ACCT NO. 90	BY AEP		0	%				0					0	0
	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
	TOTAL PROJECT DIRECT AND CONSTRUCTION INDIRECT COSTS							151,454,700	114,550,600					305,575,800	572,331,200
															0
	INDIRECT COSTS														
	ENGINEERING, PROCUREMENT, & PROJECT CONSTRUCTION MANAGEMENT			1.0	LT										30,000,000
	S-U / COMMISSIONING			3.0	%										17,169,900
				1.0											5,723,300
	CRAFT START-UP SUPPORT	1% OF TOTAL LABOR MANHOURS (INCLUDES OVERTIME INEFFICIENCY & COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - BASED ON ASSUMED 5X10 WORKWEEK)		1.0	%						24,959		97.91	2,649,200	2,649,200
	INITIAL FILLS			0.3	%										1,717,000
	OPERATOR & TRAINING MANUALS			1.0	LT										300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)			1.0	LT										400,000
	OWNERS COST - % of ACCT NOS. 92, 93.1, 93.2, 93.3, 93.4	BY AEP		0.0	%										0
	SUBTOTAL - INDIRECT COSTS														57,959,400
	TOTAL PROJECT DIRECT AND INDIRECT COSTS														630,290,600
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT			1.0	%			1,514,500							1,514,500
	SPARE PARTS FOR THE OEM EQUIPMENT			0.80				938,990							938,990
	SPARE PARTS FOR THE BOP EQUIPMENT			0.50				575,510							575,510



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

ATTACHMENT 2-7
WFGD Detailed Capital Cost Estimate No. 30706 Est-2 (1.7 lb SO₂/MMbtu)

DRAFT COPY

				AEP											Estimate No.:	30706B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU											Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:													Reviewer:	JMK
		Est.=Estimated													Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY				
		Q=Vendor Quote								Labor Productivity =		1.15				
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
1.0	ID FANS															
2.0	WET ESP															
3.0	NEW STACK															
4.0	LIMESTONE HANDLING SYSTEM														0	
5.0	REAGENT PREPARATION ISLAND														0	
5.1	MECHANICAL EQUIPMENT	INCLUDES LIMESTONE FEEDERS, FROM THE DAY SILOS THROUGH THE SLURRY STORAGE TANKS AND TRANSFER PUMPS WITH INTEGRAL PIPING	EST	1	LT	11,425,000		11,425,000	0	101240.70	116,427	MECH	88.89	10,349,200	21,774,200	
5.2	REAGENT PREPARATION BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES		2	EA	14,000		28,000	0	60.00	138	MECH	88.89	12,300	40,300	
5.3	AGITATOR FOR SUMP PUMPS	5 HP		1	EA	12,000		12,000	0	45.00	52	MECH	88.89	4,600	16,600	
5.4	PIPING - MECHANICAL		EST	1	LT			278,900	205,000					587,300	1,071,200	
	LARGE BORE PIPING	4.0" CS, SCH 40 WELDED	EST	500	LF		23.00	0	11,500	1.48	851	SPNG	94.41	80,300	91,800	
	LARGE BORE PIPING	6" FRP	EST	2,000	LF		33.90	0	67,800	0.67	1,541	SPNG	94.41	145,500	213,300	
	LARGE BORE PIPING	8" FRP	EST	1,000	LF		51.30	0	51,300	0.95	1,093	SPNG	94.41	103,100	154,400	
	LARGE BORE PIPING	10" FRP	EST	300	LF		68.00	0	20,400	1.18	407	SPNG	94.41	38,400	58,800	
	LARGE BORE PIPING	12" FRP	EST	250	LF		80.90	0	20,200	1.41	405	SPNG	94.41	38,300	58,500	
	VALVE	6" BFLY, 150 #, CS, FLANGED	EST	6	EA	850		5,100	0	8.70	60	SPNG	94.41	5,700	10,800	
	VALVE	8" BFLY, 150 #, CS, FLANGED	EST	12	EA	1,400		16,800	0	9.10	126	SPNG	94.41	11,900	28,700	
	VALVE	10" BFLY, 150 #, CS, FLANGED	EST	10	EA	2,300		23,000	0	13.80	159	SPNG	94.41	15,000	38,000	
	VALVE	12" BFLY, 150 #, CS, FLANGED	EST	3	EA	3,000		9,000	0	14.60	50	SPNG	94.41	4,800	13,800	
	VALVE	6" AIR OPERATED, 150 #, CS, FLANGED	EST	10	EA	14,000		140,000	0	17.30	199	SPNG	94.41	18,800	158,800	
	VALVE	8" AIR OPERATED, 150 #, CS, FLANGED	EST	5	EA	17,000		85,000	0	19.30	111	SPNG	94.41	10,500	95,500	
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	450	EA		75.00	0	33,800	2.50	1,294	MECH	88.89	115,000	148,800	
5.5	LIMESTONE SLURRY TANKS - FOUNDATIONS							0	166,400					278,300	444,700	
	EXCAVATION / BACKFILL		EST	969	CY			0	0	0.15	167	EXFD	90.00	15,000	15,000	
	REINFORCING		EST	90	TN		1,150.00	0	103,500	20.00	2,070	REIN	78.27	162,000	265,500	
	FORMWORK		EST	1,166	SF		2.50	0	2,900	0.14	188	FORM	99.43	18,700	21,600	
	CONCRETE		EST	475	CY		105.00	0	49,900	1.50	819	CONP	79.64	65,300	115,200	
	MUD MAT		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	EMBEDDED STEEL		EST	2,375	LB		2.50	0	5,900	0.06	164	CARP	71.88	11,800	17,700	
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS							0	649,100					1,020,200	1,669,300	
	EXCAVATION / BACKFILL		EST	2,630	CY			0	0	0.15	454	EXFD	90.00	40,800	40,800	
	REINFORCING		EST	260	TN		1,150.00	0	299,000	20.00	5,980	REIN	78.27	468,100	767,100	
	FORMWORK		EST	2,380	SF		2.50	0	6,000	0.14	383	FORM	99.43	38,100	44,100	
	CONCRETE		EST	2,750	CY		105.00	0	288,800	1.50	4,744	CONP	79.64	377,800	666,600	
	MUD MAT		EST	200	CY		105.00	0	21,000	1.50	345	CONP	79.64	27,500	48,500	
	EMBEDDED STEEL		EST	13,700	LB		2.50	0	34,300	0.06	945	CARP	71.88	67,900	102,200	
5.7	REAGENT PREPARATION BUILDING	120' L X 125' W X 130' H						269,400	4,684,200					4,106,700	9,060,300	
	STRUCTURAL STEEL		EST	1,160	TN		2650	0	3,074,000	16.00	21,344	STST	105.71	2,256,300	5,330,300	
	INSULATED METAL SIDING		EST	63,700	SF		12	0	764,400	0.11	8,058	SDNG	93.41	752,700	1,517,100	
	ROLLING OVERHEAD DOOR		EST	640	SF		27	0	17,300	0.25	184	CARP	71.88	13,200	30,500	
	METAL ROOF DECKING		EST	15,000	SF		2.7	0	40,500	0.06	1,035	STST	105.71	109,400	149,900	

				AEP										Estimate No.:	30706B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
		Est.=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	RIGID ROOF INSULATION		EST	15,000	SF		2.4	0	36,000	0.02	259	ROOF	69.12	17,900	53,900
	ROOFING (4-PLY TAR & GRAVEL)		EST	15,000	SF		1.55	0	23,300	0.04	690	ROOF	69.12	47,700	71,000
	LIGHTWEIGHT CONCRETE FILL 1"		EST	45	CY		100	0	4,500	1.30	67	ROOF	69.12	4,700	9,200
	ROOF FLASHING		EST	490	LF		14.45	0	7,100	0.12	68	ROOF	69.12	4,700	11,800
	ROOF DRAINS		EST	1	LT		45000	0	15,000	500.00	575	PLMB	79.42	45,700	60,700
	FLOOR DRAINS		EST	1	LT		37500	0	20,000	375.00	431	PLMB	79.42	34,200	54,200
	FLOOR SLABS	INCLUDES METAL DECKING AND FORMWORK	EST	45	CY		210	0	9,500	7.50	388	CONP	79.64	30,900	40,400
	FLOOR FINISHES		EST	8,900	SF		2.5	0	22,300	0.05	512	CONP	79.64	40,800	63,100
	LOUVERS/WINDOWS/DOORS		EST	6,500	SF		40	0	260,000	0.35	2,616	CARP	71.88	188,100	448,100
	ROOF VENTILATORS		EST	6	EA		15000	0	90,000	24.00	166	HVAC	81.24	13,500	103,500
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	4,500	SF		45	0	202,500	0.40	2,070	GALL	84.61	175,100	377,600
	H&V		EST	1	LT	194400	77760	194,400	77,800	3629.33	4,174	HVAC	81.24	339,100	611,300
	HVAC	40T PACKAGED UNIT FOR ELECTRICAL EQUIPMENT ROOM. INCLUDES ALLOWANCE FOR CONCRETE PAD AND ELECTRICAL WORK	EST	1	LT	75000	20000	75,000	20,000	350.00	403	HVAC	81.24	32,700	127,700
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING							0	13,800					24,800	38,600
	EXCAVATION / BACKFILL		EST	105	CY			0	0	0.15	18	EXFD	90.00	1,600	1,600
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	270	SF		2.50	0	700	0.14	43	FORM	99.43	4,300	5,000
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000
	EMBEDDED STEEL		EST	200	LB		2.50	0	500	0.06	14	CARP	71.88	1,000	1,500
5.9	LIGHTING/ TRANSFORMERS & PANELS							52,000	135,000					104,500	291,500
	LIGHT FIXTURES		EST	180	EA		750	0	135,000	4.00	828	WIRE	98.84	81,800	216,800
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	2	EA	5000		10,000	0	16.00	37	WIRE	98.84	3,600	13,600
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	2	EA	3500		7,000	0	12.00	28	WIRE	98.84	2,700	9,700
5.10	GROUNDING							2,000	0					7,900	9,900
	GROUND ROD	3/4" - 20' LONG	EST	2	EA	150		300	0	4.00	9	WIRE	98.84	900	1,200
	500 MCM	BARE COPPER WIRE	EST	200	FT	7.65		1,500	0	0.12	28	WIRE	98.84	2,700	4,200
	CADWELD		EST	16	EA	15		200	0	2.00	37	WIRE	98.84	3,600	3,800
	GROUNDING TEST	TEST, CALIBRATION & DOCUMENTATION	EST	2	EA			0	0	3.00	7	WIRE	98.84	700	700
5.11	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND, SECTION 7.0													
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							12,067,300	5,853,500		183,720			16,495,800	34,416,600
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE								0					0	0
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						15,976		89.79	1,434,000	1,434,000

				AEP										Estimate No.:	30706B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
		Est=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						19,970			1,506,741	1,506,741
	PER DIEM	NONE		0.00	HR						219,665			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				29,268					82,479	111,747
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				292,675						292,675
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			603,365							603,365
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				292,675					824,790	1,117,465
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				878,025					2,474,370	3,352,395
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							603,400	1,492,600					6,322,400	8,418,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND						12,670,700	7,346,100					22,818,200	42,835,000
6.0	BYPRODUCT DEWATERING ISLAND														0
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY DEWATERING INCLUDING HYDROCLONES, PUMPS, INTEGRAL PIPING, BELT VACUUM FILTERS, AND DISCHARGE CONVEYORS	EST	1	LT	5,688,000		5,688,000	0	50367.18	57,922	MECH	88.89	5,148,700	10,836,700
6.2	PIPING - MECHANICAL		EST	1	LT			282,700	1,202,400					2,577,100	4,062,200
	LARGE BORE PIPING	4" FRP	EST	2,050	LF		28.40	0	58,200	0.38	896	SPNG	94.41	84,600	142,800
	LARGE BORE PIPING	6" FRP	EST	3,300	LF		33.90	0	111,900	0.67	2,543	SPNG	94.41	240,100	352,000
	LARGE BORE PIPING	8" FRP	EST	6,250	LF		51.30	0	320,600	0.95	6,828	SPNG	94.41	644,600	965,200
	LARGE BORE PIPING	10" FRP	EST	6,400	LF		68.00	0	435,200	1.18	8,685	SPNG	94.41	819,900	1,255,100
	LARGE BORE PIPING	12" FRP	EST	800	LF		80.90	0	64,700	1.41	1,297	SPNG	94.41	122,500	187,200
	LARGE BORE PIPING	14" FRP	EST	100	LF		133.90	0	13,400	2.67	307	SPNG	94.41	29,000	42,400
	LARGE BORE PIPING	16" FRP	EST	100	LF		152.20	0	15,200	2.88	331	SPNG	94.41	31,300	46,500
	LARGE BORE PIPING	20" FRP	EST	125	LF		165.00	0	20,600	3.31	476	SPNG	94.41	44,900	65,500
	VALVE	4" BFLY, 150 #, CS, FLANGED	EST	6	EA	625		3,800	0	7.20	50	SPNG	94.41	4,700	8,500
	VALVE	6" BFLY, 150 #, CS, FLANGED	EST	6	EA	850		5,100	0	8.70	60	SPNG	94.41	5,700	10,800
	VALVE	8" BFLY, 150 #, CS, FLANGED	EST	12	EA	1,400		16,800	0	9.10	126	SPNG	94.41	11,900	28,700
	VALVE	10" BFLY, 150 #, CS, FLANGED	EST	10	EA	2,300		23,000	0	13.80	159	SPNG	94.41	15,000	38,000
	VALVE	12" BFLY, 150 #, CS, FLANGED	EST	3	EA	3,000		9,000	0	14.60	50	SPNG	94.41	4,800	13,800
	VALVE	6" AIR OPERATED, 150 #, CS, FLANGED	EST	10	EA	14,000		140,000	0	17.30	199	SPNG	94.41	18,800	158,800
	VALVE	8" AIR OPERATED, 150 #, CS, FLANGED	EST	5	EA	17,000		85,000	0	19.30	111	SPNG	94.41	10,500	95,500
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	1,913	EA		85.00	0	162,600	2.50	5,498	MECH	88.89	488,800	651,400
6.3	MATERIAL HANDLING EQUIPMENT							724,000	5,000					604,400	1,333,400
	CONVEYOR GH-1A	36" W x 75' L		75	LF	1,000		75,000	0	7.50	647	MECH	88.89	57,500	132,500
	CONVEYOR GH-1B	36" W x 75' L		75	LF	1,000		75,000	0	30.00	2,588	MECH	88.89	230,000	305,000
	BELT SCALES	CONVEYORS GH-1A AND GH-1B		2	EA	30,000		60,000	0	180.00	414	MECH	88.89	36,800	96,800
	STACKOUT CONVEYOR GH-2A	36" W X 120' L		120	LF	1,100		132,000	0	7.50	1,035	MECH	88.89	92,000	224,000
	STACKOUT CONVEYOR GH-2B	36" W X 120' L		120	LF	1,100		132,000	0	7.50	1,035	MECH	88.89	92,000	224,000
	TELESCOPIC CHUTES	CONVEYORS GH-2A AND GH-2B		2	EA	125,000		250,000	0	375.00	863	MECH	88.89	76,700	326,700
	FRONT END LOADER	NOT INCLUDED						0	0	30.00	0	MECH	88.89	0	0
	DUMP TRUCK	NOT INCLUDED						0	0	700.00	0	MECH	88.89	0	0
	WATER SPRAY AT DISCHARGE OF GH-2A & GH-2B	ALLOWANCE FOR 200 LF SMALL BORE PIPING AND SPRAYS AND VALVING		200	LF		25.0	0	5,000	0.95	219	MECH	88.89	19,400	24,400
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		1	LT	170,000		170,000	0	0.00	0	MECH	88.89	0	170,000

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	LOUVERS/WINDOWS/DOORS		EST	2,535	SF		40	0	101,400	0.35	1,020	CARP	71.88	73,300	174,700	
	ROOF VENTILATORS		EST	4	EA		15000	0	60,000	24.00	110	HVAC	81.24	9,000	69,000	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	1,700	SF		45	0	76,500	0.40	782	GALL	84.61	66,200	142,700	
	H&V		EST	1	LT	70200	28080	70,200	28,100	1310.67	1,507	HVAC	81.24	122,500	220,800	
	HVAC	40T PACKAGED UNIT FOR ELECTRICAL EQUIPMENT ROOM. INCLUDES ALLOWANCE FOR CONCRETE PAD AND ELECTRICAL WORK	EST	1	LT	75000	20000	75,000	20,000	350.00	403	HVAC	81.24	32,700	127,700	
6.13	PIPE SUPPORT PAD							0	13,800					24,700	38,500	
	EXCAVATION / BACKFILL		EST	95	CY			0	0	0.15	16	EXFD	90.00	1,500	1,500	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	270	SF		2.50	0	700	0.14	43	FORM	99.43	4,300	5,000	
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000	
	EMBEDDED STEEL		EST	200	LB		2.50	0	500	0.06	14	CARP	71.88	1,000	1,500	
6.14	TRANSFORMERS							170,000	0					54,600	224,600	
	SUS TRANSFORMERS: 33F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	85000		170,000	0	300.00	690	EHEA	79.16	54,600	224,600	
6.15	SWITCHGEAR	480V LOW VOLATAGE SWITCHGEAR, PRICE PER SECTION	EST	5	EA	39200		196,000	0	230.00	1,323	EHEA	79.16	104,700	300,700	
6.16	CABLE BUS DUCT							269,400	10,800					375,800	656,000	
	480V CABLE BUS DUCT	BUS DUCT ONLY	EST	300	FT	898		269,400	0	10.30	3,554	WIRE	98.84	351,200	620,600	
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	4	EA		2,700.00	0	10,800	54.00	248	WIRE	98.84	24,600	35,400	
6.17	MCC							123,600	0					6,300	129,900	
	480V MCC	PER MCC LINEUP	EST	4	EA	30900		123,600	0	16.00	64	WIRE	98.84	6,300	129,900	
6.18	MIMIC PANELS		EST	1	EA	17500		17,500	0	16.00	16	WIRE	98.84	1,600	19,100	
6.19	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700	
	DC PANEL BOADRD		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000	
	VRLA BATTERIES		EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700	
6.20	GROUNDING							5,500	0					18,600	24,100	
	GROUND ROD	3/4" - 20' LONG	EST	8	EA	150		1,200	0	4.00	37	WIRE	98.84	3,600	4,800	
	500 MCM	BARE COPPER WIRE	EST	500	FT	7.65		3,800	0	0.12	69	WIRE	98.84	6,800	10,600	
	CADWELD		EST	32	EA	15		500	0	2.00	74	WIRE	98.84	7,300	7,800	
	GROUNDING TEST	TEST & DOCUMENTATIONS	EST	1	LT			0	0	8.00	9	WIRE	98.84	900	900	
6.21	LIGHTING/ TRANSFORMERS & PANELS							52,000	135,000					104,500	291,500	
	LIGHT FIXTURES		EST	180	EA		750	0	135,000	4.00	828	WIRE	98.84	81,800	216,800	
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100	
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300	
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	2	EA	5000		10,000	0	16.00	37	WIRE	98.84	3,600	13,600	
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	2	EA	3500		7,000	0	12.00	28	WIRE	98.84	2,700	9,700	
6.22	RACEWAY, CABLE TRAY, & CONDUIT							0	310,500					1,278,800	1,589,300	
	12" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		18.25	0	16,400	1.10	990	WIRE	98.84	97900	114,300	

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	18" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		21.50	0	19,400	1.45	1,305	WIRE	98.84	129000	148,400	
	24" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		27.10	0	24,400	1.75	1,575	WIRE	98.84	155700	180,100	
	36" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		30.30	0	27,300	1.95	1,755	WIRE	98.84	173500	200,800	
	5" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	850	LF		61.00	0	51,900	1.13	958	WIRE	98.84	94700	146,600	
	4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	1,600	LF		31.00	0	49,600	0.81	1,291	WIRE	98.84	127600	177,200	
	3" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	1,700	LF		21.50	0	36,600	0.65	1,097	WIRE	98.84	108400	145,000	
	2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	2,600	LF		9.25	0	24,100	0.35	915	WIRE	98.84	90500	114,600	
	1-1/2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	3,300	LF		7.15	0	23,600	0.28	937	WIRE	98.84	92600	116,200	
	1" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	5,500	LF		4.44	0	24,400	0.24	1,315	WIRE	98.84	129900	154,300	
	3/4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	8,800	LF		1.46	0	12,800	0.08	799	WIRE	98.84	79000	91,800	
6.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	EST	1,500	LF		9.27	0	13,900	0.23	397	WIRE	98.84	39200	53,100	
6.24	LOW VOLTAGE POWER CABLE & TERMINATION							0	73,100					533,900	607,000	
	3/C # 500KCMIL- 600V		EST	2,800	LF		26.12	0	73,100	0.69	2,222	WIRE	98.84	219600	292,700	
	#4/0 - #12 AWG-600V		EST	35,000	LF		7.22			0.08	3,180	WIRE	98.84	314300	314,300	
6.25	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	EST	31,000	LF		3.20	0	99,200	0.08	2,816	WIRE	98.84	278400	377,600	
6.26	FOUNDATIONS FOR TRANSFORMERS							0	3,500					10,300	13,800	
	FOR XFMR 33F, 33G	INCLUDES MUD MAT	EST	14.0	CY		250	0	3,500	8.00	129	CONP	79.64	10,300	13,800	
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							7,992,200	5,625,700		172,224			15,436,200	29,054,100	
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS															
	ADDITIONAL CRANE ALLOWANCE								0					0	0	
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0	
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS				1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY				8.00	%					14,976		89.63	1,342,000	1,342,000	
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED				10.00	%					18,720			1,409,956	1,409,956	
	PER DIEM	NONE			0.00	HR					205,920			0	0	
	CONSUMABLES - % of ACCT NO. 90				0.5	%			28,129					77,181	105,310	
	FREIGHT ON MATERIAL - % of ACCT NO. 90				5.0	%			281,285						281,285	
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90				5.0	%			399,610						399,610	
	SALES TAX - NOT INCLUDED														0	
	SCAFFOLDING - % OF ACCT NO. 90				5.0	%			281,285					771,810	1,053,095	
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90				15	%			843,855					2,315,430	3,159,285	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							399,600	1,434,600					5,916,400	7,750,500	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND						8,391,800	7,060,300					21,352,600	36,804,600	
7.0	ABSORBER ISLAND														0	

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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 MATERIAL	EST	1	LT	40589000		40,589,000	0	395500.00	454,825	MECH	88.89	40,429,400	81,018,400
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	EST	49,800	SF		300.00	0	14,940,000	1.50	85,905	MECH	88.89	7,636,100	22,576,100
7.3	ABSORBER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES		2	EA	14,000		28,000	0	60.00	138	MECH	88.89	12,300	40,300
7.4	AGITATOR FOR SUMP PUMPS	5 HP		1	EA	12,000		12,000	0	45.00	52	MECH	88.89	4,600	16,600
7.5	EMERGENCY DIESEL DRIVEN QUENCH PUMP	WITH FUEL DAY TANK. FOUNDATIONS INCLUDED WITH ABSORBER BUILDING FOUNDATIONS		1	EA	150,000		150,000	0	300.00	345	MECH	88.89	30,700	180,700
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM EQUIPMENT COST. NO BOP PIPING						0	0					0	0
7.7	ABSORBER VESSEL - FOUNDATIONS							0	366,900					609,400	976,300
	EXCAVATION / BACKFILL		EST	2,921	CY			0	0	0.15	504	EXFD	90.00	45,300	45,300
	REINFORCING		EST	148	TN		1,150.00	0	170,200	20.00	3,404	REIN	78.27	266,400	436,600
	FORMWORK		EST	2,121	SF		2.50	0	5,300	0.14	341	FORM	99.43	34,000	39,300
	CONCRETE		EST	1,571	CY		105.00	0	165,000	1.50	2,710	CONP	79.64	215,800	380,800
	MUD MAT		EST	65	CY		105.00	0	6,800	1.50	112	CONP	79.64	8,900	15,700
	EMBEDDED STEEL		EST	7,855	LB		2.50	0	19,600	0.06	542	CARP	71.88	39,000	58,600
7.8	ABSORBER BUILDING - FOUNDATIONS							0	544,300					852,800	1,397,100
	EXCAVATION / BACKFILL		EST	2,300	CY			0	0	0.15	397	EXFD	90.00	35,700	35,700
	REINFORCING		EST	220	TN		1,150.00	0	253,000	20.00	5,060	REIN	78.27	396,000	649,000
	FORMWORK		EST	2,350	SF		2.50	0	5,900	0.14	378	FORM	99.43	37,600	43,500
	CONCRETE		EST	2,400	CY		105.00	0	252,000	1.50	4,140	CONP	79.64	329,700	581,700
	MUD MAT		EST	175	CY		105.00	0	18,400	1.50	302	CONP	79.64	24,000	42,400
	EMBEDDED STEEL		EST	6,000	LB		2.50	0	15,000	0.06	414	CARP	71.88	29,800	44,800
7.9	ABSORBER BUILDING	150' L X 85' W X 60' H						164,500	2,501,100					2,297,900	4,963,500
	STRUCTURAL STEEL		EST	530	TN		2650	0	1,404,500	16.00	9,752	STST	105.71	1,030,900	2,435,400
	INSULATED METAL SIDING		EST	28,200	SF		12	0	338,400	0.11	3,567	SDNG	93.41	333,200	671,600
	ROLLING OVERHEAD DOOR		EST	960	SF		27	0	25,900	0.25	276	CARP	71.88	19,800	45,700
	METAL ROOF DECKING		EST	12,750	SF		2.7	0	34,400	0.06	880	STST	105.71	93,000	127,400
	RIGID ROOF INSULATION		EST	12,750	SF		2.4	0	30,600	0.02	220	ROOF	69.12	15,200	45,800
	ROOFING (4-PLY TAR & GRAVEL)		EST	12,750	SF		1.55	0	19,800	0.04	587	ROOF	69.12	40,500	60,300
	LIGHTWEIGHT CONCRETE FILL 1"		EST	39	CY		100	0	3,900	1.30	58	ROOF	69.12	4,000	7,900
	ROOF FLASHING		EST	470	LF		14.45	0	6,800	0.12	65	ROOF	69.12	4,500	11,300
	ROOF DRAINS		EST	1	LT		45000	0	15,000	500.00	575	PLMB	79.42	45,700	60,700
	FLOOR DRAINS		EST	1	LT		37500	0	20,000	375.00	431	PLMB	79.42	34,200	54,200
	FLOOR SLABS	INCLUDES METAL DECKING AND FORMWORK	EST	50	CY		210	0	10,500	7.50	431	CONP	79.64	34,300	44,800
	FLOOR FINISHES		EST	7,800	SF		2.5	0	19,500	0.05	449	CONP	79.64	35,700	55,200
	LOUVERS/WINDOWS/DOORS		EST	5,600	SF		40	0	224,000	0.35	2,254	CARP	71.88	162,000	386,000

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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
	ROOF VENTILATORS		EST	6	EA		20000	0	120,000	32.00	221	HVAC	81.24	17,900	137,900	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	3,600	SF		45	0	162,000	0.40	1,656	GALL	84.61	140,100	302,100	
	H&V		EST	1	LT	164500	65800	164,500	65,800	3070.67	3,531	HVAC	81.24	286,900	517,200	
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING							0	7,700					14,100	21,800	
	EXCAVATION / BACKFILL		EST	95	CY			0	0	0.15	16	EXFD	90.00	1,500	1,500	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500	
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500	
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200	
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300	
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS							0	37,000					63,200	100,200	
	EXCAVATION / BACKFILL		EST	188	CY			0	0	0.15	32	EXFD	90.00	2,900	2,900	
	REINFORCING		EST	16.0	TN		1,150.00	0	18,400	20.00	368	REIN	78.27	28,800	47,200	
	FORMWORK		EST	480	SF		2.50	0	1,200	0.14	77	FORM	99.43	7,700	8,900	
	CONCRETE		EST	133	CY		105.00	0	14,000	1.50	229	CONP	79.64	18,300	32,300	
	MUD MAT		EST	16	CY		105.00	0	1,700	1.50	28	CONP	79.64	2,200	3,900	
	EMBEDDED STEEL		EST	665	LB		2.50	0	1,700	0.06	46	CARP	71.88	3,300	5,000	
7.12	OXIDATION AIR BLOWER BUILDING	30' L X 30' W X 25' H						33,800	191,000					201,400	426,200	
	STRUCTURAL STEEL		EST	14	TN		2650	0	35,800	16.00	248	STST	105.71	26,300	62,100	
	INSULATED METAL SIDING		EST	3,000	SF		12	0	36,000	0.11	380	SDNG	93.41	35,400	71,400	
	ROLLING OVERHEAD DOOR		EST	320	SF		27	0	8,600	0.25	92	CARP	71.88	6,600	15,200	
	METAL ROOF DECKING		EST	900	SF		2.7	0	2,400	0.06	62	STST	105.71	6,600	9,000	
	RIGID ROOF INSULATION		EST	900	SF		2.4	0	2,200	0.02	16	ROOF	69.12	1,100	3,300	
	ROOFING (4-PLY TAR & GRAVEL)		EST	900	SF		1.55	0	1,400	0.04	41	ROOF	69.12	2,900	4,300	
	LIGHTWEIGHT CONCRETE FILL 1"		EST	3	CY		100	0	300	1.30	4	ROOF	69.12	300	600	
	ROOF FLASHING		EST	120	LF		14.45	0	1,700	0.12	17	ROOF	69.12	1,100	2,800	
	ROOF DRAINS		EST	1	LT		7000	0	15,000	50.00	58	PLMB	79.42	4,600	19,600	
	FLOOR DRAINS		EST	1	LT		7500	0	20,000	60.00	69	PLMB	79.42	5,500	25,500	
	FLOOR SLABS	NONE	EST	0	CY		210	0	0	7.50	0	CONP	79.64	0	0	
	FLOOR FINISHES	MAIN LEVEL	EST	810	SF		2.5	0	2,000	0.05	47	CONP	79.64	3,700	5,700	
	BLOCK WALLS	SOUND ATTENUATING INTERIOR BLOCK WALLS	EST	3,000	SF		8	0	24,000	0.18	621	MSRY	73.39	45,600	69,600	
	LOUVERS/WINDOWS/DOORS & VENTILATORS	SOUND ATTENUATING	EST	300	SF	75	40	22,500	12,000	1.25	431	CARP	71.88	31,000	65,500	
	ROOF VENTILATORS		EST	1	EA		15000	0	15,000	24.00	28	HVAC	81.24	2,200	17,200	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	225	SF		45	0	10,100	0.40	104	GALL	84.61	8,800	18,900	
	H&V		EST	1	LT	11250	4500	11,300	4,500	210.67	242	HVAC	81.24	19,700	35,500	
7.13	PIPE SUPPORT PAD - OXIDATION BUILDING							0	7,700					13,100	20,800	
	EXCAVATION / BACKFILL		EST	30	CY			0	0	0.15	5	EXFD	90.00	500	500	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500	
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500	
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200	
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300	
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	EST	1,095	TN		3,250.00	0	3,558,800	60.00	75,555	FLDU	107.96	8,156,900	11,715,700	
7.15	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	EST	547	TN		2,900.00	0	1,586,300	24.00	15,097	STST	105.71	1,595,900	3,182,200	
7.16	DUCTWORK INSULATION & LAGGING		EST	105,100	SF		12.00	0	1,261,200	0.25	30,216	DINS	81.75	2,470,200	3,731,400	
7.17	FOUNDATIONS FOR DUCT SUPPORT STEEL							0	69,000					126,000	195,000	

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	EXCAVATION / BACKFILL		EST	784	CY			0	0	0.15	135	EXFD	90.00	12,200	12,200
	REINFORCING		EST	23	TN		1,150.00	0	26,100	20.00	522	REIN	78.27	40,900	67,000
	FORMWORK		EST	1,125	SF		2.50	0	2,800	0.14	181	FORM	99.43	18,000	20,800
	CONCRETE		EST	303	CY		105.00	0	31,800	1.50	522	CONP	79.64	41,600	73,400
	MUD MAT		EST	43	CY		105.00	0	4,500	1.50	73	CONP	79.64	5,800	10,300
	EMBEDDED STEEL		EST	1,513	LB		2.50	0	3,800	0.06	104	CARP	71.88	7,500	11,300
7.18	TRANSFORMERS							1,181,000	0					263,900	1,444,900
	SST TRANSFORMERS: 21A & 21B	13.8KV-4160V, 2 WINDING XFMR 17/22.5 - 17MVA (DELTA TO STAR)	EST	2	EA	320500		641,000	0	550.00	1,265	EHEA	79.16	100,100	741,100
	SUS TRANSFORMERS: 31F/G; 32F/G	13.8KV-480V,3PHASE, CAST COIL	EST	4	EA	85000		340,000	0	300.00	1,380	EHEA	79.16	109,200	449,200
	SUS TRANSFORMERS: 30F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	100000		200,000	0	300.00	690	EHEA	79.16	54,600	254,600
7.19	SWITCHGEAR							1,838,400	0					1,118,900	2,957,300
	13.8 KV MEDIUM VOLTAGE SWITCHGEAR (13F/G))	PRICE PER SECTION	EST	11	EA	50000		550,000	0	340.00	4,301	EHEA	79.16	340,500	890,500
	4.16KV MEDIUM VOLTAGE SWITCHGEAR& MCCS (21A/B)	PRICE PER SECTION	EST	17	EA	41200		700,400	0	300.00	5,865	EHEA	79.16	464,300	1,164,700
	480V LOW VOLTAGE SWITCHGEAR (31F/G ; 32F/G)	PRICE PER SECTION	EST	15	EA	39200		588,000	0	230.00	3,968	EHEA	79.16	314,100	902,100
7.20	CABLE BUS & TERMINATIONS							1,658,300	46,600					2,982,700	4,687,600
	1200A, 15KV CABLE BUS	CABLE BUS	EST	2,000	FT	466		932,000	0	6.75	15,525	WIRE	98.84	1,534,500	2,466,500
	3200A, 5KV CABLE BUS	CABLE BUS	EST	300	FT	567		170,100	0	9.00	3,105	WIRE	98.84	306,900	477,000
	4000A, 480V CABLE BUS	CABLE BUS	EST	900	FT	618		556,200	0	10.30	10,661	WIRE	98.84	1,053,700	1,609,900
	CABLE BUS TERMINATION	500MCM- 15KV TERMINATIONS	EST	4	EA		1,800.00	0	7,200	33.00	152	WIRE	98.84	15,000	22,200
	CABLE BUS TERMINATION	1000MCM- 5KV TERMINATIONS	EST	4	EA		4,440.00	0	17,800	51.60	237	WIRE	98.84	23,500	41,300
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	8	EA		2,700.00	0	21,600	54.00	497	WIRE	98.84	49,100	70,700
7.21	MCC							432,600	0					22,100	454,700
	480V MCC	PER MCC LINE UP	EST	14	EA	30900		432,600	0	16.00	224	WIRE	98.84	22,100	454,700
7.22	MIMIC PANELS		EST	1	EA	17500		17,500	0	40.00	40	WIRE	98.84	4,000	21,500
7.23	GROUNDING							16,000	0					46,100	62,100
	GROUND ROD	3/4" - 20' LONG	EST	16	EA	150		2,400	0	4.00	74	WIRE	98.84	7,300	9,700
	500 MCM	BARE COPPER WIRE	EST	1,650	FT	7.65		12,600	0	0.12	228	WIRE	98.84	22,500	35,100
	CADWELD		EST	64	EA	15		1,000	0	2.00	147	WIRE	98.84	14,500	15,500
	GROUNDING TEST	TEST & DOCUMENTATIONS	EST	1	LT			0	0	16.00	18	WIRE	98.84	1,800	1,800
7.24	LIGHTING/ TRANSFORMERS & PANELS							164,500	165,000					171,300	500,800
	LIGHT FIXTURES		EST	220	EA		750	0	165,000	4.00	1,012	WIRE	98.84	100,000	265,000
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	6	EA	10000		60,000	0	40.00	276	WIRE	98.84	27,300	87,300
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	6	EA	7500		45,000	0	32.00	221	WIRE	98.84	21,800	66,800
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	7	EA	5000		35,000	0	16.00	129	WIRE	98.84	12,700	47,700
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	7	EA	3500		24,500	0	12.00	97	WIRE	98.84	9,500	34,000
7.25	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700
	DC PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000
	VRLA BATTERIES	8HR-400A, 480V	EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700

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	CONSUMABLES - % of ACCT NO. 90			0.5	%				141,240					390,279	531,518
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				1,412,395						1,412,395
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			2,319,695							2,319,695
	SALES TAX - NOT INCLUDED													0	
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				1,412,395					3,902,785	5,315,180
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				4,237,185					11,708,355	15,945,540
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							2,994,700	7,203,200					30,702,900	40,900,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND						49,388,600	35,451,100					108,758,600	193,598,300
8.0	FGD WASTE WATER TREATMENT PLANT														0
9.0	COMPRESSED AIR SYSTEM														0
10.0	SERVICE WATER SYSTEM														
11.0	POTABLE WATER SYSTEM														
12.0	FGD SUBSTATION														0
14.0	CEM SYSTEM														0
15.0	RAIL INFRASTRUCTURE														0
16.0	SITE IMPROVEMENTS - CIVIL WORK														
17.0	BOP ITEMS														0
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	EST	7,800	LF		10	0	78,000	0.39	3,498	PINS	69.50	243,100	321,100
17.2	HEAT TRACING							0	332,700					474,800	807,500
	CABLE	AVERAGE 6" PIPE SIZE	EST	5,000	LF		10.35	0	51,800	0.05	288	WIRE	98.84	28,400	80,200
	POWER CONNECTOR AND OTHER ACCESSORIES INCLUDING THERMOSTATS FOR HEAT TRACING (BY ZONES)		EST	91	EA		450	0	40,900	8.00	836	WIRE	98.84	82,700	123,600
	HEAT TRACING BALANCE OF PLANT INCL PANELS, POWER WIRING AND CONDUITS		EST	8	LT		30000	0	240,000	400.00	3,680	WIRE	98.84	363,700	603,700
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)							0	181,700					696,800	878,500
	TOUCH UP PAINT FOR SHOP PAINTED STEEL		EST	20,427	SF		3	0	61,300	0.15	3,524	PNTR	66.72	235,100	296,400
	TOUCH UP PAINT FOR EQUIPMENT		EST	15,000	SF		3	0	45,000	0.15	2,588	PNTR	66.72	172,600	217,600
	PAINTING CS PIPE ONLY	AVERAGE 6" PIPE SIZE, ALLOWANCE FOR 16,000 LF PIPE	EST	25,120	SF		3	0	75,400	0.15	4,333	PNTR	66.72	289,100	364,500
17.4	HOISTS & TROLLEYS							180,000	210,000					245,300	635,300
	MISC HOISTS & TROLLEYS	IN BUILDINGS FOR EQUIPMENT MAINTENANCE AND FOR ID FANS. INCLUDES TROLLEY BEAMS	EST	12	EA	15000	17500	180,000	210,000	200.00	2,760	MECH	88.89	245,300	635,300
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	EST	40	TN		3500	0	140,000	120.00	5,520	STST	105.71	583,500	723,500
17.6	MISC PIPE SUPPORT FOUNDATIONS							0	10,500					19,600	30,100
	EXCAVATION / BACKFILL		EST	65	CY			0	0	0.15	11	EXFD	90.00	1,000	1,000
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	260	SF		2.50	0	700	0.14	42	FORM	99.43	4,200	4,900
	CONCRETE		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000
	MUD MAT		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500



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

ATTACHMENT 2-8
WFGD Detailed Capital Cost Estimate No. 30707 Est-3 (3.0 lb SO₂/MMbtu)

DRAFT COPY

				AEP											Estimate No.:	30707B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU											Date:	9/10/2010
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1.0	ID FANS															
2.0	WET ESP															
3.0	NEW STACK															
4.0	LIMESTONE HANDLING SYSTEM														0	
5.0	REAGENT PREPARATION ISLAND														0	
5.1	MECHANICAL EQUIPMENT	INCLUDES LIMESTONE FEEDERS, FROM THE DAY SILOS THROUGH THE SLURRY STORAGE TANKS AND TRANSFER PUMPS WITH INTEGRAL PIPING	EST	1	LT	13,430,000		13,430,000	0	111600.00	128,340	MECH	88.89	11,408,100	24,838,100	
5.2	REAGENT PREPARATION BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES		2	EA	14,000		28,000	0	60.00	138	MECH	88.89	12,300	40,300	
5.3	AGITATOR FOR SUMP PUMPS	5 HP		1	EA	12,000		12,000	0	45.00	52	MECH	88.89	4,600	16,600	
5.4	PIPING - MECHANICAL		EST	1	LT			278,900	205,000					587,300	1,071,200	
	LARGE BORE PIPING	4.0" CS, SCH 40 WELDED	EST	500	LF		23.00	0	11,500	1.48	851	SPNG	94.41	80,300	91,800	
	LARGE BORE PIPING	6" FRP	EST	2,000	LF		33.90	0	67,800	0.67	1,541	SPNG	94.41	145,500	213,300	
	LARGE BORE PIPING	8" FRP	EST	1,000	LF		51.30	0	51,300	0.95	1,093	SPNG	94.41	103,100	154,400	
	LARGE BORE PIPING	10" FRP	EST	300	LF		68.00	0	20,400	1.18	407	SPNG	94.41	38,400	58,800	
	LARGE BORE PIPING	12" FRP	EST	250	LF		80.90	0	20,200	1.41	405	SPNG	94.41	38,300	58,500	
	VALVE	6" BFLY, 150 #, CS, FLANGED	EST	6	EA	850		5,100	0	8.70	60	SPNG	94.41	5,700	10,800	
	VALVE	8" BFLY, 150 #, CS, FLANGED	EST	12	EA	1,400		16,800	0	9.10	126	SPNG	94.41	11,900	28,700	
	VALVE	10" BFLY, 150 #, CS, FLANGED	EST	10	EA	2,300		23,000	0	13.80	159	SPNG	94.41	15,000	38,000	
	VALVE	12" BFLY, 150 #, CS, FLANGED	EST	3	EA	3,000		9,000	0	14.60	50	SPNG	94.41	4,800	13,800	
	VALVE	6" AIR OPERATED, 150 #, CS, FLANGED	EST	10	EA	14,000		140,000	0	17.30	199	SPNG	94.41	18,800	158,800	
	VALVE	8" AIR OPERATED, 150 #, CS, FLANGED	EST	5	EA	17,000		85,000	0	19.30	111	SPNG	94.41	10,500	95,500	
	PIPE SUPPORTS	AVERAGE COST FOR MISC PIPE SIZES	EST	450	EA		75.00	0	33,800	2.50	1,294	MECH	88.89	115,000	148,800	
5.5	LIMESTONE SLURRY TANKS - FOUNDATIONS							0	166,400					278,300	444,700	
	EXCAVATION / BACKFILL		EST	969	CY			0	0	0.15	167	EXFD	90.00	15,000	15,000	
	REINFORCING		EST	90	TN		1,150.00	0	103,500	20.00	2,070	REIN	78.27	162,000	265,500	
	FORMWORK		EST	1,166	SF		2.50	0	2,900	0.14	188	FORM	99.43	18,700	21,600	
	CONCRETE		EST	475	CY		105.00	0	49,900	1.50	819	CONP	79.64	65,300	115,200	
	MUD MAT		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	EMBEDDED STEEL		EST	2,375	LB		2.50	0	5,900	0.06	164	CARP	71.88	11,800	17,700	
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS							0	674,900					1,060,900	1,735,800	
	EXCAVATION / BACKFILL		EST	2,740	CY			0	0	0.15	473	EXFD	90.00	42,500	42,500	
	REINFORCING		EST	270	TN		1,150.00	0	310,500	20.00	6,210	REIN	78.27	486,100	796,600	
	FORMWORK		EST	2,480	SF		2.50	0	6,200	0.14	399	FORM	99.43	39,700	45,900	
	CONCRETE		EST	2,860	CY		105.00	0	300,300	1.50	4,934	CONP	79.64	392,900	693,200	
	MUD MAT		EST	210	CY		105.00	0	22,100	1.50	362	CONP	79.64	28,800	50,900	
	EMBEDDED STEEL		EST	14,300	LB		2.50	0	35,800	0.06	987	CARP	71.88	70,900	106,700	
5.7	REAGENT PREPARATION BUILDING	120' L X 129' W X 130' H						269,400	4,813,500					4,211,000	9,293,900	
	STRUCTURAL STEEL		EST	1,200	TN		2650	0	3,180,000	16.00	22,080	STST	105.71	2,334,100	5,514,100	
	INSULATED METAL SIDING		EST	64,740	SF		12	0	776,900	0.11	8,190	SDNG	93.41	765,000	1,541,900	
	ROLLING OVERHEAD DOOR		EST	640	SF		27	0	17,300	0.25	184	CARP	71.88	13,200	30,500	

				AEP											Estimate No.:	30707B
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU											Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:													Reviewer:	JMK
		Est=Estimated													Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:			BIG SANDY			
		Q=Vendor Quote								Labor Productivity =			1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
	METAL ROOF DECKING		EST	15,480	SF		2.7	0	41,800	0.06	1,068	STST	105.71	112,900	154,700	
	RIGID ROOF INSULATION		EST	15,480	SF		2.4	0	37,200	0.02	267	ROOF	69.12	18,500	55,700	
	ROOFING (4-PLY TAR & GRAVEL)		EST	15,480	SF		1.55	0	24,000	0.04	712	ROOF	69.12	49,200	73,200	
	LIGHTWEIGHT CONCRETE FILL 1"		EST	48	CY		100	0	4,800	1.30	72	ROOF	69.12	5,000	9,800	
	ROOF FLASHING		EST	498	LF		14.45	0	7,200	0.12	69	ROOF	69.12	4,800	12,000	
	ROOF DRAINS		EST	1	LT		45000	0	15,000	500.00	575	PLMB	79.42	45,700	60,700	
	FLOOR DRAINS		EST	1	LT		37500	0	20,000	375.00	431	PLMB	79.42	34,200	54,200	
	FLOOR SLABS	INCLUDES METAL DECKING AND FORMWORK	EST	47	CY		210	0	9,900	7.50	405	CONP	79.64	32,300	42,200	
	FLOOR FINISHES		EST	9,270	SF		2.5	0	23,200	0.05	533	CONP	79.64	42,500	65,700	
	LOUVERS/WINDOWS/DOORS		EST	6,500	SF		40	0	260,000	0.35	2,616	CARP	71.88	188,100	448,100	
	ROOF VENTILATORS		EST	6	EA		15000	0	90,000	24.00	166	HVAC	81.24	13,500	103,500	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	4,630	SF		45	0	208,400	0.40	2,130	GALL	84.61	180,200	388,600	
	H&V		EST	1	LT	194400	77760	194,400	77,800	3629.33	4,174	HVAC	81.24	339,100	611,300	
	HVAC	40T PACKAGED UNIT FOR ELECTRICAL EQUIPMENT ROOM. INCLUDES ALLOWANCE FOR CONCRETE PAD AND ELECTRICAL WORK	EST	1	LT	75000	20000	75,000	20,000	350.00	403	HVAC	81.24	32,700	127,700	
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING							0	13,800					24,900	38,700	
	EXCAVATION / BACKFILL		EST	108	CY			0	0	0.15	19	EXFD	90.00	1,700	1,700	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	270	SF		2.50	0	700	0.14	43	FORM	99.43	4,300	5,000	
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000	
	EMBEDDED STEEL		EST	195	LB		2.50	0	500	0.06	13	CARP	71.88	1,000	1,500	
5.9	LIGHTING/ TRANSFORMERS & PANELS							52,000	135,000					104,500	291,500	
	LIGHT FIXTURES		EST	180	EA		750	0	135,000	4.00	828	WIRE	98.84	81,800	216,800	
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100	
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300	
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	2	EA	5000		10,000	0	16.00	37	WIRE	98.84	3,600	13,600	
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	2	EA	3500		7,000	0	12.00	28	WIRE	98.84	2,700	9,700	
5.10	GROUNDING							2,000	0					7,900	9,900	
	GROUND ROD	3/4" - 20' LONG	EST	2	EA	150		300	0	4.00	9	WIRE	98.84	900	1,200	
	500 MCM	BARE COPPER WIRE	EST	200	FT	7.65		1,500	0	0.12	28	WIRE	98.84	2,700	4,200	
	CADWELD		EST	16	EA	15		200	0	2.00	37	WIRE	98.84	3,600	3,800	
	GROUNDING TEST	TEST, CALIBRATION & DOCUMENTATION	EST	2	EA			0	0	3.00	7	WIRE	98.84	700	700	
5.11	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND, SECTION 7.0														
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							14,072,300	6,008,600		197,182			17,699,800	37,780,700	
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS															
	ADDITIONAL CRANE ALLOWANCE								0					0	0	
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0	
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS											
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						17,146		89.76	1,539,000	1,539,000	

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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
	FLOOR DRAINS		EST	1	LT		32500	0	20,000	350.00	403	PLMB	79.42	32,000	52,000	
	FLOOR SLABS		EST	50	CY		210	0	10,500	7.50	431	CONP	79.64	34,300	44,800	
	FLOOR FINISHES	MAIN LEVEL	EST	6,680	SF		2.5	0	16,700	0.05	384	CONP	79.64	30,600	47,300	
	LOUVERS/WINDOWS/DOORS		EST	2,535	SF		40	0	101,400	0.35	1,020	CARP	71.88	73,300	174,700	
	ROOF VENTILATORS		EST	4	EA		15000	0	60,000	24.00	110	HVAC	81.24	9,000	69,000	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	1,780	SF		45	0	80,100	0.40	819	GALL	84.61	69,300	149,400	
	H&V		EST	1	LT	70200	28080	70,200	28,100	1310.67	1,507	HVAC	81.24	122,500	220,800	
	HVAC	40T PACKAGED UNIT FOR ELECTRICAL EQUIPMENT ROOM. INCLUDES ALLOWANCE FOR CONCRETE PAD AND ELECTRICAL WORK	EST	1	LT	75000	20000	75,000	20,000	350.00	403	HVAC	81.24	32,700	127,700	
6.13	PIPE SUPPORT PAD							0	13,800					25,000	38,800	
	EXCAVATION / BACKFILL		EST	100	CY			0	0	0.15	17	EXFD	90.00	1,600	1,600	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	280	SF		2.50	0	700	0.14	45	FORM	99.43	4,500	5,200	
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700	
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000	
	EMBEDDED STEEL		EST	200	LB		2.50	0	500	0.06	14	CARP	71.88	1,000	1,500	
6.14	TRANSFORMERS							170,000	0					54,600	224,600	
	SUS TRANSFORMERS: 33F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	85000		170,000	0	300.00	690	EHEA	79.16	54,600	224,600	
6.15	SWITCHGEAR	480V LOW VOLATAGE SWITCHGEAR, PRICE PER SECTION	EST	5	EA	39200		196,000	0	230.00	1,323	EHEA	79.16	104,700	300,700	
6.16	CABLE BUS DUCT							269,400	10,800					375,800	656,000	
	480V CABLE BUS DUCT	BUS DUCT ONLY	EST	300	FT	898		269,400	0	10.30	3,554	WIRE	98.84	351,200	620,600	
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	4	EA		2,700.00	0	10,800	54.00	248	WIRE	98.84	24,600	35,400	
6.17	MCC							123,600	0					6,300	129,900	
	480V MCC	PER MCC LINEUP	EST	4	EA	30900		123,600	0	16.00	64	WIRE	98.84	6,300	129,900	
6.18	MIMIC PANELS		EST	1	EA	17500		17,500	0	16.00	16	WIRE	98.84	1,600	19,100	
				1												
6.19	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700	
	DC PANEL BOABRD		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000	
	VRLA BATTERIES		EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700	
6.20	GROUNDING							5,500	0					18,600	24,100	
	GROUND ROD	3/4" - 20' LONG	EST	8	EA	150		1,200	0	4.00	37	WIRE	98.84	3,600	4,800	
	500 MCM	BARE COPPER WIRE	EST	500	FT	7.65		3,800	0	0.12	69	WIRE	98.84	6,800	10,600	
	CADWELD		EST	32	EA	15		500	0	2.00	74	WIRE	98.84	7,300	7,800	
	GROUNDING TEST	TEST & DOCUMENTATION	EST	1	LT			0	0	8.00	9	WIRE	98.84	900	900	
6.21	LIGHTING/ TRANSFORMERS & PANELS							52,000	135,000					104,500	291,500	
	LIGHT FIXTURES		EST	180	EA		750	0	135,000	4.00	828	WIRE	98.84	81,800	216,800	
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100	
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300	

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				BIG SANDY UNIT 2										Project No.:	12721-000
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				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				284,500					815,465	1,099,965
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				853,500					2,446,395	3,299,895
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							477,700	1,451,000					6,251,100	8,179,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND						10,031,900	7,141,000					22,560,400	39,733,300
7.0	ABSORBER ISLAND														0
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 MATERIAL	EST	1	LT	41029000		41,029,000	0	398100.00	457,815	MECH	88.89	40,695,200	81,724,200
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	EST	49,800	SF		300.00	0	14,940,000	1.50	85,905	MECH	88.89	7,636,100	22,576,100
7.3	ABSORBER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION VALVES		2	EA	14,000		28,000	0	60.00	138	MECH	88.89	12,300	40,300
7.4	AGITATOR FOR SUMP PUMPS	5 HP		1	EA	12,000		12,000	0	45.00	52	MECH	88.89	4,600	16,600
7.5	EMERGENCY DIESEL DRIVEN QUENCH PUMP	WITH FUEL DAY TANK. FOUNDATIONS INCLUDED WITH ABSORBER BUILDING FOUNDATIONS		1	EA	150,000		150,000	0	300.00	345	MECH	88.89	30,700	180,700
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM EQUIPMENT COST. NO BOP PIPING						0	0					0	0
7.7	ABSORBER VESSEL - FOUNDATIONS							0	366,900					609,400	976,300
	EXCAVATION / BACKFILL		EST	2,921	CY			0	0	0.15	504	EXFD	90.00	45,300	45,300
	REINFORCING		EST	148	TN		1,150.00	0	170,200	20.00	3,404	REIN	78.27	266,400	436,600
	FORMWORK		EST	2,121	SF		2.50	0	5,300	0.14	341	FORM	99.43	34,000	39,300
	CONCRETE		EST	1,571	CY		105.00	0	165,000	1.50	2,710	CONP	79.64	215,800	380,800
	MUD MAT		EST	65	CY		105.00	0	6,800	1.50	112	CONP	79.64	8,900	15,700
	EMBEDDED STEEL		EST	7,855	LB		2.50	0	19,600	0.06	542	CARP	71.88	39,000	58,600
7.8	ABSORBER BUILDING - FOUNDATIONS							0	564,200					884,300	1,448,500
	EXCAVATION / BACKFILL		EST	2,410	CY			0	0	0.15	416	EXFD	90.00	37,400	37,400
	REINFORCING		EST	230	TN		1,150.00	0	264,500	20.00	5,290	REIN	78.27	414,000	678,500
	FORMWORK		EST	2,390	SF		2.50	0	6,000	0.14	385	FORM	99.43	38,300	44,300
	CONCRETE		EST	2,470	CY		105.00	0	259,400	1.50	4,261	CONP	79.64	339,300	598,700

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	MUD MAT		EST	180	CY		105.00	0	18,900	1.50	311	CONP	79.64	24,700	43,600	
	EMBEDDED STEEL		EST	6,175	LB		2.50	0	15,400	0.06	426	CARP	71.88	30,600	46,000	
7.9	ABSORBER BUILDING	150' L X 89' W X 60' H						164,500	2,583,100					2,368,200	5,115,800	
	STRUCTURAL STEEL		EST	550	TN		2650	0	1,457,500	16.00	10,120	STST	105.71	1,069,800	2,527,300	
	INSULATED METAL SIDING		EST	28,680	SF		12	0	344,200	0.11	3,628	SDNG	93.41	338,900	683,100	
	ROLLING OVERHEAD DOOR		EST	960	SF		27	0	25,900	0.25	276	CARP	71.88	19,800	45,700	
	METAL ROOF DECKING		EST	13,350	SF		2.7	0	36,000	0.06	921	STST	105.71	97,400	133,400	
	RIGID ROOF INSULATION		EST	13,350	SF		2.4	0	32,000	0.02	230	ROOF	69.12	15,900	47,900	
	ROOFING (4-PLY TAR & GRAVEL)		EST	13,350	SF		1.55	0	20,700	0.04	614	ROOF	69.12	42,400	63,100	
	LIGHTWEIGHT CONCRETE FILL 1"		EST	39	CY		100	0	3,900	1.30	58	ROOF	69.12	4,000	7,900	
	ROOF FLASHING		EST	478	LF		14.45	0	6,900	0.12	66	ROOF	69.12	4,600	11,500	
	ROOF DRAINS		EST	1	LT		45000	0	15,000	500.00	575	PLMB	79.42	45,700	60,700	
	FLOOR DRAINS		EST	1	LT		37500	0	20,000	375.00	431	PLMB	79.42	34,200	54,200	
	FLOOR SLABS	INCLUDES METAL DECKING AND FORMWORK	EST	55	CY		210	0	11,600	7.50	474	CONP	79.64	37,800	49,400	
	FLOOR FINISHES		EST	8,140	SF		2.5	0	20,400	0.05	468	CONP	79.64	37,300	57,700	
	LOUVERS/WINDOWS/DOORS		EST	5,850	SF		40	0	234,000	0.35	2,355	CARP	71.88	169,300	403,300	
	ROOF VENTILATORS		EST	6	EA		20000	0	120,000	32.00	221	HVAC	81.24	17,900	137,900	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	3,760	SF		45	0	169,200	0.40	1,730	GALL	84.61	146,300	315,500	
	H&V		EST	1	LT	164500	65800	164,500	65,800	3070.67	3,531	HVAC	81.24	286,900	517,200	
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING							0	7,700					14,100	21,800	
	EXCAVATION / BACKFILL		EST	95	CY			0	0	0.15	16	EXFD	90.00	1,500	1,500	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500	
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500	
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200	
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300	
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS							0	37,000					63,200	100,200	
	EXCAVATION / BACKFILL		EST	188	CY			0	0	0.15	32	EXFD	90.00	2,900	2,900	
	REINFORCING		EST	16.0	TN		1,150.00	0	18,400	20.00	368	REIN	78.27	28,800	47,200	
	FORMWORK		EST	480	SF		2.50	0	1,200	0.14	77	FORM	99.43	7,700	8,900	
	CONCRETE		EST	133	CY		105.00	0	14,000	1.50	229	CONP	79.64	18,300	32,300	
	MUD MAT		EST	16	CY		105.00	0	1,700	1.50	28	CONP	79.64	2,200	3,900	
	EMBEDDED STEEL		EST	665	LB		2.50	0	1,700	0.06	46	CARP	71.88	3,300	5,000	
7.12	OXIDATION AIR BLOWER BUILDING	30' L X 30' W X 25' H						33,800	191,000					201,400	426,200	
	STRUCTURAL STEEL		EST	14	TN		2650	0	35,800	16.00	248	STST	105.71	26,300	62,100	
	INSULATED METAL SIDING		EST	3,000	SF		12	0	36,000	0.11	380	SDNG	93.41	35,400	71,400	
	ROLLING OVERHEAD DOOR		EST	320	SF		27	0	8,600	0.25	92	CARP	71.88	6,600	15,200	
	METAL ROOF DECKING		EST	900	SF		2.7	0	2,400	0.06	62	STST	105.71	6,600	9,000	
	RIGID ROOF INSULATION		EST	900	SF		2.4	0	2,200	0.02	16	ROOF	69.12	1,100	3,300	
	ROOFING (4-PLY TAR & GRAVEL)		EST	900	SF		1.55	0	1,400	0.04	41	ROOF	69.12	2,900	4,300	
	LIGHTWEIGHT CONCRETE FILL 1"		EST	3	CY		100	0	300	1.30	4	ROOF	69.12	300	600	
	ROOF FLASHING		EST	120	LF		14.45	0	1,700	0.12	17	ROOF	69.12	1,100	2,800	
	ROOF DRAINS		EST	1	LT		7000	0	15,000	50.00	58	PLMB	79.42	4,600	19,600	
	FLOOR DRAINS		EST	1	LT		7500	0	20,000	60.00	69	PLMB	79.42	5,500	25,500	
	FLOOR SLABS	NONE	EST	0	CY		210	0	0	7.50	0	CONP	79.64	0	0	
	FLOOR FINISHES	MAIN LEVEL	EST	810	SF		2.5	0	2,000	0.05	47	CONP	79.64	3,700	5,700	
	BLOCK WALLS	SOUND ATTENUATING INTERIOR BLOCK WALLS	EST	3,000	SF		8	0	24,000	0.18	621	MSRY	73.39	45,600	69,600	
	LOUVERS/WINDOWS/DOORS & VENTILATORS	SOUND ATTENUATING	EST	300	SF	75	40	22,500	12,000	1.25	431	CARP	71.88	31,000	65,500	
	ROOF VENTILATORS		EST	1	EA		15000	0	15,000	24.00	28	HVAC	81.24	2,200	17,200	
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	225	SF		45	0	10,100	0.40	104	GALL	84.61	8,800	18,900	
	H&V		EST	1	LT	11250	4500	11,300	4,500	210.67	242	HVAC	81.24	19,700	35,500	

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				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:													Reviewer:	JMK
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		Allow.=Allowance								Wage Rates Based on:			BIG SANDY			
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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
7.13	PIPE SUPPORT PAD - OXIDATION BUILDING							0	7,700					13,100	20,800	
	EXCAVATION / BACKFILL		EST	30	CY			0	0	0.15	5	EXFD	90.00	500	500	
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800	
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500	
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500	
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200	
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300	
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	EST	1,095	TN		3,250.00	0	3,558,800	60.00	75,555	FLDU	107.96	8,156,900	11,715,700	
7.15	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	EST	547	TN		2,900.00	0	1,586,300	24.00	15,097	STST	105.71	1,595,900	3,182,200	
7.16	DUCTWORK INSULATION & LAGGING		EST	105,100	SF		12.00	0	1,261,200	0.25	30,216	DINS	81.75	2,470,200	3,731,400	
7.17	FOUNDATIONS FOR DUCT SUPPORT STEEL							0	69,000					126,000	195,000	
	EXCAVATION / BACKFILL		EST	784	CY			0	0	0.15	135	EXFD	90.00	12,200	12,200	
	REINFORCING		EST	23	TN		1,150.00	0	26,100	20.00	522	REIN	78.27	40,900	67,000	
	FORMWORK		EST	1,125	SF		2.50	0	2,800	0.14	181	FORM	99.43	18,000	20,800	
	CONCRETE		EST	303	CY		105.00	0	31,800	1.50	522	CONP	79.64	41,600	73,400	
	MUD MAT		EST	43	CY		105.00	0	4,500	1.50	73	CONP	79.64	5,800	10,300	
	EMBEDDED STEEL		EST	1,513	LB		2.50	0	3,800	0.06	104	CARP	71.88	7,500	11,300	
7.18	TRANSFORMERS							1,181,000	0					263,900	1,444,900	
	SST TRANSFORMERS: 21A & 21B	13.8KV-4160V, 2 WINDING XFMR 17/22.5 - 17MVA (DELTA TO STAR)	EST	2	EA	320500		641,000	0	550.00	1,265	EHEA	79.16	100,100	741,100	
	SUS TRANSFORMERS: 31F/G; 32F/G	13.8KV-480V,3PHASE, CAST COIL	EST	4	EA	85000		340,000	0	300.00	1,380	EHEA	79.16	109,200	449,200	
	SUS TRANSFORMERS: 30F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	100000		200,000	0	300.00	690	EHEA	79.16	54,600	254,600	
7.19	SWITCHGEAR							1,838,400	0					1,118,900	2,957,300	
	13.8 KV MEDIUM VOLTAGE SWITCHGEAR (13F/G))	PRICE PER SECTION	EST	11	EA	50000		550,000	0	340.00	4,301	EHEA	79.16	340,500	890,500	
	4.16KV MEDIUM VOLTAGE SWITCHGEAR& MCCS (21A/B)	PRICE PER SECTION	EST	17	EA	41200		700,400	0	300.00	5,865	EHEA	79.16	464,300	1,164,700	
	480V LOW VOLTAGE SWITCHGEAR (31F/G ; 32F/G)	PRICE PER SECTION	EST	15	EA	39200		588,000	0	230.00	3,968	EHEA	79.16	314,100	902,100	
7.20	CABLE BUS & TERMINATIONS							1,658,300	46,600					2,982,700	4,687,600	
	1200A, 15KV CABLE BUS	CABLE BUS	EST	2,000	FT	466		932,000	0	6.75	15,525	WIRE	98.84	1,534,500	2,466,500	
	3200A, 5KV CABLE BUS	CABLE BUS	EST	300	FT	567		170,100	0	9.00	3,105	WIRE	98.84	306,900	477,000	
	4000A, 480V CABLE BUS	CABLE BUS	EST	900	FT	618		556,200	0	10.30	10,661	WIRE	98.84	1,053,700	1,609,900	
	CABLE BUS TERMINATION	500MCM- 15KV TERMINATIONS	EST	4	EA		1,800.00	0	7,200	33.00	152	WIRE	98.84	15,000	22,200	
	CABLE BUS TERMINATION	1000MCM- 5KV TERMINATIONS	EST	4	EA		4,440.00	0	17,800	51.60	237	WIRE	98.84	23,500	41,300	
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	8	EA		2,700.00	0	21,600	54.00	497	WIRE	98.84	49,100	70,700	
7.21	MCC							432,600	0					22,100	454,700	
	480V MCC	PER MCC LINE UP	EST	14	EA	30900		432,600	0	16.00	224	WIRE	98.84	22,100	454,700	
7.22	MIMIC PANELS		EST	1	EA	17500		17,500	0	40.00	40	WIRE	98.84	4,000	21,500	
7.23	GROUNDING							16,000	0					46,100	62,100	

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	GROUND ROD	3/4" - 20' LONG	EST	16	EA	150		2,400	0	4.00	74	WIRE	98.84	7,300	9,700	
	500 MCM	BARE COPPER WIRE	EST	1,650	FT	7.65		12,600	0	0.12	228	WIRE	98.84	22,500	35,100	
	CADWELD		EST	64	EA	15		1,000	0	2.00	147	WIRE	98.84	14,500	15,500	
	GROUNDING TEST	TEST & DOCUMENTATION	EST	1	LT			0	0	16.00	18	WIRE	98.84	1,800	1,800	
7.24	LIGHTING/ TRANSFORMERS & PANELS							164,500	165,000					171,300	500,800	
	LIGHT FIXTURES		EST	220	EA		750	0	165,000	4.00	1,012	WIRE	98.84	100,000	265,000	
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	6	EA	10000		60,000	0	40.00	276	WIRE	98.84	27,300	87,300	
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	6	EA	7500		45,000	0	32.00	221	WIRE	98.84	21,800	66,800	
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	7	EA	5000		35,000	0	16.00	129	WIRE	98.84	12,700	47,700	
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	7	EA	3500		24,500	0	12.00	97	WIRE	98.84	9,500	34,000	
7.25	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700	
	DC PANEL BOADRD		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000	
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000	
	VRLA BATTERIES	8HR-400A, 480V	EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700	
7.26	RACEWAY, CABLE TRAY, & CONDUIT							0	1,421,900					5,191,200	6,613,100	
	12" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	2,450	LF		18.25	0	44,700	1.10	2,695	WIRE	98.84	266400	311,100	
	18" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	1,650	LF		21.50	0	35,500	1.45	2,393	WIRE	98.84	236500	272,000	
	24" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	2,950	LF		27.10	0	79,900	1.75	5,163	WIRE	98.84	510300	590,200	
	36" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	1,650	LF		30.30	0	50,000	1.95	3,218	WIRE	98.84	318000	368,000	
	5" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	4,500	LF		61.00	0	274,500	1.13	5,072	WIRE	98.84	501300	775,800	
	4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	8,000	LF		31.00	0	248,000	0.81	6,456	WIRE	98.84	638100	886,100	
	3" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	8,000	LF		21.50	0	172,000	0.65	5,160	WIRE	98.84	510000	682,000	
	2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	13,000	LF		9.25	0	120,300	0.35	4,576	WIRE	98.84	452300	572,600	
	1-1/2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	16,000	LF		7.15	0	114,400	0.28	4,544	WIRE	98.84	449100	563,500	
	1" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	29,000	LF		4.44	0	128,800	0.24	6,931	WIRE	98.84	685100	813,900	
	3/4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	53,000	LF		1.46	0	77,400	0.08	4,815	WIRE	98.84	475900	553,300	
	DUCT BANK WITH 12-5" & 6-3" CONDUITS	3.08' H X 5.2' W	EST	200	LF		381.96	0	76,400	6.48	1,490	FORM	99.43	148200	224,600	
7.27	HIGH VOLTAGE POWER CABLE & TERMINATION							0	58,400					164,700	223,100	
	1/C # 500KCML-15KV		EST	6,300	LF		9.27	0	58,400	0.23	1,666	WIRE	98.84	164700	223,100	
7.28	MEDIUM VOLTAGE POWER CABLE & TERMINATION							0	114,600		0			431,700	546,300	
	1/C # 500KCML-5KV		EST	6,000	LF		8.08	0	48,500	0.17	1,194	WIRE	98.84	118000	166,500	
	1/C # 350KCML-5KV		EST	6,600	LF		6.13	0	40,500	0.23	1,746	WIRE	98.84	172500	213,000	

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	1/C # 250KCMIL-5KV		EST	5,400	LF		4.74	0	25,600	0.23	1,428	WIRE	98.84	141200	166,800
7.29	LOW VOLTAGE POWER CABLE & TERMINATION							0	795,900					1,500,700	2,296,600
	3/C # 500KCMIL- 600V		EST	11,120	LF		26.12	0	290,500	0.69	8,824	WIRE	98.84	872100	1,162,600
	#4/0 - #12 AWG-600V		EST	70,000	LF		7.22	0	505,400	0.08	6,360	WIRE	98.84	628600	1,134,000
7.30	CONTROL & INSTRUMENT CABLE							0	512,000					1,436,700	1,948,700
	#14, #16 & PR # 20 FD & SHLD WIRE		EST	160,000	LF		3.20	0	512,000	0.08	14,536	WIRE	98.84	1436700	1,948,700
7.31	FOUNDATION FOR TRANSFORMERS							0	59,000					173,700	232,700
	FOR 21A & 21B	WITH OIL PIT	EST	178	CY		250	0	44,500	8.00	1,638	CONP	79.64	130,400	174,900
	FOR 31F, 31G, 32F, 32G, 33F & 33G		EST	63.0	CY		230	0	14,500	7.50	543	CONP	79.64	43,300	57,800
7.32	TRANSFORMER FIRE WALLS							0	3,500					9,600	13,100
	FOR 21A & 21B		EST	15	CY		230	0	3,500	7.00	121	CONP	79.64	9,600	13,100
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							46,833,900	28,349,800		855,561			78,423,300	153,607,000
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														
	ADDITIONAL CRANE ALLOWANCE			9	MN	75000		675,000		720.00	7,452	MECH	88.89	662400	1,337,400
	MOBILIZATION / DEMOBILIZATION - INCLUDED IN WAGE RATES ABOVE														0
	COST DUE TO OVERTIME WORKING 5 X10 HOUR DAYS			1	LS										
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						75,045		91.66	6,879,000	6,879,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						93,806			7,225,646	7,225,646
	PER DIEM	NONE		0.00	HR						1,031,864			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				141,749					392,117	533,866
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				1,417,490						1,417,490
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			2,341,695							2,341,695
	SALES TAX - NOT INCLUDED														0
	SCAFFOLDING - % OF ACCT NO. 90			5.0	%				1,417,490					3,921,165	5,338,655
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				4,252,470					11,763,495	16,015,965
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							3,016,700	7,229,200					30,843,800	41,089,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND						49,850,600	35,579,000					109,267,100	194,696,700
8.0	FGD WASTE WATER TREATMENT PLANT														0
9.0	COMPRESSED AIR SYSTEM														0
10.0	SERVICE WATER SYSTEM														
11.0	POTABLE WATER SYSTEM														
12.0	FGD SUBSTATION														0
13.0	FGD DCS SYSTEM														0
14.0	CEM SYSTEM														0
15.0	RAIL INFRASTRUCTURE														0



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

ATTACHMENT 2-9
WFGD Detailed Capital Cost Estimate No. 30709 Est-4 (7.5 lb SO₂/MMbtu)

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[illegible]

				AEP										Estimate No.:	30709B
				BIG SANDY UNIT 2										Project No.:	12721-000
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	H&V		EST	1	LT	70200	28080	70,200	28,100	1310.67	1,507	HVAC	81.24	122,500	220,800
	HVAC	40T PACKAGED UNIT FOR ELECTRICAL EQUIPMENT ROOM. INCLUDES ALLOWANCE FOR CONCRETE PAD AND ELECTRICAL WORK	EST	1	LT	75000	20000	75,000	20,000	350.00	403	HVAC	81.24	32,700	127,700
6.13	PIPE SUPPORT PAD							0	13,800					25,000	38,800
	EXCAVATION / BACKFILL		EST	100	CY			0	0	0.15	17	EXFD	90.00	1,600	1,600
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	280	SF		2.50	0	700	0.14	45	FORM	99.43	4,500	5,200
	CONCRETE		EST	40	CY		105.00	0	4,200	1.50	69	CONP	79.64	5,500	9,700
	MUD MAT		EST	25	CY		105.00	0	2,600	1.50	43	CONP	79.64	3,400	6,000
	EMBEDDED STEEL		EST	200	LB		2.50	0	500	0.06	14	CARP	71.88	1,000	1,500
6.14	TRANSFORMERS							170,000	0					54,600	224,600
	SUS TRANSFORMERS: 33F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	85000		170,000	0	300.00	690	EHEA	79.16	54,600	224,600
6.15	SWITCHGEAR	480V LOW VOLATAGE SWITCHGEAR, PRICE PER SECTION	EST	5	EA	39200		196,000	0	230.00	1,323	EHEA	79.16	104,700	300,700
6.16	CABLE BUS DUCT							269,400	10,800					375,800	656,000
	480V CABLE BUS DUCT	BUS DUCT ONLY	EST	300	FT	898		269,400	0	10.30	3,554	WIRE	98.84	351,200	620,600
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	4	EA		2,700.00	0	10,800	54.00	248	WIRE	98.84	24,600	35,400
6.17	MCC							123,600	0					6,300	129,900
	480V MCC	PER MCC LINEUP	EST	4	EA	30900		123,600	0	16.00	64	WIRE	98.84	6,300	129,900
6.18	MIMIC PANELS		EST	1	EA	17500		17,500	0	16.00	16	WIRE	98.84	1,600	19,100
				1											
6.19	EMERGENCY POWER SYSTEM							108,300	0					24,400	132,700
	DC PANEL BOABRD		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000
	UPS PANEL BOARDS		EST	1	EA	15450		15,500	0	40.00	46	WIRE	98.84	4,500	20,000
	SATELLITE UPS		EST	1	EA	41200		41,200	0	16.00	18	WIRE	98.84	1,800	43,000
	VRLA BATTERIES		EST	1	LT	36050		36,100	0	120.00	138	WIRE	98.84	13,600	49,700
6.20	GROUNDING							5,500	0					18,600	24,100
	GROUND ROD	3/4" - 20' LONG	EST	8	EA	150		1,200	0	4.00	37	WIRE	98.84	3,600	4,800
	500 MCM	BARE COPPER WIRE	EST	500	FT	7.65		3,800	0	0.12	69	WIRE	98.84	6,800	10,600
	CADWELD		EST	32	EA	15		500	0	2.00	74	WIRE	98.84	7,300	7,800
	GROUNDING TEST	TEST & DOCUMENTATIONS	EST	1	LT			0	0	8.00	9	WIRE	98.84	900	900

				AEP										Estimate No.:	30709B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU										Date:	9/10/2010
				ORDER OF MAGNITUDE COST ESTIMATE										Preparer:	MNO
		Cost Type:												Reviewer:	JMK
		Est=Estimated												Approver:	PEF
		Allow.=Allowance								Wage Rates Based on:		BIG SANDY			
		Q=Vendor Quote								Labor Productivity =		1.15			
Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
6.21	LIGHTING/ TRANSFORMERS & PANELS							52,000	135,000					104,500	291,500
	LIGHT FIXTURES		EST	180	EA		750	0	135,000	4.00	828	WIRE	98.84	81,800	216,800
	45KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	10000		20,000	0	40.00	92	WIRE	98.84	9,100	29,100
	37.7KVA, 480V, 3 PHASE	LOW VOLTAGE XFMR	EST	2	EA	7500		15,000	0	32.00	74	WIRE	98.84	7,300	22,300
	200A, 480-277V, 3 PHASE- RECEPTACLE PANEL	INCLUDING BREAKERS	EST	2	EA	5000		10,000	0	16.00	37	WIRE	98.84	3,600	13,600
	200A, 277V-120V, 3 PHASE- LIGHTING PANELS	INCLUDING BREAKERS	EST	2	EA	3500		7,000	0	12.00	28	WIRE	98.84	2,700	9,700
6.22	RACEWAY, CABLE TRAY, & CONDUIT							0	310,500					1,278,800	1,589,300
	12" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		18.25	0	16,400	1.10	990	WIRE	98.84	97900	114,300
	18" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		21.50	0	19,400	1.45	1,305	WIRE	98.84	129000	148,400
	24" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		27.10	0	24,400	1.75	1,575	WIRE	98.84	155700	180,100
	36" X 6" AL CABLE TRAY	INCLUDING SUPPORT & FITTINGS	EST	900	LF		30.30	0	27,300	1.95	1,755	WIRE	98.84	173500	200,800
	5" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	850	LF		61.00	0	51,900	1.13	958	WIRE	98.84	94700	146,600
	4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	1,600	LF		31.00	0	49,600	0.81	1,291	WIRE	98.84	127600	177,200
	3" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	1,700	LF		21.50	0	36,600	0.65	1,097	WIRE	98.84	108400	145,000
	2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	2,600	LF		9.25	0	24,100	0.35	915	WIRE	98.84	90500	114,600
	1-1/2" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	3,300	LF		7.15	0	23,600	0.28	937	WIRE	98.84	92600	116,200
	1" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	5,500	LF		4.44	0	24,400	0.24	1,315	WIRE	98.84	129900	154,300
	3/4" RGS CONDUIT	INCLUDING SUPPORT & FITTINGS	EST	8,800	LF		1.46	0	12,800	0.08	799	WIRE	98.84	79000	91,800
6.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCML-15KV	EST	1,500	LF		9.27	0	13,900	0.23	397	WIRE	98.84	39200	53,100
6.24	LOW VOLTAGE POWER CABLE & TERMINATION							0	73,100					533,900	607,000
	3/C # 500KCML- 600V		EST	2,800	LF		26.12	0	73,100	0.69	2,222	WIRE	98.84	219600	292,700
	#4/0 - #12 AWG-600V		EST	35,000	LF		7.22			0.08	3,180	WIRE	98.84	314300	314,300
6.25	CONTROL & INSTRUMENT CABLE	#14, #16 & PR # 20 & SHLD WIRE	EST	31,000	LF		3.20	0	99,200	0.08	2,816	WIRE	98.84	278400	377,600
6.26	FOUNDATIONS FOR TRANSFORMERS							0	3,500					10,300	13,800
	FOR XFMR 33F, 33G	INCLUDES MUD MAT	EST	14.0	CY		250	0	3,500	8.00	129	CONP	79.64	10,300	13,800
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							12,571,200	5,763,800		198,375			17,765,000	36,100,000
	OTHER DIRECT & CONSTRUCTION INDIRECT COSTS														

				AEP										Estimate No.:	30709B
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU										Date:	9/10/2010
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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING							0	7,700					14,100	21,800
	EXCAVATION / BACKFILL		EST	95	CY			0	0	0.15	16	EXFD	90.00	1,500	1,500
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS							0	37,000					63,200	100,200
	EXCAVATION / BACKFILL		EST	188	CY			0	0	0.15	32	EXFD	90.00	2,900	2,900
	REINFORCING		EST	16.0	TN		1,150.00	0	18,400	20.00	368	REIN	78.27	28,800	47,200
	FORMWORK		EST	480	SF		2.50	0	1,200	0.14	77	FORM	99.43	7,700	8,900
	CONCRETE		EST	133	CY		105.00	0	14,000	1.50	229	CONP	79.64	18,300	32,300
	MUD MAT		EST	16	CY		105.00	0	1,700	1.50	28	CONP	79.64	2,200	3,900
	EMBEDDED STEEL		EST	665	LB		2.50	0	1,700	0.06	46	CARP	71.88	3,300	5,000
7.12	OXIDATION AIR BLOWER BUILDING	30' L X 30' W X 25' H						33,800	191,000					201,400	426,200
	STRUCTURAL STEEL		EST	14	TN		2650	0	35,800	16.00	248	STST	105.71	26,300	62,100
	INSULATED METAL SIDING		EST	3,000	SF		12	0	36,000	0.11	380	SDNG	93.41	35,400	71,400
	ROLLING OVERHEAD DOOR		EST	320	SF		27	0	8,600	0.25	92	CARP	71.88	6,600	15,200
	METAL ROOF DECKING		EST	900	SF		2.7	0	2,400	0.06	62	STST	105.71	6,600	9,000
	RIGID ROOF INSULATION		EST	900	SF		2.4	0	2,200	0.02	16	ROOF	69.12	1,100	3,300
	ROOFING (4-PLY TAR & GRAVEL)		EST	900	SF		1.55	0	1,400	0.04	41	ROOF	69.12	2,900	4,300
	LIGHTWEIGHT CONCRETE FILL 1"		EST	3	CY		100	0	300	1.30	4	ROOF	69.12	300	600
	ROOF FLASHING		EST	120	LF		14.45	0	1,700	0.12	17	ROOF	69.12	1,100	2,800
	ROOF DRAINS		EST	1	LT		7000	0	15,000	50.00	58	PLMB	79.42	4,600	19,600
	FLOOR DRAINS		EST	1	LT		7500	0	20,000	60.00	69	PLMB	79.42	5,500	25,500
	FLOOR SLABS	NONE	EST	0	CY		210	0	0	7.50	0	CONP	79.64	0	0
	FLOOR FINISHES	MAIN LEVEL	EST	810	SF		2.5	0	2,000	0.05	47	CONP	79.64	3,700	5,700
	BLOCK WALLS	SOUND ATTENUATING INTERIOR BLOCK WALLS	EST	3,000	SF		8	0	24,000	0.18	621	MSRY	73.39	45,600	69,600
	LOUVERS/WINDOWS/DOORS & VENTILATORS	SOUND ATTENUATING	EST	300	SF	75	40	22,500	12,000	1.25	431	CARP	71.88	31,000	65,500
	ROOF VENTILATORS		EST	1	EA		15000	0	15,000	24.00	28	HVAC	81.24	2,200	17,200
	GALLERIES & LANDINGS	SUPPORT STEEL WITH BUILDING STEEL	EST	225	SF		45	0	10,100	0.40	104	GALL	84.61	8,800	18,900
	H&V		EST	1	LT	11250	4500	11,300	4,500	210.67	242	HVAC	81.24	19,700	35,500
7.13	PIPE SUPPORT PAD - OXIDATION BUILDING							0	7,700					13,100	20,800
	EXCAVATION / BACKFILL		EST	30	CY			0	0	0.15	5	EXFD	90.00	500	500
	REINFORCING		EST	5.0	TN		1,150.00	0	5,800	20.00	115	REIN	78.27	9,000	14,800
	FORMWORK		EST	80	SF		2.50	0	200	0.14	13	FORM	99.43	1,300	1,500
	CONCRETE		EST	10	CY		105.00	0	1,100	1.50	17	CONP	79.64	1,400	2,500
	MUD MAT		EST	5	CY		105.00	0	500	1.50	9	CONP	79.64	700	1,200
	EMBEDDED STEEL		EST	50	LB		2.50	0	100	0.06	3	CARP	71.88	200	300
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	EST	1,095	TN		3,250.00	0	3,558,800	60.00	75,555	FLDU	107.96	8,156,900	11,715,700

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Account No.	Item Description	Scope Definition	Cost Type	Quantity	Unit of Measure	Unit Equip.Cost	Unit Material Cost	Total Equipment Cost	Total Material Cost	Unit Man-hours (Base)	Total Man-hours (w/ productivity)	Crew Code	Crew Wage Rate	Total Construction & Erection Cost	Total Projected Cost	
7.15	DUCT SUPPORT STEEL	THREE-COAT SHOP PAINT	EST	547	TN		2,900.00	0	1,586,300	24.00	15,097	STST	105.71	1,595,900	3,182,200	
7.16	DUCTWORK INSULATION & LAGGING		EST	105,100	SF		12.00	0	1,261,200	0.25	30,216	DINS	81.75	2,470,200	3,731,400	
7.17	FOUNDATIONS FOR DUCT SUPPORT STEEL							0	69,000					125,700	194,700	
	EXCAVATION / BACKFILL		EST	784	CY			0	0	0.15	135	EXFD	88.17	11,900	11,900	
	REINFORCING		EST	23	TN		1,150.00	0	26,100	20.00	522	REIN	78.27	40,900	67,000	
	FORMWORK		EST	1,125	SF		2.50	0	2,800	0.14	181	FORM	99.43	18,000	20,800	
	CONCRETE		EST	303	CY		105.00	0	31,800	1.50	522	CONP	79.64	41,600	73,400	
	MUD MAT		EST	43	CY		105.00	0	4,500	1.50	73	CONP	79.64	5,800	10,300	
	EMBEDDED STEEL		EST	1,513	LB		2.50	0	3,800	0.06	104	CARP	71.88	7,500	11,300	
7.18	TRANSFORMERS							1,181,000	0					263,900	1,444,900	
	SST TRANSFORMERS: 21A & 21B	13.8KV-4160V, 2 WINDING XFMR 17/22.5 - 17MVA (DELTA TO STAR)	EST	2	EA	320500		641,000	0	550.00	1,265	EHEA	79.16	100,100	741,100	
	SUS TRANSFORMERS: 31F/G; 32F/G	13.8KV-480V,3PHASE, CAST COIL	EST	4	EA	85000		340,000	0	300.00	1,380	EHEA	79.16	109,200	449,200	
	SUS TRANSFORMERS: 30F/G	13.8KV-480V,3PHASE, CAST COIL	EST	2	EA	100000		200,000	0	300.00	690	EHEA	79.16	54,600	254,600	
7.19	SWITCHGEAR							1,838,400	0					1,118,900	2,957,300	
	13.8 KV MEDIUM VOLTAGE SWITCHGEAR (13F/G))	PRICE PER SECTION	EST	11	EA	50000		550,000	0	340.00	4,301	EHEA	79.16	340,500	890,500	
	4.16KV MEDIUM VOLTAGE SWITCHGEAR& MCCS (21A/B)	PRICE PER SECTION	EST	17	EA	41200		700,400	0	300.00	5,865	EHEA	79.16	464,300	1,164,700	
	480V LOW VOLTAGE SWITCHGEAR (31F/G ; 32F/G)	PRICE PER SECTION	EST	15	EA	39200		588,000	0	230.00	3,968	EHEA	79.16	314,100	902,100	
7.20	CABLE BUS & TERMINATIONS							1,658,300	46,600					2,982,700	4,687,600	
	1200A, 15KV CABLE BUS	CABLE BUS	EST	2,000	FT	466		932,000	0	6.75	15,525	WIRE	98.84	1,534,500	2,466,500	
	3200A, 5KV CABLE BUS	CABLE BUS	EST	300	FT	567		170,100	0	9.00	3,105	WIRE	98.84	306,900	477,000	
	4000A, 480V CABLE BUS	CABLE BUS	EST	900	FT	618		556,200	0	10.30	10,661	WIRE	98.84	1,053,700	1,609,900	
	CABLE BUS TERMINATION	500MCM- 15KV TERMINATIONS	EST	4	EA		1,800.00	0	7,200	33.00	152	WIRE	98.84	15,000	22,200	
	CABLE BUS TERMINATION	1000MCM- 5KV TERMINATIONS	EST	4	EA		4,440.00	0	17,800	51.60	237	WIRE	98.84	23,500	41,300	
	CABLE BUS TERMINATION	750MCM- 480V TERMINATIONS	EST	8	EA		2,700.00	0	21,600	54.00	497	WIRE	98.84	49,100	70,700	
7.21	MCC							432,600	0					22,100	454,700	
	480V MCC	PER MCC LINE UP	EST	14	EA	30900		432,600	0	16.00	224	WIRE	98.84	22,100	454,700	
7.22	MIMIC PANELS		EST	1	EA	17500		17,500	0	40.00	40	WIRE	98.84	4,000	21,500	
7.23	GROUNDING							16,000	0					46,100	62,100	
	GROUND ROD	3/4" - 20' LONG	EST	16	EA	150		2,400	0	4.00	74	WIRE	98.84	7,300	9,700	

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

ATTACHMENT 2-10
WFGD Summary Capital Cost Estimate No. 30708 Base Est-1 (4.5 lb SO₂/MMbtu)

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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
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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

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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

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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

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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	\$ -	\$ -	\$ -	\$ -

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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

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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					

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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

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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

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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	\$ -	\$ -	\$ -	\$ -

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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

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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
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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

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	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

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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					

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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

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	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					\$ -

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	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
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

ATTACHMENT 2-11
WFGD Summary Capital Cost Estimate No. 30706 Est-2 (1.7 lb SO₂/MMbtu)

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Sargent & Lundy, LLC

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BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU
COST ESTIMATE SUMMARY

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1.0	ID FANS					
2.0	WET ESP					
3.0	NEW STACK					
4.0	LIMESTONE HANDLING SYSTEM					
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	\$ 11,425,000	\$ -	\$ 10,349,200	\$ 21,774,200
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		\$ -	\$ 649,100	\$ 1,020,200	\$ 1,669,300
5.7	REAGENT PREPARATION BUILDING	120' L X 125' W X 130' H	\$ 269,400	\$ 4,684,200	\$ 4,106,700	\$ 9,060,300
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING		\$ -	\$ 13,800	\$ 24,800	\$ 38,600
5.9	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
5.10	GROUNDING		\$ 2,000	\$ -	\$ 7,900	\$ 9,900
5.11	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND,	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 12,067,300	\$ 5,853,500	\$ 16,495,800	\$ 34,416,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 603,400	\$ 1,492,600	\$ 6,322,400	\$ 8,418,400

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	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 12,670,700	\$ 7,346,100	\$ 22,818,200	\$ 42,835,000
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY DEWATERING INCLUDING HYDROCLONES, PUMPS, INTEGRAL PIPING, BELT VACUUM FILTERS, AND DISCHARGE	\$ 5,688,000	\$ -	\$ 5,148,700	\$ 10,836,700
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
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		\$ -	\$ 275,400	\$ 432,300	\$ 707,700
6.12	BYPRODUCT DEWATERING BUILDING	120' L X 71' W X 65' H	\$ 145,200	\$ 1,536,000	\$ 1,446,100	\$ 3,127,300
6.13	PIPE SUPPORT PAD		\$ -	\$ 13,800	\$ 24,700	\$ 38,500
6.14	TRANSFORMERS		\$ 170,000	\$ -	\$ 54,600	\$ 224,600

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6.15	SWITCHGEAR	480V LOW VOLATAGE 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		\$ 7,992,200	\$ 5,625,700	\$ 15,436,200	\$ 29,054,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 399,600	\$ 1,434,600	\$ 5,916,400	\$ 7,750,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 8,391,800	\$ 7,060,300	\$ 21,352,600	\$ 36,804,600
7.0	ABSORBER ISLAND					

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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	\$ 40,589,000	\$ -	\$ 40,429,400	\$ 81,018,400
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		\$ -	\$ 544,300	\$ 852,800	\$ 1,397,100
7.9	ABSORBER BUILDING	150' L X 85' W X 60' H	\$ 164,500	\$ 2,501,100	\$ 2,297,900	\$ 4,963,500
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING		\$ -	\$ 7,700	\$ 14,100	\$ 21,800
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

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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
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		\$ 46,393,900	\$ 28,247,900	\$ 78,055,700	\$ 152,697,500
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,994,700	\$ 7,203,200	\$ 30,702,900	\$ 40,900,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 49,388,600	\$ 35,451,100	\$ 108,758,600	\$ 193,598,300
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					
10.0	SERVICE WATER SYSTEM					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30706B
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
11.0	POTABLE WATER SYSTEM					
12.0	FGD SUBSTATION					
13.0	FGD DCS SYSTEM					
14.0	CEM SYSTEM					
15.0	RAIL INFRASTRUCTURE					
16.0	SITE IMPROVEMENTS - CIVIL WORK					
17.0	BOP ITEMS					
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)		\$ -	\$ 181,700	\$ 696,800	\$ 878,500
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	\$ 1,377,900	\$ 2,637,300	\$ 4,225,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 351,365	\$ 1,010,540	\$ 1,372,404
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,729,300	\$ 3,647,800	\$ 5,597,600
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	0.0				

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30706B
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS - PROJECT TOTAL		\$ 136,167,900	\$ 93,982,100	\$ 220,450,200	\$ 451,350,200
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS - PROJECT TOTAL		\$ 7,381,400	\$ 20,002,700	\$ 79,143,800	\$ 106,527,900
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST - PROJECT TOTAL		\$ 143,549,300	\$ 113,984,800	\$ 299,594,000	\$ 557,878,100
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 16,736,300
	S-U / COMMISSIONING					\$ 5,578,800
	CRAFT START-UP SUPPORT					\$ 2,598,200
	INITIAL FILLS					\$ 1,673,600
	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					\$ -
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 615,165,000
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,866,100
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 1,157,000
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 709,100
	CONTINGENCY	14.4				\$ 89,116,700
	ESCALATION					\$ 55,376,200

Sargent & Lundy, LLC

AEP
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	EQUIPMENT					\$ 14,980,700
	MATERIAL					\$ 8,180,400
	LABOR					\$ 27,043,900
	INDIRECTS					\$ 5,171,200
	INTEREST DURING CONSTRUCTION (AFUDC)					
	TOTAL PROJECT COST					\$ 761,524,000
	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
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

ATTACHMENT 2-12
WFGD Summary Capital Cost Estimate No. 30707 Est-3 (3.0 lb SO₂/MMbtu)

DRAFT COPY

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30707B
Project No.: 12721-000
Date: 9/10/2010
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
1.0	ID FANS					
2.0	WET ESP					
3.0	NEW STACK					
4.0	LIMESTONE HANDLING SYSTEM					
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	\$ 13,430,000	\$ -	\$ 11,408,100	\$ 24,838,100
5.2	REAGENT PREPARATION BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK & ISOLATION	\$ 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		\$ -	\$ 674,900	\$ 1,060,900	\$ 1,735,800
5.7	REAGENT PREPARATION BUILDING	120' L X 129' W X 130' H	\$ 269,400	\$ 4,813,500	\$ 4,211,000	\$ 9,293,900
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING		\$ -	\$ 13,800	\$ 24,900	\$ 38,700
5.9	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
5.10	GROUNDING		\$ 2,000	\$ -	\$ 7,900	\$ 9,900
5.11	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND, SECTION 7.0	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 14,072,300	\$ 6,008,600	\$ 17,699,800	\$ 37,780,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 703,600	\$ 1,532,200	\$ 6,784,200	\$ 9,020,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 14,775,900	\$ 7,540,800	\$ 24,484,000	\$ 46,800,700
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY DEWATERING INCLUDING HYDROCLONES, PUMPS, INTEGRAL PIPING, BELT VACUUM FILTERS, AND DISCHARGE CONVEYORS	\$ 7,250,000	\$ -	\$ 5,959,600	\$ 13,209,600
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
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		\$ -	\$ 288,700	\$ 451,900	\$ 740,600
6.12	BYPRODUCT DEWATERING BUILDING	120' L X 74' W X 65' H	\$ 145,200	\$ 1,587,000	\$ 1,488,400	\$ 3,220,600

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BIG SANDY UNIT 2
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
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 VOLATAGE 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		\$ 9,554,200	\$ 5,690,000	\$ 16,309,300	\$ 31,553,500
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 477,700	\$ 1,451,000	\$ 6,251,100	\$ 8,179,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 10,031,900	\$ 7,141,000	\$ 22,560,400	\$ 39,733,300
7.0	ABSORBER ISLAND					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU
COST ESTIMATE SUMMARY

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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	\$ 41,029,000	\$ -	\$ 40,695,200	\$ 81,724,200
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		\$ -	\$ 564,200	\$ 884,300	\$ 1,448,500
7.9	ABSORBER BUILDING	150' L X 89' W X 60' H	\$ 164,500	\$ 2,583,100	\$ 2,368,200	\$ 5,115,800
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING		\$ -	\$ 7,700	\$ 14,100	\$ 21,800
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

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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		\$ 46,833,900	\$ 28,349,800	\$ 78,423,300	\$ 153,607,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,016,700	\$ 7,229,200	\$ 30,843,800	\$ 41,089,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 49,850,600	\$ 35,579,000	\$ 109,267,100	\$ 194,696,700
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					
10.0	SERVICE WATER SYSTEM					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
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11.0	POTABLE WATER SYSTEM					
12.0	FGD SUBSTATION					
13.0	FGD DCS SYSTEM					
14.0	CEM SYSTEM					
15.0	RAIL INFRASTRUCTURE					
16.0	SITE IMPROVEMENTS - CIVIL WORK					
17.0	BOP ITEMS					
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)		\$ -	\$ 183,700	\$ 704,600	\$ 888,300
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	\$ 1,379,900	\$ 2,645,100	\$ 4,235,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 351,875	\$ 1,013,851	\$ 1,376,226
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,731,800	\$ 3,659,000	\$ 5,611,200
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					

Sargent & Lundy, LLC

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99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 140,174,900	\$ 94,305,400	\$ 222,902,700	\$ 458,133,000
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,581,700	\$ 20,085,200	\$ 80,084,600	\$ 107,751,500
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 147,756,600	\$ 114,390,600	\$ 302,987,300	\$ 565,884,500
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 16,976,500
	S-U / COMMISSIONING					\$ 5,658,800
	CRAFT START-UP SUPPORT					\$ 2,627,100
	INITIAL FILLS					\$ 1,697,700
	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					\$ -
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 623,544,600
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 1,920,800
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 1,536,640
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 960,400
	CONTINGENCY	14.48				\$ 90,572,700
	ESCALATION					\$ 56,184,500
	EQUIPMENT					\$ 15,419,800
	MATERIAL					\$ 8,209,500
	LABOR					\$ 27,350,300

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30707B
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					\$ 5,204,900
	INTEREST DURING CONSTRUCTION (AFUDC)					
	TOTAL PROJECT COST					\$ 772,222,600
	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
WFGD, DFGD, IAQCS & NID Technologies
September 10, 2010

ATTACHMENT 2-13
WFGD Summary Capital Cost Estimate No. 30709 Est-4 (7.5 lb SO₂/MMbtu)

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Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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					
2.0	WET ESP					
3.0	NEW STACK					
4.0	LIMESTONE HANDLING SYSTEM					
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	\$ 16,936,000	\$ -	\$ 13,105,100	\$ 30,041,100
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		\$ -	\$ 701,800	\$ 1,103,100	\$ 1,804,900
5.7	REAGENT PREPARATION BUILDING	120' L X 135' W X 130' H	\$ 269,400	\$ 4,979,600	\$ 4,346,100	\$ 9,595,100
5.8	PIPE SUPPORT PAD - REAGENT PREP BUILDING		\$ -	\$ 14,400	\$ 26,100	\$ 40,500
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	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 17,578,300	\$ 6,202,200	\$ 19,575,300	\$ 43,355,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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		\$ 878,900	\$ 1,581,600	\$ 7,503,000	\$ 9,963,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 18,457,200	\$ 7,783,800	\$ 27,078,300	\$ 53,319,200
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY DEWATERING INCLUDING HYDROCLONES, PUMPS, INTEGRAL PIPING, BELT VACUUM FILTERS, AND DISCHARGE CONVEYORS	\$ 10,267,000	\$ -	\$ 7,339,600	\$ 17,606,600
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
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT AREA SI AB	\$ -	\$ 1,155,700	\$ 1,779,300	\$ 2,935,000
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 224,400	\$ 361,700

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 301,000	\$ 471,300	\$ 772,300
6.12	BYPRODUCT DEWATERING BUILDING	120' L X 80' W X 65' H	\$ 145,200	\$ 1,648,500	\$ 1,544,700	\$ 3,338,400
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 VOLATAGE 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		\$ 12,571,200	\$ 5,763,800	\$ 17,765,000	\$ 36,100,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 628,600	\$ 1,469,800	\$ 6,809,500	\$ 8,907,800
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 13,199,800	\$ 7,233,600	\$ 24,574,500	\$ 45,007,800
7.0	ABSORBER ISLAND					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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	\$ 41,668,000	\$ -	\$ 41,073,400	\$ 82,741,400
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		\$ -	\$ 608,300	\$ 951,900	\$ 1,560,200
7.9	ABSORBER BUILDING	150' L X 95' W X 60' H	\$ 164,500	\$ 2,746,000	\$ 2,500,300	\$ 5,410,800
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING		\$ -	\$ 7,700	\$ 14,100	\$ 21,800
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 37,000	\$ 63,200	\$ 100,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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
7.12	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	\$ 125,700	\$ 194,700
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		\$ 47,472,900	\$ 28,556,800	\$ 79,000,900	\$ 155,030,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,048,600	\$ 7,282,000	\$ 31,065,000	\$ 41,395,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,521,500	\$ 35,838,800	\$ 110,065,900	\$ 196,426,200
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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
10.0	SERVICE WATER SYSTEM					
11.0	POTABLE WATER SYSTEM					
12.0	FGD SUBSTATION					
13.0	FGD DCS SYSTEM					
14.0	CEM SYSTEM					
15.0	RAIL INFRASTRUCTURE					
16.0	SITE IMPROVEMENTS - CIVIL WORK					
17.0	BOP ITEMS					
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 147,336,900	\$ 94,787,100	\$ 226,839,400	\$ 469,713,400
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,939,800	\$ 20,208,000	\$ 81,593,200	\$ 109,741,000
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 155,276,700	\$ 114,995,100	\$ 308,432,600	\$ 580,204,400
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30709B
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
	CONSTRUCTION MANAGEMENT					\$ 17,383,600
	S-U / COMMISSIONING					\$ 5,794,500
	CRAFT START-UP SUPPORT					\$ 2,673,500
	INITIAL FILLS					\$ 1,738,400
	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					\$ -
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 637,744,400
	SPARE PARTS FOR THE OEM & THE BOP EQUIPMENT					\$ 2,018,600
	SPARE PARTS FOR THE OEM EQUIPMENT	0.80				\$ 1,251,532
	SPARE PARTS FOR THE BOP EQUIPMENT	0.50				\$ 767,068
	CONTINGENCY	14.4				\$ 92,439,700
	ESCALATION					\$ 57,561,000
	EQUIPMENT					\$ 16,204,500
	MATERIAL					\$ 8,252,900
	LABOR					\$ 27,841,800
	INDIRECTS					\$ 5,261,800
	INTEREST DURING CONSTRUCTION (AFUDC)					
	TOTAL PROJECT COST					\$ 789,763,700
	REFERENCE COSTS:					
A	ESP STRUCTURAL INTEGRITY MODS	ALLOWANCE FOR 150 TON FRAMING REINFORCEMENT	\$ -	\$ 435,000	\$ 2,188,200	\$ 2,623,200

Sargent & Lundy, LLC		AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30709B 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
B	REMOVE BOOSTER AIR FANS	0	\$ -	\$ -	\$ 111,000	\$ 111,000



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

ATTACHMENT 2-14
O&M Costs – Fixed and Variable (WFGD)

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Order-of-Magnitude EPC Cost Estimate – Attachment 2-14
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010

WFGD O&M Costs – Revision B**GENERAL**

All O&M costs are presented in constant 2010 dollars.

VARIABLE O&M COSTS

The variable O&M costs include:

- Reagent and Disposal
- WFGD byproduct will be disposed of with 85% solids directly from the belt filter.
- Makeup water is for the process only. The water consumption includes: limestone slurry water, mist eliminator wash water, and oxidation air water only.
- Auxiliary Power (displayed as MW consumed)
- The draft power accounts for the WFGD system loss, new ductwork, and all other losses associated with the balance draft conversion (furnace to stack). In all cases the ESP is left in service, the additional ESP pressure loss is included in the draft power estimate. This will provide a consistent basis for comparison of the various technologies. The operating power is 20% less than the test block power used for cost estimating purposes.
- A second value for the draft power is provided that shows the estimated requirement for the FGD system only (spray tower through wet ESP). The FGD draft power is part of the overall draft power.
- No forced outages are anticipated due to equipment redundancy designed into the system.

FIXED O&M COSTS

The fixed O&M costs include:

- Operating Labor

The FGD system will require additional staff to operate the equipment. The minimum additional staff used in the estimate was based on:

Operation	Staff
Absorber Island Operation	2 people per shift for 5 shifts (10 operators total)
Chemists	2 operators total
Total	12 operations staff

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Order-of-Magnitude EPC Cost Estimate – Attachment 2-14
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010

WFGD O&M Costs – Revision B

Depending on the workload of the balance of the plant operations staff, additional FGD operating labor may be required. Other areas to consider are:

Operation	Staff
Reagent Unloading	2 additional people if the coal handling staff cannot handle the additional duties.
Dewatering and Reagent Preparation	5 additional operations staff
Byproduct Loadout	2 additional operators
System Engineer	1 additional position
Total	10 additional operations staff

For FGD technology comparison purposes, the minimum operations staff required was used in the evaluation. Additional staff could be included; however, the difference in staff between the various technologies would be the same.

- **Maintenance Labor**
Including: maintenance mechanics, I&C technicians, maintenance planner, supervision, and overhead.
- **Maintenance Materials**
Including: all preventative and corrective maintenance materials for the conveyors, ball mills, pumps, blowers/compressors, fans, filters, spray headers, agitators, etc...

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Order-of-Magnitude EPC Cost Estimate – Attachment 2-14
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010

WFGD O&M Costs – Revision B**ECONOMIC BASIS**

Table 1 shows the data used to generate the costs associated with the retrofit options.

Table 1. Economic Parameters

Unit Capacity Factor (%) ^{Note 1}	85
Operating Labor Rate (\$/hr) ^{Note 2}	50.00
Limestone (\$/ton) ^{Note 4}	28 (Delivered by Rail Costs)
By-Product Disposal (\$/ton) ^{Note 3}	8
Makeup Water (\$/1000 gallons)	1.00

Notes:

- 1) Per Order of Magnitude/Relative Capital Installed Cost Estimate Specification (BS2-FGDSCE-052010) Revision 1 dated June 21, 2010 provided by AEP.
- 2) The labor rate is a total pay and benefits rate.
- 3) Disposal cost for by-product, trucking to landfill on private haul road.
- 4) Provided by AEP on the teleconference on 27-July-2010.

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Order-of-Magnitude EPC Cost Estimate – Attachment 2-14
Big Sandy Station – Unit 2

Project No. 12721-000
September 10, 2010

WFGD O&M Costs – Revision B

Table 2. O&M Costs for WFGD Systems (2010 dollars)

Fuel	1.7	3.0	4.5	7.5
Fixed O&M (\$/year)				
Operating Labor	1,248,000	1,248,000	1,248,000	1,248,000
Maintenance Material	2,412,000	2,590,000	2,763,000	2,950,000
Maintenance Labor	1,608,000	1,727,000	1,842,000	1,967,000
Total Fixed O&M (\$/year)	5,268,000	5,565,000	5,853,000	6,165,000
Variable O&M (\$/year)				
Reagent Cost	2,534,000	4,729,000	6,618,000	9,940,000
Activated Carbon	NA	NA	NA	NA
FGD Byproduct Disposal Cost	1,290,000	2,528,000	3,604,000	5,408,000
Makeup Water Cost	685,000	650,000	618,000	626,000
Wastewater Treatment Chemicals	299,000	169,000	31,000	12,000
Bags and Cages Replacement	NA	NA	NA	NA
Total Variable O&M excluding Auxiliary Power (\$/year)	4,808,000	8,076,000	10,871,000	15,986,000
Auxiliary Power at Full Load (MW)				
Overall Draft (Furnace to Stack)	26	26	26	26
FGD Draft Only	8	8	9	10
FGD Equipment Load	7	10	11	18
Existing ESP	4	4	4	4
WESP	3	3	3	3
Total Auxiliary Power at Full Load (MW)	40	43	44	51

Note: NA = Not Applicable



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

ATTACHMENT 2-15
Project Schedule (WFGD)

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Big Sandy - Level 2 Schedule Layout

Big Sandy WFGD

Data Date: 03-Jan-11 12:00 AM

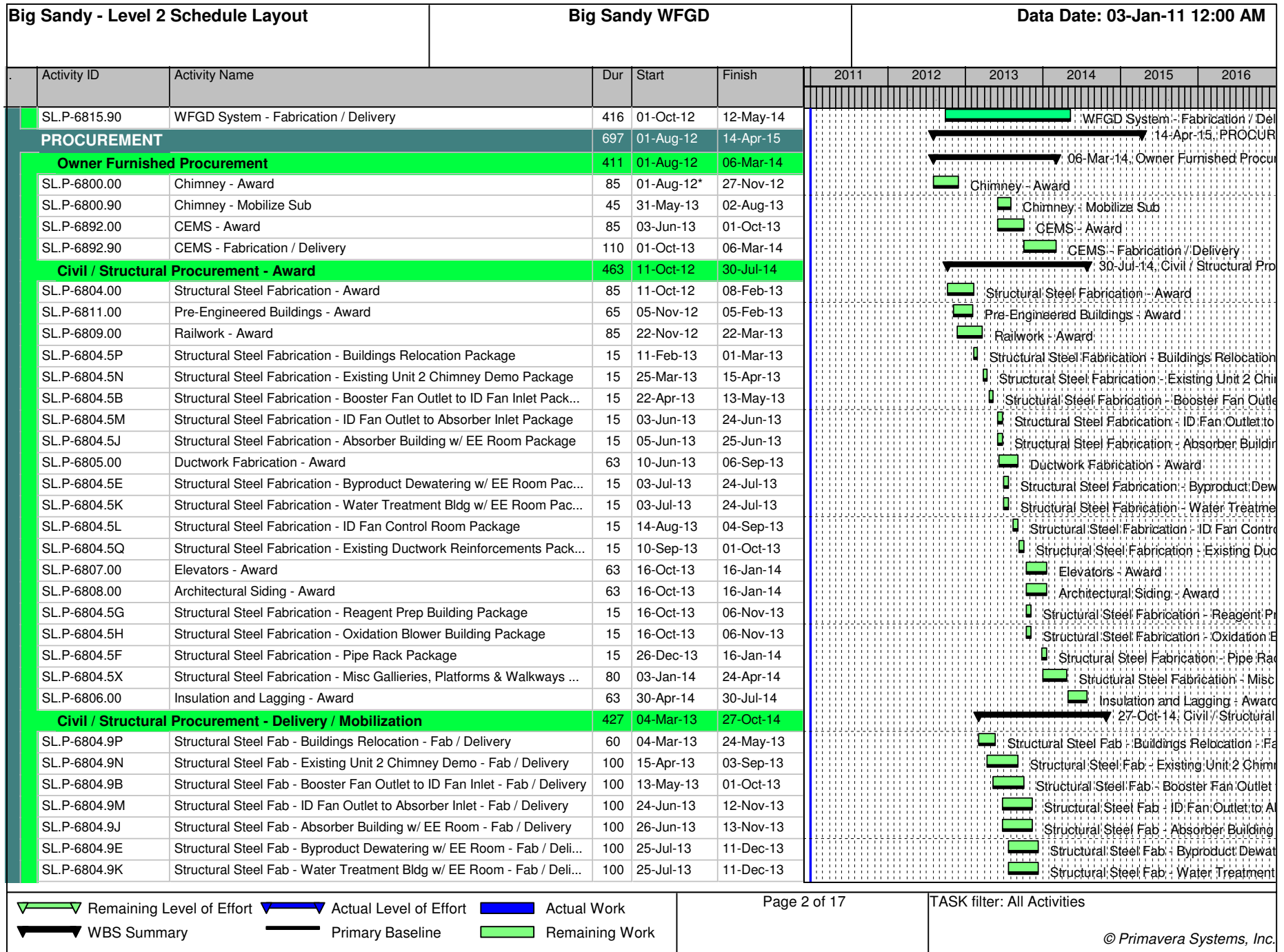
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
KEY PROJECT MILESTONES		1158	01-Sep-11	29-Feb-16						
Key Project Milestones		1158	01-Sep-11	29-Feb-16						
MS.SL.200	WFGD System PO	0		01-Sep-11	◆ WFGD System PO					
MS.SL.070	Award Limestone Handling System PO	0		28-Dec-12	◆ Award Limestone Handling System PO					
MS.SL.080	Award Gypsum Handling System PO	0		28-Dec-12	◆ Award Gypsum Handling System PO					
MS.SL.210	ID Fans PO	0		15-Jan-13	◆ ID Fans PO					
MS.SL.190	Start Site Mobilization	0		11-Mar-13	◆ Start Site Mobilization					
MS.SL.090	Award 13.8/4.16 kV Transformers PO	0		27-May-13	◆ Award 13.8/4.16 kV Transformers PO					
MS.SL.230	Award 138/13.8 kV Transformers PO	0		27-May-13	◆ Award 138/13.8 kV Transformers PO					
MS.SL.240	Foundation / Substructure Construction Packages	0		10-Jun-13	◆ Foundation / Substructure Construction Packages					
MS.SL.140	Civil Construction Packages	0		10-Jun-13	◆ Civil Construction Packages					
MS.SL.150	Structural Construction Packages	0		09-Sep-13	◆ Structural Construction Packages					
MS.SL.160	Mechanical Construction Packages	0		09-Sep-13	◆ Mechanical Construction Packages					
MS.SL.110	Final Delivery at Site - Limestone Handling System	0		24-Oct-13	◆ Final Delivery at Site - Limestone Handling System					
MS.SL.270	Final Delivery at Site - Gypsum Handling System	0		24-Oct-13	◆ Final Delivery at Site - Gypsum Handling System					
MS.SL.170	Electrical Construction Packages	0		05-Dec-13	◆ Electrical Construction Packages					
MS.SL.250	Architectural Construction Packages	0		15-Jan-14	◆ Architectural Construction Packages					
MS.SL.180	I&C Construction Packages	0		07-Mar-14	◆ I&C Construction Packages					
MS.SL.100	Final Delivery at Site - ID Fans	0		06-Jun-14	◆ Final Delivery at Site - ID Fans					
MS.SL.130	Final Delivery at Site - 13.8/4.16 kV Transformers	0		17-Nov-14	◆ Final Delivery at Site - 13.8/4.16 kV Transformers					
MS.SL.220	Final Delivery at Site - 138/13.8 kV Transformers	0		17-Nov-14	◆ Final Delivery at Site - 138/13.8 kV Transformers					
MS.TC.200	Complete Absorber Erection	0		20-Jul-15	◆ Complete Absorber Erection					
MS.TC.210	Start Outage Tie-in	0		01-Oct-15	◆ Start Outage Tie-in					
MS.TC.220	Complete Outage Tie-in	0		30-Nov-15	◆ Complete Outage Tie-in					
MS.TC.230	Commercial Operation	0		29-Feb-16	◆ Commercial Operation					
EPC CONTRACT		409	03-Jan-11	01-Aug-12						
Wet FGD		409	03-Jan-11	01-Aug-12						
EPC1000	Select EPC Contractor	0		03-Jan-11	◆ Select EPC Contractor					
EPC1010	EPC Contractor LNTP	0		03-Jan-11	◆ EPC Contractor LNTP					
EPC1020	WFGD Specification Develop / Bid / Award	173	03-Jan-11	01-Sep-11						
EPC1030	EPC Contractor Scope / Cost / Schedule Development	260	01-Aug-11	01-Aug-12						
EPC1040	EPC Contractor FNTF	0		01-Aug-12	◆ EPC Contractor FNTF					
WET FGD (WFGD)		694	01-Sep-11	12-May-14						
Wet FGD		694	01-Sep-11	12-May-14						
SL.P-6815.10	WFGD Vendor LNTP	0		01-Sep-11	◆ WFGD Vendor LNTP					
SL.P-6815.50	WFGD Vendor FNTF	0		03-Sep-12	◆ WFGD Vendor FNTF					

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Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.P-6804.9L	Structural Steel Fab - ID Fan Control Room - Fab / Delivery	100	04-Sep-13	24-Jan-14						
SL.P-6805.90	Ductwork Fabrication - Fabrication / Delivery	148	06-Sep-13	07-Apr-14						
SL.P-6809.90	Railwork - Mobilize Sub	45	24-Sep-13	25-Nov-13						
SL.P-6804.9Q	Structural Steel Fab - Existing Ductwork Reinforcements - Fab / Deliv...	100	01-Oct-13	20-Feb-14						
SL.P-6804.9X	Structural Steel Fab - Misc Galleries, Platforms & Walkways - Fab / D...	150	06-Nov-13	05-Jun-14						
SL.P-6804.9G	Structural Steel Fab - Reagent Prep Building - Fab / Delivery	100	06-Nov-13	28-Mar-14						
SL.P-6804.9H	Structural Steel Fab - Oxidation Blower Building - Fab / Delivery	100	06-Nov-13	28-Mar-14						
SL.P-6807.90	Elevators - Fabrication / Delivery	85	16-Jan-14	14-May-14						
SL.P-6808.90	Architectural Siding - Fabrication / Delivery	85	16-Jan-14	14-May-14						
SL.P-6804.9F	Structural Steel Fab - Pipe Rack - Fab / Delivery	150	17-Jan-14	15-Aug-14						
SL.P-6806.90	Insulation and Lagging - Fabrication / Delivery	63	30-Jul-14	27-Oct-14						
Mechanical Procurement - Award		496	02-Aug-12	03-Jul-14						
SL.P-6820.00	Noise Investigation Consultant - Award	63	02-Aug-12	30-Oct-12						
SL.P-6874.00	Waste Water Treatment System - Award	106	02-Aug-12	28-Dec-12						
SL.P-6821.00	Ductwork Design Consultant - Award	63	06-Aug-12	01-Nov-12						
SL.P-6822.00	ID Fans - Award	106	16-Aug-12	15-Jan-13						
SL.P-6823.00	Air Compressors - Award	106	15-Nov-12	16-Apr-13						
SL.P-6853.00	Rail Car Scale - Award	63	22-Nov-12	21-Feb-13						
SL.P-6834.00	HVAC - Award	80	18-Feb-13	07-Jun-13						
SL.P-6826.00	General Service Pumps - Award	75	26-Feb-13	10-Jun-13						
SL.P-6827.00	Sump Pumps - Award	85	26-Feb-13	24-Jun-13						
SL.P-6830.00	General Service Valves - Award	85	12-Mar-13	09-Jul-13						
SL.P-6831.00	Specialty Valves - Award	85	12-Mar-13	09-Jul-13						
SL.P-6852.00	Truck Scale - Award	63	12-Mar-13	07-Jun-13						
SL.P-6878.00	Control Valves - Award	85	12-Mar-13	09-Jul-13						
SL.P-6828.00	Field Fabricated Tanks - Award	85	26-Mar-13	24-Jul-13						
SL.P-6829.00	Shop Fabricated Tanks - Award	85	26-Mar-13	24-Jul-13						
SL.P-6838.00	Fire Protection and Detection System - Award	85	29-Apr-13	26-Aug-13						
SL.P-6824.00	Expansion Joints - Award	85	06-May-13	03-Sep-13						
SL.P-6836.00	Agitators - Award	106	24-Jun-13	20-Nov-13						
SL.P-6835.00	Pipe Fabrication - RFQ	65	25-Jun-13	24-Sep-13						
SL.P-6833.00	Piping Specialties - Award	85	25-Sep-13	23-Jan-14						
SL.P-6825.00	Dampers - Award	85	04-Oct-13	04-Feb-14						
SL.P-6835.10	Pipe Fabrication - Award	45	06-Nov-13	09-Jan-14						
SL.P-6837.00	Insulation and Heat Tracing - Award	80	23-Jan-14	15-May-14						
SL.P-6832.00	Engineered Pipe Supports - Bid	65	31-Jan-14	01-May-14						

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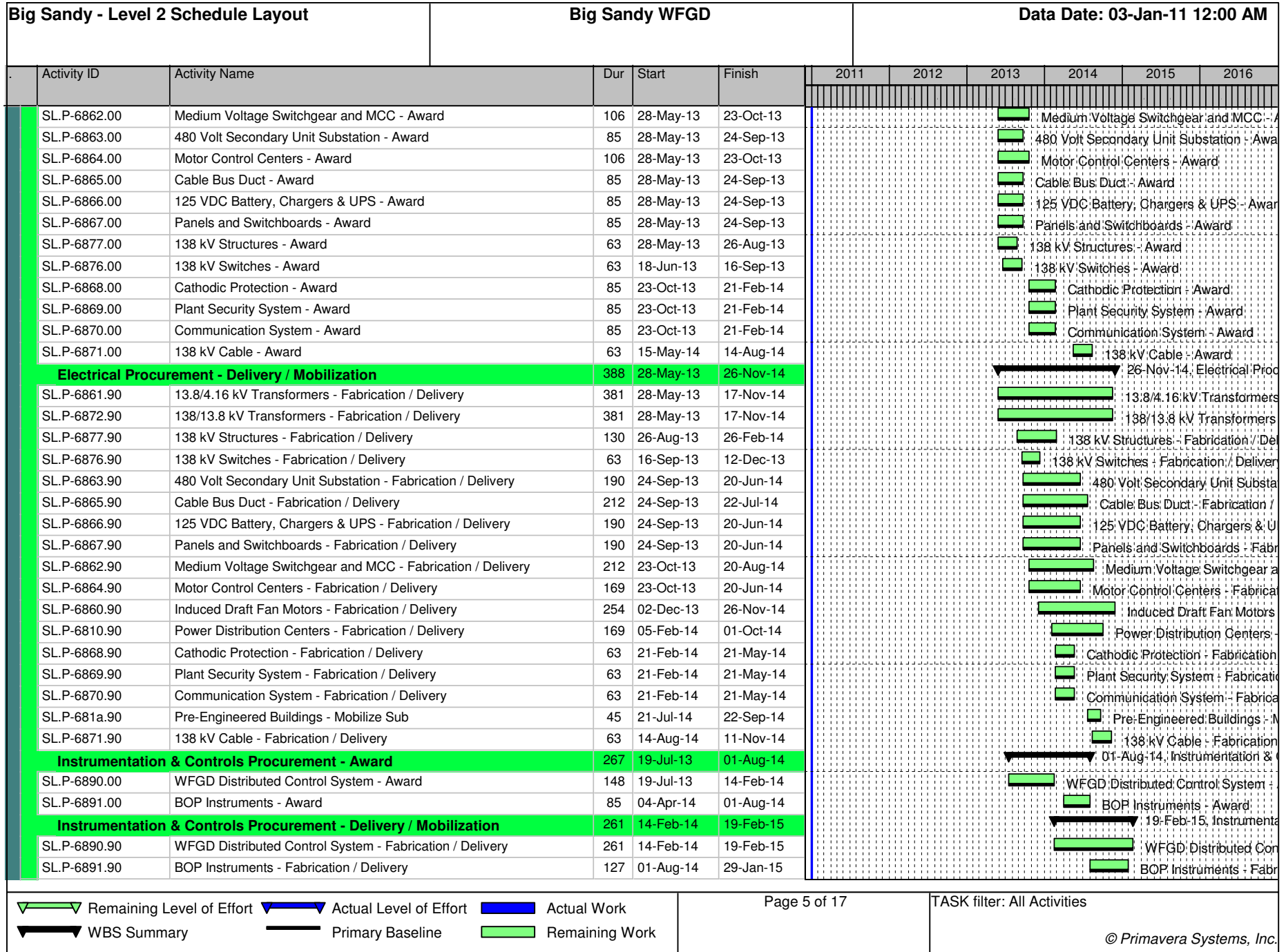
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.P-6832.10	Engineered Pipe Supports - Award	45	02-May-14	03-Jul-14						
Mechanical Procurement - Delivery / Mobilization		631	01-Nov-12	14-Apr-15						
SL.P-6821.90	Ductwork Design Consultant - Mobilize Sub	21	01-Nov-12	30-Nov-12						
SL.P-6874.90	Waste Water Treatment System - Fabrication / Delivery	260	31-Dec-12	02-Jan-14						
SL.P-6822.90	Induced Draft Fans - Fabrication / Delivery	360	15-Jan-13	06-Jun-14						
SL.P-6820.90	Noise Investigation Consultant - Mobilize Sub	21	25-Jan-13	25-Feb-13						
SL.P-6853.90	Rail Car Scale - Fabrication / Delivery	85	21-Feb-13	20-Jun-13						
SL.P-6823.90	Air Compressors - Fabrication / Delivery	169	16-Apr-13	10-Dec-13						
SL.P-6852.90	Truck Scale - Fabrication / Delivery	63	07-Jun-13	05-Sep-13						
SL.P-6834.90	HVAC - Fabrication / Delivery	127	10-Jun-13	04-Dec-13						
SL.P-6826.90	General Service Pumps - Fabrication / Delivery	148	11-Jun-13	07-Jan-14						
SL.P-6827.90	Sump Pumps - Fabrication / Delivery	127	24-Jun-13	19-Dec-13						
SL.P-6830.90	General Service Valves - Fabrication / Delivery	106	09-Jul-13	04-Dec-13						
SL.P-6831.90	Specialty Valves - Fabrication / Delivery	169	09-Jul-13	05-Mar-14						
SL.P-6878.90	Control Valves - Fabrication / Delivery	106	09-Jul-13	04-Dec-13						
SL.P-6828.90	Field Fabricated Tanks - Mobilize Sub	106	24-Jul-13	19-Dec-13						
SL.P-6829.90	Shop Fabricated Tanks - Fabrication / Delivery	190	24-Jul-13	21-Apr-14						
SL.P-6838.90	Fire Protection and Detection System - Fabrication / Delivery	85	27-Aug-13	23-Dec-13						
SL.P-6824.90	Expansion Joints - Fabrication / Delivery	63	03-Sep-13	29-Nov-13						
SL.P-6836.90	Agitators - Fabrication / Delivery	127	20-Nov-13	20-May-14						
SL.P-6835.90	Pipe Fabrication - Fabrication / Delivery	233	10-Jan-14	03-Dec-14						
SL.P-6833.90	Piping Specialties - Fabrication / Delivery	169	23-Jan-14	18-Sep-14						
SL.P-6825.90	Dampers - Fabrication / Delivery	106	04-Feb-14	02-Jul-14						
SL.P-6837.90	Insulation and Heat Tracing - Fabrication / Delivery	127	15-May-14	11-Nov-14						
SL.P-6832.90	Engineered Pipe Supports - Fabrication / Delivery	200	07-Jul-14	14-Apr-15						
Material Handling Procurement - Award		106	02-Aug-12	28-Dec-12						
SL.P-6850.00	Limestone Handling System - Award	106	02-Aug-12	28-Dec-12						
SL.P-6873.00	Gypsum Handling System - Award	106	02-Aug-12	28-Dec-12						
Material Handling Procurement - Delivery / Mobilization		212	31-Dec-12	24-Oct-13						
SL.P-6850.90	Limestone Handling System - Fabrication / Delivery	212	31-Dec-12	24-Oct-13						
SL.P-6873.90	Gypsum Handling System - Fabrication / Delivery	212	31-Dec-12	24-Oct-13						
Electrical Procurement - Award		474	11-Oct-12	14-Aug-14						
SL.P-6810.00	Power Distribution Centers - Award	90	11-Oct-12	15-Feb-13						
SL.P-6861.00	13.8/4.16 kV Transformers - Award	106	28-Dec-12	27-May-13						
SL.P-6872.10	138/13.8 kV Transformers - Award	106	28-Dec-12	27-May-13						
SL.P-6860.00	Induced Draft Fan Motors - Award	106	15-Jan-13	12-Jun-13						

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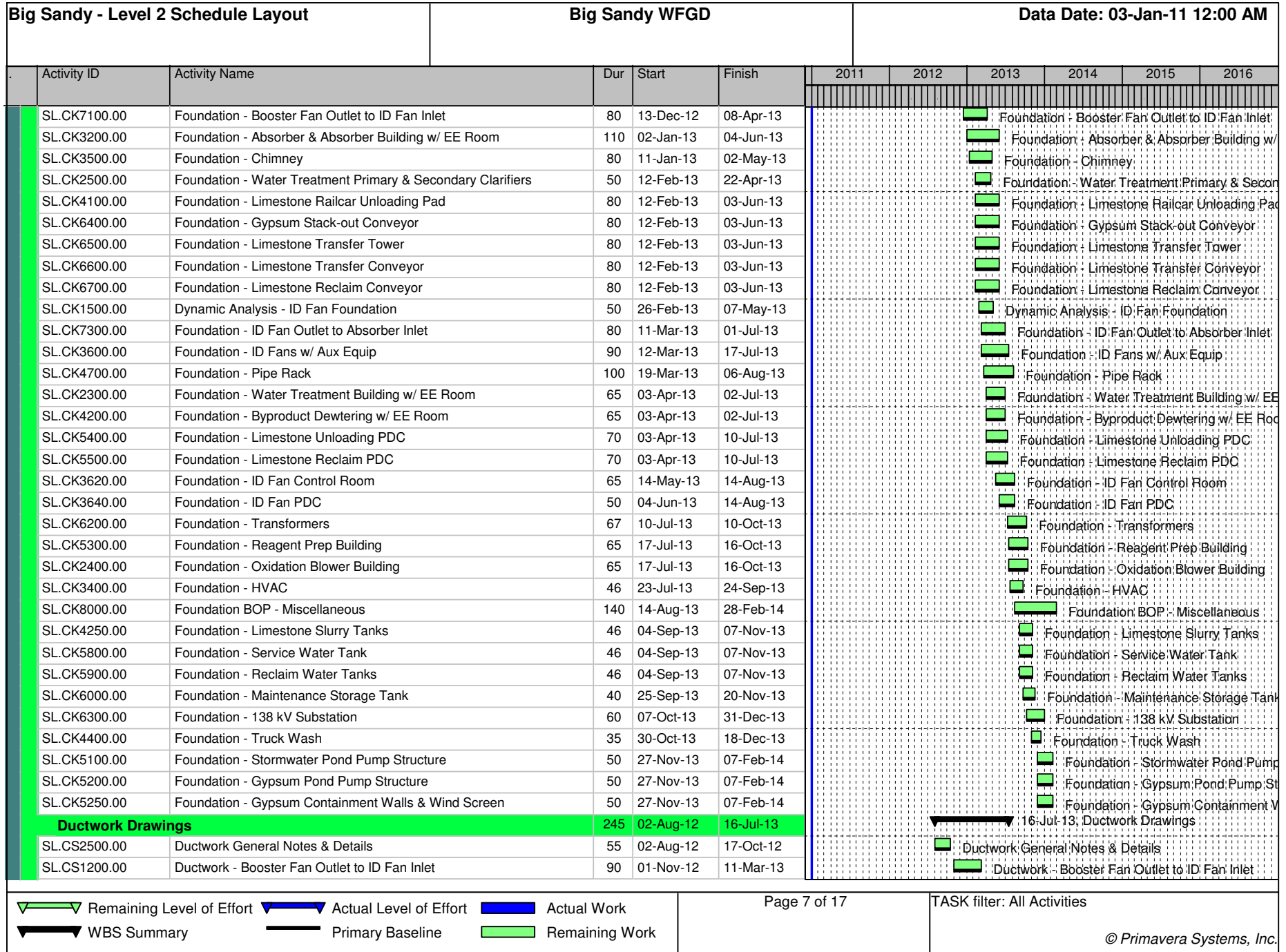
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
ENGINEERING / DESIGN		742	05-Jun-12	21-Apr-15						
Architectural Drawings		312	02-Aug-12	16-Oct-13						
SL.CA6000.00	Architectural General Notes & Details	50	02-Aug-12	10-Oct-12						
SL.CA1200.00	Arch - Water Treatment Building w/ EE Room - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA1800.00	Arch - Absorber Building w/ EE Room - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA2500.00	Arch - Byproduct Dewatering w/ EE Room - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA3400.00	Arch - Reagent Prep Building - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA1500.00	Arch - Oxidation Blower Building - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA2100.00	Arch - ID Fan Control Room - for Bids	65	06-Aug-12	02-Nov-12						
SL.CA3500.00	Arch - Limestone Unloading PDC - for Bids	45	11-Oct-12	12-Dec-12						
SL.CA2200.00	Arch - ID Fan PDC - for Bids	45	11-Oct-12	12-Dec-12						
SL.CA3600.00	Arch - Limestone Reclaim PDC - for Bids	45	11-Oct-12	12-Dec-12						
SL.CA4500.00	Arch - New Warehouse (Replacement) - IFC	45	08-Nov-12	11-Jan-13						
SL.CA4700.00	Arch - New Hazardous Waste Storage Building - IFC	45	08-Nov-12	11-Jan-13						
SL.CA4800.00	Arch - Hydrogen Storage (Relocation) - IFC	45	08-Nov-12	11-Jan-13						
SL.CA1200.50	Arch - Water Treatment Building w/ EE Room - IFC	65	03-Apr-13	02-Jul-13						
SL.CA1800.50	Arch - Absorber Building w/ EE Room - IFC	65	03-Apr-13	02-Jul-13						
SL.CA2500.50	Arch - Byproduct Dewatering w/ EE Room - IFC	65	03-Apr-13	02-Jul-13						
SL.CA2100.50	Arch - ID Fan Control Room - IFC	65	14-May-13	14-Aug-13						
SL.CA3400.50	Arch - Reagent Prep Building - IFC	65	17-Jul-13	16-Oct-13						
SL.CA1500.50	Arch - Oxidation Blower Building - IFC	65	17-Jul-13	16-Oct-13						
Misc Civil Deliverables		257	02-Aug-12	31-Jul-13						
SL.CC1000.00	Civil General Notes & Details	94	02-Aug-12	11-Dec-12						
SL.CC4000.00	Initial Sitework	156	02-Aug-12	11-Mar-13						
SL.CC0800.00	Civil / Structural / Architectural Design Criteria	45	02-Aug-12	03-Oct-12						
SL.CC7200.00	Rail Work	50	13-Sep-12	21-Nov-12						
SL.CC5300.00	Oily Water Separator & Piping	30	11-Oct-12	21-Nov-12						
SL.CC1500.00	Demolition Drawings - Ductwork	50	12-Dec-12	21-Feb-13						
SL.CC1600.00	Demolition Drawings - Ductwork Support Steel	50	12-Dec-12	21-Feb-13						
SL.CC1700.00	Demolition Drawings - ID Fan Foundation	50	12-Dec-12	21-Feb-13						
SL.CC3000.00	Final Sitework	101	12-Mar-13	31-Jul-13						
Foundation Drawings		407	02-Aug-12	28-Feb-14						
SL.CK1200.00	Concrete General Notes & Details	60	02-Aug-12	24-Oct-12						
SL.CK3700.00	Foundation - New Warehouse (Replacement)	45	25-Oct-12	27-Dec-12						
SL.CK3100.00	Foundation - Hydrogen Storage (Relocation)	45	25-Oct-12	27-Dec-12						
SL.CK3800.00	Foundation - New Hazardous Area Waste Storage Building	45	25-Oct-12	27-Dec-12						

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Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.CS1700.00	Ductwork - Existing Unit 2 Chimney Demo	60	01-Nov-12	28-Jan-13						
SL.CS2300.00	Ductwork - ID Fan Outlet to Absorber Inlet	90	13-Dec-12	22-Apr-13						
SL.CS1400.00	Ductwork - Absorber Outlet to Chimney	90	28-Jan-13	03-Jun-13						
SL.CS2000.00	Ductwork - Existing Modifications	65	15-Apr-13	16-Jul-13						
Structural Steel Drawings		431	02-Aug-12	03-Apr-14						
SL.CS7000.00	Structural Steel General Notes & Details	50	02-Aug-12	10-Oct-12						
SL.CS1900.00	Struct Steel - New Warehouse (Replacement)	45	25-Oct-12	27-Dec-12						
SL.CS1950.00	Struct Steel - New Hazardous Waste Storage Building	45	25-Oct-12	27-Dec-12						
SL.CS2700.00	Struct Steel - Hydrogen Storage (Relocation)	45	25-Oct-12	27-Dec-12						
SL.CS3300.00	Struct Steel - Booster Fan Outlet to ID Fan Inlet	90	13-Dec-12	22-Apr-13						
SL.CS5100.00	Struct Steel - Existing Unit 2 Chimney Demo	70	13-Dec-12	25-Mar-13						
SL.CS5300.00	Struct Steel - Absorber Building w/ EE Room	110	02-Jan-13	04-Jun-13						
SL.CS3300.10	Struct Steel - ID Fan Outlet to Absorber Inlet	90	28-Jan-13	03-Jun-13						
SL.CS4700.00	Struct Steel - Byproduct Dewatering w/ EE Room	65	03-Apr-13	02-Jul-13						
SL.CS5400.00	Struct Steel - Water Treatment Building w/ EE Room	65	03-Apr-13	02-Jul-13						
SL.CS5200.00	Struct Steel - ID Fan Control Room	65	14-May-13	14-Aug-13						
SL.CS5900.00	Struct Steel - Existing Ductwork Reinforcements	60	17-Jun-13	10-Sep-13						
SL.CS4900.00	Struct Steel - Pipe Rack	130	25-Jun-13	24-Dec-13						
SL.CS5000.00	Struct Steel - Reagent Prep Building	65	17-Jul-13	16-Oct-13						
SL.CS2400.00	Struct Steel - Oxidation Blower Building	65	17-Jul-13	16-Oct-13						
SL.CS5800.00	Struct Steel BOP - Misc Galleries, Platforms & Walkways	100	13-Nov-13	03-Apr-14						
Mechanical Deliverables		651	05-Jun-12	11-Dec-14						
SL.MM3000.00	GA - Initial Design Release	43	05-Jun-12	03-Aug-12						
SL.MM6000.00	Mass Balances	61	02-Aug-12	25-Oct-12						
SL.MM7000.00	Mechanical General Notes & Details	75	02-Aug-12	14-Nov-12						
SL.MM6500.00	Mechanical Design Criteria	45	02-Aug-12	03-Oct-12						
SL.MM1200.00	Demolition Drawings - Common	50	27-Sep-12	05-Dec-12						
SL.MM1300.00	Demolition Drawings - Site Prep	50	27-Sep-12	05-Dec-12						
SL.MM2800.00	Ductwork Arrangement Drawings - BOP	65	15-Apr-13	16-Jul-13						
SL.MM5800.00	List - Valves	100	15-Apr-13	03-Sep-13						
SL.MM4000.00	HVAC Ductwork Drawings	60	16-Jul-13	08-Oct-13						
SL.MM5200.00	List - Equipment	300	25-Sep-13	21-Nov-14						
SL.MM3200.00	GA - WFGD Area - Final Issue	20	08-Oct-13	05-Nov-13						
SL.MM3300.00	GA - Baghouse Area - Final Issue	20	08-Oct-13	05-Nov-13						
SL.MM3500.00	GA - Limestone Unloading Area - Final Issue	20	08-Oct-13	05-Nov-13						
SL.MM5600.00	List - Piping Specialties	100	12-Nov-13	03-Apr-14						

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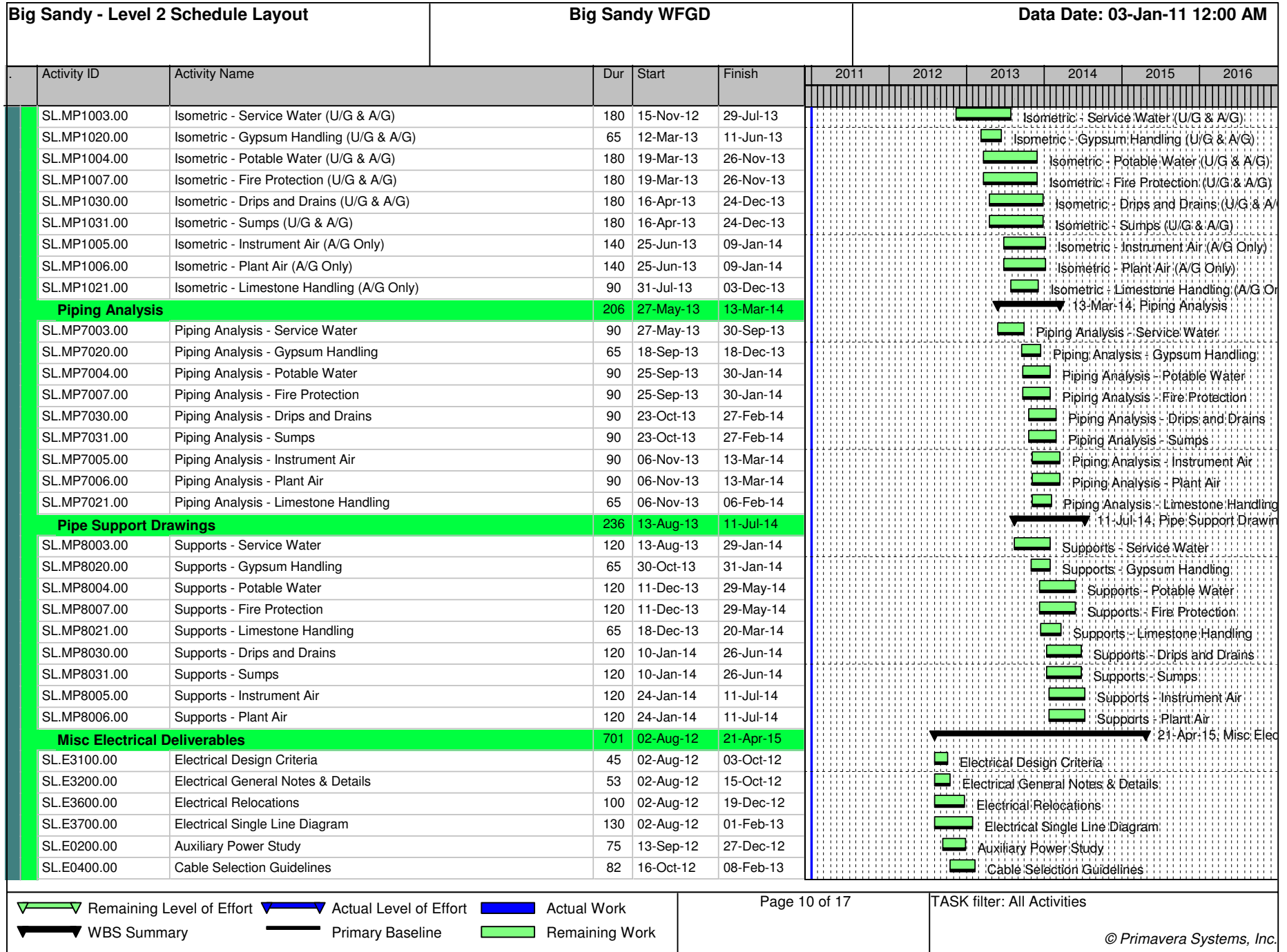
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.MM5500.00	List - Pipe Lines	200	06-Mar-14	11-Dec-14						
Misc Piping Deliverables		600	02-Aug-12	27-Nov-14						
SL.MP0700.00	Existing Utility Relocation - BOP Areas	65	02-Aug-12	31-Oct-12						
SL.MP7800.00	Plumbing Drawings	65	15-Apr-13	15-Jul-13						
SL.MP0400.00	Composite Drawings - A/G	99	14-Jul-14	27-Nov-14						
Piping & Instrumentation Diagrams		371	02-Aug-12	09-Jan-14						
SL.MP6003.00	P&ID - Service Water - Prepare	75	02-Aug-12	14-Nov-12						
SL.MP6004.00	P&ID - Potable Water - Prepare	75	02-Aug-12	14-Nov-12						
SL.MP6007.00	P&ID - Fire Protection - Prepare	75	02-Aug-12	14-Nov-12						
SL.MP6002.00	P&ID - Flue Gas - Prepare	75	02-Aug-12	14-Nov-12						
SL.MP6030.00	P&ID - Drips and Drains - Prepare	75	30-Aug-12	12-Dec-12						
SL.MP6031.00	P&ID - Sumps - Prepare	75	30-Aug-12	12-Dec-12						
SL.MP6005.00	P&ID - Instrument Air - Prepare	75	27-Sep-12	11-Jan-13						
SL.MP6006.00	P&ID - Plant Air - Prepare	75	27-Sep-12	11-Jan-13						
SL.MP6020.00	P&ID - Gypsum Handling - Prepare	50	25-Oct-12	04-Jan-13						
SL.MP6021.00	P&ID - Limestone Handling - Prepare	50	25-Oct-12	04-Jan-13						
SL.MP6003.50	P&ID - Service Water - IFC	25	24-Jun-13	29-Jul-13						
SL.MP6002.50	P&ID - Flue Gas - IFC	25	24-Jun-13	29-Jul-13						
SL.MP6004.50	P&ID - Potable Water - IFC	25	23-Oct-13	26-Nov-13						
SL.MP6007.50	P&ID - Fire Protection - IFC	25	23-Oct-13	26-Nov-13						
SL.MP6030.50	P&ID - Drips and Drains - IFC	25	20-Nov-13	24-Dec-13						
SL.MP6031.50	P&ID - Sumps - IFC	25	20-Nov-13	24-Dec-13						
SL.MP6005.50	P&ID - Instrument Air - IFC	25	04-Dec-13	09-Jan-14						
SL.MP6006.50	P&ID - Plant Air - IFC	25	04-Dec-13	09-Jan-14						
System Descriptions		65	13-Dec-12	15-Mar-13						
SL.MP9003.00	System Descriptions - Service Water - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9004.00	System Descriptions - Potable Water - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9007.00	System Descriptions - Fire Protection - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9030.00	System Descriptions - Drips and Drains - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9031.00	System Descriptions - Sumps - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9002.00	System Descriptions - Flue Gas - Preliminary	45	13-Dec-12	15-Feb-13						
SL.MP9020.00	System Descriptions - Gypsum Handling - Preliminary	45	07-Jan-13	08-Mar-13						
SL.MP9021.00	System Descriptions - Limestone Handling - Preliminary	45	07-Jan-13	08-Mar-13						
SL.MP9005.00	System Descriptions - Instrument Air - Preliminary	45	14-Jan-13	15-Mar-13						
SL.MP9006.00	System Descriptions - Plant Air - Preliminary	45	14-Jan-13	15-Mar-13						
Isometric Drawings		296	15-Nov-12	09-Jan-14						

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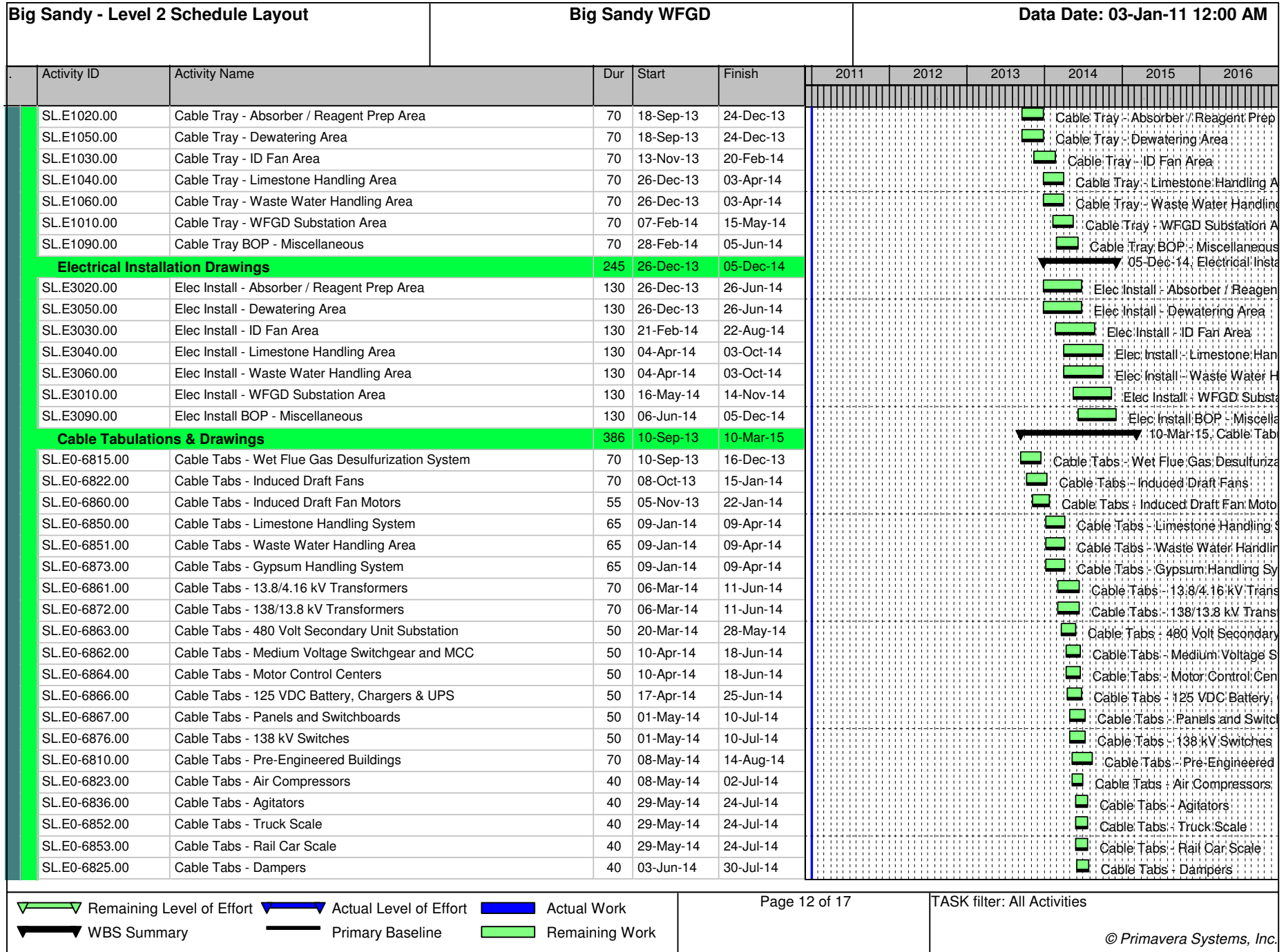
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.E7800.00	Motor Load List	468	16-Oct-12	08-Aug-14						
SL.E8700.00	Short Circuit ETAP Study	545	16-Oct-12	25-Nov-14						
SL.E8200.00	Phasing Diagrams	48	04-Feb-13	10-Apr-13						
SL.E8600.00	Relay Settings	179	04-Feb-13	11-Oct-13						
SL.E5600.00	Key Diagrams	100	17-Jan-14	06-Jun-14						
SL.E6700.00	Lightning Protection Drawings	45	16-May-14	18-Jul-14						
SL.E1300.00	Communication Drawings	65	16-May-14	18-Aug-14						
SL.E3820.00	Electrical System Descriptions - Main Power - Preliminary	65	13-Jun-14	15-Sep-14						
SL.E3840.00	Electrical System Descriptions - Aux Power - Preliminary	65	20-Jun-14	22-Sep-14						
SL.E3860.00	Electrical System Descriptions - DC Power - Preliminary	65	27-Jun-14	29-Sep-14						
SL.E8800.00	Telephone & LAN Diagrams	45	18-Feb-15	21-Apr-15						
Electrical Ductbank Drawings		228	26-Feb-13	15-Jan-14						
SL.E2060.00	Ductbank - Waste Water Handling Area	70	26-Feb-13	03-Jun-13						
SL.E2050.00	Ductbank - Dewatering Area	90	13-Mar-13	17-Jul-13						
SL.E2040.00	Ductbank - Limestone Handling Area	70	15-Apr-13	22-Jul-13						
SL.E2030.00	Ductbank - ID Fan Area	90	23-Apr-13	28-Aug-13						
SL.E2090.00	Ductbank BOP - Miscellaneous	80	29-Apr-13	19-Aug-13						
SL.E2020.00	Ductbank - Absorber / Reagent Prep Area	110	28-May-13	30-Oct-13						
SL.E2010.00	Ductbank - WFGD Substation Area	60	21-Oct-13	15-Jan-14						
Embedded Conduit Drawings		232	13-Mar-13	05-Feb-14						
SL.E4050.00	Embedded Conduit - Dewatering Area	90	13-Mar-13	17-Jul-13						
SL.E4060.00	Embedded Conduit - Waste Water Handling Area	90	13-Mar-13	17-Jul-13						
SL.E4030.00	Embedded Conduit - ID Fan Area	90	23-Apr-13	28-Aug-13						
SL.E4020.00	Embedded Conduit - Absorber / Reagent Prep Area	90	25-Jun-13	30-Oct-13						
SL.E4090.00	Embedded Conduit BOP - Miscellaneous	140	22-Jul-13	05-Feb-14						
SL.E4040.00	Embedded Conduit - Limestone Handling Area	90	28-Aug-13	03-Jan-14						
SL.E4010.00	Embedded Conduit - WFGD Substation Area	70	07-Oct-13	15-Jan-14						
Grounding Drawings		207	17-Apr-13	05-Feb-14						
SL.E5050.00	Grounding - Dewatering Area	65	17-Apr-13	17-Jul-13						
SL.E5060.00	Grounding - Waste Water Handling Area	65	17-Apr-13	17-Jul-13						
SL.E5030.00	Grounding - ID Fan Area	65	28-May-13	28-Aug-13						
SL.E5090.00	Grounding BOP - Miscellaneous	140	22-Jul-13	05-Feb-14						
SL.E5020.00	Grounding - Absorber / Reagent Prep Area	65	31-Jul-13	30-Oct-13						
SL.E5040.00	Grounding - Limestone Handling Area	65	02-Oct-13	03-Jan-14						
SL.E5010.00	Grounding - WFGD Substation Area	60	21-Oct-13	15-Jan-14						
Cable Tray Drawings		185	18-Sep-13	05-Jun-14						

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Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.E0-6838.00	Cable Tabs - Fire Protection and Detection System	60	05-Jun-14	28-Aug-14						
SL.E0-6826.00	Cable Tabs - General Service Pumps	40	12-Jun-14	07-Aug-14						
SL.E0-6827.00	Cable Tabs - Sump Pumps	40	12-Jun-14	07-Aug-14						
SL.E0-6890.00	Cable Tabs - WFGD Distributed Control System	70	13-Jun-14	22-Sep-14						
SL.E0-6834.00	Cable Tabs - HVAC	40	19-Jun-14	14-Aug-14						
SL.E0-6830.00	Cable Tabs - General Service Valves	40	26-Jun-14	21-Aug-14						
SL.E0-6831.00	Cable Tabs - Specialty Valves	40	26-Jun-14	21-Aug-14						
SL.E0-6807.00	Cable Tabs - Elevators	40	11-Jul-14	04-Sep-14						
SL.E0-6868.00	Cable Tabs - Cathodic Protection	50	18-Jul-14	25-Sep-14						
SL.E0-6869.00	Cable Tabs - Plant Security System	50	25-Jul-14	02-Oct-14						
SL.E0-6870.00	Cable Tabs - Communication System	50	25-Jul-14	02-Oct-14						
SL.E0-6999.00	Cable Tabs BOP - Miscellaneous	75	08-Aug-14	20-Nov-14						
SL.E0-6837.00	Cable Tabs - Insulation and Heat Tracing	80	12-Sep-14	06-Jan-15						
SL.E0-6891.00	Cable Tabs - BOP Instruments	70	28-Nov-14	10-Mar-15						
Lighting Diagrams		165	27-Jun-14	17-Feb-15						
SL.E6020.00	Lighting - Absorber / Reagent Prep Area	45	27-Jun-14	29-Aug-14						
SL.E6050.00	Lighting - Dewatering Area	45	27-Jun-14	29-Aug-14						
SL.E6030.00	Lighting - ID Fan Area	45	25-Aug-14	24-Oct-14						
SL.E6040.00	Lighting - Limestone Handling Area	45	06-Oct-14	05-Dec-14						
SL.E6060.00	Lighting - Waste Water Handling Area	45	06-Oct-14	05-Dec-14						
SL.E6010.00	Lighting - WFGD Substation Area	45	17-Nov-14	20-Jan-15						
SL.E6090.00	Lighting BOP - Miscellaneous	50	08-Dec-14	17-Feb-15						
Master Schematic Diagrams		381	06-Aug-13	27-Jan-15						
SL.E7-6815.00	Master Schem - Wet Flue Gas Desulfurization System	170	06-Aug-13	02-Apr-14						
SL.E7-6822.00	Master Schem - Induced Draft Fans	120	03-Sep-13	19-Feb-14						
SL.E7-6860.00	Master Schem - Induced Draft Fan Motors	100	01-Oct-13	19-Feb-14						
SL.E7-6850.00	Master Schem - Limestone Handling System	100	03-Dec-13	23-Apr-14						
SL.E7-6851.00	Master Schem - Waste Water Handling Area	100	03-Dec-13	23-Apr-14						
SL.E7-6873.00	Master Schem - Gypsum Handling System	100	03-Dec-13	23-Apr-14						
SL.E7-6861.00	Master Schem - 13.8/4.16 kV Transformers	90	30-Jan-14	04-Jun-14						
SL.E7-6872.00	Master Schem - 138/13.8 kV Transformers	90	30-Jan-14	04-Jun-14						
SL.E7-6863.00	Master Schem - 480 Volt Secondary Unit Substation	105	13-Feb-14	10-Jul-14						
SL.E7-6862.00	Master Schem - Medium Voltage Switchgear and MCC	127	06-Mar-14	01-Sep-14						
SL.E7-6864.00	Master Schem - Motor Control Centers	105	06-Mar-14	31-Jul-14						
SL.E7-6866.00	Master Schem - 125 VDC Battery, Chargers & UPS	120	13-Mar-14	28-Aug-14						
SL.E7-6867.00	Master Schem - Panels and Switchboards	120	27-Mar-14	11-Sep-14						

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SL.E7-6876.00	Master Schem - 138 kV Switches	120	27-Mar-14	11-Sep-14													Master Schem - 138 kV Switches
SL.E7-6810.00	Master Schem - Pre-Engineered Buildings	90	03-Apr-14	07-Aug-14													Master Schem - Pre-Engineered Buildings
SL.E7-6823.00	Master Schem - Air Compressors	65	03-Apr-14	02-Jul-14													Master Schem - Air Compressors
SL.E7-6836.00	Master Schem - Agitators	60	24-Apr-14	17-Jul-14													Master Schem - Agitators
SL.E7-6852.00	Master Schem - Truck Scale	50	24-Apr-14	02-Jul-14													Master Schem - Truck Scale
SL.E7-6853.00	Master Schem - Rail Car Scale	50	24-Apr-14	02-Jul-14													Master Schem - Rail Car Scale
SL.E7-6825.00	Master Schem - Dampers	60	29-Apr-14	23-Jul-14													Master Schem - Dampers
SL.E7-6838.00	Master Schem - Fire Protection and Detection System	90	01-May-14	04-Sep-14													Master Schem - Fire Protection and Detection System
SL.E7-6826.00	Master Schem - General Service Pumps	65	08-May-14	07-Aug-14													Master Schem - General Service Pumps
SL.E7-6827.00	Master Schem - Sump Pumps	77	08-May-14	25-Aug-14													Master Schem - Sump Pumps
SL.E7-6890.00	Master Schem - WFGD Distributed Control System	128	09-May-14	06-Nov-14													Master Schem - WFGD Distributed Control System
SL.E7-6834.00	Master Schem - HVAC	60	15-May-14	07-Aug-14													Master Schem - HVAC
SL.E7-6830.00	Master Schem - General Service Valves	65	22-May-14	21-Aug-14													Master Schem - General Service Valves
SL.E7-6831.00	Master Schem - Specialty Valves	65	22-May-14	21-Aug-14													Master Schem - Specialty Valves
SL.E7-6807.00	Master Schem - Elevators	55	05-Jun-14	21-Aug-14													Master Schem - Elevators
SL.E7-6868.00	Master Schem - Cathodic Protection	89	12-Jun-14	15-Oct-14													Master Schem - Cathodic Protection
SL.E7-6869.00	Master Schem - Plant Security System	60	19-Jun-14	11-Sep-14													Master Schem - Plant Security System
SL.E7-6870.00	Master Schem - Communication System	60	19-Jun-14	11-Sep-14													Master Schem - Communication System
SL.E7-6999.00	Master Schem BOP - Miscellaneous	95	03-Jul-14	13-Nov-14													Master Schem BOP - Miscellaneous
SL.E7-6837.00	Master Schem - Insulation and Heat Tracing	60	08-Aug-14	31-Oct-14													Master Schem - Insulation and Heat Tracing
SL.E7-6891.00	Master Schem - BOP Instruments	65	24-Oct-14	27-Jan-15													Master Schem - BOP Instruments
Wiring Diagrams		281	20-Feb-14	24-Mar-15													24-Mar-15, Wiring Diagrams
SL.E9-6822.00	Wiring - Induced Draft Fans	80	20-Feb-14	11-Jun-14													Wiring - Induced Draft Fans
SL.E9-6860.00	Wiring - Induced Draft Fan Motors	55	20-Feb-14	07-May-14													Wiring - Induced Draft Fan Motors
SL.E9-6815.00	Wiring - Wet Flue Gas Desulfurization System	60	03-Apr-14	25-Jun-14													Wiring - Wet Flue Gas Desulfurization System
SL.E9-6850.00	Wiring - Limestone Handling System	45	24-Apr-14	25-Jun-14													Wiring - Limestone Handling System
SL.E9-6851.00	Wiring - Waste Water Handling Area	45	24-Apr-14	25-Jun-14													Wiring - Waste Water Handling Area
SL.E9-6873.00	Wiring - Gypsum Handling System	45	24-Apr-14	25-Jun-14													Wiring - Gypsum Handling System
SL.E9-6861.00	Wiring - 13.8/4.16 kV Transformers	40	05-Jun-14	31-Jul-14													Wiring - 13.8/4.16 kV Transformers
SL.E9-6872.00	Wiring - 138/13.8 kV Transformers	40	05-Jun-14	31-Jul-14													Wiring - 138/13.8 kV Transformers
SL.E9-6823.00	Wiring - Air Compressors	25	03-Jul-14	07-Aug-14													Wiring - Air Compressors
SL.E9-6852.00	Wiring - Truck Scale	15	03-Jul-14	24-Jul-14													Wiring - Truck Scale
SL.E9-6853.00	Wiring - Rail Car Scale	15	03-Jul-14	24-Jul-14													Wiring - Rail Car Scale
SL.E9-6863.00	Wiring - 480 Volt Secondary Unit Substation	40	11-Jul-14	04-Sep-14													Wiring - 480 Volt Secondary Unit Substation
SL.E9-6836.00	Wiring - Agitators	15	18-Jul-14	07-Aug-14													Wiring - Agitators
SL.E9-6825.00	Wiring - Dampers	15	23-Jul-14	13-Aug-14													Wiring - Dampers

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SL.E9-6864.00	Wiring - Motor Control Centers	40	01-Aug-14	25-Sep-14						
SL.E9-6810.00	Wiring - Pre-Engineered Buildings	30	08-Aug-14	18-Sep-14						
SL.E9-6826.00	Wiring - General Service Pumps	15	08-Aug-14	28-Aug-14						
SL.E9-6834.00	Wiring - HVAC	15	08-Aug-14	28-Aug-14						
SL.E9-6807.00	Wiring - Elevators	15	22-Aug-14	11-Sep-14						
SL.E9-6830.00	Wiring - General Service Valves	15	22-Aug-14	11-Sep-14						
SL.E9-6831.00	Wiring - Specialty Valves	15	22-Aug-14	11-Sep-14						
SL.E9-6827.00	Wiring - Sump Pumps	15	26-Aug-14	15-Sep-14						
SL.E9-6866.00	Wiring - 125 VDC Battery, Chargers & UPS	35	29-Aug-14	16-Oct-14						
SL.E9-6862.00	Wiring - Medium Voltage Switchgear and MCC	40	02-Sep-14	27-Oct-14						
SL.E9-6838.00	Wiring - Fire Protection and Detection System	25	05-Sep-14	09-Oct-14						
SL.E9-6867.00	Wiring - Panels and Switchboards	35	12-Sep-14	30-Oct-14						
SL.E9-6869.00	Wiring - Plant Security System	40	12-Sep-14	06-Nov-14						
SL.E9-6870.00	Wiring - Communication System	40	12-Sep-14	06-Nov-14						
SL.E9-6876.00	Wiring - 138 kV Switches	35	12-Sep-14	30-Oct-14						
SL.E9-6868.00	Wiring - Cathodic Protection	15	16-Oct-14	05-Nov-14						
SL.E9-6837.00	Wiring - Insulation and Heat Tracing	65	31-Oct-14	03-Feb-15						
SL.E9-6890.00	Wiring - WFGD Distributed Control System	50	06-Nov-14	19-Jan-15						
SL.E9-6999.00	Wiring BOP - Miscellaneous	50	14-Nov-14	26-Jan-15						
SL.E9-6891.00	Wiring - BOP Instruments	40	27-Jan-15	24-Mar-15						
Misc Instrumentation & Control Deliverables		540	02-Aug-12	04-Sep-14						
SL.J5000.00	I&C Design Criteria	45	02-Aug-12	03-Oct-12						
SL.J6100.00	Instrument Data Sheets	230	26-Mar-13	14-Feb-14						
SL.J6300.00	Instrument List	373	26-Mar-13	04-Sep-14						
SL.J1000.00	CEMS Test Port Locations	45	03-Jun-13	06-Aug-13						
SL.J6200.00	Instrument Installation Details	165	14-Aug-13	03-Apr-14						
SL.J6400.00	Instrument Locations Drawings	165	14-Aug-13	03-Apr-14						
Distributed Control System Deliverables		649	04-Sep-12	11-Mar-15						
SL.J2000.00	DCS Alarm List	255	04-Sep-12	29-Aug-13						
SL.J2500.00	DCS Datalink I/O List	130	04-Sep-12	06-Mar-13						
SL.J3700.00	DCS I/O Database	130	04-Sep-12	06-Mar-13						
SL.J4000.00	DCS Master Logics	163	04-Oct-12	22-May-13						
SL.J3100.00	DCS Graphic Displays	130	15-Nov-12	17-May-13						
SL.J2400.00	DCS Control Logics	130	23-May-13	21-Nov-13						
SL.J2100.00	DCS Analog Output List	255	14-Feb-14	11-Feb-15						
SL.J2200.00	DCS Communication, Power & Grounding Schematics	130	14-Feb-14	18-Aug-14						

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SL.J2300.00	DCS Computers & Network Equipment Lists	50	14-Feb-14	25-Apr-14						
SL.J3500.00	DCS Hardware List	90	14-Feb-14	20-Jun-14						
SL.J3800.00	DCS I/O Partitioning & Marshalling Cabinet Design	130	14-Feb-14	18-Aug-14						
SL.J4800.00	DCS Setpoint List	130	14-Feb-14	18-Aug-14						
SL.J3000.00	DCS Hardware Freeze	0		18-Aug-14						
SL.J3000.10	DCS Software Freeze	0		20-Oct-14						
SL.J3200.00	DCS Graphic Displays List	20	14-Jan-15	11-Feb-15						
SL.J3000.20	DCS FAT	20	11-Feb-15	11-Mar-15						
CONSTRUCTION		808	12-Dec-12	01-Feb-16						
General Works Packages		317	12-Dec-12	07-Mar-14						
SL.P-6896.00	General Works Specification - Prepare Package	63	12-Dec-12	13-Mar-13						
SL.P-6896C.00	Civil Construction Packages - Prepare Package	63	13-Mar-13	10-Jun-13						
SL.P-6896U.00	Foundation / Substructure Construction Packages - Prepare Package	63	13-Mar-13	10-Jun-13						
SL.P-6896M.00	Mechanical Construction Packages - Prepare Package	63	10-Jun-13	09-Sep-13						
SL.P-6896S.00	Structural Construction Packages - Prepare Package	63	10-Jun-13	09-Sep-13						
SL.P-6896E.00	Electrical Construction Packages - Prepare Package	63	09-Sep-13	05-Dec-13						
SL.P-6896A.00	Architectural Construction Packages - Prepare Package	63	16-Oct-13	15-Jan-14						
SL.P-6896J.00	I&C Construction Packages - Prepare Package	63	05-Dec-13	07-Mar-14						
Construction		747	11-Mar-13	01-Feb-16						
P1EPC7000	Start Site Mobilization	45	11-Mar-13*	10-May-13						
P1EPC7010	Demo / Utility & Buildings Relocation / Site Development	110	10-Jun-13	11-Nov-13						
P1EPC7030	Foundations / Undergrounds Installation	220	17-Jul-13	21-May-14						
P1EPC7050	Chimney Erection	230	18-Oct-13	05-Sep-14						
P1EPC7040	Support Steel Erection (JV Supplied, excl pipe rack)	175	08-Jan-14	10-Sep-14						
P1EPC7056	Absorber Erection	395	14-Jan-14	20-Jul-15						
P1EPC7120	Rail Work Phase 1 Installation	120	14-Jan-14	30-Jun-14						
P1EPC7080	Ductwork Installation	290	30-Apr-14	10-Jun-15						
P1EPC7180	Pipe Rack Erection	120	21-Jul-14	02-Jan-15						
P1EPC7060	Limestone & Gypsum Handling Installation	210	06-Aug-14	26-May-15						
P1EPC7070	ID Fans Installation	130	10-Sep-14	11-Mar-15						
P1EPC7066	Elevators Installation	100	10-Sep-14	28-Jan-15						
P1EPC7140	Building Erection	230	01-Oct-14	19-Aug-15						
P1EPC7100	Rail Work Phase 2 Installation	130	15-Oct-14	14-Apr-15						
P1EPC7150	Transmission Line Installation	65	10-Dec-14	11-Mar-15						
P1EPC7170	Insulation & Lagging Installation	160	20-Jan-15	31-Aug-15						
P1EPC7190	WFGD DCS Installation	130	19-Feb-15	20-Aug-15						

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