



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 29, 2010

Report for WFGD, DFGD, IAQCS
and NID Technologies

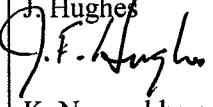
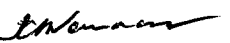
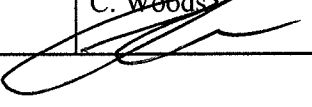
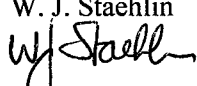
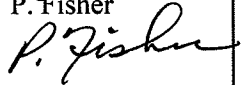
Volume 2 – WFGD Technology



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Issue Summary Page

Revision Number	Date	Purpose	Prepared By	Reviewed By	Approved By	Pages Affected
0	9/29/10	Use	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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2-11	WFGD Summary Capital Cost Estimate No. 30706 Est-2 (1.7 lb SO ₂ /MMbtu)*
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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 was 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 was 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 defines 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. In order to reduce the size of the report the non-base cost estimates contain only those cost accounts that were different from the base estimate. For the WFGD technology the ESP was required to remain in service for protection from erosion and wear of the ID fans and FGD system components (pumps, piping, nozzles, etc.).

The cost 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. 2) 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.



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

EXHIBIT 2-1

WFGD Project Deliverable Index

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 – (1.7 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
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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
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EXHIBIT 2-2

WFGD Capital Cost Estimate Outline

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	Past AEP Projects	
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	Past AEP Projects	
15.0	RAIL INFRASTRUCTURE	S&L	S&L	Past & Current S&L Projects	
16.0	SITE IMPROVEMENTS - CIVIL WORK	S&L	S&L	Past & Current S&L Projects	
17.0	BOP ITEMS	S&L	S&L	Past & Current S&L Projects	
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	Past AEP Projects	

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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Order-of-Magnitude FGD Cost Estimate
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EXHIBIT 2-3

WFGD Contingency Analysis

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-2 - 1.7 LB/MM/BTU

@RISK
Risk Analysis and Simulation Add-In for Microsoft EXCEL
Version 5.0
Palisade Corporation

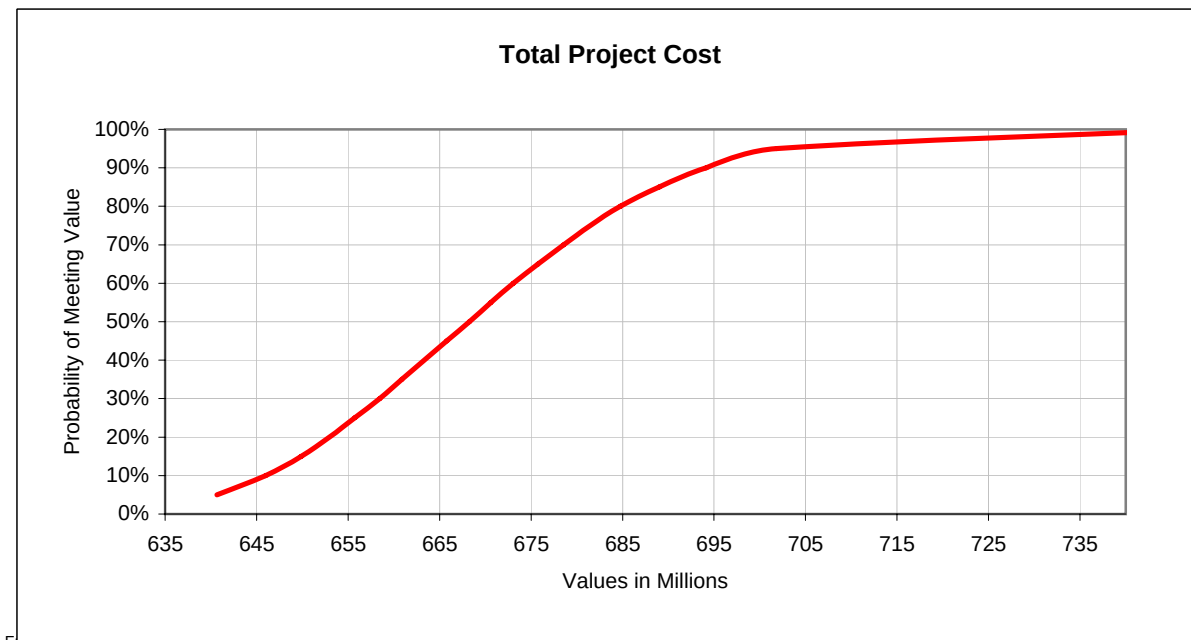
ANALYSIS INPUT

Values in Thousands						
Acct. No.	Cost Elements	Target Value \$k	Minimum	Maximum	Minimum	Maximum
1.0	ID FANS	\$22,698,700	95%	130%	\$21,563,765	\$29,508,310
2.0	WET ESP	\$89,935,300	95%	130%	\$85,438,535	\$116,915,890
3.0	NEW STACK	\$31,480,000	95%	130%	\$29,906,000	\$40,924,000
4.0	LIMESTONE HANDLING SYSTEM	\$23,589,100	95%	125%	\$22,409,645	\$29,486,375
5.0	REAGENT PREPARATION ISLAND	\$34,611,200	95%	130%	\$32,880,640	\$44,994,560
6.0	BYPRODUCT DEWATERING ISLAND	\$29,419,700	95%	130%	\$27,948,715	\$38,245,610
7.0	ABSORBER ISLAND	\$145,098,100	95%	130%	\$137,843,195	\$188,627,530
8.0	FGD WASTE WATER TREATMENT PLANT	\$17,233,200	95%	130%	\$16,371,540	\$22,403,160
9.0	COMPRESSED AIR SYSTEM	\$1,940,700	95%	135%	\$1,843,665	\$2,619,945
10.0	SERVICE WATER SYSTEM	\$5,830,000	95%	135%	\$5,538,500	\$7,870,500
11.1	POTABLE WATER SYSTEM	\$718,500	95%	135%	\$682,575	\$969,975
12.0	FGD SUBSTATION	\$3,060,200	95%	135%	\$2,907,190	\$4,131,270
13.0	FGD DCS SYSTEM	\$6,230,300	95%	135%	\$5,918,785	\$8,410,905
14.0	CEM SYSTEM	\$2,110,000	95%	130%	\$2,004,500	\$2,743,000
15.0	RAIL INFRASTRUCTURE	\$4,340,700	95%	140%	\$4,123,665	\$6,076,980
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$17,138,100	95%	140%	\$16,281,195	\$23,993,340
17.0	BOP ITEMS	\$4,227,600	95%	160%	\$4,016,220	\$6,764,160
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$3,509,200	95%	200%	\$3,333,740	\$7,018,400
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$750,000	95%	150%	\$712,500	\$1,125,000
99.0	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS	\$107,303,400	95%	140%	\$101,938,230	\$150,224,760
	OVERALL PROJECT INDIRECT COSTS	\$59,312,000	95%	130%	\$56,346,400	\$77,105,600
	SPARE PARTS	\$2,203,700	95%	130%	\$2,093,515	\$2,864,810
	Total Base Case	\$612,739,700				

ANALYSIS OUTPUT

Probability of meeting "Total Base Case" value: 612,739,700 0.0%

Total Budget Required (\$k)	% Confidence Level	Confidence Level Risk	Contingency % of Base
748,297,448	100.0%	135,557,700	22.123%
701,802,601	95.0%	89,062,900	14.535%
694,129,811	90.0%	81,390,100	13.283%
689,015,610	85.0%	76,275,900	12.448%
684,762,054	80.0%	72,022,400	11.754%
681,439,913	75.0%	68,700,200	11.212%
678,534,300	70.0%	65,794,600	10.738%
675,751,803	65.0%	63,012,100	10.284%
673,068,676	60.0%	60,329,000	9.846%
670,614,835	55.0%	57,875,100	9.445%
668,256,944	50.0%	55,517,200	9.060%
665,770,089	45.0%	53,030,400	8.655%
663,316,096	40.0%	50,576,400	8.254%
660,896,179	35.0%	48,156,500	7.859%
658,471,498	30.0%	45,731,800	7.463%
655,753,355	25.0%	43,013,700	7.020%
652,953,707	20.0%	40,214,000	6.563%
649,865,806	15.0%	37,126,100	6.059%
645,990,561	10.0%	33,250,900	5.427%
640,663,286	5.0%	27,923,600	4.557%



AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-3 - 3.0 LB/MM/BTU

@RISK
Risk Analysis and Simulation Add-In for Microsoft EXCEL
Version 5.0
Palisade Corporation

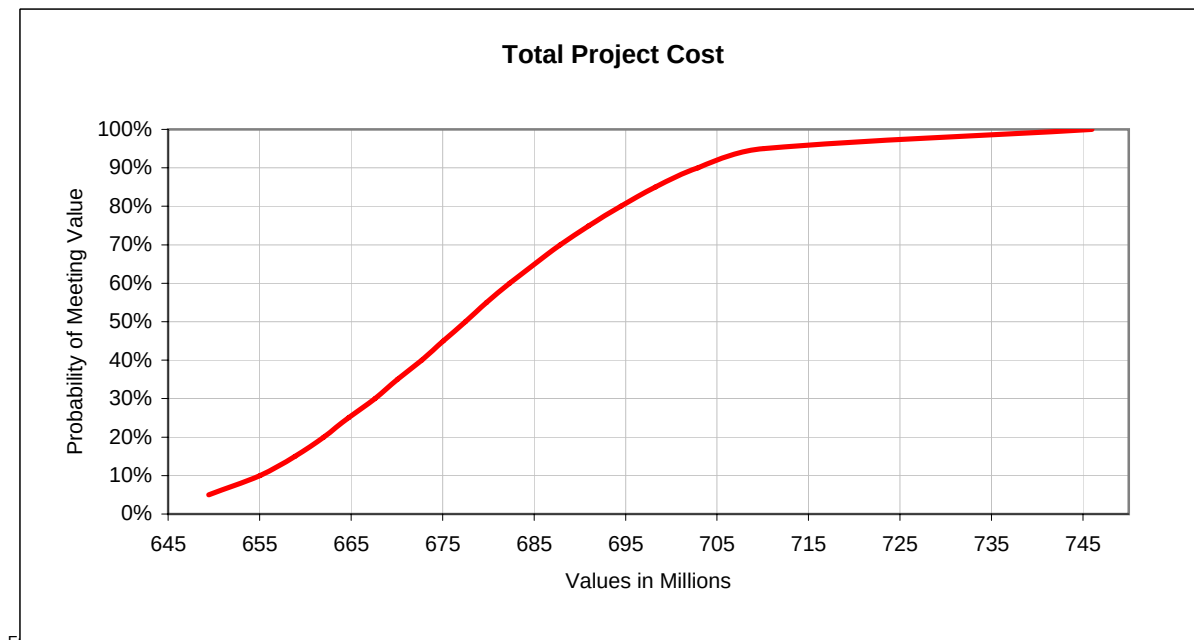
ANALYSIS INPUT

Values in Thousands						
Acct. No.	Cost Elements	Target Value \$k	Minimum	Maximum	Minimum	Maximum
1.0	ID FANS	\$22,698,700	95%	130%	\$21,563,765	\$29,508,310
2.0	WET ESP	\$89,935,300	95%	130%	\$85,438,535	\$116,915,890
3.0	NEW STACK	\$31,480,000	95%	130%	\$29,906,000	\$40,924,000
4.0	LIMESTONE HANDLING SYSTEM	\$23,589,100	95%	125%	\$22,409,645	\$29,486,375
5.0	REAGENT PREPARATION ISLAND	\$37,977,700	95%	130%	\$36,078,815	\$49,371,010
6.0	BYPRODUCT DEWATERING ISLAND	\$31,919,200	95%	130%	\$30,323,240	\$41,494,960
7.0	ABSORBER ISLAND	\$146,010,000	95%	130%	\$138,709,500	\$189,813,000
8.0	FGD WASTE WATER TREATMENT PLANT	\$17,233,200	95%	130%	\$16,371,540	\$22,403,160
9.0	COMPRESSED AIR SYSTEM	\$1,940,700	95%	135%	\$1,843,665	\$2,619,945
10.0	SERVICE WATER SYSTEM	\$5,830,000	95%	135%	\$5,538,500	\$7,870,500
11.1	POTABLE WATER SYSTEM	\$718,500	95%	135%	\$682,575	\$969,975
12.0	FGD SUBSTATION	\$3,060,200	95%	135%	\$2,907,190	\$4,131,270
13.0	FGD DCS SYSTEM	\$6,230,300	95%	135%	\$5,918,785	\$8,410,905
14.0	CEM SYSTEM	\$2,110,000	95%	130%	\$2,004,500	\$2,743,000
15.0	RAIL INFRASTRUCTURE	\$4,340,700	95%	140%	\$4,123,665	\$6,076,980
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$17,138,100	95%	140%	\$16,281,195	\$23,993,340
17.0	BOP ITEMS	\$4,227,600	95%	160%	\$4,016,220	\$6,764,160
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$3,509,200	95%	200%	\$3,333,740	\$7,018,400
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$750,000	95%	150%	\$712,500	\$1,125,000
99.0	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS	\$108,412,000	95%	140%	\$102,991,400	\$151,776,800
	OVERALL PROJECT INDIRECT COSTS	\$59,680,000	95%	130%	\$56,696,000	\$77,584,000
	SPARE PARTS	\$2,266,800	95%	130%	\$2,153,460	\$2,946,840
	Total Base Case	\$621,057,300				

ANALYSIS OUTPUT

Probability of meeting "Total Base Case" value: 621,057,300 0.0%

Total Budget Required (\$k)	% Confidence Level	Confidence Level Risk	Contingency % of Base
745,985,241	100.0%	124,927,900	20.115%
710,133,022	95.0%	89,075,700	14.343%
702,920,766	90.0%	81,863,500	13.181%
698,253,419	85.0%	77,196,100	12.430%
694,487,190	80.0%	73,429,900	11.823%
691,007,931	75.0%	69,950,600	11.263%
687,840,783	70.0%	66,783,500	10.753%
685,057,183	65.0%	63,999,900	10.305%
682,317,980	60.0%	61,260,700	9.864%
679,789,030	55.0%	58,731,700	9.457%
677,492,600	50.0%	56,435,300	9.087%
675,068,936	45.0%	54,011,600	8.697%
672,724,477	40.0%	51,667,200	8.319%
670,068,375	35.0%	49,011,100	7.892%
667,628,362	30.0%	46,571,100	7.499%
664,743,285	25.0%	43,686,000	7.034%
661,987,558	20.0%	40,930,300	6.590%
658,855,499	15.0%	37,798,200	6.086%
655,051,117	10.0%	33,993,800	5.474%
649,455,587	5.0%	28,398,300	4.573%



AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE - 4.5 LB/MM/BTU

@RISK
Risk Analysis and Simulation Add-In for Microsoft EXCEL
Version 5.0
Palisade Corporation

ANALYSIS INPUT

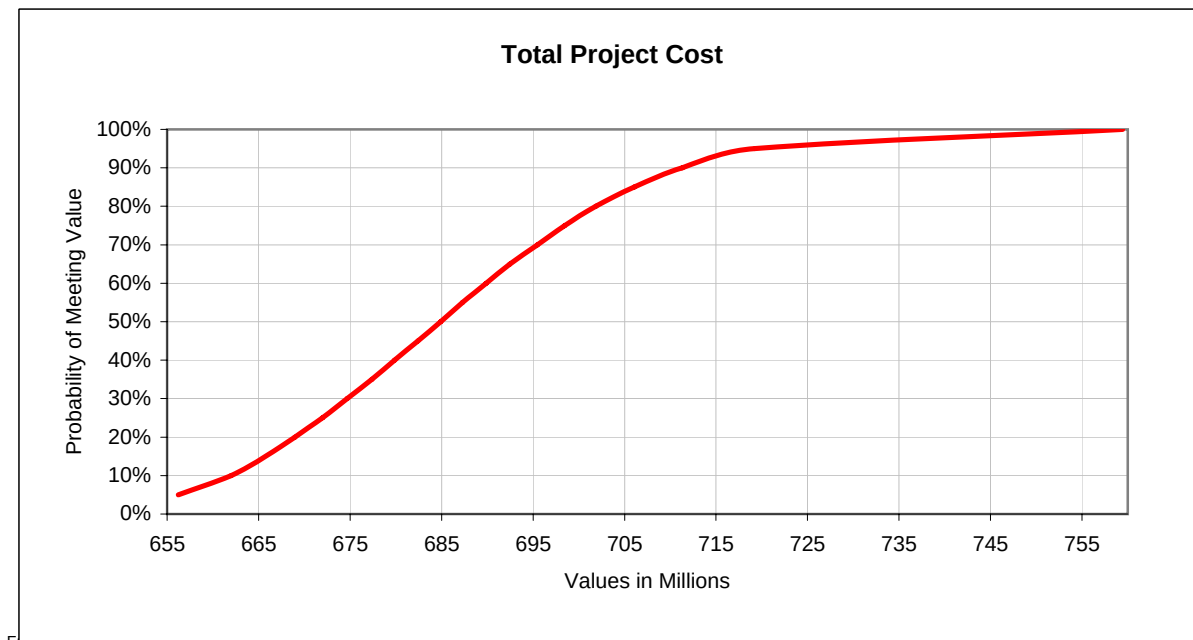
Values in Thousands

Accnt. No.	Cost Elements	Target Value \$k	Minimum	Maximum	Minimum	Maximum
1.0	ID FANS	\$22,698,700	95%	130%	\$21,563,765	\$29,508,310
2.0	WET ESP	\$89,935,300	95%	130%	\$85,438,535	\$116,915,890
3.0	NEW STACK	\$31,480,000	95%	130%	\$29,906,000	\$40,924,000
4.0	LIMESTONE HANDLING SYSTEM	\$23,589,100	95%	125%	\$22,409,645	\$29,486,375
5.0	REAGENT PREPARATION ISLAND	\$40,684,600	95%	130%	\$38,650,370	\$52,889,980
6.0	BYPRODUCT DEWATERING ISLAND	\$34,078,400	95%	130%	\$32,374,480	\$44,301,920
7.0	ABSORBER ISLAND	\$146,652,200	95%	130%	\$139,319,590	\$190,647,860
8.0	FGD WASTE WATER TREATMENT PLANT	\$17,233,200	95%	130%	\$16,371,540	\$22,403,160
9.0	COMPRESSED AIR SYSTEM	\$1,940,700	95%	135%	\$1,843,665	\$2,619,945
10.0	SERVICE WATER SYSTEM	\$5,830,000	95%	135%	\$5,538,500	\$7,870,500
11.1	POTABLE WATER SYSTEM	\$718,500	95%	135%	\$682,575	\$969,975
12.0	FGD SUBSTATION	\$3,060,200	95%	135%	\$2,907,190	\$4,131,270
13.0	FGD DCS SYSTEM	\$6,230,300	95%	135%	\$5,918,785	\$8,410,905
14.0	CEM SYSTEM	\$2,110,000	95%	130%	\$2,004,500	\$2,743,000
15.0	RAIL INFRASTRUCTURE	\$4,340,700	95%	140%	\$4,123,665	\$6,076,980
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$17,138,100	95%	140%	\$16,281,195	\$23,993,340
17.0	BOP ITEMS	\$4,227,600	95%	160%	\$4,016,220	\$6,764,160
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$3,509,200	95%	200%	\$3,333,740	\$7,018,400
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$750,000	95%	150%	\$712,500	\$1,125,000
99.0	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS	\$109,445,100	95%	140%	\$103,972,845	\$153,223,140
	OVERALL PROJECT INDIRECT COSTS	\$59,983,300	95%	130%	\$56,984,135	\$77,978,290
	SPARE PARTS	\$2,322,300	95%	130%	\$2,206,185	\$3,018,990
	Total Base Case	\$627,957,500				

ANALYSIS OUTPUT

Probability of meeting "Total Base Case" value: 627,957,500 0.0%

Total Budget Required (\$k)	% Confidence Level	Confidence Level Risk	Contingency % of Base
759,446,830	100.0%	131,489,300	20.939%
719,211,777	95.0%	91,254,300	14.532%
711,329,081	90.0%	83,371,600	13.277%
706,056,693	85.0%	78,099,200	12.437%
701,866,390	80.0%	73,908,900	11.770%
698,444,985	75.0%	70,487,500	11.225%
695,478,897	70.0%	67,521,400	10.753%
692,472,969	65.0%	64,515,500	10.274%
689,877,826	60.0%	61,920,300	9.861%
687,273,165	55.0%	59,315,700	9.446%
684,922,000	50.0%	56,964,500	9.071%
682,427,571	45.0%	54,470,100	8.674%
679,882,467	40.0%	51,925,000	8.269%
677,390,981	35.0%	49,433,500	7.872%
674,679,607	30.0%	46,722,100	7.440%
671,982,596	25.0%	44,025,100	7.011%
668,955,253	20.0%	40,997,800	6.529%
665,738,849	15.0%	37,781,300	6.017%
661,981,064	10.0%	34,023,600	5.418%
656,232,312	5.0%	28,274,800	4.503%



AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD EST-4 - 7.5 LB/MM/BTU

@RISK
Risk Analysis and Simulation Add-In for Microsoft EXCEL
Version 5.0
Palisade Corporation

ANALYSIS INPUT

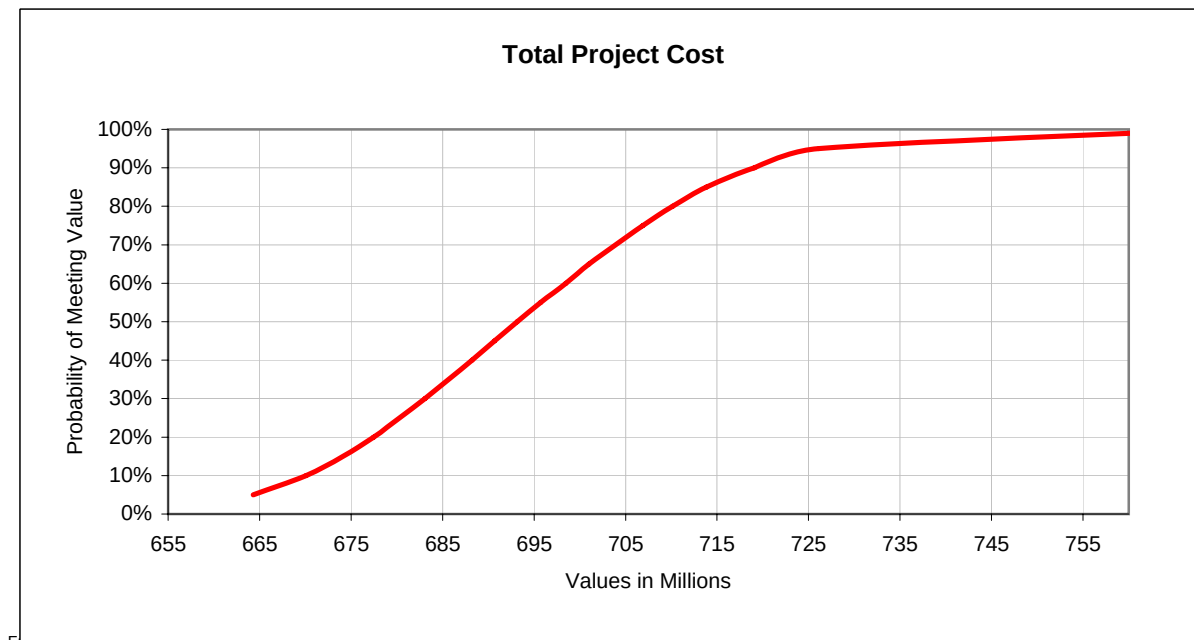
Values in Thousands

Accnt. No.	Cost Elements	Target Value \$k	Minimum	Maximum	Minimum	Maximum
1.0	ID FANS	\$22,698,700	95%	130%	\$21,563,765	\$29,508,310
2.0	WET ESP	\$89,935,300	95%	130%	\$85,438,535	\$116,915,890
3.0	NEW STACK	\$31,480,000	95%	130%	\$29,906,000	\$40,924,000
4.0	LIMESTONE HANDLING SYSTEM	\$23,589,100	95%	125%	\$22,409,645	\$29,486,375
5.0	REAGENT PREPARATION ISLAND	\$43,555,400	95%	130%	\$41,377,630	\$56,622,020
6.0	BYPRODUCT DEWATERING ISLAND	\$36,466,900	95%	130%	\$34,643,555	\$47,406,970
7.0	ABSORBER ISLAND	\$147,437,200	95%	130%	\$140,065,340	\$191,668,360
8.0	FGD WASTE WATER TREATMENT PLANT	\$17,233,200	95%	130%	\$16,371,540	\$22,403,160
9.0	COMPRESSED AIR SYSTEM	\$1,940,700	95%	135%	\$1,843,665	\$2,619,945
10.0	SERVICE WATER SYSTEM	\$5,830,000	95%	135%	\$5,538,500	\$7,870,500
11.1	POTABLE WATER SYSTEM	\$718,500	95%	135%	\$682,575	\$969,975
12.0	FGD SUBSTATION	\$3,060,200	95%	135%	\$2,907,190	\$4,131,270
13.0	FGD DCS SYSTEM	\$6,230,300	95%	135%	\$5,918,785	\$8,410,905
14.0	CEM SYSTEM	\$2,110,000	95%	130%	\$2,004,500	\$2,743,000
15.0	RAIL INFRASTRUCTURE	\$4,340,700	95%	140%	\$4,123,665	\$6,076,980
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$17,138,100	95%	140%	\$16,281,195	\$23,993,340
17.0	BOP ITEMS	\$4,227,600	95%	160%	\$4,016,220	\$6,764,160
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$3,509,200	95%	200%	\$3,333,740	\$7,018,400
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$750,000	95%	150%	\$712,500	\$1,125,000
99.0	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS	\$110,505,100	95%	140%	\$104,979,845	\$154,707,140
	OVERALL PROJECT INDIRECT COSTS	\$60,313,000	95%	130%	\$57,297,350	\$78,406,900
	SPARE PARTS	\$2,379,600	95%	130%	\$2,260,620	\$3,093,480
	Total Base Case	\$635,448,800				

ANALYSIS OUTPUT

Probability of meeting "Total Base Case" value: 635,448,800 0.0%

Total Budget Required (\$k)	% Confidence Level	Confidence Level Risk	Contingency % of Base
769,525,117	100.0%	134,076,300	21.099%
726,124,795	95.0%	90,676,000	14.270%
719,066,135	90.0%	83,617,300	13.159%
713,869,266	85.0%	78,420,500	12.341%
710,146,041	80.0%	74,697,200	11.755%
706,863,784	75.0%	71,415,000	11.239%
703,906,812	70.0%	68,458,000	10.773%
700,980,043	65.0%	65,531,200	10.313%
698,471,822	60.0%	63,023,000	9.918%
695,717,801	55.0%	60,269,000	9.484%
693,174,144	50.0%	57,725,300	9.084%
690,684,230	45.0%	55,235,400	8.692%
688,214,695	40.0%	52,765,900	8.304%
685,687,251	35.0%	50,238,500	7.906%
683,071,421	30.0%	47,622,600	7.494%
680,330,211	25.0%	44,881,400	7.063%
677,463,347	20.0%	42,014,500	6.612%
674,090,626	15.0%	38,641,800	6.081%
670,076,662	10.0%	34,627,900	5.449%
664,309,423	5.0%	28,860,600	4.542%





Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

EXHIBIT 2-4

OEM Cost and Capital Cost Estimate Comparison Summaries - Wet FGD Options

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 reagent preparation 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.

Exhibit 2-4. WFGD OEM Cost Summary (Engineer and Furnish Materials Only)

	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 - Trolleys and Hoists 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 - Trolleys and Hoists 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 29, 2010

Revision 0

Exhibit 2-4. WFGD OEM Cost Summary (Engineer and Furnish Materials Only)

	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 - Trolleys and Hoists 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.

Sargent & Lundy, LLC	30708C WFGD Base Estimate 1 4.5 lb SO2/MMBTU	EXHIBIT 2-4 CAPITAL COST ESTIMATE COMPARISON SUMMARY WET FGD OPTIONS				30708C	30706C	30707C	30709C	Est 2 (1.7 lb SO2/MMBTU) Delta Base Est 1	Est 3 (3.0 lb SO2/MMBTU) Delta Base Est 1	Est 4 (7.5 lb SO2/MMBTU) Delta Base Est 1	Remarks
						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				
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		\$ 10,286,200	\$ 3,289,500	\$ 9,123,000	\$ 22,698,700	\$ 22,698,700	\$ 22,698,700	\$ 22,698,700	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 514,300	\$ 838,800	\$ 3,496,500	\$ 4,849,700	\$ 4,849,700	\$ 4,849,700	\$ 4,849,700	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 10,800,500	\$ 4,128,300	\$ 12,619,500	\$ 27,548,400	\$ 27,548,400	\$ 27,548,400	\$ 27,548,400	\$ -	\$ -	\$ -	
2.0	WET ESP												
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 41,051,200	\$ 12,743,300	\$ 36,140,800	\$ 89,935,300	\$ 89,935,300	\$ 89,935,300	\$ 89,935,300	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,052,600	\$ 3,249,500	\$ 13,853,000	\$ 19,155,100	\$ 19,155,100	\$ 19,155,100	\$ 19,155,100	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	WET ESP	\$ 43,103,800	\$ 15,992,800	\$ 49,993,800	\$ 109,090,400	\$ 109,090,400	\$ 109,090,400	\$ 109,090,400	\$ -	\$ -	\$ -	
3.0	NEW STACK												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ -	\$ -	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	\$ 31,480,000	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 4,722,000	\$ 4,722,000	\$ 4,722,000	\$ 4,722,000	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	NEW STACK	\$ -	\$ -	\$ -	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	\$ -	\$ -	\$ -	
4.0	LIMESTONE HANDLING SYSTEM												
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 6,898,900	\$ 3,730,000	\$ 12,960,200	\$ 23,589,100	\$ 23,589,100	\$ 23,589,100	\$ 23,589,100	\$ -	\$ -	\$ -	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.
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 344,900	\$ 951,200	\$ 4,967,600	\$ 6,263,700	\$ 6,263,700	\$ 6,263,700	\$ 6,263,700	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIMESTONE HANDLING SYSTEM	\$ 7,243,800	\$ 4,681,200	\$ 17,927,800	\$ 29,852,800	\$ 29,852,800	\$ 29,852,800	\$ 29,852,800	\$ -	\$ -	\$ -	
5.0	REAGENT PREPARATION ISLAND												
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 15,809,300	\$ 6,132,200	\$ 18,743,100	\$ 40,684,600	\$ 34,611,200	\$ 37,977,700	\$ 43,555,400	\$ (6,073,400)	\$ (2,706,900)	\$ 2,870,800	As fuel sulfur content increases more limestone is required, therefore the reagent prep island costs are increased.
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 790,500	\$ 1,563,700	\$ 7,184,300	\$ 9,538,500	\$ 8,485,400	\$ 9,087,700	\$ 10,031,900	\$ (1,053,100)	\$ (450,800)	\$ 493,400	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 16,599,800	\$ 7,695,900	\$ 25,927,400	\$ 50,223,100	\$ 43,096,600	\$ 47,065,400	\$ 53,587,300	\$ (7,126,500)	\$ (3,157,700)	\$ 3,364,200	
6.0	BYPRODUCT DEWATERING ISLAND												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 11,005,200	\$ 5,771,600	\$ 17,301,600	\$ 34,078,400	\$ 29,419,700	\$ 31,919,200	\$ 36,466,900	\$ (4,658,700)	\$ (2,159,200)	\$ 2,388,500	As fuel sulfur content increases more limestone is required and more byproduct is produced, therefore the byproduct handling costs are increased.
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 550,300	\$ 1,471,800	\$ 6,631,200	\$ 8,653,200	\$ 7,882,000	\$ 8,311,200	\$ 9,039,600	\$ (771,200)	\$ (342,000)	\$ 386,400	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 11,555,500	\$ 7,243,400	\$ 23,932,800	\$ 42,731,600	\$ 37,301,700	\$ 40,230,400	\$ 45,506,500	\$ (5,429,900)	\$ (2,501,200)	\$ 2,774,900	
7.0	ABSORBER ISLAND												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 47,167,900	\$ 28,958,500	\$ 70,525,800	\$ 146,652,200	\$ 145,098,100	\$ 146,010,000	\$ 147,437,200	\$ (1,554,100)	\$ (642,200)	\$ 785,000	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.
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,033,400	\$ 7,384,400	\$ 27,816,500	\$ 38,234,300	\$ 37,916,900	\$ 38,106,600	\$ 38,414,500	\$ (317,400)	\$ (127,700)	\$ 180,200	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,201,300	\$ 36,342,900	\$ 98,342,300	\$ 184,886,500	\$ 183,015,000	\$ 184,116,600	\$ 185,851,700	\$ (1,871,500)	\$ (769,900)	\$ 965,200	
8.0	FGD WASTE WATER TREATMENT PLANT												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,874,400	\$ 4,979,100	\$ 7,379,700	\$ 17,233,200	\$ 17,233,200	\$ 17,233,200	\$ 17,233,200	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 243,700	\$ 1,269,700	\$ 2,828,900	\$ 4,342,300	\$ 4,342,300	\$ 4,342,300	\$ 4,342,300	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD WASTE WATER TREATMENT PLANT	\$ 5,118,100	\$ 6,248,800	\$ 10,208,600	\$ 21,575,500	\$ 21,575,500	\$ 21,575,500	\$ 21,575,500	\$ -	\$ -	\$ -	
9.0	COMPRESSED AIR SYSTEM												
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 767,700	\$ 200,200	\$ 972,800	\$ 1,940,700	\$ 1,940,700	\$ 1,940,700	\$ 1,940,700	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 38,400	\$ 51,100	\$ 373,300	\$ 462,700	\$ 462,700	\$ 462,700	\$ 462,700	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 806,100	\$ 251,300	\$ 1,346,100	\$ 2,403,400	\$ 2,403,400	\$ 2,403,400	\$ 2,403,400	\$ -	\$ -	\$ -	

Sargent & Lundy, LLC	30708C WFGD Base Estimate 1 4.5 lb SO2/MMBTU	EXHIBIT 2-4 CAPITAL COST ESTIMATE COMPARISON SUMMARY WET FGD OPTIONS				30708C	30706C	30707C	30709C	Est 2 (1.7 lb SO2/MMBTU) Delta Base Est 1	Est 3 (3.0 lb SO2/MMBTU) Delta Base Est 1	Est 4 (7.5 lb SO2/MMBTU) Delta Base Est 1	Remarks
						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				
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				
10.0	SERVICE WATER SYSTEM												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 949,000	\$ 1,486,100	\$ 3,394,900	\$ 5,830,000	\$ 5,830,000	\$ 5,830,000	\$ 5,830,000	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 47,500	\$ 379,000	\$ 1,301,000	\$ 1,727,500	\$ 1,727,500	\$ 1,727,500	\$ 1,727,500	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 996,500	\$ 1,865,100	\$ 4,695,900	\$ 7,557,500	\$ 7,557,500	\$ 7,557,500	\$ 7,557,500	\$ -	\$ -	\$ -	
11.0	POTABLE WATER SYSTEM												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 167,000	\$ 134,500	\$ 417,000	\$ 718,500	\$ 718,500	\$ 718,500	\$ 718,500	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 8,400	\$ 34,300	\$ 159,600	\$ 202,200	\$ 202,200	\$ 202,200	\$ 202,200	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 175,400	\$ 168,800	\$ 576,600	\$ 920,700	\$ 920,700	\$ 920,700	\$ 920,700	\$ -	\$ -	\$ -	
12.0	FGD SUBSTATION												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,813,800	\$ 192,700	\$ 1,053,700	\$ 3,060,200	\$ 3,060,200	\$ 3,060,200	\$ 3,060,200	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 90,700	\$ 49,100	\$ 404,254	\$ 544,100	\$ 544,100	\$ 544,100	\$ 544,100	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 1,904,500	\$ 241,800	\$ 1,458,000	\$ 3,604,300	\$ 3,604,300	\$ 3,604,300	\$ 3,604,300	\$ -	\$ -	\$ -	
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												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ 2,110,000	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 316,500	\$ 316,500	\$ 316,500	\$ 316,500	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CEM SYSTEM	\$ -	\$ -	\$ -	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ -	\$ -	\$ -	
15.0	RAIL INFRASTRUCTURE												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,100	\$ 2,084,100	\$ 4,340,700	\$ 4,340,700	\$ 4,340,700	\$ 4,340,700	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 521,200	\$ 798,600	\$ 1,330,500	\$ 1,330,500	\$ 1,330,500	\$ 1,330,500	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,300	\$ 2,882,700	\$ 5,671,200	\$ 5,671,200	\$ 5,671,200	\$ 5,671,200	\$ -	\$ -	\$ -	
16.0	SITE IMPROVEMENTS - CIVIL WORK												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,092,500	\$ 4,776,700	\$ 8,268,900	\$ 17,138,100	\$ 17,138,100	\$ 17,138,100	\$ 17,138,100	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 204,600	\$ 1,218,100	\$ 3,169,400	\$ 4,592,100	\$ 4,592,100	\$ 4,592,100	\$ 4,592,100	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 4,297,100	\$ 5,994,800	\$ 11,438,300	\$ 21,730,200	\$ 21,730,200	\$ 21,730,200	\$ 21,730,200	\$ -	\$ -	\$ -	
17.0	BOP ITEMS												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,378,100	\$ 2,639,500	\$ 4,227,600	\$ 4,227,600	\$ 4,227,600	\$ 4,227,600	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 351,416	\$ 1,012,192	\$ 1,374,107	\$ 1,374,107	\$ 1,374,107	\$ 1,374,107	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,729,500	\$ 3,651,700	\$ 5,601,700	\$ 5,601,700	\$ 5,601,700	\$ 5,601,700	\$ -	\$ -	\$ -	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 917,200	\$ 2,592,000	\$ 3,509,200	\$ 3,509,200	\$ 3,509,200	\$ 3,509,200	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 233,900	\$ 993,100	\$ 1,227,000	\$ 1,227,000	\$ 1,227,000	\$ 1,227,000	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 1,151,100	\$ 3,585,100	\$ 4,736,200	\$ 4,736,200	\$ 4,736,200	\$ 4,736,200	\$ -	\$ -	\$ -	

Sargent & Lundy, LLC	30708C WFGD Base Estimate 1 4.5 lb SO2/MMBTU	EXHIBIT 2-4 CAPITAL COST ESTIMATE COMPARISON SUMMARY WET FGD OPTIONS				30708C	30706C	30707C	30709C	Est 2 (1.7 lb SO2/MMBTU) Delta Base Est 1	Est 3 (3.0 lb SO2/MMBTU) Delta Base Est 1	Est 4 (7.5 lb SO2/MMBTU) Delta 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				
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT												
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ -	\$ -	\$ 750,000	\$ 750,000	\$ 750,000	\$ 750,000	\$ -	\$ -	\$ -	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 112,500	\$ 112,500	\$ 112,500	\$ 112,500	\$ -	\$ -	\$ -	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ -	\$ -	\$ -	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	\$ -	\$ -	\$ -	
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 146,865,600	\$ 81,101,600	\$ 196,009,600	\$ 456,206,800	\$ 443,920,600	\$ 450,698,500	\$ 462,251,100	\$ (12,286,200)	\$ (5,508,300)	\$ 6,044,300	
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,955,300	\$ 20,624,200	\$ 75,795,600	\$ 109,445,100	\$ 107,303,400	\$ 108,412,000	\$ 110,505,100	\$ (2,141,700)	\$ (1,033,100)	\$ 1,060,000	
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 154,820,900	\$ 101,725,800	\$ 271,805,200	\$ 565,651,900	\$ 551,224,000	\$ 559,110,500	\$ 572,756,200	\$ (14,427,900)	\$ (6,541,400)	\$ 7,104,300	
	OVERALL PROJECT INDIRECT COSTS												
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ 30,000,000	\$ -	\$ -	\$ -	
	CONSTRUCTION MANAGEMENT					\$ 16,969,600	\$ 16,536,700	\$ 16,773,300	\$ 17,182,700	\$ (432,900)	\$ (196,300)	\$ 213,100	
	S-U / COMMISSIONING					\$ 5,656,500	\$ 5,512,200	\$ 5,591,100	\$ 5,727,600	\$ (144,300)	\$ (65,400)	\$ 71,100	
	CRAFT START-UP SUPPORT					\$ 2,310,200	\$ 2,259,400	\$ 2,288,300	\$ 2,334,400	\$ (50,800)	\$ (21,900)	\$ 24,200	
	INITIAL FILLS					\$ 1,697,000	\$ 1,653,700	\$ 1,677,300	\$ 1,718,300	\$ (43,300)	\$ (19,700)	\$ 21,300	
	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	\$ -	\$ -	\$ -	
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS				\$ 2,650,000	\$ 2,650,000	\$ 2,650,000	\$ 2,650,000	\$ -	\$ -	\$ -	
	SUBTOTAL - INDIRECT COSTS					\$ 59,983,300	\$ 59,312,000	\$ 59,680,000	\$ 60,313,000	\$ (671,300)	\$ (303,300)	\$ 329,700	
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 625,635,200	\$ 610,536,000	\$ 618,790,500	\$ 633,069,200	\$ (15,099,200)	\$ (6,844,700)	\$ 7,434,000	
	SPARE PARTS:					\$ 2,322,300	\$ 2,203,700	\$ 2,266,800	\$ 2,379,600	\$ (118,600)	\$ (55,500)	\$ 57,300	
	SPARE PARTS - CAPITALIZED	0.90				\$ 1,393,380	\$ 1,322,200	\$ 1,813,440	\$ 1,427,760	\$ (71,180)	\$ 420,060	\$ 34,380	
	SPARE PARTS - FIRST YEAR OF OPERATION	0.60				\$ 928,920	\$ 881,500	\$ 1,133,400	\$ 951,840	\$ (47,420)	\$ 204,480	\$ 22,920	
	CONTINGENCY	14.5				\$ 91,254,300	\$ 89,062,900	\$ 89,075,700	\$ 90,676,000	\$ (2,191,400)	\$ (2,178,600)	\$ (578,300)	
	ESCALATION					\$ 78,606,500	\$ 76,508,800	\$ 77,651,000	\$ 79,631,900	\$ (2,097,700)	\$ (955,500)	\$ 1,025,400	
	EQUIPMENT					\$ 23,797,800	\$ 22,582,600	\$ 23,229,300	\$ 24,385,300	\$ (1,215,200)	\$ (568,500)	\$ 587,500	
	MATERIAL					\$ 11,195,900	\$ 11,143,900	\$ 11,176,100	\$ 11,236,700	\$ (52,000)	\$ (19,800)	\$ 40,800	
	LABOR					\$ 36,670,100	\$ 35,917,300	\$ 36,338,000	\$ 37,029,100	\$ (752,800)	\$ (332,100)	\$ 359,000	
	INDIRECTS					\$ 6,942,700	\$ 6,865,000	\$ 6,907,600	\$ 6,980,800	\$ (77,700)	\$ (35,100)	\$ 38,100	
	TOTAL PROJECT COST					\$ 797,818,300	\$ 778,311,400	\$ 787,784,000	\$ 805,756,700	\$ (19,506,900)	\$ (10,034,300)	\$ 7,938,400	



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
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EXHIBIT 2-5

WFGD O&M Cost Estimate Summary

AEP

Order-of-Magnitude EPC Cost Estimate

Big Sandy Station – Unit 2

Project No. 12721-000

September 29, 2010

Revision 0

Exhibit 2-5. WFGD O&M Cost Estimate Summary (2010 dollars)

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 [in WC]	26 [52]	26 [52]	26 [52]	26 [52]
FGD Draft Only [in WC]	8 [14]	8 [15]	9 [16]	10 [17]
FGD Equipment Load	7	10	11	18
Existing Booster Fans	-10	-10	-10	-10
Existing ESP	0	0	0	0
WESP	3	3	3	3
Total Auxiliary Power at Full Load (MW)	26	29	30	37

Note: NA = Not Applicable for the technology



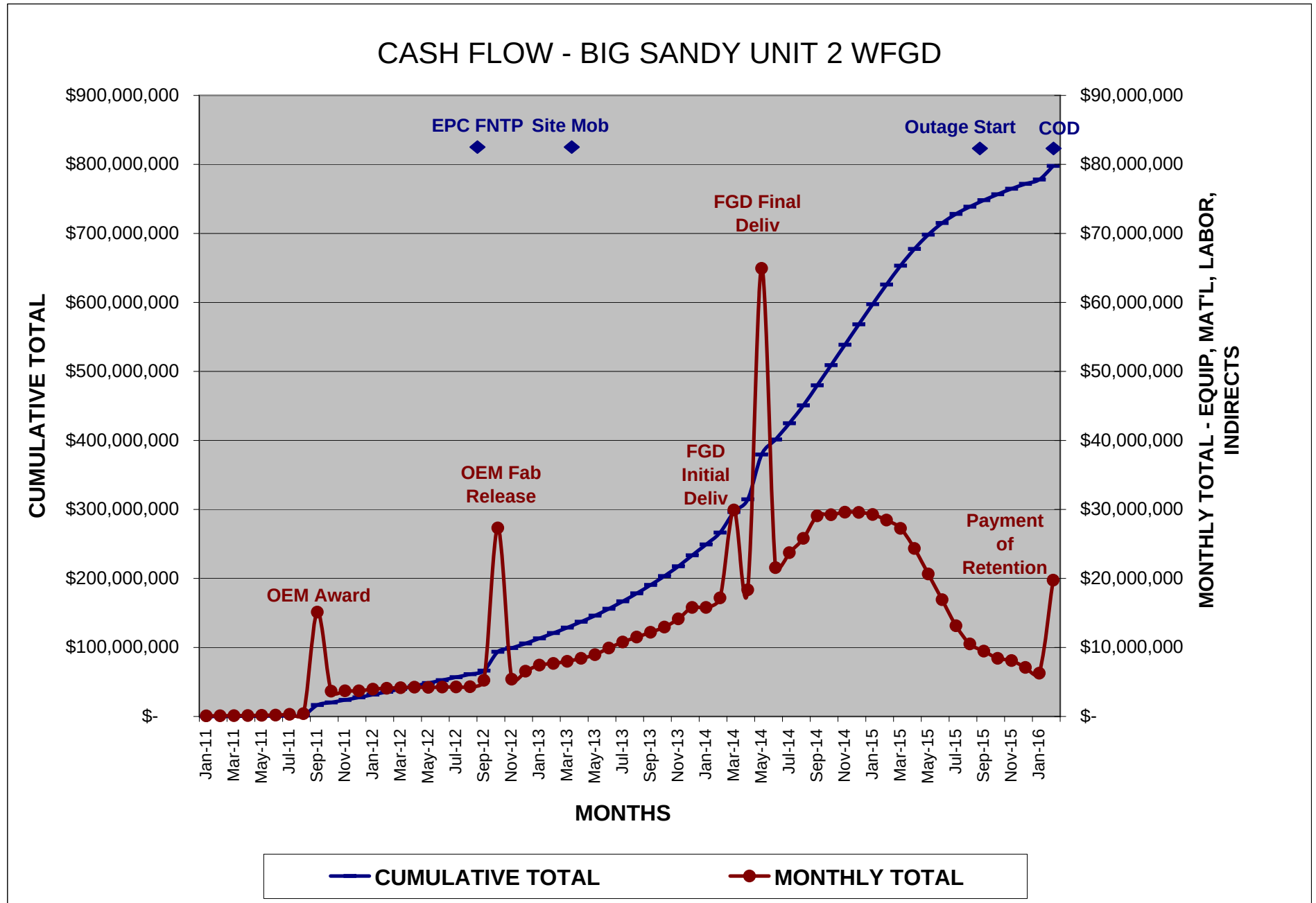
Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
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EXHIBIT 2-6

WFGD Project Cash Flow

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

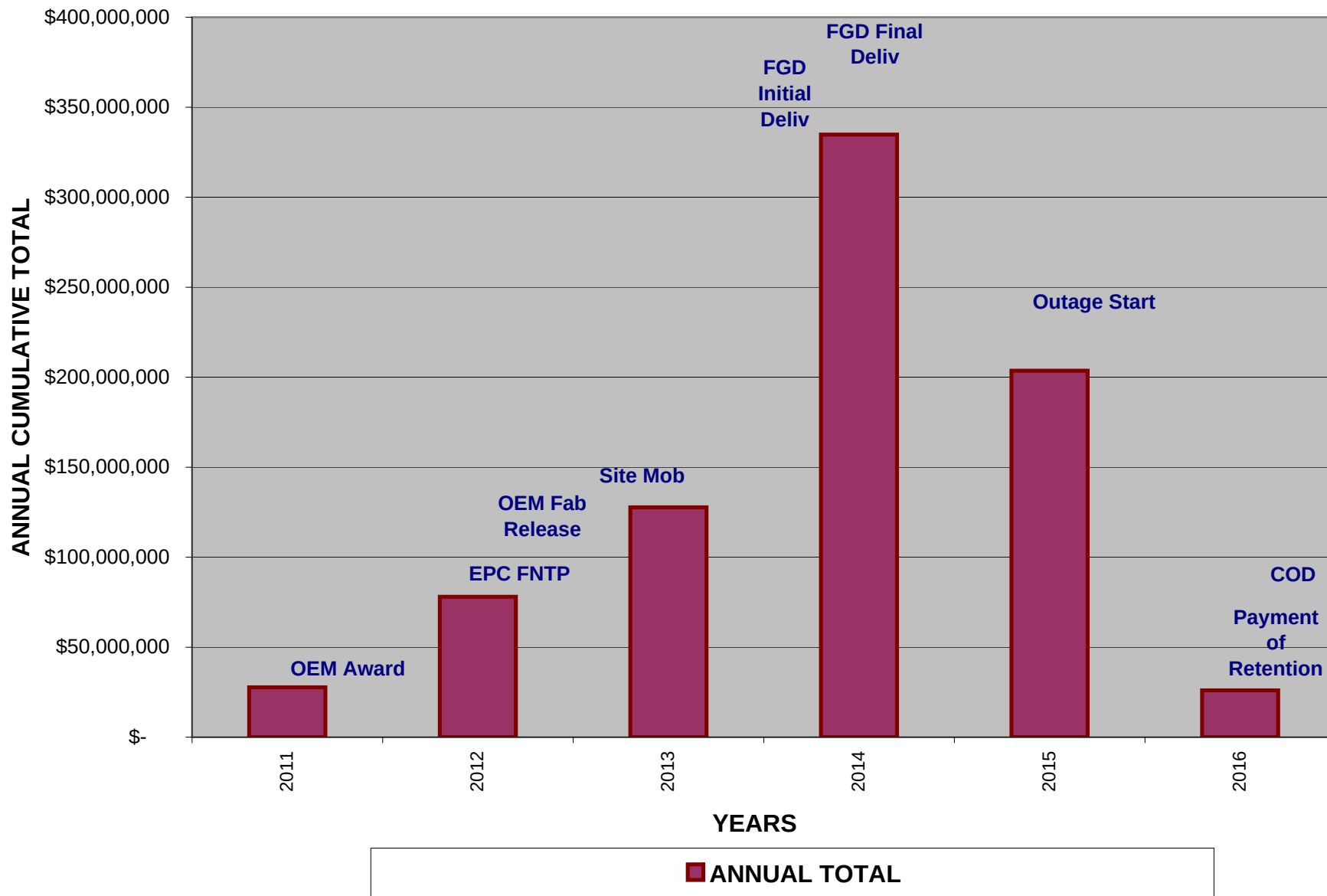
Sargent & Lundy
Date: 9/29/10
Rev: 0



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: 9/29/10
Rev: 0

ANNUAL CASH FLOW - BIG SANDY UNIT 2 WFGD

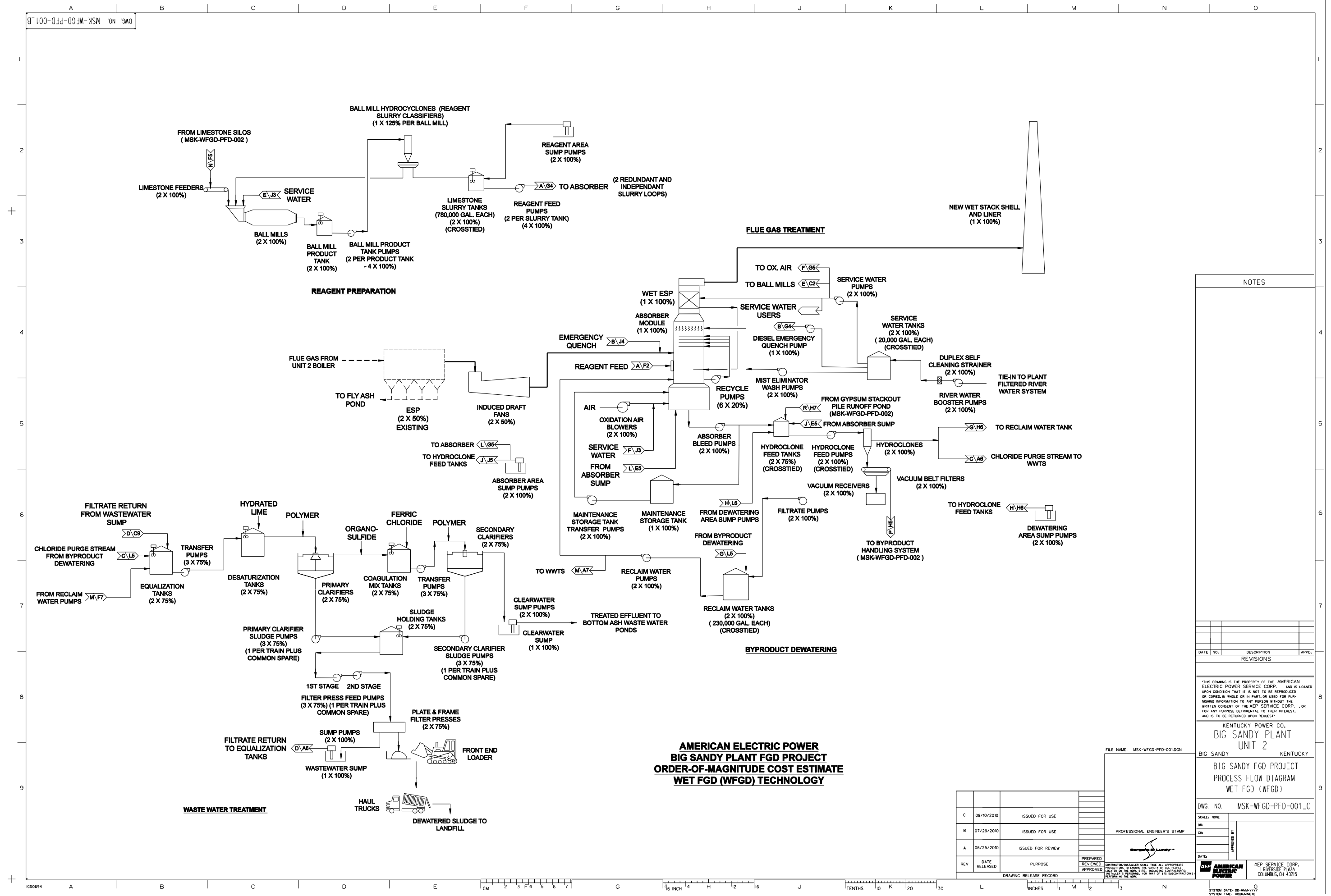




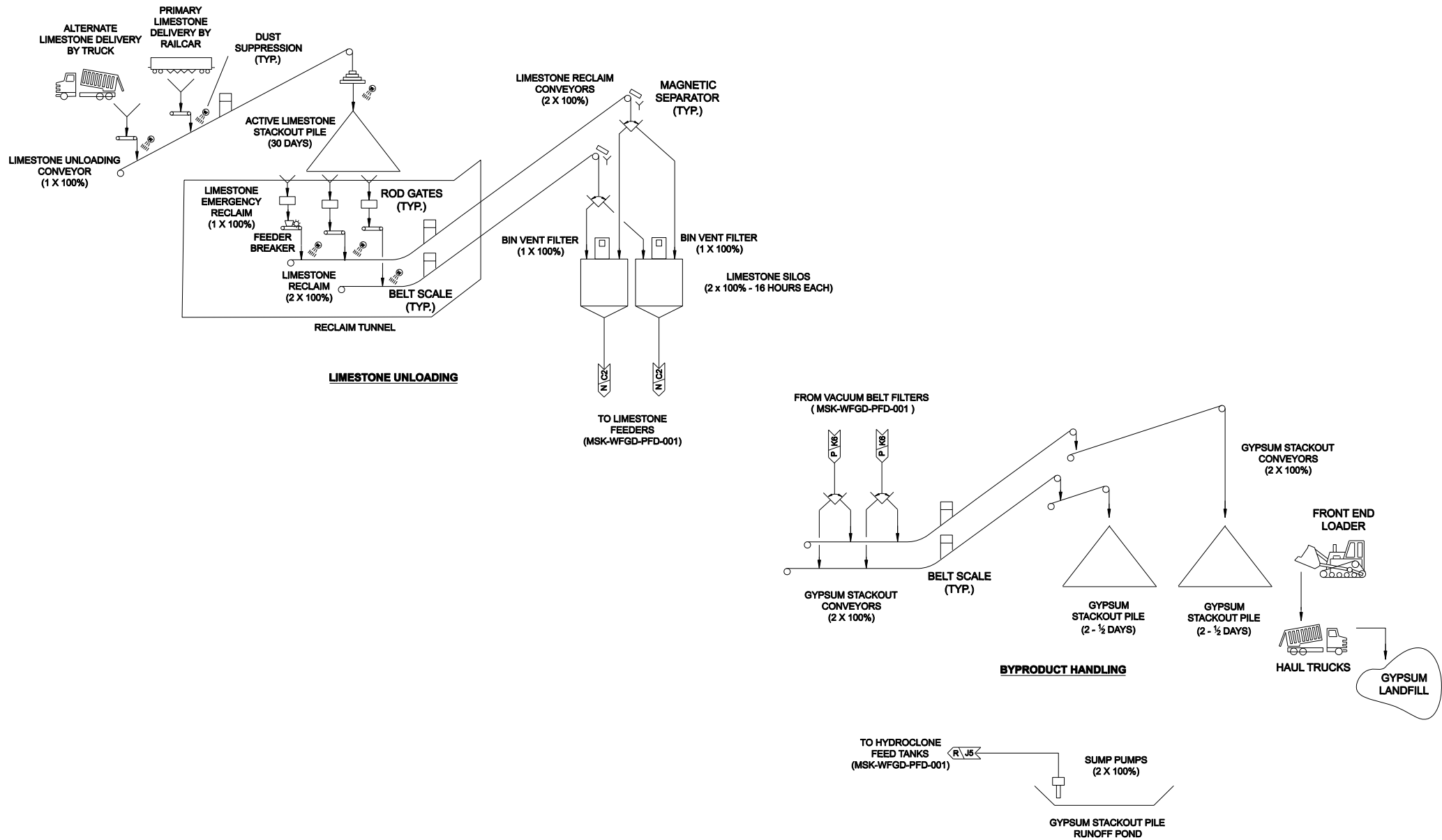
Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
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ATTACHMENT 2-1

WFGD Process Flow Diagrams



DWG. NO. MSK-WFGD-PFD-002_B



**AMERICAN ELECTRIC POWER
BIG SANDY PLANT FGD PROJECT
ORDER-OF-MAGNITUDE COST ESTIMATE
WET FGD (WFGD) TECHNOLOGY**

REV	DATE	RELEASED	PURPOSE
C	09/10/2010		ISSUED FOR USE
B	07/29/2010		ISSUED FOR USE
A	06/25/2010		ISSUED FOR REVIEW

FILE NAME: MSK-WFGD-PFD-M002.DGN

KENTUCKY POWER CO. BIG SANDY PLANT UNIT 2	
BIG SANDY FGD PROJECT PROCESS FLOW DIAGRAM WET FGD (WFGD)	
DWG. NO. MSK-WFGD-PFD-002_C	
SCALE: 1/8"=1'-0"	DATE: 09/10/2010
DR: [Signature]	APPROVED BY: [Signature]
AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215	

NOTES

DATE	NO.	DESCRIPTION	APPRO.
REVISIONS			
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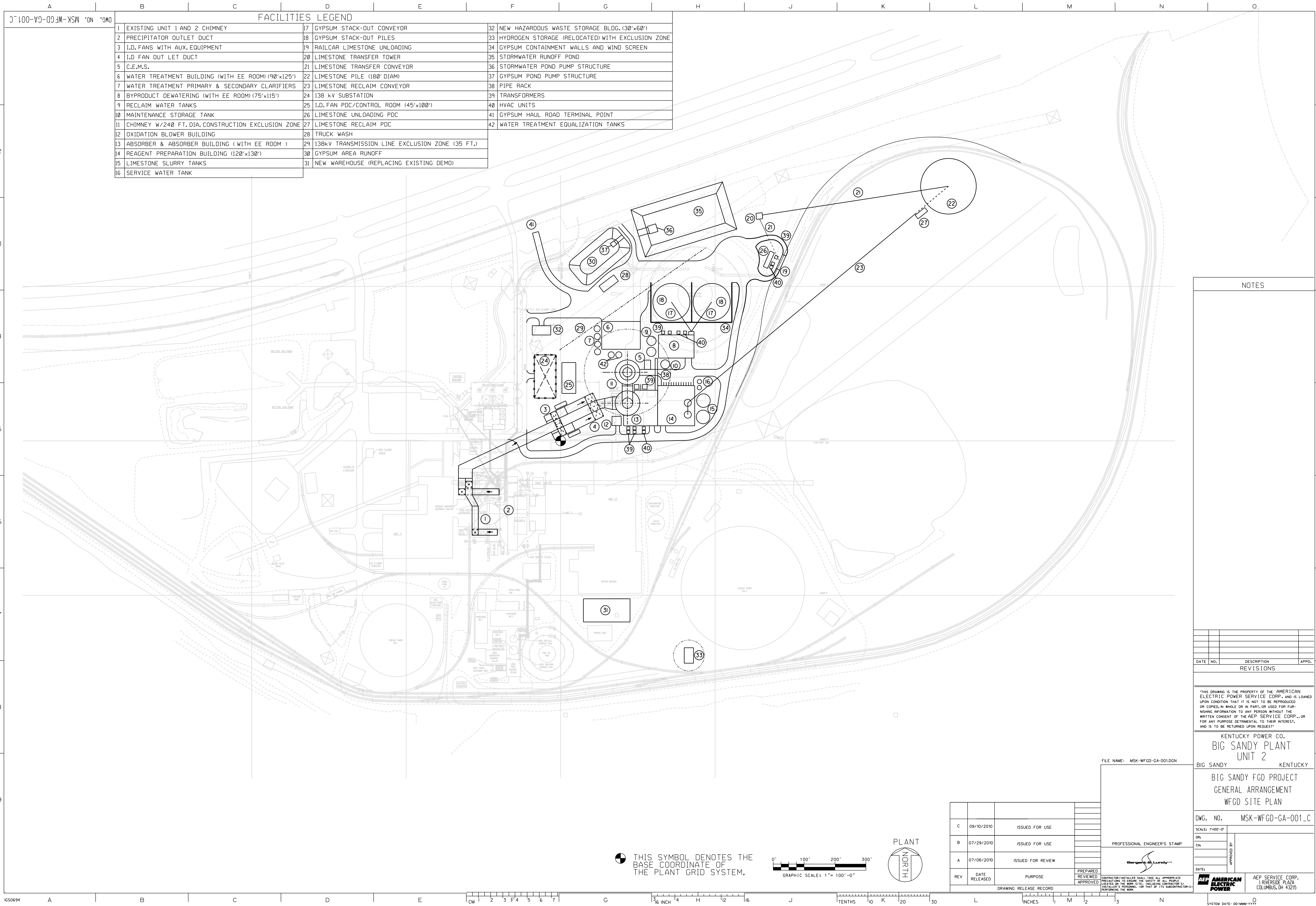
KENTUCKY POWER CO.
BIG SANDY PLANT
UNIT 2
BIG SANDY FGD PROJECT
PROCESS FLOW DIAGRAM
WET FGD (WFGD)
DWG. NO. MSK-WFGD-PFD-002_C
SCALE: 1/8"=1'-0"
DATE: 09/10/2010
DR: [Signature]
APPROVED BY: [Signature]
AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

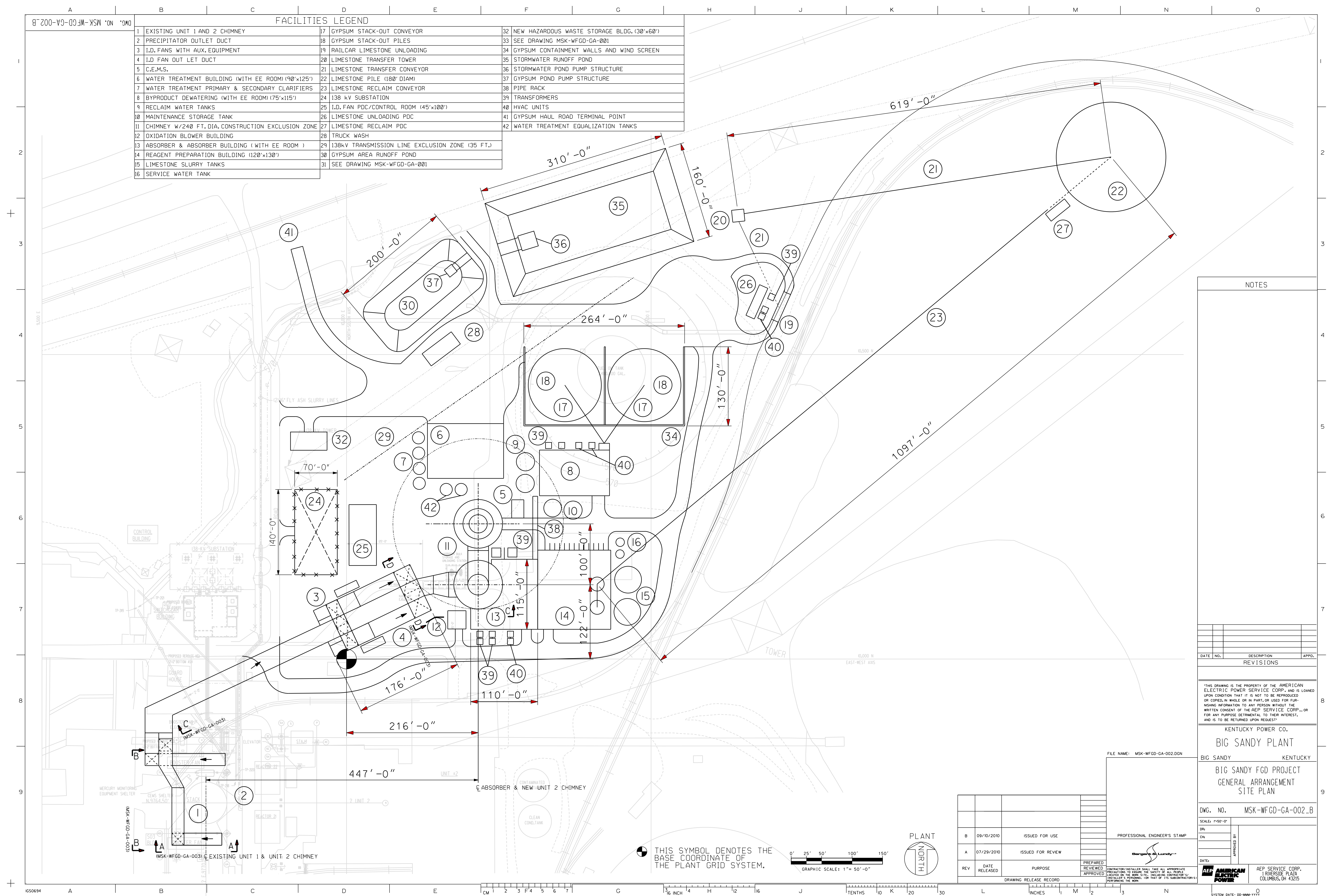


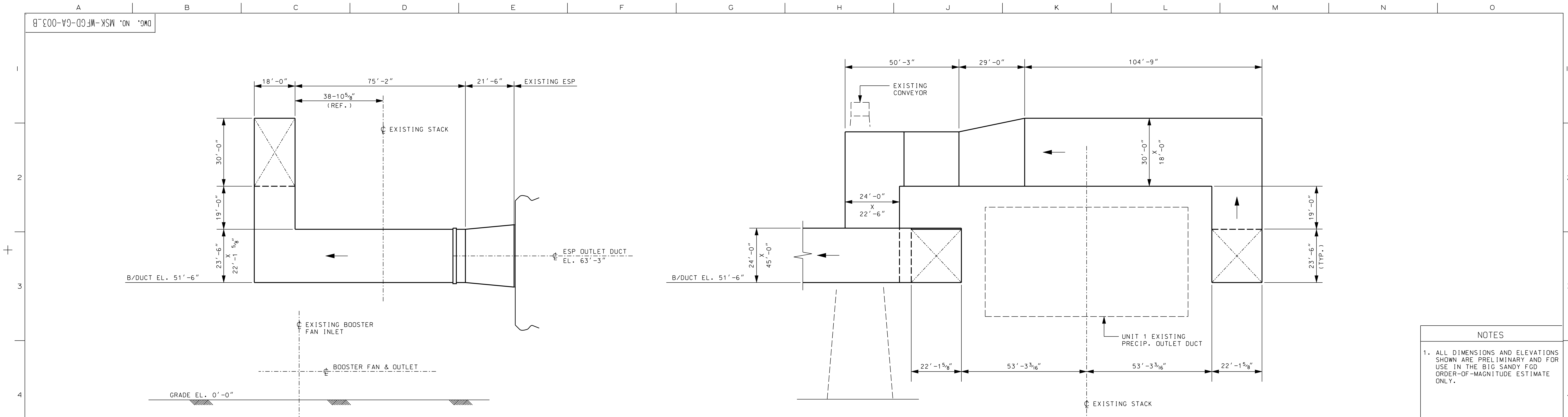
Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
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ATTACHMENT 2-2

WFGD Site Plan and General Arrangement Drawings

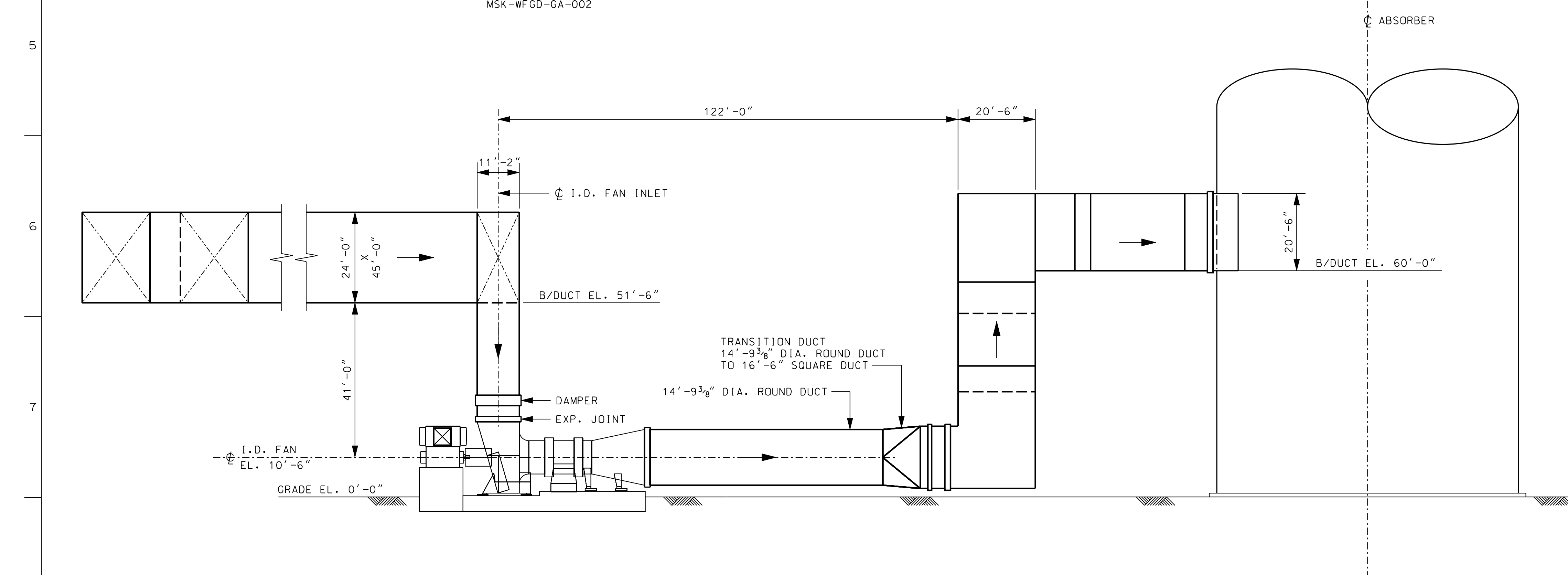




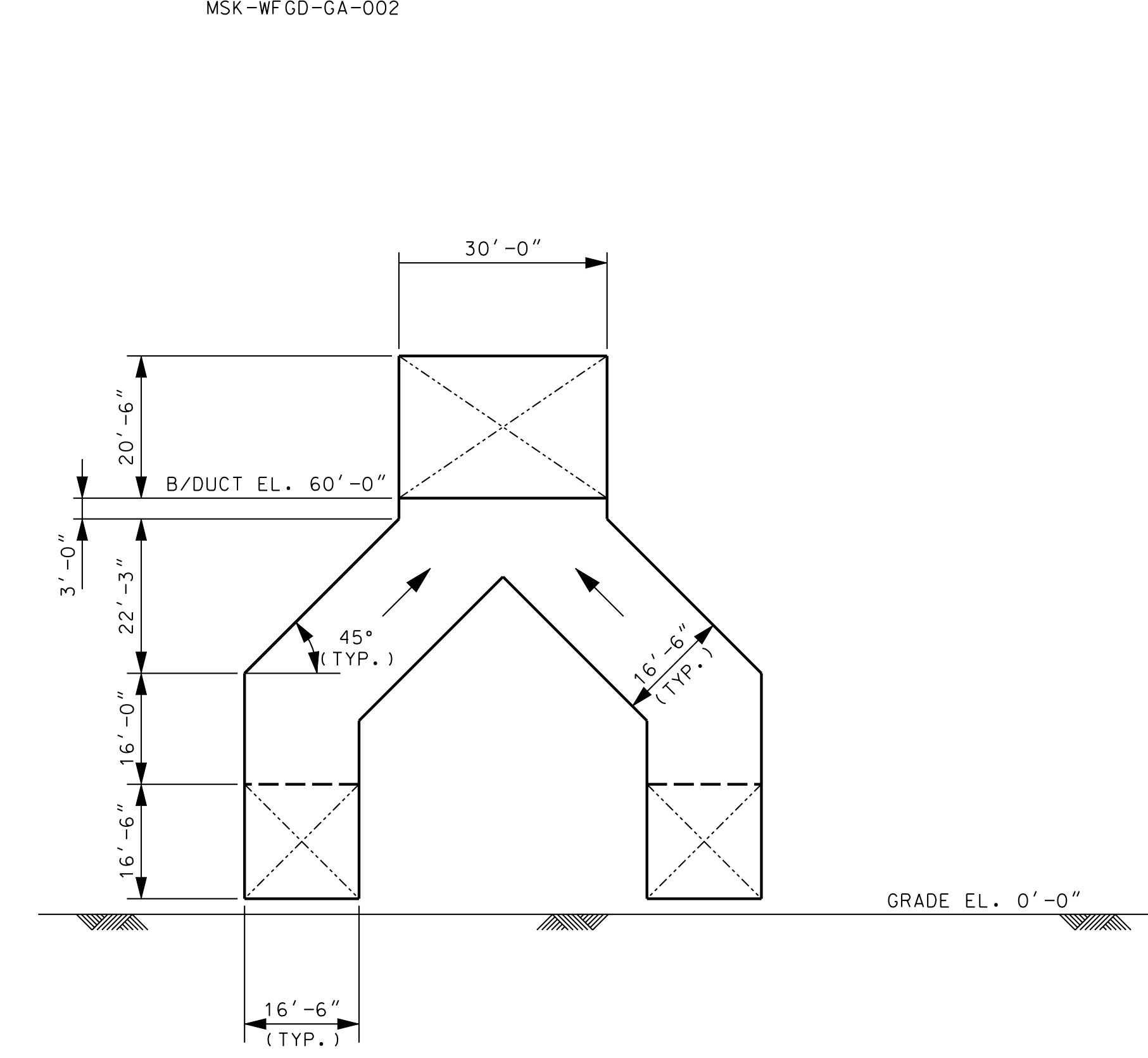


SECTION A-A (LOOKING NORTH)
MSK-WFGD-GA-002

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"

DR: _____
CH: _____
DATE: _____
APPROVED BY: _____

AEP 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

Bergin & Lundy, Inc.

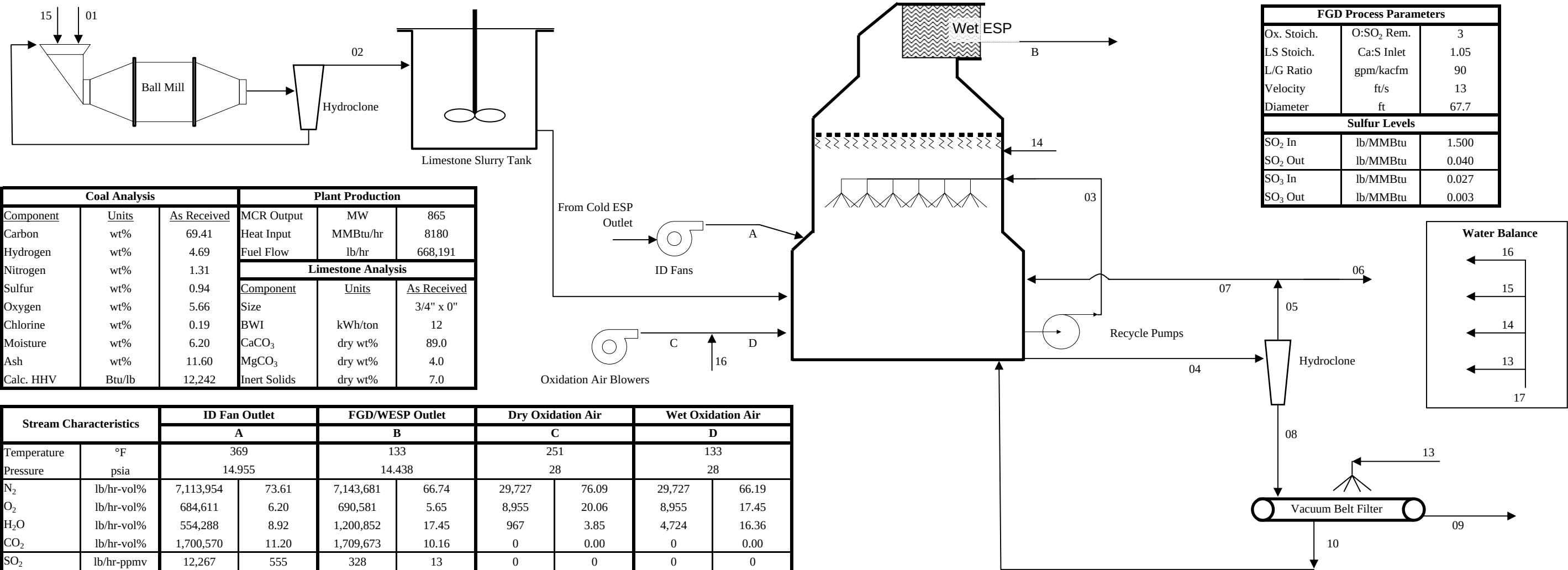
CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE EMPLOYED ON THE WORK SITE, INCLUDING CONTRACTOR'S, INSTALLER'S PERSONNEL AND THAT OF ALL SUBCONTRACTORS' PERSONNEL ON THE WORK SITE.



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
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ATTACHMENT 2-3 WFGD Mass Balances

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



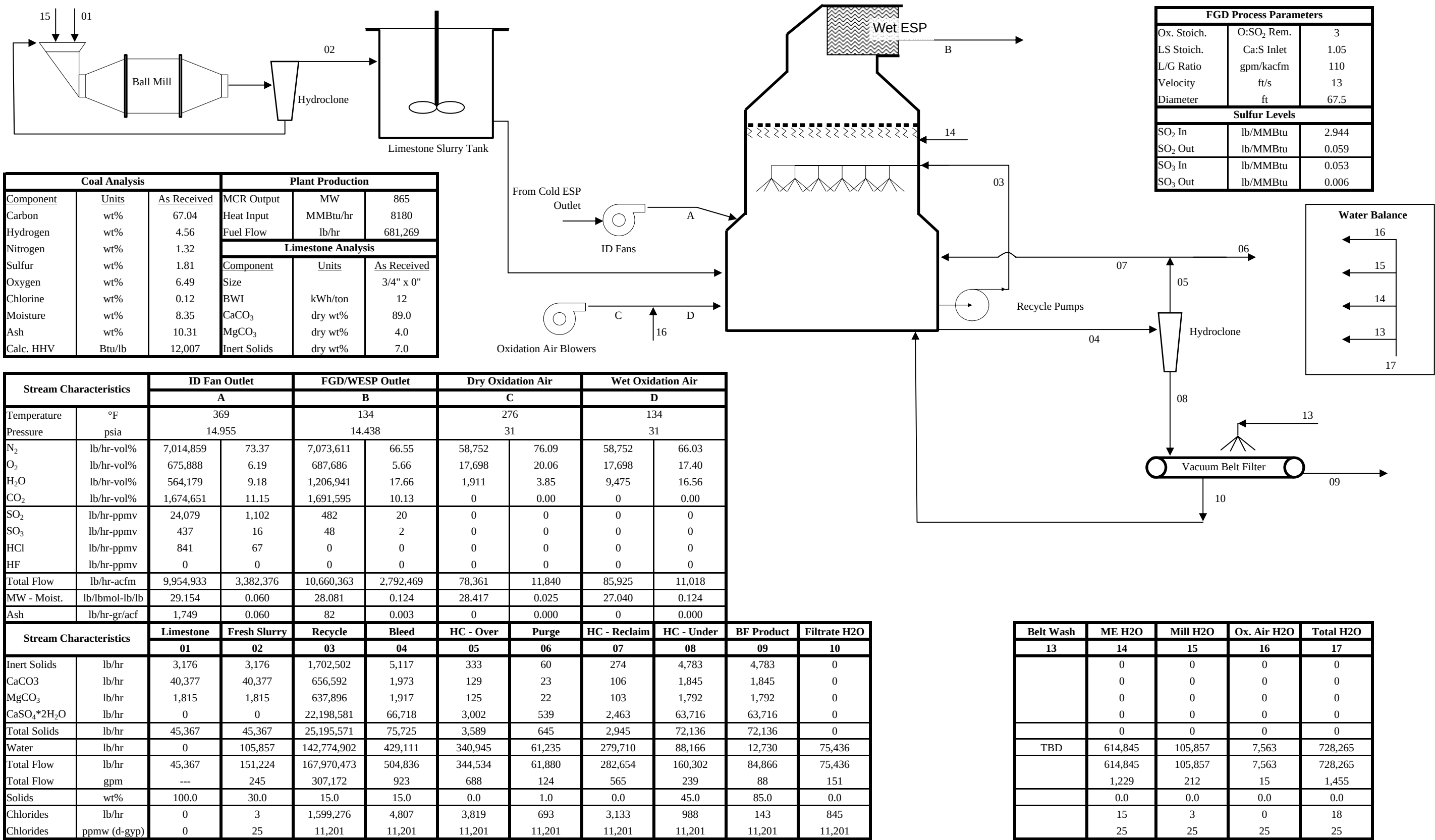
Coal Analysis			Plant Production		
Component	Units	As Received	MCR Output	MW	865
Carbon	wt%	69.41	Heat Input	MMBtu/hr	8180
Hydrogen	wt%	4.69	Fuel Flow	lb/hr	668,191
Nitrogen	wt%	1.31	Limestone Analysis		
Sulfur	wt%	0.94	Component	Units	As Received
Oxygen	wt%	5.66	Size		3/4" x 0"
Chlorine	wt%	0.19	BWI	kWh/ton	12
Moisture	wt%	6.20	CaCO ₃	dry wt%	89.0
Ash	wt%	11.60	MgCO ₃	dry wt%	4.0
Calc. HHV	Btu/lb	12,242	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		251		133	
Pressure	psia	14.955		14.438		28		28	
N ₂	lb/hr-vol%	7,113,954	73.61	7,143,681	66.74	29,727	76.09	29,727	66.19
O ₂	lb/hr-vol%	684,611	6.20	690,581	5.65	8,955	20.06	8,955	17.45
H ₂ O	lb/hr-vol%	554,288	8.92	1,200,852	17.45	967	3.85	4,724	16.36
CO ₂	lb/hr-vol%	1,700,570	11.20	1,709,673	10.16	0	0.00	0	0.00
SO ₂	lb/hr-ppmv	12,267	555	328	13	0	0	0	0
SO ₃	lb/hr-ppmv	221	8	24	<1	0	0	0	0
HCl	lb/hr-ppmv	1,305	104	0	0	0	0	0	0
HF	lb/hr-ppmv	0	0	0	0	0	0	0	0
Total Flow	lb/hr-acfm	10,067,216	3,418,797	10,745,140	2,809,209	39,649	6,374	43,406	6,120
MW - Moist.	lb/lbmol-lb/lb	29.169	0.058	28.107	0.122	28.417	0.025	27.062	0.122
Ash	lb/hr-gr/acf	1,930	0.066	82	0.003	0	0.000	0	0.000

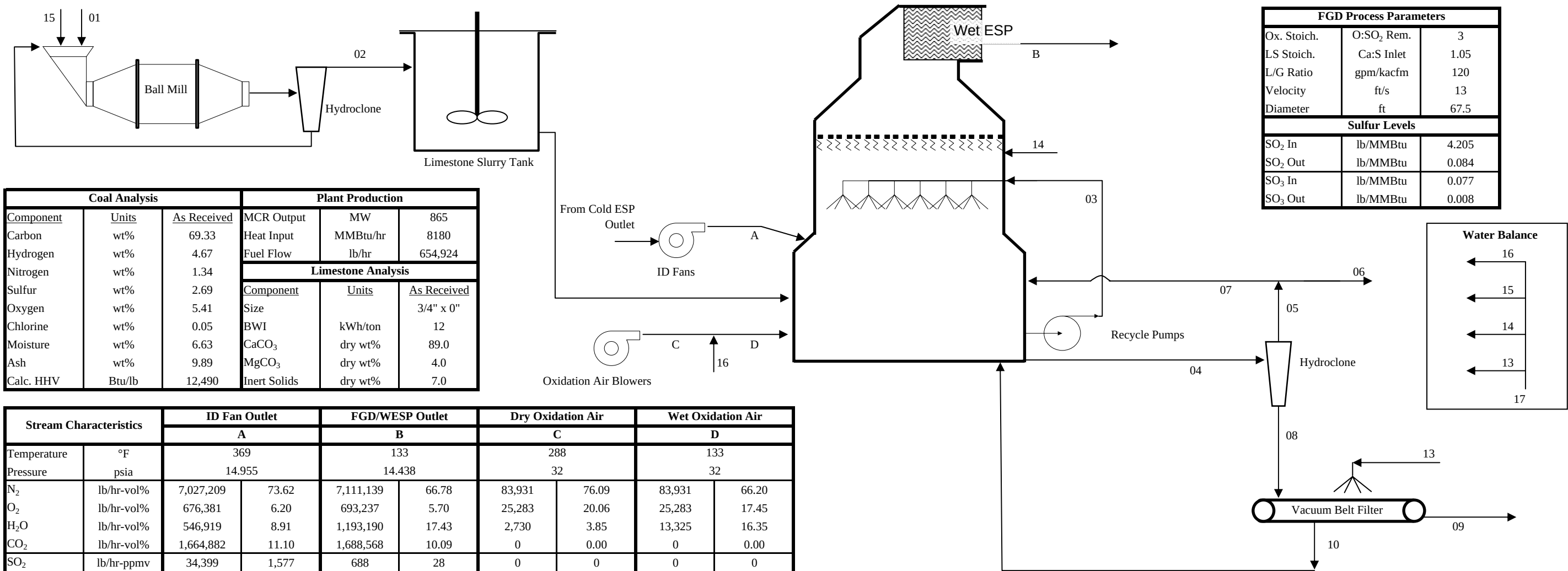
Stream Characteristics		Limestone	Fresh Slurry	Recycle	Bleed	HC - Over	Purge	HC - Reclaim	HC - Under	BF Product	Filtrate H2O
		01	02	03	04	05	06	07	08	09	10
Inert Solids	lb/hr	1,702	1,702	1,951,555	3,640	237	148	89	3,403	3,403	0
CaCO3	lb/hr	21,635	21,635	519,504	969	63	39	24	906	906	0
MgCO ₃	lb/hr	972	972	534,494	997	65	40	25	932	932	0
CaSO ₄ *2H ₂ O	lb/hr	0	0	17,732,585	33,073	1,488	927	561	31,584	31,584	0
Total Solids	lb/hr	24,309	24,309	20,738,138	38,678	1,854	1,154	699	36,825	36,825	0
Water	lb/hr	0	56,721	117,516,115	219,177	174,169	108,470	65,699	45,008	6,498	38,509
Total Flow	lb/hr	24,309	81,030	138,254,253	257,855	176,022	109,624	66,398	81,833	43,323	38,509
Total Flow	gpm	---	131	252,829	472	352	219	133	122	45	77
Solids	wt%	100.0	30.0	15.0	15.0	0.0	1.1	0.0	45.0	85.0	0.0
Chlorides	lb/hr	0	1	1,304,211	2,432	1,933	1,217	729	500	72	427
Chlorides	ppmw (d-gyp)	0	25	11,098	11,098	11,098	11,098	11,098	11,098	11,098	11,098

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	706,892	56,721	3,757	767,370
	706,892	56,721	3,757	767,370
	1,412	113	8	1,533
	0.0	0.0	0.0	0.0
	18	1	0	19
	25	25	25	25

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

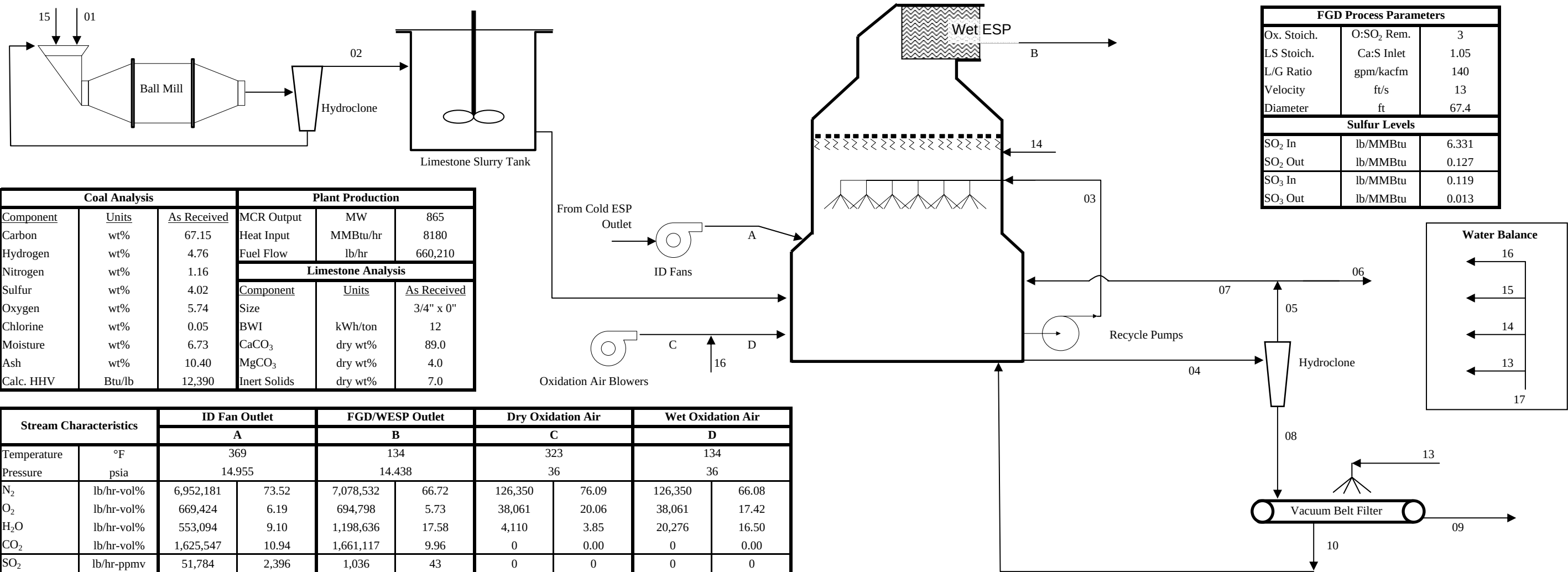
Stream Characteristics		ID Fan Outlet		FGD/WESP Outlet		Dry Oxidation Air		Wet Oxidation Air	
		A		B		C		D	
Temperature	°F	369		133		288		133	
Pressure	psia	14.955		14.438		32		32	
N ₂	lb/hr-vol%	7,027,209	73.62	7,111,139	66.78	83,931	76.09	83,931	66.20
O ₂	lb/hr-vol%	676,381	6.20	693,237	5.70	25,283	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



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



Coal Analysis			Plant Production		
Component	Units	As Received	MCR Output	MW	865
Carbon	wt%	67.15	Heat Input	MMBtu/hr	8180
Hydrogen	wt%	4.76	Fuel Flow	lb/hr	660,210
Nitrogen	wt%	1.16	Limestone Analysis		
Sulfur	wt%	4.02	Component	Units	As Received
Oxygen	wt%	5.74	Size		3/4" x 0"
Chlorine	wt%	0.05	BWI	kWh/ton	12
Moisture	wt%	6.73	CaCO ₃	dry wt%	89.0
Ash	wt%	10.40	MgCO ₃	dry wt%	4.0
Calc. HHV	Btu/lb	12,390	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		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

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	6,674	6,674	1,753,560	8,878	579	3	575	8,299	8,299	0
CaCO ₃	lb/hr	84,860	84,860	848,790	4,297	280	2	278	4,017	4,017	0
MgCO ₃	lb/hr	3,814	3,814	805,518	4,078	266	2	264	3,812	3,812	0
CaSO ₄ *2H ₂ O	lb/hr	0	0	28,585,283	144,722	6,512	38	6,475	138,209	138,209	0
Total Solids	lb/hr	95,348	95,348	31,993,152	161,975	7,637	44	7,593	154,338	154,338	0
Water	lb/hr	0	222,480	181,294,528	917,860	729,224	4,242	724,983	188,636	27,236	161,400
Total Flow	lb/hr	95,348	317,828	213,287,681	1,079,836	736,861	4,286	732,575	342,974	181,575	161,400
Total Flow	gpm	---	515	390,044	1,975	1,472	9	1,464	511	189	322
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	6	1,999,451	10,123	8,042	47	7,996	2,080	300	1,780
Chlorides	ppmw (d-gyp)	0	25	11,029	11,029	11,029	11,029	11,029	11,029	11,029	11,029

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



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ATTACHMENT 2-4 WFGD Water Balances

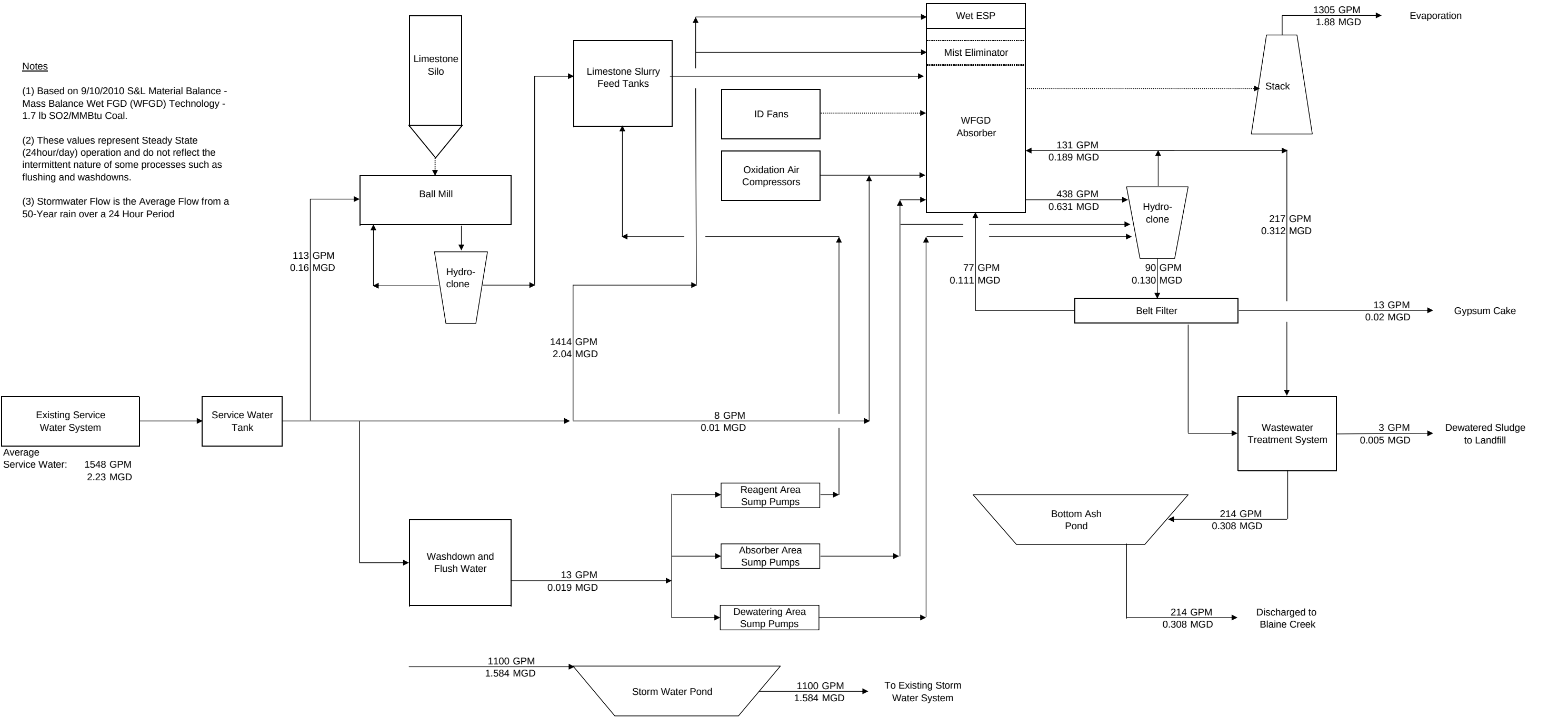
Wet FGD Water Balance Assumptions

- (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

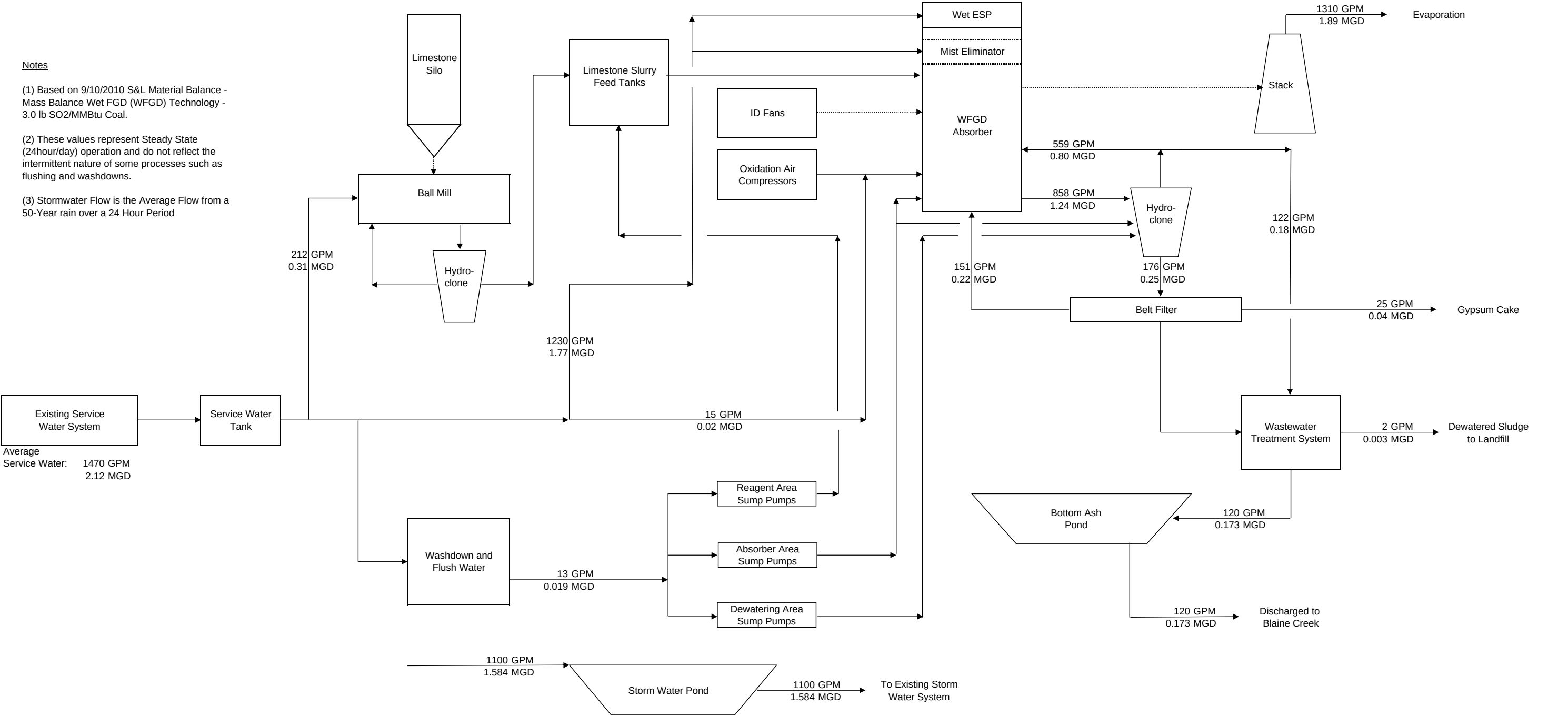
The average service water required is a steady state (or average) amount over the course of a year. Actual operation will occur in more of a batch mode, and as such, higher demands of service water will be needed over the course of a day (i.e., the ball mill requires a maximum of flow of service water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

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



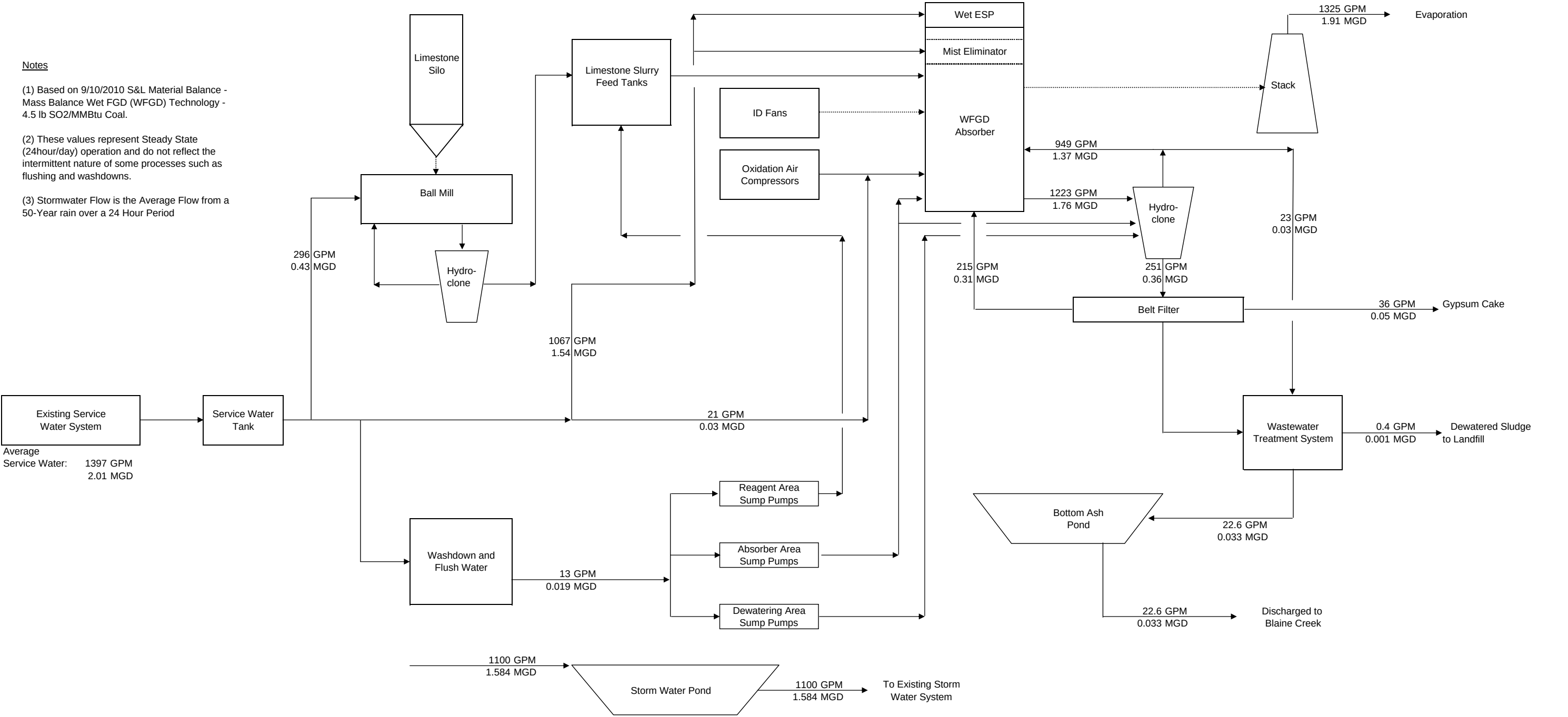
Big Sandy Wet FGD Water Balance
3.0 lb SO₂/MMBtu Coal

- 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



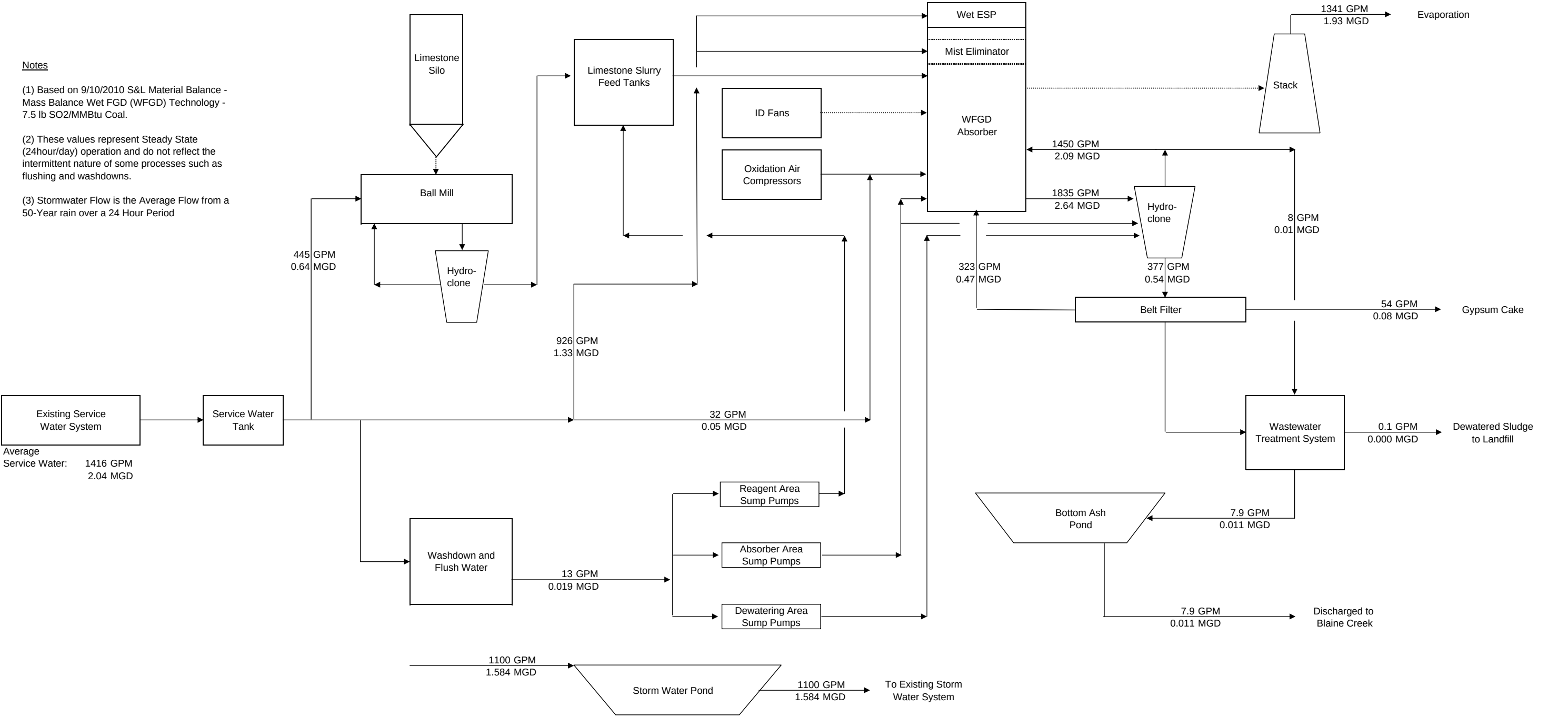
Big Sandy Wet FGD Water Balance
4.5 lb SO₂/MMBtu Coal

- 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

- Notes
- (1) Based on 9/10/2010 S&L Material Balance - Mass Balance Wet FGD (WFGD) Technology - 7.5 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





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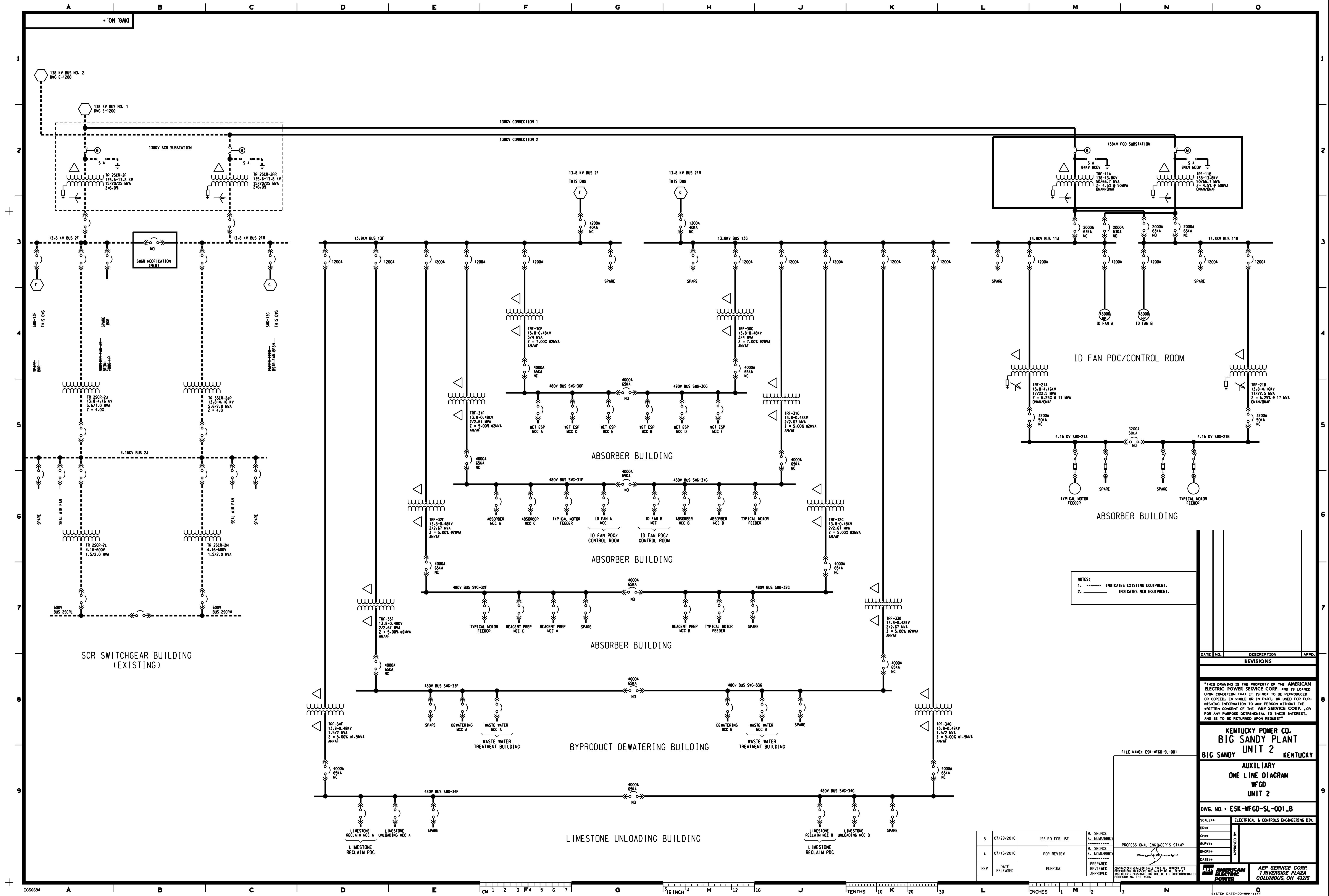
ATTACHMENT 2-5

WFGD Electrical One-Lines

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	APPROVED
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

ELECTRICAL & CONTROLS ENGINEERING DIV.

SCALE: 1" = 100'	DATE: 07/29/2010	ISSUED FOR USE	M. SHONKE
DATE: 07/16/2010	FOR REVIEW	M. SHONKE	K. NOLANBOWEN
DATE: 07/16/2010	PURPOSE	PREPARED	REVIEWED
DATE: 07/16/2010		APPROVED	

FILE NAME: ESK-WFGD-SL-001

PROFESSIONAL ENGINEER'S STAMP
Charles J. Lundy, P.E.
ELECTRIC POWER SERVICE CORP.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PERSONS AND PROPERTY AND TO PROTECT THE WORK FROM DAMAGE BY OTHERS.

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

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



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



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

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

				AEP										Estimate No.:	30706C
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU										Date:	9/29/2010
				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
A	REMOVE BOOSTER AIR FANS		EST	2	EA				0	400.00	920	WRKG	120.63	111,000	111,000
B	REMOVAL OF FUEL OIL TANK							1,200,000	80,000					469,400	1,749,400
	REMOVE FUEL OIL TANK & SOIL REMEDIATION	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118-355/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	EST	8,000	CY	150		1,200,000	0		0	MECH	88.89	0	1,200,000
	REMOVE DIKE & RECOMPACT FILL IN TANK AREA		EST	3,500	CY			0	0	0.60	2,415	ETWK	177.49	428,600	428,600
	FILL FROM OFF SITE COURSE		EST	5,000	CY		16	0	80,000	0.04	230	ETWK	177.49	40,800	120,800



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
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ATTACHMENT 2-8
WFGD Detailed Capital Cost Estimate No. 30707 Est-3 (3.0 lb SO₂/MMbtu)*

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.



Big Sandy Unit 2
Kentucky Power Company
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ATTACHMENT 2-9
WFGD Detailed Capital Cost Estimate No. 30709 Est-4 (7.5 lb SO₂/MMbtu)*

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

30709C- BIG SANDY WET FGD - EST-4 - 7.5 LB- MMBTU_Mod
Project Cost Estimate Mod

30709C- BIG SANDY WET FGD - EST-4 - 7.5 LB- MMBTU_Mod
Project Cost Estimate Mod

30709C- BIG SANDY WET FGD - EST-4 - 7.5 LB- MMBTU_Mod
Project Cost Estimate_Mod

30709C- BIG SANDY WET FGD - EST-4 - 7.5 LB- MMBTU_Mod
Project Cost Estimate Mod

				AEP										Estimate No.:	30709C
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU										Date:	9/29/2010
				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
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	0.68	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
6.27	COMMUNICATIONS		EST	1	LT		34,000.00	0	34,000	229.00	263	WIRE	98.84	26,000	60,000
6.28	LIGHTNING PROTECTION		EST	1	LT		13,000.00	0	13,000	48.00	91	WIRE	98.84	9,000	22,000
6.29	SECURITY SYSTEM		EST	1	LT		8,000.00	0	8,000	62.00	71	WIRE	98.84	7,000	15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS							12,571,200	5,834,400		201,513			18,061,300	36,466,900
	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										3,220,739
	COST DUE TO OVERTIME INEFFICIENCY - SPECIFY % INEFFICIENCY			8.00	%						17,523		89.63	1,571,000	1,571,000
	COST DUE TO OVERTIME PAY @1.5 TIMES OVERTIME PAY RATE - SPECIFY % ADDITIONAL HOURS PAID ON ACTUAL HOURS WORKED			10.00	%						21,904			1,649,739	1,649,739
	PER DIEM	NONE		0.00	HR						240,940			0	0
	CONSUMABLES - % of ACCT NO. 90			0.5	%				29,172					90,307	119,479
	FREIGHT ON MATERIAL - % of ACCT NO. 90			5.0	%				291,720						291,720
	FREIGHT ON EQUIPMENT - % of ACCT NO. 90			5.0	%			628,560							628,560
	SCAFFOLDING - % of ACCT NO. 90			5.0	%				291,720					903,065	1,194,785
	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE & PROFIT - % of ACCT NO. 90			15	%				875,160					2,709,199	3,584,359
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS							628,600	1,487,800					6,923,300	9,039,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND						13,199,800	7,322,200					24,984,600	45,506,500
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	41668000		41,668,000	0	401800.00	462,070	MECH	88.89	41,073,400	82,741,400
7.2	ADDITIONAL COST FOR C276 ABSORBER SHELL MATERIAL ABOVE THE PRICE OF A2205 ABSORBER SHELL	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 49,800 TOTAL SF	EST	49,800	SF		308.00	0	15,338,400	0.00	0	MECH	88.89	0	15,338,400

				AEP											Estimate No.:	30709C
				BIG SANDY UNIT 2											Project No.:	12721-000
				FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU											Date:	9/29/2010
				ORDER OF MAGNITUDE COST ESTIMATE											Preparer:	MNO
		Cost Type:												Reviewer:	JMK	
		Est.=Estimated												Approver:	PEF	
		Allow.=Allowance														
		Q=Vendor Quote														

30709C- BIG SANDY WET FGD - EST-4 - 7.5 LB- MMBTU_Mod
Project Cost Estimate Mod

				AEP										Estimate No.:	30709C
				BIG SANDY UNIT 2										Project No.:	12721-000
				FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU										Date:	9/29/2010
				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
12.0	FGD SUBSTATION														0
13.0	FGD DCS SYSTEM														0
14.0	CEM SYSTEM														0
15.0	RAIL INFRASTRUCTURE														0
16.0	SITE IMPROVEMENTS - CIVIL WORK														
17.0	BOP ITEMS														0
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE														
19.0	ARSENIC, ASBESTOS, LEAD ABATEMENT														0
	TOTAL PROJECT DIRECT AND CONSTRUCTION INDIRECT COSTS							158,642,900	102,164,800					274,648,500	572,756,200
	INDIRECT COSTS							0	0					0	0
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES			1.0	LT										30,000,000
	CONSTRUCTION MANAGEMENT			3.0	%										17,182,700
	S-U / COMMISSIONING			1.0	%										5,727,600
	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	%						23,664		91.00	2,334,400	2,334,400
	INITIAL FILLS			0.3	%										1,718,300
	OPERATOR & TRAINING MANUALS			1.0	LT										300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)			1.0	LT										400,000
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS		1.0	LT										2,650,000
	SUBTOTAL - INDIRECT COSTS														60,313,000
	TOTAL PROJECT DIRECT AND INDIRECT COSTS														633,069,200
	SPARE PARTS:			1.5	%			2,379,600							2,379,600
	SPARE PARTS - CAPITALIZED			0.90	%			1,427,760							1,427,760
	SPARE PARTS - FIRST YEAR OF OPERATION			0.60	%			951,840							951,840
	CONTINGENCY			14.3	%										90,676,000
	ESCALATION (TOTAL)														79,631,900
	EQUIPMENT	4.0%/yr		4.0	%			24,385,300							24,385,300
	MATERIAL	2.0%/yr		2.0	%				11,236,700						11,236,700
	LABOR	2.5%/yr		2.5	%									37,029,100	37,029,100
	INDIRECTS	2.5%/yr		2.5	%									6,980,800	6,980,800
	TOTAL PROJECT COST														805,756,700
	REFERENCE COSTS:														
A	REMOVE BOOSTER AIR FANS		EST	2	EA				0	400.00	920	WRKG	120.63	111,000	111,000
B	REMOVAL OF FUEL OIL TANK							1,200,000	80,000					469,400	1,749,400

			AEP											Estimate No.: 30709C	
			BIG SANDY UNIT 2											Project No.: 12721-000	
			FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU											Date: 9/29/2010	
			ORDER OF MAGNITUDE COST ESTIMATE											Preparer: MNO	
		Cost Type:												Reviewer: JMK	
		Est=Estimated												Approver: PEF	
		Allow.=Allowance													
		Q=Vendor Quote													
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
	REMOVE FUEL OIL TANK & SOIL REMEDIATION	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118.35\$/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	EST	8,000	CY	150		1,200,000	0		0	MECH	88.89	0	1,200,000
	REMOVE DIKE & RECOMPACT FILL IN TANK AREA		EST	3,500	CY			0	0	0.60	2,415	ETWK	177.49	428,600	428,600
	FILL FROM OFF SITE COURSE		EST	5,000	CY		16	0	80,000	0.04	230	ETWK	177.49	40,800	120,800



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

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

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
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	2,070,000 ACFM WITH 21,500 HP MOTORS (\$825,000 EACH. INCLUDES HYDRAULIC OIL UNITS, SEAL AIR FAN SKIDS, VIBRATION MONITORING EQUIPMENT, FAN STALL EQUIPMENT, FIELD SERVICE REP FOR 140 DAYS	\$ 7,544,000	\$ -	\$ 1,696,900	\$ 9,240,900
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	\$ 2,197,500	\$ 3,348,000
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 STANDARD ACOUSTICAL INSULATION	\$ -	\$ 200,000	\$ 258,500	\$ 458,500
1.8	DUCTWORK INSULATION & LAGGING		\$ -	\$ 289,100	\$ 566,200	\$ 855,300
1.9	SUPPORT STEEL - FOUNDATIONS		\$ -	\$ 73,600	\$ 151,400	\$ 225,000
1.10	ID FAN PDC / CONTROL ROOM - FOUNDATIONS		\$ -	\$ 122,100	\$ 206,200	\$ 328,300
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	\$ 415,700	\$ 645,000
1.13	SWITCHGEAR	0.00	\$ 700,000	\$ -	\$ 36,400	\$ 736,400
1.14	MCC	0.00	\$ 123,600	\$ -	\$ 11,300	\$ 134,900
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

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
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
1.22	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 390,600	\$ 1,918,600	\$ 2,309,200
1.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	\$ -	\$ 12,500	\$ 35,300	\$ 47,800
1.24	LOW VOLTAGE POWER CABLE & TERMINATION	0.00	\$ -	\$ -	\$ 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	\$ 127,400	\$ 200,800
1.27	COMMUNICATIONS		\$ -	\$ 17,000	\$ 13,000	\$ 30,000
1.28	LIGHTNING PROTECTION		\$ -	\$ 7,000	\$ 6,000	\$ 13,000
1.29	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 10,286,200	\$ 3,289,500	\$ 9,123,000	\$ 22,698,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 514,300	\$ 838,800	\$ 3,496,500	\$ 4,849,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ID FANS	\$ 10,800,500	\$ 4,128,300	\$ 12,619,500	\$ 27,548,400
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	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 41,000 TOTAL SF	\$ -	\$ 12,628,000	\$ -	\$ 12,628,000
2.3	PIPING & SUPPORTS - MECHANICAL		\$ 30,200	\$ 115,300	\$ 362,600	\$ 508,100
2.4	WET ESP - FOUNDATIONS	INCLUDED WITH ABSORBER FOUNDATIONS				

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
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Preparer: MNO
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
2.5	ELECTRICAL	INCLUDED WITH ABSORBER ISLAND SECTION 7.0				
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 41,051,200	\$ 12,743,300	\$ 36,140,800	\$ 89,935,300
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,052,600	\$ 3,249,500	\$ 13,853,000	\$ 19,155,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	WET ESP	\$ 43,103,800	\$ 15,992,800	\$ 49,993,800	\$ 109,090,400
3.0	NEW STACK					
3.1	CONCRETE STACK (WET)	PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 31,480,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ -	\$ -	\$ 31,480,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 4,722,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	NEW STACK	\$ -	\$ -	\$ -	\$ 36,202,000
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	\$ 48,700	\$ 64,700
4.6	RAILCAR LIMESTONE UNLOADING HOPPER, CONVEYOR TUNNEL AND ESCAPE TUNNEL - FOUNDATIONS		\$ -	\$ 542,000	\$ 1,613,400	\$ 2,155,400
4.7	LIMESTONE TRANSFER TOWER - FOUNDATIONS		\$ -	\$ 15,400	\$ 30,500	\$ 45,900
4.8	LIMESTONE TRANSFER CONVEYOR - FOUNDATIONS		\$ -	\$ 62,000	\$ 125,800	\$ 187,800

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.9	LIMESTONE RECLAIM HOPPER, CONVEYOR TUNNEL AND ESCAPE TUNNEL - FOUNDATIONS		\$ -	\$ 542,000	\$ 1,613,400	\$ 2,155,400
4.10	LIMESTONE UNLOADING PDC - FOUNDATIONS		\$ -	\$ 24,100	\$ 44,800	\$ 68,900
4.11	LIMESTONE UNLOADING PDC - CONCRETE PIERS	10 PIERS	\$ -	\$ 6,900	\$ 20,600	\$ 27,500
4.12	LIMESTONE RECLAIM PDC - FOUNDATIONS		\$ -	\$ 16,800	\$ 32,300	\$ 49,100
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		\$ -	\$ 801,100	\$ 3,597,400	\$ 4,398,500
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

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
4.28	DUCT BANK	DUCT BANK WITH 12-5" CONDUIT, 37"H X 62.5"W (325'+50'=375')	\$ -	\$ 122,400	\$ 212,300	\$ 334,700
4.29	FOUNDATIONS FOR TRANSFORMERS	LIMESTONE UNLOADING & RECLAIM AREAS	\$ -	\$ 3,500	\$ 10,300	\$ 13,800
4.30	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
4.31	LIGHTNING PROTECTION		\$ -	\$ 6,500	\$ 5,500	\$ 12,000
4.32	SECURITY SYSTEM		\$ -	\$ 16,000	\$ 14,000	\$ 30,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 6,898,900	\$ 3,730,000	\$ 12,960,200	\$ 23,589,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 344,900	\$ 951,200	\$ 4,967,600	\$ 6,263,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	LIMESTONE HANDLING SYSTEM	\$ 7,243,800	\$ 4,681,200	\$ 17,927,800	\$ 29,852,800
5.0	REAGENT PREPARATION ISLAND					
5.1	MECHANICAL EQUIPMENT	INCLUDES LIMESTONE FEEDERS, FROM THE 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	\$ 299,400	\$ 465,800
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS		\$ -	\$ 682,000	\$ 1,132,200	\$ 1,814,200
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	\$ 27,500	\$ 41,300
5.9	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
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
5.10	GROUNDING		\$ 2,000	\$ -	\$ 7,900	\$ 9,900
5.11	ELECTRICAL CABLE AND RACEWAY	INCLUDED IN ABSORBER ISLAND SECTION 7.0	\$ -	\$ -	\$ -	\$ -
5.12	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
5.13	LIGHTNING PROTECTION		\$ -	\$ 23,000	\$ 16,000	\$ 39,000
5.14	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 15,809,300	\$ 6,132,200	\$ 18,743,100	\$ 40,684,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 790,500	\$ 1,563,700	\$ 7,184,300	\$ 9,538,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 16,599,800	\$ 7,695,900	\$ 25,927,400	\$ 50,223,100
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	\$ 65,400	\$ 95,500

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT AREA SLAB	\$ -	\$ 1,155,700	\$ 1,872,400	\$ 3,028,100
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 235,000	\$ 372,300
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 291,400	\$ 482,800	\$ 774,200
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	\$ 27,100	\$ 40,900
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		\$ -	\$ 326,100	\$ 1,393,900	\$ 1,720,000
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
6.27	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
6.28	LIGHTNING PROTECTION		\$ -	\$ 13,000	\$ 9,000	\$ 22,000
6.29	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 11,005,200	\$ 5,771,600	\$ 17,301,600	\$ 34,078,400
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 550,300	\$ 1,471,800	\$ 6,631,200	\$ 8,653,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 11,555,500	\$ 7,243,400	\$ 23,932,800	\$ 42,731,600
7.0	ABSORBER ISLAND					
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	\$ 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	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 49,800 TOTAL SF	\$ -	\$ 15,338,400	\$ -	\$ 15,338,400
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

Sargent & Lundy, LLC

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

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
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
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM EQUIPMENT COST. NO BOP PIPING	\$ -	\$ -	\$ -	\$ -
7.7	ABSORBER VESSEL - FOUNDATIONS		\$ -	\$ 366,900	\$ 672,900	\$ 1,039,800
7.8	ABSORBER BUILDING - FOUNDATIONS		\$ -	\$ 579,500	\$ 961,200	\$ 1,540,700
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	\$ 16,100	\$ 23,800
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 37,000	\$ 67,300	\$ 104,300
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	\$ 13,700	\$ 21,400
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 3,558,800	\$ 6,797,400	\$ 10,356,200
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	\$ 143,000	\$ 212,000
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		\$ -	\$ 1,515,700	\$ 5,849,000	\$ 7,364,700
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
7.33	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
7.34	LIGHTNING PROTECTION		\$ -	\$ 19,500	\$ 14,500	\$ 34,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
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7.35	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 47,167,900	\$ 28,958,500	\$ 70,525,800	\$ 146,652,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,033,400	\$ 7,384,400	\$ 27,816,500	\$ 38,234,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,201,300	\$ 36,342,900	\$ 98,342,300	\$ 184,886,500
8.0	FGD WASTE WATER TREATMENT PLANT					
8.1	WWT MECHANICAL EQUIPMENT:		\$ 4,500,000	\$ -	\$ 1,073,300	\$ 5,573,300
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	\$ 56,100	\$ 79,500
8.6	SECONDARY CLARIFIER - FOUNDATIONS		\$ -	\$ 23,400	\$ 56,100	\$ 79,500
8.7	RECLAIM WATER TANKS - FOUNDATIONS	TOTAL FOR TWO TANKS	\$ -	\$ 26,000	\$ 54,000	\$ 80,000
8.8	EQUALIZATION TANKS - FOUNDATIONS	TOTAL FOR TWO TANKS	\$ -	\$ 5,400	\$ 13,200	\$ 18,600
8.9	MAINTENANCE STORAGE TANK - FOUNDATIONS		\$ -	\$ 100,000	\$ 177,300	\$ 277,300
8.10	WWT BUILDING - FOUNDATIONS		\$ -	\$ 301,900	\$ 527,400	\$ 829,300
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	\$ 27,100	\$ 40,900
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		\$ -	\$ 536,200	\$ 2,162,700	\$ 2,698,900
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
8.20	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000

Sargent & Lundy, LLC

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8.21	LIGHTNING PROTECTION		\$ -	\$ 16,000	\$ 12,000	\$ 28,000
8.22	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,874,400	\$ 4,979,100	\$ 7,379,700	\$ 17,233,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 243,700	\$ 1,269,700	\$ 2,828,900	\$ 4,342,300
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD WASTE WATER TREATMENT PLANT	\$ 5,118,100	\$ 6,248,800	\$ 10,208,600	\$ 21,575,500
9.0	COMPRESSED AIR SYSTEM					
9.1	AIR COMPRESSOR & AUXILIARIES	3000 CFM	\$ 399,000	\$ -	\$ 112,500	\$ 511,500
9.2	PIPING - MECHANICAL		\$ 368,700	\$ 200,200	\$ 860,300	\$ 1,429,200
9.3	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 767,700	\$ 200,200	\$ 972,800	\$ 1,940,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 38,400	\$ 51,100	\$ 373,300	\$ 462,700
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	COMPRESSED AIR SYSTEM	\$ 806,100	\$ 251,300	\$ 1,346,100	\$ 2,403,400
10.0	SERVICE WATER SYSTEM					
10.1	PUMPS	INCLUDES SELF-CLEANING STRAINERS	\$ 204,000	\$ -	\$ 90,000	\$ 294,000
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

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10.4	TANKS		\$ -	\$ 120,000	\$ -	\$ 120,000
10.5	SERVICE WATER TANK & PUMP - FOUNDATIONS		\$ -	\$ 17,300	\$ 41,400	\$ 58,700
10.6	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 949,000	\$ 1,486,100	\$ 3,394,900	\$ 5,830,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 47,500	\$ 379,000	\$ 1,301,000	\$ 1,727,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SERVICE WATER SYSTEM	\$ 996,500	\$ 1,865,100	\$ 4,695,900	\$ 7,557,500
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	\$ 9,200	\$ 14,400
11.5	ELECTRICAL	INCLUDED IN REAGENT PREPARATION, SECTION 5.0	\$ -	\$ -	\$ -	\$ -
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 167,000	\$ 134,500	\$ 417,000	\$ 718,500
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 8,400	\$ 34,300	\$ 159,600	\$ 202,200
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	POTABLE WATER SYSTEM	\$ 175,400	\$ 168,800	\$ 576,600	\$ 920,700
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	\$ 194,700	\$ 257,900

Sargent & Lundy, LLC		AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30708C Project No.: 12721-000 Date: 9/29/2010 Preparer: MNO Reviewer: JMK Approver: PEF	
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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	\$ 1,053,700	\$ 3,060,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 90,700	\$ 49,100	\$ 404,254	\$ 544,100
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	FGD SUBSTATION	\$ 1,904,500	\$ 241,800	\$ 1,458,000	\$ 3,604,300
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
14.0	CEM SYSTEM					
14.1	CEM	PROVIDED BY AEP	\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 1,260,000	\$ 540,000	\$ 310,000	\$ 2,110,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 316,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CEM SYSTEM	\$ -	\$ -	\$ -	\$ 2,426,500
15.0	RAIL INFRASTRUCTURE					

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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 EXTENSION	\$ -	\$ 33,100	\$ 71,400	\$ 104,500
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 212,500	\$ 2,044,100	\$ 2,084,100	\$ 4,340,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,600	\$ 521,200	\$ 798,600	\$ 1,330,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,300	\$ 2,882,700	\$ 5,671,200
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	GYPSUM HANDLING & STORAGE		\$ -	\$ 1,147,200	\$ 1,784,100	\$ 2,931,300
16.5	GYPSUM RUNOFF POND		\$ 60,000	\$ 110,400	\$ 312,600	\$ 483,000
16.6	BYPRODUCT POND PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400

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16.7	NEW CONCRETE ENCASEMENT	8' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 15,200	\$ 33,500	\$ 48,700
16.8	TRUCK WASH AREA		\$ -	\$ 47,300	\$ 83,100	\$ 130,400
16.9	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.10	STORMWATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 472,500	\$ 480,800	\$ 953,300
16.11	STORMWATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.12	STORM WATER POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.13	OILY WATER SEWER		\$ 4,500	\$ 80,600	\$ 186,100	\$ 271,200
16.14	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.15	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.16	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.17	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 875,000	\$ 1,035,000	\$ 1,910,000
16.18	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	\$ -	\$ 225,000	\$ 517,800	\$ 742,800

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16.19	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	\$ -	\$ 56,300	\$ 129,400	\$ 185,700
16.20	NEW PERMANENT STORAGE	INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 1,700,000	\$ -	\$ -	\$ 1,700,000
16.21	FOUNDATIONS FOR THE NEW WAREHOUSE		\$ -	\$ 532,900	\$ 867,800	\$ 1,400,700
16.22	NEW TEMPORARY STORAGE	WEATHER TIGHT CANVAS ENCLOSURE. INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 450,000	\$ -	\$ -	\$ 450,000
16.23	FOUNDATIONS FOR TEMPORARY STORAGE		\$ -	\$ 99,500	\$ 157,200	\$ 256,700
16.24	LABOR BUS SERVICE FROM PARKING LOT TO CONSTRUCTION AREA AND ACCESS CONTROL	ALLOWANCE FOR 36 MONTHS BASED ON 2 BUSES OPERATING CONTINUOUSLY FOR 5X10 WORKWEEK. SUBCONTRACT COST INCLUDES EQUIPMENT, MATERIAL AND LABOR	\$ 1,368,000	\$ -	\$ -	\$ 1,368,000
16.25	EROSION & SEDIMENT CONTROL		\$ -	\$ 15,800	\$ 25,900	\$ 41,700
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,092,500	\$ 4,776,700	\$ 8,268,900	\$ 17,138,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 204,600	\$ 1,218,100	\$ 3,169,400	\$ 4,592,100

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	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 4,297,100	\$ 5,994,800	\$ 11,438,300	\$ 21,730,200
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)		\$ -	\$ 181,900	\$ 697,600	\$ 879,500
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	\$ 21,000	\$ 31,500
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	\$ 1,378,100	\$ 2,639,500	\$ 4,227,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 351,416	\$ 1,012,192	\$ 1,374,107
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,729,500	\$ 3,651,700	\$ 5,601,700
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	\$ 527,700	\$ 804,000
18.5	RELOCATED WAREHOUSE - FOUNDATIONS		\$ -	\$ 342,600	\$ 534,900	\$ 877,500
18.6	RELOCATE EXISTING WAREHOUSE BUILDING	150' L X 75' W X 25' H	\$ -	\$ 95,600	\$ 1,121,500	\$ 1,217,100

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90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ 917,200	\$ 2,592,000	\$ 3,509,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ 233,900	\$ 993,100	\$ 1,227,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ -	\$ 1,151,100	\$ 3,585,100	\$ 4,736,200
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT					
19.1	ARSENIC, ASBESTOS , LEAD ABATEMENT	PROVIDED BY AEP	\$ -	\$ -	\$ -	\$ 750,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ -	\$ -	\$ -	\$ 750,000
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ -	\$ -	\$ -	\$ 112,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ -	\$ -	\$ -	\$ 862,500
99.0	OVERALL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 146,865,600	\$ 81,101,600	\$ 196,009,600	\$ 456,206,800
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,955,300	\$ 20,624,200	\$ 75,795,600	\$ 109,445,100
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 154,820,900	\$ 101,725,800	\$ 271,805,200	\$ 565,651,900
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 16,969,600
	S-U / COMMISSIONING					\$ 5,656,500
	CRAFT START-UP SUPPORT					\$ 2,310,200
	INITIAL FILLS					\$ 1,697,000

Sargent & Lundy, LLC	AEP	Estimate No.:	30708C
	BIG SANDY UNIT 2	Project No.:	12721-000
	FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU	Date:	9/29/2010
	COST ESTIMATE SUMMARY	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
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS				\$ 2,650,000
	SUBTOTAL - INDIRECT COSTS					\$ 59,983,300
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 625,635,200
	SPARE PARTS:					\$ 2,322,300
	SPARE PARTS - CAPITALIZED	0.90				\$ 1,393,380
	SPARE PARTS - FIRST YEAR OF OPERATION	0.60				\$ 928,920
	CONTINGENCY	14.5				\$ 91,254,300
	ESCALATION					\$ 78,606,500
	EQUIPMENT					\$ 23,797,800
	MATERIAL					\$ 11,195,900
	LABOR					\$ 36,670,100
	INDIRECTS					\$ 6,942,700
	TOTAL PROJECT COST					\$ 797,818,300
	REFERENCE COSTS:					
A	REMOVE BOOSTER AIR FANS		\$ -	\$ -	\$ 111,000	\$ 111,000

Sargent & Lundy, LLC		AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU COST ESTIMATE SUMMARY				Estimate No.: 30708C Project No.: 12721-000 Date: 9/29/2010 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	REMOVAL OF FUEL OIL TANK	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118-355/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	\$ 1,200,000	\$ 80,000	\$ 469,400	\$ 1,749,400	



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

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

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
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 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	\$ 299,400	\$ 465,800
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS		\$ -	\$ 649,100	\$ 1,077,400	\$ 1,726,500
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	\$ 27,100	\$ 40,900
5.9	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500
5.10	GROUNDING		\$ 2,000	\$ -	\$ 7,900	\$ 9,900
5.11	RACEWAY, CABLE TRAY, & CONDUIT	INCLUDED IN ABSORBER ISLAND, SECTION 7.0	\$ -	\$ -	\$ -	\$ -
5.12	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
5.13	LIGHTNING PROTECTION		\$ -	\$ 23,000	\$ 16,000	\$ 39,000
5.14	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 12,067,300	\$ 5,918,500	\$ 16,625,400	\$ 34,611,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 603,400	\$ 1,509,200	\$ 6,372,800	\$ 8,485,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 12,670,700	\$ 7,427,700	\$ 22,998,200	\$ 43,096,600

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
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
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY	\$ 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	\$ 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	\$ 65,400	\$ 95,500
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT AREA	\$ -	\$ 1,155,700	\$ 1,872,400	\$ 3,028,100
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 235,000	\$ 372,300
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 275,400	\$ 458,400	\$ 733,800
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	\$ 26,700	\$ 40,500
6.14	TRANSFORMERS		\$ 170,000	\$ -	\$ 54,600	\$ 224,600
6.15	SWITCHGEAR	480V LOW VOLATAGE SWITCHGEAR,	\$ 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		\$ -	\$ 326,100	\$ 1,393,900	\$ 1,720,000
6.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCMIL-15KV	\$ -	\$ 13,900	\$ 39,200	\$ 53,100
6.24	LOW VOLTAGE POWER CABLE & TERMINATION	0.00	\$ -	\$ 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
6.27	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
6.28	LIGHTNING PROTECTION		\$ -	\$ 13,000	\$ 9,000	\$ 22,000
6.29	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 7,992,200	\$ 5,696,300	\$ 15,731,200	\$ 29,419,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 399,600	\$ 1,452,600	\$ 6,029,800	\$ 7,882,000
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 8,391,800	\$ 7,148,900	\$ 21,761,000	\$ 37,301,700
7.0	ABSORBER ISLAND					
7.1	MECHANICAL EQUIPMENT	INCLUDES ABSORBER MODULE	\$ 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	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 49,800 TOTAL SF	\$ -	\$ 15,338,400	\$ -	\$ 15,338,400
7.3	ABSORBER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK &	\$ 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	\$ 150,000	\$ -	\$ 30,700	\$ 180,700
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM	\$ -	\$ -	\$ -	\$ -
7.7	ABSORBER VESSEL - FOUNDATIONS		\$ -	\$ 366,900	\$ 672,900	\$ 1,039,800
7.8	ABSORBER BUILDING - FOUNDATIONS		\$ -	\$ 544,300	\$ 902,800	\$ 1,447,100
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	\$ 16,100	\$ 23,800
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 37,000	\$ 67,300	\$ 104,300
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	\$ 13,700	\$ 21,400
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND	\$ -	\$ 3,558,800	\$ 6,797,400	\$ 10,356,200
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	\$ 143,000	\$ 212,000
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

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
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
7.23	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		\$ -	\$ 1,515,700	\$ 5,849,000	\$ 7,364,700
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
7.33	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
7.34	LIGHTNING PROTECTION		\$ -	\$ 19,500	\$ 14,500	\$ 34,000
7.35	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 46,393,900	\$ 28,801,600	\$ 69,902,600	\$ 145,098,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 2,994,700	\$ 7,344,400	\$ 27,577,800	\$ 37,916,900
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 49,388,600	\$ 36,146,000	\$ 97,480,400	\$ 183,015,000
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					
10.0	SERVICE WATER SYSTEM					
11.0	POTABLE WATER SYSTEM					
12.0	FGD SUBSTATION					
13.0	FGD DCS SYSTEM					

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
14.0	CEM SYSTEM					
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 - PROJECT TOTAL		\$ 139,336,600	\$ 80,655,700	\$ 191,698,300	\$ 443,920,600
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS - PROJECT TOTAL		\$ 7,578,800	\$ 20,510,500	\$ 74,144,000	\$ 107,303,400
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST - PROJECT TOTAL		\$ 146,915,400	\$ 101,166,200	\$ 265,842,300	\$ 551,224,000
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 16,536,700
	S-U / COMMISSIONING					\$ 5,512,200
	CRAFT START-UP SUPPORT					\$ 2,259,400
	INITIAL FILLS					\$ 1,653,700
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000

Sargent & Lundy, LLC

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

Estimate No.: 30706C
Project No.: 12721-000
Date: 9/29/2010
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
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS				\$ 2,650,000
	SUBTOTAL - INDIRECT COSTS					\$ 59,312,000
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 610,536,000
	SPARE PARTS:					\$ 2,203,700
	SPARE PARTS - CAPITALIZED	0.90				\$ 1,322,200
	SPARE PARTS - FIRST YEAR OF OPERATION	0.60				\$ 881,500
	CONTINGENCY	14.5				\$ 89,062,900
	ESCALATION					\$ 76,508,800
	EQUIPMENT					\$ 22,582,600
	MATERIAL					\$ 11,143,900
	LABOR					\$ 35,917,300
	INDIRECTS					\$ 6,865,000
	TOTAL PROJECT COST					\$ 778,311,400
	REFERENCE COSTS:					
A	REMOVE BOOSTER AIR FANS	0	\$ -	\$ -	\$ 111,000	\$ 111,000

Sargent & Lundy, LLC		AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-2 - 1.7 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30706C Project No.: 12721-000 Date: 9/29/2010 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	REMOVAL OF FUEL OIL TANK	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118-355/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	\$ 1,200,000	\$ 80,000	\$ 469,400	\$ 1,749,400



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

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

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

Sargent & Lundy, LLC		AEP		Estimate No.:	30707C
		BIG SANDY UNIT 2		Project No.:	12721-000
		FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU		Date:	9/29/2010
		COST ESTIMATE SUMMARY		Preparer:	MNO
				Reviewer:	JMK
				Approver:	PER

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
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 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 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	\$ 299,400	\$ 465,800
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS		\$ -	\$ 674,900	\$ 1,120,500	\$ 1,795,400
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	\$ 27,200	\$ 41,000
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	\$ -	\$ -	\$ -	\$ -
5.12	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
5.13	LIGHTNING PROTECTION		\$ -	\$ 23,000	\$ 16,000	\$ 39,000
5.14	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 14,072,300	\$ 6,073,600	\$ 17,831,800	\$ 37,977,700

Sargent & Lundy, LLC				AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU COST ESTIMATE SUMMARY		Estimate No.: 30707C Project No.: 12721-000 Date: 9/29/2010 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		\$ 703,600	\$ 1,548,800	\$ 6,835,300	\$ 9,087,700	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 14,775,900	\$ 7,622,400	\$ 24,667,100	\$ 47,065,400	
6.0	BYPRODUCT DEWATERING ISLAND						
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY	\$ 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	\$ 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	\$ 65,400	\$ 95,500	
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT AREA	\$ -	\$ 1,155,700	\$ 1,872,400	\$ 3,028,100	
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 235,000	\$ 372,300	
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300	
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 288,700	\$ 478,000	\$ 766,700	
6.12	BYPRODUCT DEWATERING BUILDING	120' L X 74' W X 65' H	\$ 145,200	\$ 1,587,000	\$ 1,488,400	\$ 3,220,600	
6.13	PIPE SUPPORT PAD		\$ -	\$ 13,800	\$ 27,100	\$ 40,900	
6.14	TRANSFORMERS		\$ 170,000	\$ -	\$ 54,600	\$ 224,600	
6.15	SWITCHGEAR	480V LOW VOLATAGE	\$ 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	

Sargent & Lundy, LLC			AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30707C Project No.: 12721-000 Date: 9/29/2010 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	
6.21	LIGHTING/ TRANSFORMERS & PANELS		\$ 52,000	\$ 135,000	\$ 104,500	\$ 291,500	
6.22	RACEWAY, CABLE TRAY, & CONDUIT		\$ -	\$ 326,100	\$ 1,393,900	\$ 1,720,000	
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	
6.27	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000	
6.28	LIGHTNING PROTECTION		\$ -	\$ 13,000	\$ 9,000	\$ 22,000	
6.29	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000	
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 9,554,200	\$ 5,760,600	\$ 16,604,400	\$ 31,919,200	
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 477,700	\$ 1,469,000	\$ 6,364,600	\$ 8,311,200	
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 10,031,900	\$ 7,229,600	\$ 22,969,000	\$ 40,230,400	
7.0	ABSORBER ISLAND						
7.1	MECHANICAL EQUIPMENT	INCLUDES ABSORBER MODULE	\$ 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	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 49,800 TOTAL SF	\$ -	\$ 15,338,400	\$ -	\$ 15,338,400	
7.3	ABSORBER BUILDING SUMP PUMPS	DUPLEX. INCLUDES CHECK &	\$ 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	\$ 150,000	\$ -	\$ 30,700	\$ 180,700	
7.6	PIPING - MECHANICAL	ALL PIPING INCLUDED IN OEM	\$ -	\$ -	\$ -	\$ -	
7.7	ABSORBER VESSEL - FOUNDATIONS		\$ -	\$ 366,900	\$ 672,900	\$ 1,039,800	
7.8	ABSORBER BUILDING - FOUNDATIONS		\$ -	\$ 564,200	\$ 936,700	\$ 1,500,900	
7.9	ABSORBER BUILDING	150' L X 89' W X 60' H	\$ 164,500	\$ 2,583,100	\$ 2,368,200	\$ 5,115,800	

Sargent & Lundy, LLC			AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30707C Project No.: 12721-000 Date: 9/29/2010 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	
7.10	PIPE SUPPORT PAD - ABSORBER BUILDING		\$ -	\$ 7,700	\$ 16,100	\$ 23,800	
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS		\$ -	\$ 37,000	\$ 67,300	\$ 104,300	
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	\$ 13,700	\$ 21,400	
7.14	DUCTWORK	INCLUDES INTERNAL BRACING	\$ -	\$ 3,558,800	\$ 6,797,400	\$ 10,356,200	
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	\$ 143,000	\$ 212,000	
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		\$ -	\$ 1,515,700	\$ 5,849,000	\$ 7,364,700	
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	
7.33	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000	
7.34	LIGHTNING PROTECTION		\$ -	\$ 19,500	\$ 14,500	\$ 34,000	
7.35	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000	
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 46,833,900	\$ 28,903,500	\$ 70,272,600	\$ 146,010,000	

Sargent & Lundy, LLC

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

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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		\$ 3,016,700	\$ 7,370,400	\$ 27,719,500	\$ 38,106,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 49,850,600	\$ 36,273,900	\$ 97,992,100	\$ 184,116,600
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					
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					

Sargent & Lundy, LLC

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

Estimate No.: 30707C
Project No.: 12721-000
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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		\$ 143,343,600	\$ 80,977,000	\$ 194,147,900	\$ 450,698,500
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 7,779,200	\$ 20,592,400	\$ 75,082,900	\$ 108,412,000
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 151,122,800	\$ 101,569,400	\$ 269,230,800	\$ 559,110,500
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 16,773,300
	S-U / COMMISSIONING					\$ 5,591,100
	CRAFT START-UP SUPPORT					\$ 2,288,300
	INITIAL FILLS					\$ 1,677,300
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS				\$ 2,650,000
	SUBTOTAL - INDIRECT COSTS					\$ 59,680,000
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 618,790,500
	SPARE PARTS:					\$ 2,266,800
	SPARE PARTS - CAPITALIZED	0.90				\$ 1,813,440
	SPARE PARTS - FIRST YEAR OF OPERATION	0.60				\$ 1,133,400
	CONTINGENCY	14.34				\$ 89,075,700

Sargent & Lundy, LLC

AEP

Estimate No.: 30707C

BIG SANDY UNIT 2

Project No.: 12721-000

FGD PROJECT - WFGD EST-3 - 3.0 LB/MMBTU

Date: 9/29/2010

COST ESTIMATE SUMMARY

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
	ESCALATION					\$ 77,651,000
	EQUIPMENT					\$ 23,229,300
	MATERIAL					\$ 11,176,100
	LABOR					\$ 36,338,000
	INDIRECTS					\$ 6,907,600
	TOTAL PROJECT COST					\$ 787,784,000
	REFERENCE COSTS:					
A	REMOVE BOOSTER AIR FANS	\$ -	\$ -	\$ -	\$ 111,000	\$ 111,000
B	REMOVAL OF FUEL OIL TANK	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118-355/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	\$ 1,200,000	\$ 80,000	\$ 469,400	\$ 1,749,400



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

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

* - Estimates 2, 3 and 4 contain only accounts whose costs are different from the base estimate 1.

Sargent & Lundy, LLC

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

Estimate No.: 30709C
Project No.: 12721-000
Date: 9/29/2010
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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	\$ 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	\$ 299,400	\$ 465,800
5.6	REAGENT PREPARATION BUILDING - FOUNDATIONS		\$ -	\$ 701,800	\$ 1,165,100	\$ 1,866,900
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	\$ 28,600	\$ 43,000
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	\$ -	\$ -	\$ -	\$ -
5.12	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
5.13	LIGHTNING PROTECTION		\$ -	\$ 23,000	\$ 16,000	\$ 39,000
5.14	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.00	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 17,578,300	\$ 6,267,200	\$ 19,709,900	\$ 43,555,400
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 878,900	\$ 1,598,100	\$ 7,554,800	\$ 10,031,900

Sargent & Lundy, LLC

AEP
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
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	REAGENT PREPARATION ISLAND	\$ 18,457,200	\$ 7,865,300	\$ 27,264,700	\$ 53,587,300
6.0	BYPRODUCT DEWATERING ISLAND					
6.1	MECHANICAL EQUIPMENT	PRIMARY & SECONDARY	\$ 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,	\$ 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	\$ 65,400	\$ 95,500
6.8	BYPRODUCT STACKOUT PILE - FOUNDATIONS	INCLUDES CONTAINMENT	\$ -	\$ 1,155,700	\$ 1,872,400	\$ 3,028,100
6.9	BYPRODUCT CONTAINMENT WALLS		\$ -	\$ 137,300	\$ 235,000	\$ 372,300
6.10	INSTALL WIND SCREEN		\$ -	\$ 525,000	\$ 192,300	\$ 717,300
6.11	BYPRODUCT DEWATERING BUILDING - FOUNDATIONS		\$ -	\$ 301,000	\$ 498,600	\$ 799,600
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	\$ 27,100	\$ 40,900
6.14	TRANSFORMERS		\$ 170,000	\$ -	\$ 54,600	\$ 224,600
6.15	SWITCHGEAR	480V LOW VOLATAGE	\$ 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		\$ -	\$ 326,100	\$ 1,393,900	\$ 1,720,000

Sargent & Lundy, LLC

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

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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
6.23	HIGH VOLTAGE POWER CABLE & TERMINATION	1/C # 500KCML-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	\$ -	\$ 99,200	\$ 278,400	\$ 377,600
6.26	FOUNDATIONS FOR TRANSFORMERS		\$ -	\$ 3,500	\$ 10,300	\$ 13,800
6.27	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
6.28	LIGHTNING PROTECTION		\$ -	\$ 13,000	\$ 9,000	\$ 22,000
6.29	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 12,571,200	\$ 5,834,400	\$ 18,061,300	\$ 36,466,900
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 628,600	\$ 1,487,800	\$ 6,923,300	\$ 9,039,600
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BYPRODUCT DEWATERING ISLAND	\$ 13,199,800	\$ 7,322,200	\$ 24,984,600	\$ 45,506,500
7.0	ABSORBER ISLAND					
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	\$ 41,668,000	\$ -	\$ 41,073,400	\$ 82,741,400

Sargent & Lundy, LLC

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

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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
7.2	ADDITIONAL COST FOR C276 ABSORBER SHELL MATERIAL ABOVE THE PRICE OF A2205 ABSORBER SHELL	INCLUDES MATERIAL AND WELDING ROD COST DIFFERENTIAL 49,800 TOTAL SF	\$ -	\$ 15,338,400	\$ -	\$ 15,338,400
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	0.0	\$ -	\$ 366,900	\$ 672,900	\$ 1,039,800
7.8	ABSORBER BUILDING - FOUNDATIONS	0.0	\$ -	\$ 608,300	\$ 1,007,600	\$ 1,615,900
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	0.00	\$ -	\$ 7,700	\$ 16,100	\$ 23,800
7.11	OXIDATION AIR BLOWER BUILDING - FOUNDATIONS	0.00	\$ -	\$ 37,000	\$ 67,300	\$ 104,300
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	0.00	\$ -	\$ 7,700	\$ 13,700	\$ 21,400
7.14	DUCTWORK	INCLUDES INTERNAL BRACING AND TURNING VANES	\$ -	\$ 3,558,800	\$ 6,797,400	\$ 10,356,200
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	\$ 143,000	\$ 212,000
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

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

Estimate No.: 30709C
Project No.: 12721-000
Date: 9/29/2010
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
7.22	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		\$ -	\$ 1,515,700	\$ 5,849,000	\$ 7,364,700
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
7.33	COMMUNICATIONS		\$ -	\$ 34,000	\$ 26,000	\$ 60,000
7.34	LIGHTNING PROTECTION		\$ -	\$ 19,500	\$ 14,500	\$ 34,000
7.35	SECURITY SYSTEM		\$ -	\$ 8,000	\$ 7,000	\$ 15,000
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 47,472,900	\$ 29,110,500	\$ 70,853,800	\$ 147,437,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 3,048,600	\$ 7,423,200	\$ 27,942,700	\$ 38,414,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	ABSORBER ISLAND	\$ 50,521,500	\$ 36,533,700	\$ 98,796,500	\$ 185,851,700
8.0	FGD WASTE WATER TREATMENT PLANT					
9.0	COMPRESSED AIR SYSTEM					
10.0	SERVICE WATER SYSTEM					
11.0	POTABLE WATER SYSTEM					

Sargent & Lundy, LLC

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

Estimate No.: 30709C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
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Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
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		\$ 150,505,600	\$ 81,451,400	\$ 198,064,100	\$ 462,251,100
	OVERALL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 8,137,300	\$ 20,713,400	\$ 76,584,400	\$ 110,505,100
	OVERALL TOTAL DIRECT & CONSTRUCTION INDIRECT COST		\$ 158,642,900	\$ 102,164,800	\$ 274,648,500	\$ 572,756,200
	OVERALL PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES					\$ 30,000,000
	CONSTRUCTION MANAGEMENT					\$ 17,182,700
	S-U / COMMISSIONING					\$ 5,727,600
	CRAFT START-UP SUPPORT					\$ 2,334,400

Sargent & Lundy, LLC

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

Estimate No.: 30709C
Project No.: 12721-000
Date: 9/29/2010
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
	INITIAL FILLS					\$ 1,718,300
	OPERATOR & TRAINING MANUALS					\$ 300,000
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)					\$ 400,000
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	FOR ID FAN, TRANSFORMERS, BOP, DUCTWORK, ACOUSTIC BARRIERS FOR BOUNDARY LIMITS				\$ 2,650,000
	SUBTOTAL - INDIRECT COSTS					\$ 60,313,000
	TOTAL PROJECT DIRECT AND INDIRECT COSTS					\$ 633,069,200
	SPARE PARTS:					\$ 2,379,600
	SPARE PARTS - CAPITALIZED	0.90				\$ 1,427,760
	SPARE PARTS - FIRST YEAR OF OPERATION	0.60				\$ 951,840
	CONTINGENCY	14.3				\$ 90,676,000
	ESCALATION					\$ 79,631,900
	EQUIPMENT					\$ 24,385,300
	MATERIAL					\$ 11,236,700
	LABOR					\$ 37,029,100
	INDIRECTS					\$ 6,980,800
	TOTAL PROJECT COST					\$ 805,756,700
	REFERENCE COSTS:					
A	REMOVE BOOSTER AIR FANS		\$ -	\$ -	\$ 111,000	\$ 111,000

Sargent & Lundy, LLC		AEP BIG SANDY UNIT 2 FGD PROJECT - WFGD EST-4 - 7.5 LB/MMBTU COST ESTIMATE SUMMARY			Estimate No.: 30709C Project No.: 12721-000 Date: 9/29/2010 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	REMOVAL OF FUEL OIL TANK	LABOR COST IS FOR REMOVAL OF TANK ONLY. ALLOWANCE FOR SOIL REMEDIATION AND DISPOSAL IN AN EPA APPROVED LANDFILL. SUBCONTRACT COST INCLUDES LABOR. USED LOWER END OF THE RANGE \$118-355/CY. COST COULD BE LOWER (\$59-118/CY) IF SOLD TO A BITUMINOUS CONCRETE BATCH PLANT	\$ 1,200,000	\$ 80,000	\$ 469,400	\$ 1,749,400



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 2 - WFGD Technology
September 29, 2010

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

AEP

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

Project No. 12721-000
September 29, 2010

WFGD O&M Costs – Revision 0

GENERAL

The O&M costs are based on defined inputs from AEP and results of mass balance calculations. Unlike the capital costs that require estimation from previous project and scaling parameters, the O&M cost basis is well defined. Therefore, the O&M costs presented are expected to reflect the actual cost that will be incurred with little variance. The costs are affected by changes in labor rates, commodity pricing, and agreed to minimum staffing requirements. Although these inputs were confirmed by AEP, an uncertainty associated with this pricing is generally in the range of $\pm 10\%$. Based on the typical pricing uncertainty, it is expected that the O&M costs are accurate to $\pm 10\%$.

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.

AEP

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

Project No. 12721-000
September 29, 2010

WFGD O&M Costs – Revision 0**FIXED O&M COSTS**

The fixed O&M costs include:

- Operating Labor

The FGD system will require additional staff to operate the equipment. An absolute minimum number of additional staff was used for comparison purposes between the various technologies. Actual staffing requirements would be based on site specific operating experience. The WFGD 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

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.

AEP

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

Project No. 12721-000
September 29, 2010

WFGD O&M Costs – Revision 0

- 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...

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 2 dated September 24, 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.

AEP

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

Project No. 12721-000
 September 29, 2010

WFGD O&M Costs – Revision 0

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

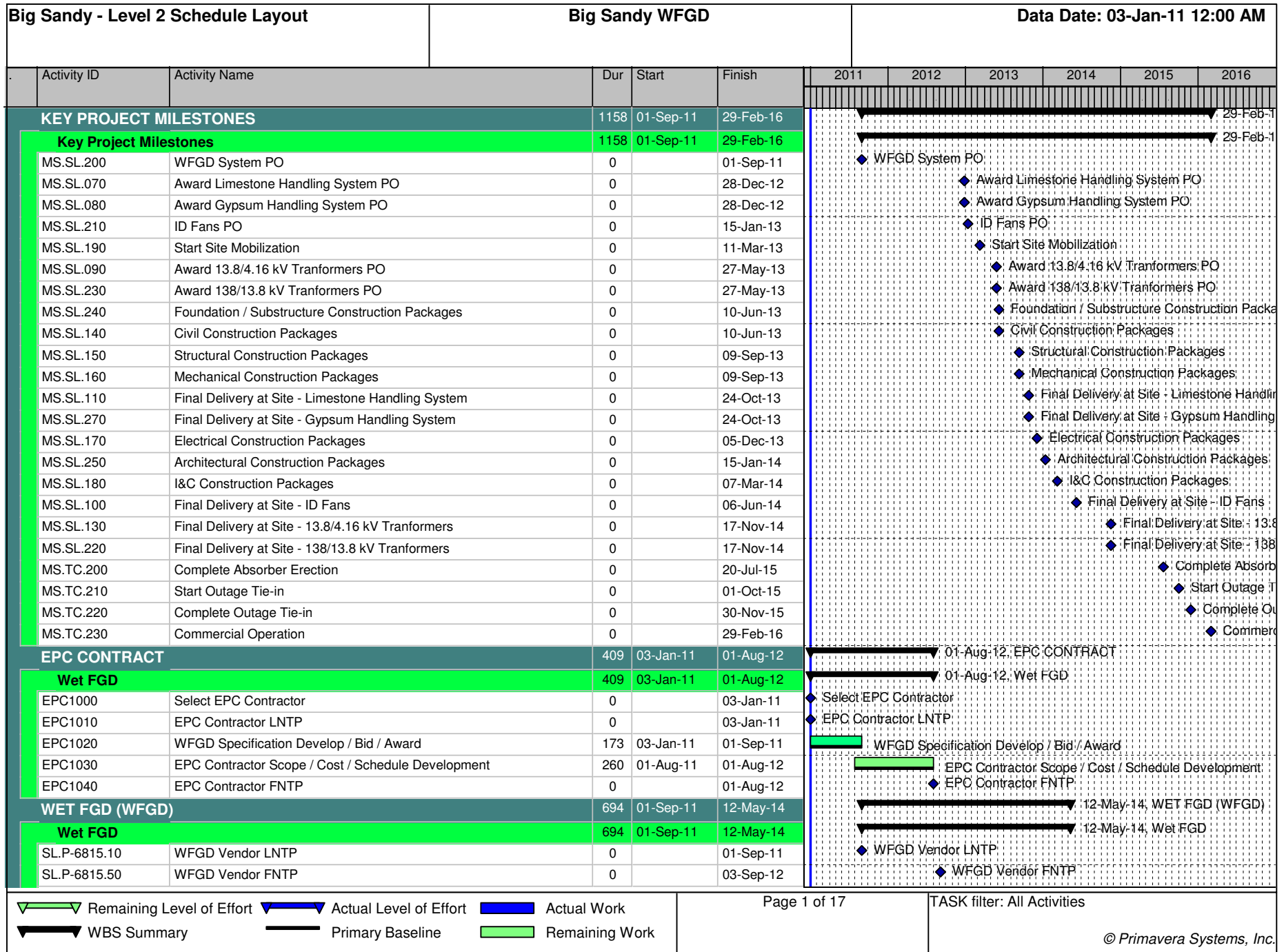
Fuel	1.7	3.0	4.5	7.5
Fixed O&M (\$/year)				
Operating Labor	1,248,000	1,248,000	1,248,000	1,248,000
Maintenance Material	2,412,000	2,590,000	2,763,000	2,950,000
Maintenance Labor	1,608,000	1,727,000	1,842,000	1,967,000
Total Fixed O&M (\$/year)	5,268,000	5,565,000	5,853,000	6,165,000
Variable O&M (\$/year)				
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 [in WC]	26 [52]	26 [52]	26 [52]	26 [52]
FGD Draft Only [in WC]	8 [14]	8 [15]	9 [16]	10 [17]
FGD Equipment Load	7	10	11	18
Existing Booster Fans	-10	-10	-10	-10
Existing ESP	0	0	0	0
WESP	3	3	3	3
Total Auxiliary Power at Full Load (MW)	26	29	30	37

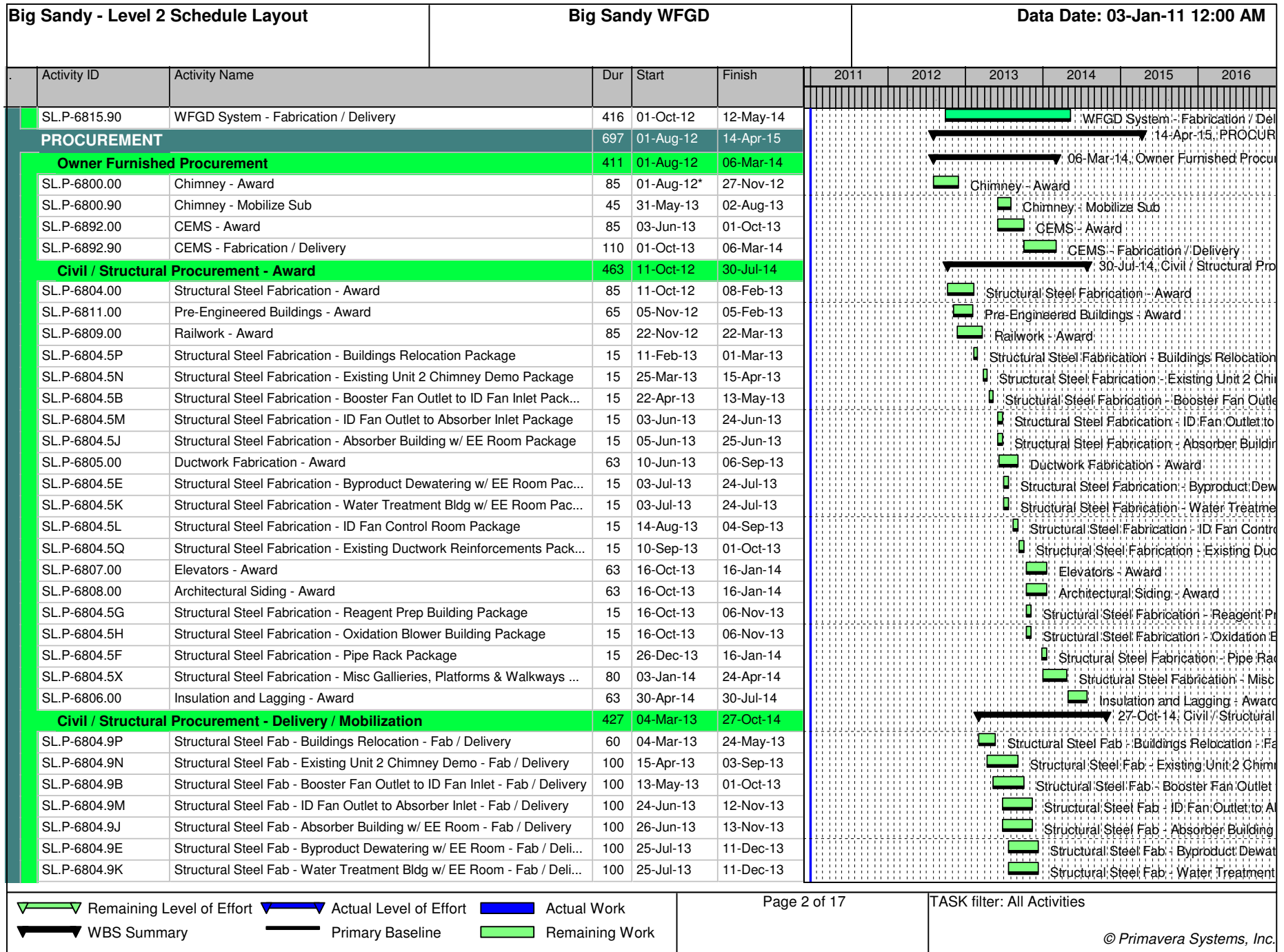
Note: NA = Not Applicable for the technology



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
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ATTACHMENT 2-15 Project Schedule (WFGD)





Big Sandy - Level 2 Schedule Layout

Big Sandy WFGD

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

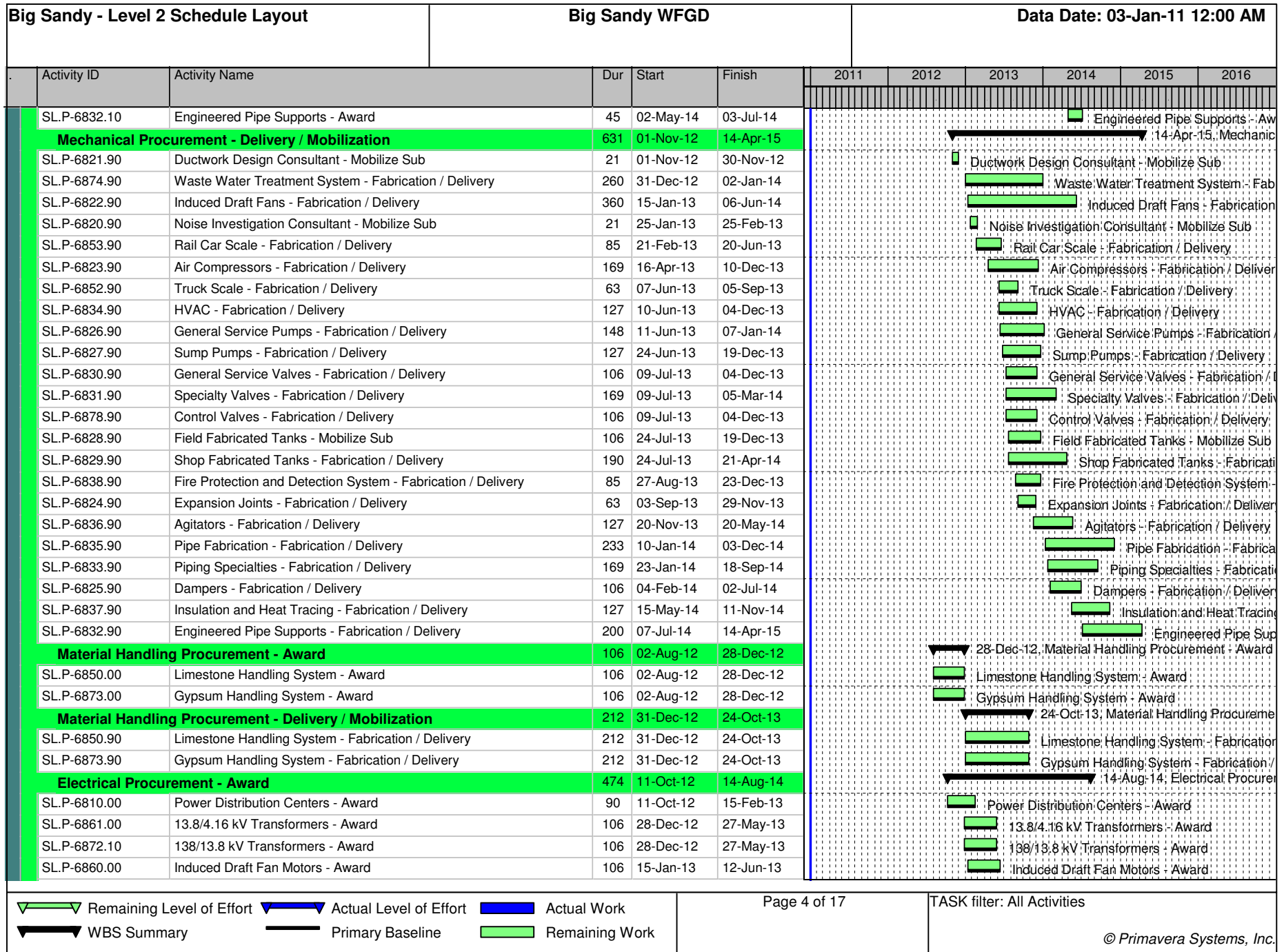
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.P-6804.9L	Structural Steel Fab - ID Fan Control Room - Fab / Delivery	100	04-Sep-13	24-Jan-14						
SL.P-6805.90	Ductwork Fabrication - Fabrication / Delivery	148	06-Sep-13	07-Apr-14						
SL.P-6809.90	Railwork - Mobilize Sub	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						

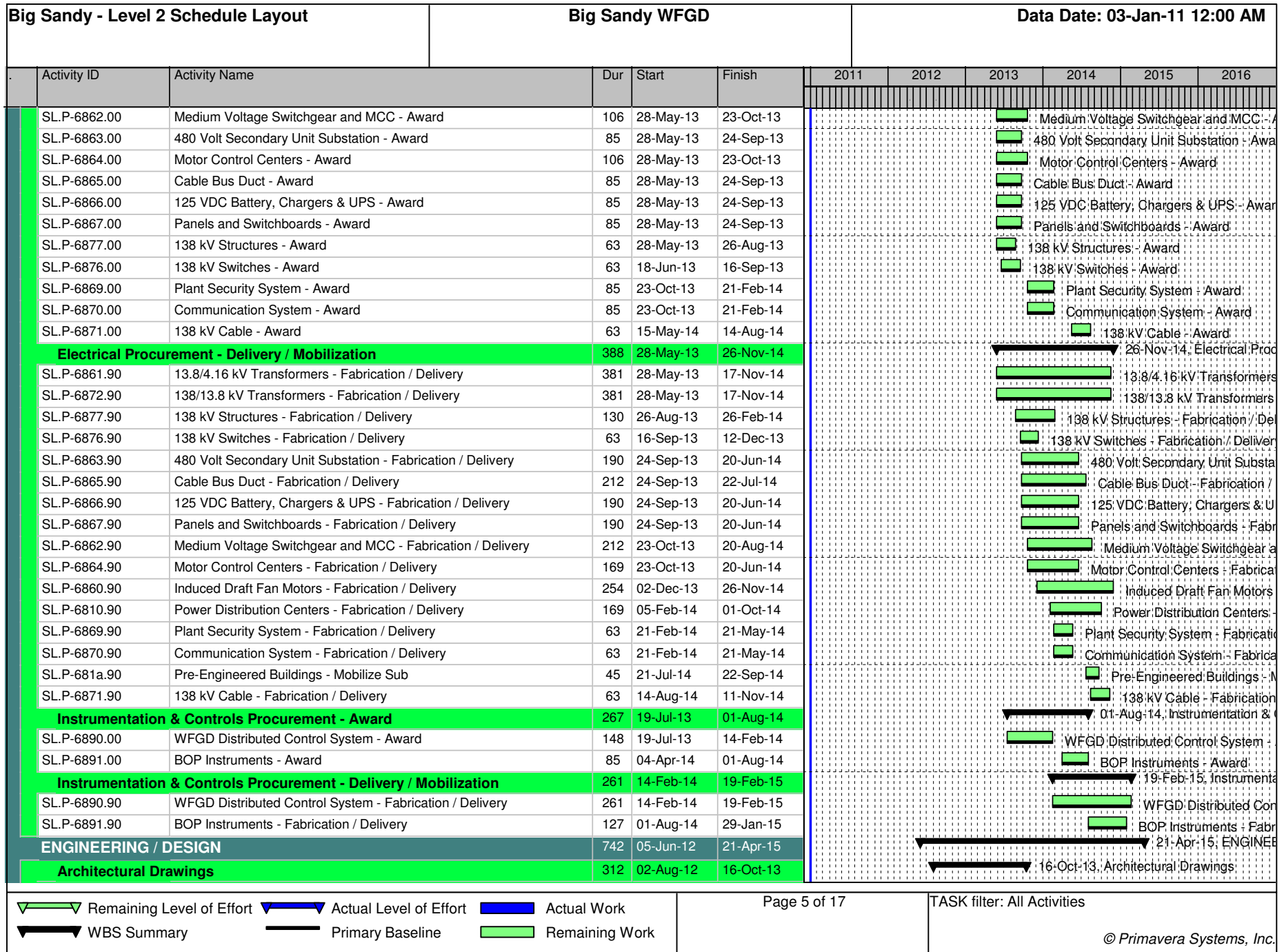
 Remaining Level of Effort
  Actual Level of Effort
  Actual Work
  WBS Summary
  Primary Baseline
  Remaining Work

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TASK filter: All Activities

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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
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						
SL.CK7100.00	Foundation - Booster Fan Outlet to ID Fan Inlet	80	13-Dec-12	08-Apr-13						
SL.CK3200.00	Foundation - Absorber & Absorber Building w/ EE Room	110	02-Jan-13	04-Jun-13						

Remaining Level of Effort
 Actual Level of Effort
 Actual Work
 WBS Summary
 Primary Baseline
 Remaining Work

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TASK filter: All Activities

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	SL.CK3500.00	Foundation - Chimney	80	11-Jan-13	02-May-13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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
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						
SL.MM5500.00	List - Pipe Lines	200	06-Mar-14	11-Dec-14						
Misc Piping Deliverables		600	02-Aug-12	27-Nov-14						

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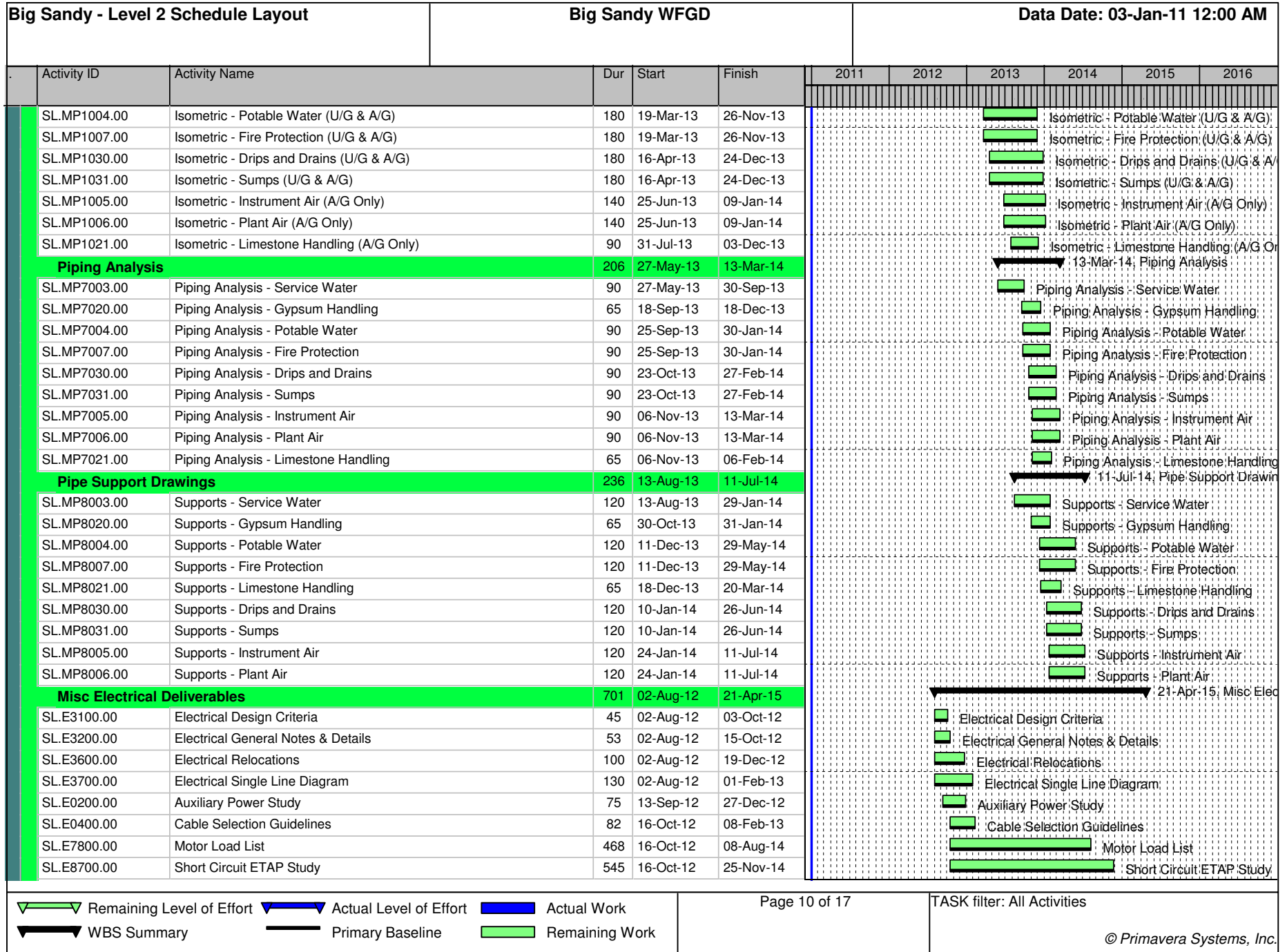
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.MP0700.00	Existing Utility Relocation - BOP Areas	65	02-Aug-12	31-Oct-12						
SL.MP7800.00	Plumbing Drawings	65	15-Apr-13	15-Jul-13						
SL.MP0400.00	Composite Drawings - A/G	99	14-Jul-14	27-Nov-14						
Piping & Instrumentation 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						
SL.MP1003.00	Isometric - Service Water (U/G & A/G)	180	15-Nov-12	29-Jul-13						
SL.MP1020.00	Isometric - Gypsum Handling (U/G & A/G)	65	12-Mar-13	11-Jun-13						

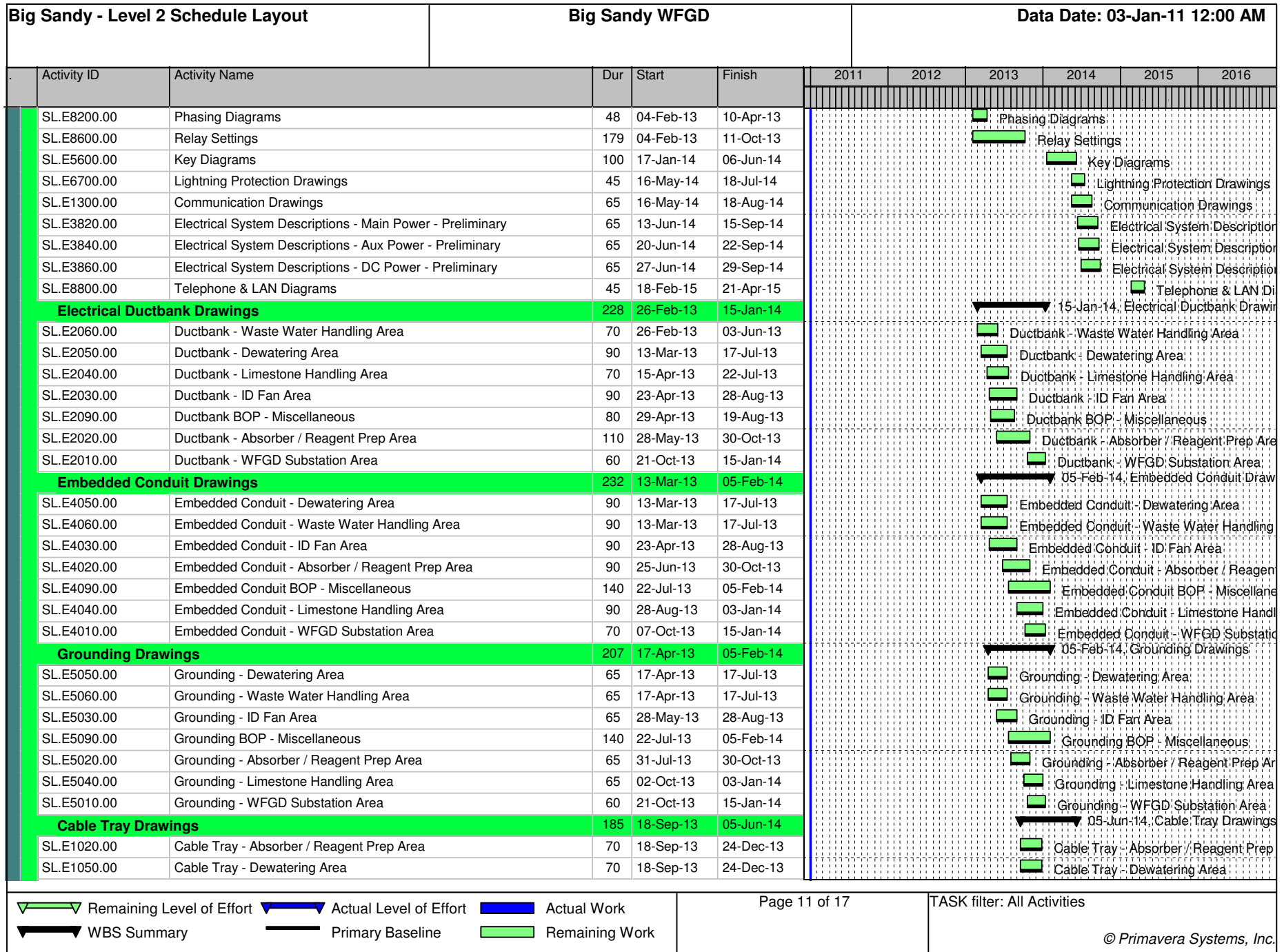
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Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.E1030.00	Cable Tray - ID Fan Area	70	13-Nov-13	20-Feb-14						
SL.E1040.00	Cable Tray - Limestone Handling Area	70	26-Dec-13	03-Apr-14						
SL.E1060.00	Cable Tray - Waste Water Handling Area	70	26-Dec-13	03-Apr-14						
SL.E1010.00	Cable Tray - WFGD Substation Area	70	07-Feb-14	15-May-14						
SL.E1090.00	Cable Tray BOP - Miscellaneous	70	28-Feb-14	05-Jun-14						
Electrical Installation Drawings		245	26-Dec-13	05-Dec-14						
SL.E3020.00	Elec Install - Absorber / Reagent Prep Area	130	26-Dec-13	26-Jun-14						
SL.E3050.00	Elec Install - Dewatering Area	130	26-Dec-13	26-Jun-14						
SL.E3030.00	Elec Install - ID Fan Area	130	21-Feb-14	22-Aug-14						
SL.E3040.00	Elec Install - Limestone Handling Area	130	04-Apr-14	03-Oct-14						
SL.E3060.00	Elec Install - Waste Water Handling Area	130	04-Apr-14	03-Oct-14						
SL.E3010.00	Elec Install - WFGD Substation Area	130	16-May-14	14-Nov-14						
SL.E3090.00	Elec Install BOP - Miscellaneous	130	06-Jun-14	05-Dec-14						
Cable Tabulations & Drawings		386	10-Sep-13	10-Mar-15						
SL.E0-6815.00	Cable Tabs - Wet Flue Gas Desulfurization System	70	10-Sep-13	16-Dec-13						
SL.E0-6822.00	Cable Tabs - Induced Draft Fans	70	08-Oct-13	15-Jan-14						
SL.E0-6860.00	Cable Tabs - Induced Draft Fan Motors	55	05-Nov-13	22-Jan-14						
SL.E0-6850.00	Cable Tabs - Limestone Handling System	65	09-Jan-14	09-Apr-14						
SL.E0-6851.00	Cable Tabs - Waste Water Handling Area	65	09-Jan-14	09-Apr-14						
SL.E0-6873.00	Cable Tabs - Gypsum Handling System	65	09-Jan-14	09-Apr-14						
SL.E0-6861.00	Cable Tabs - 13.8/4.16 kV Transformers	70	06-Mar-14	11-Jun-14						
SL.E0-6872.00	Cable Tabs - 138/13.8 kV Transformers	70	06-Mar-14	11-Jun-14						
SL.E0-6863.00	Cable Tabs - 480 Volt Secondary Unit Substation	50	20-Mar-14	28-May-14						
SL.E0-6862.00	Cable Tabs - Medium Voltage Switchgear and MCC	50	10-Apr-14	18-Jun-14						
SL.E0-6864.00	Cable Tabs - Motor Control Centers	50	10-Apr-14	18-Jun-14						
SL.E0-6866.00	Cable Tabs - 125 VDC Battery, Chargers & UPS	50	17-Apr-14	25-Jun-14						
SL.E0-6867.00	Cable Tabs - Panels and Switchboards	50	01-May-14	10-Jul-14						
SL.E0-6876.00	Cable Tabs - 138 kV Switches	50	01-May-14	10-Jul-14						
SL.E0-6810.00	Cable Tabs - Pre-Engineered Buildings	70	08-May-14	14-Aug-14						
SL.E0-6823.00	Cable Tabs - Air Compressors	40	08-May-14	02-Jul-14						
SL.E0-6836.00	Cable Tabs - Agitators	40	29-May-14	24-Jul-14						
SL.E0-6852.00	Cable Tabs - Truck Scale	40	29-May-14	24-Jul-14						
SL.E0-6853.00	Cable Tabs - Rail Car Scale	40	29-May-14	24-Jul-14						
SL.E0-6825.00	Cable Tabs - Dampers	40	03-Jun-14	30-Jul-14						
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						

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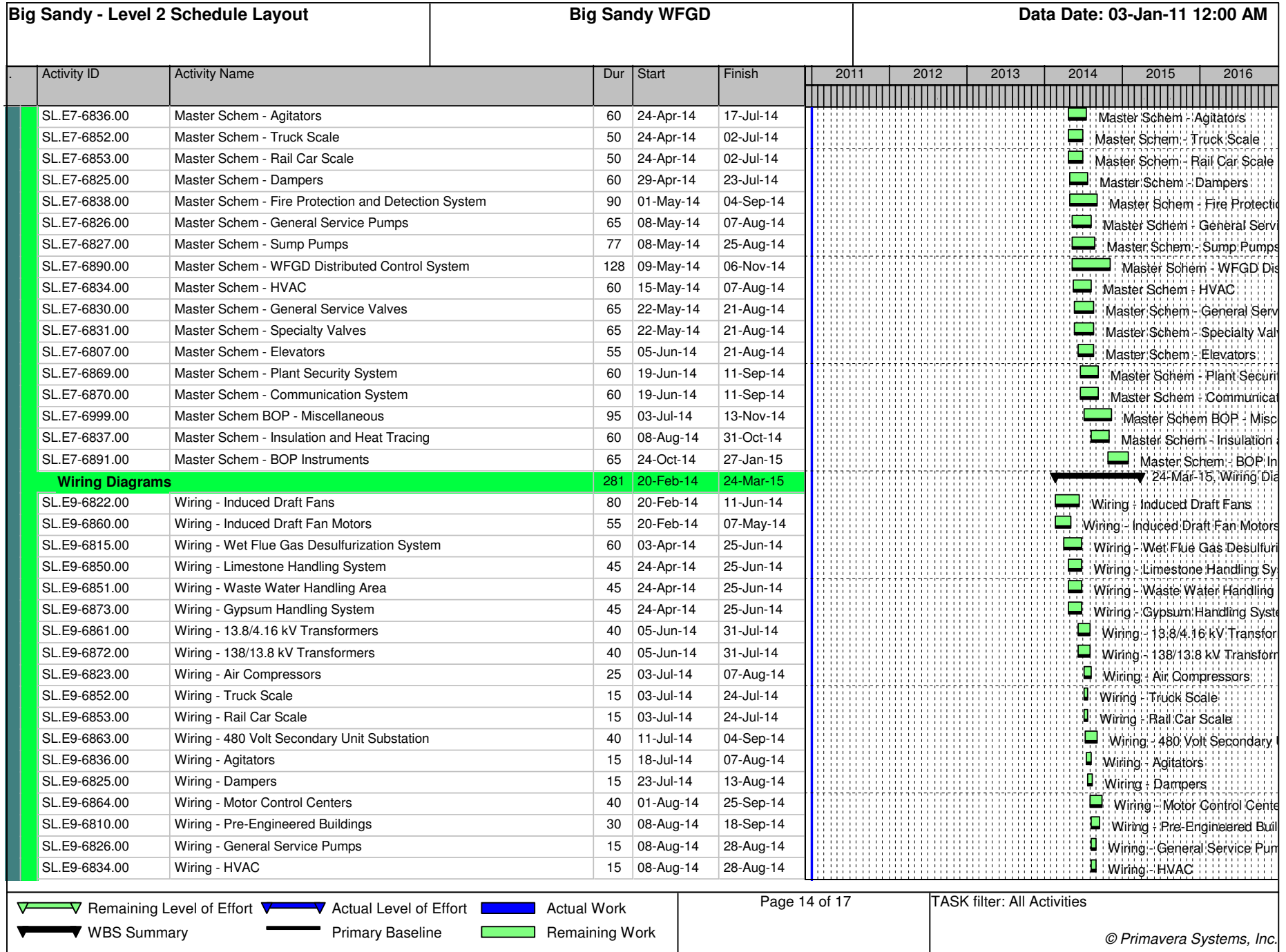
Activity ID	Activity Name	Dur	Start	Finish	2011	2012	2013	2014	2015	2016
SL.E0-6827.00	Cable Tabs - Sump Pumps	40	12-Jun-14	07-Aug-14						
SL.E0-6890.00	Cable Tabs - WFGD Distributed Control System	70	13-Jun-14	22-Sep-14						
SL.E0-6834.00	Cable Tabs - HVAC	40	19-Jun-14	14-Aug-14						
SL.E0-6830.00	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.E0-6869.00	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						
SL.E7-6876.00	Master Schem - 138 kV Switches	120	27-Mar-14	11-Sep-14						
SL.E7-6810.00	Master Schem - Pre-Engineered Buildings	90	03-Apr-14	07-Aug-14						
SL.E7-6823.00	Master Schem - Air Compressors	65	03-Apr-14	02-Jul-14						

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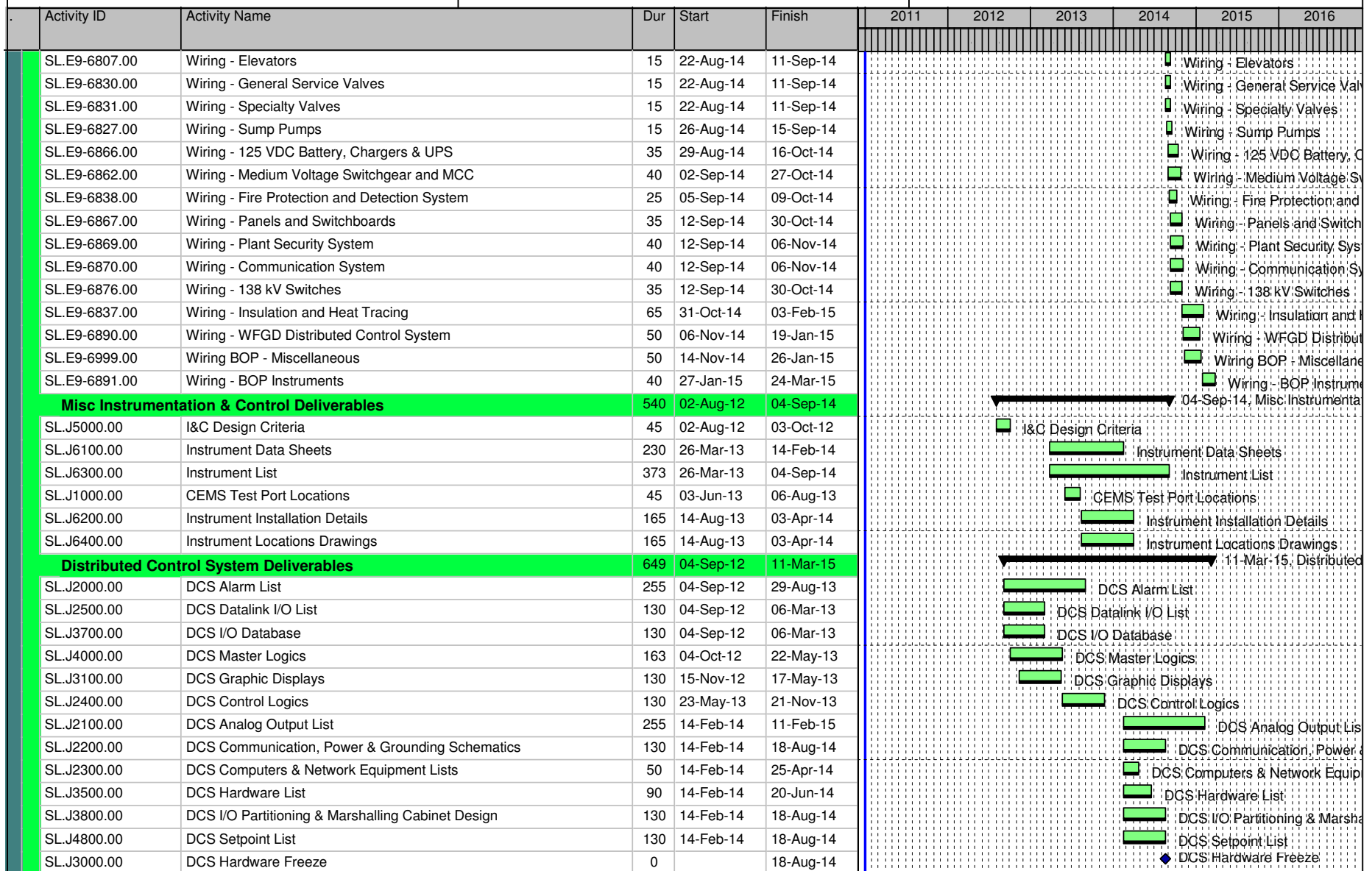
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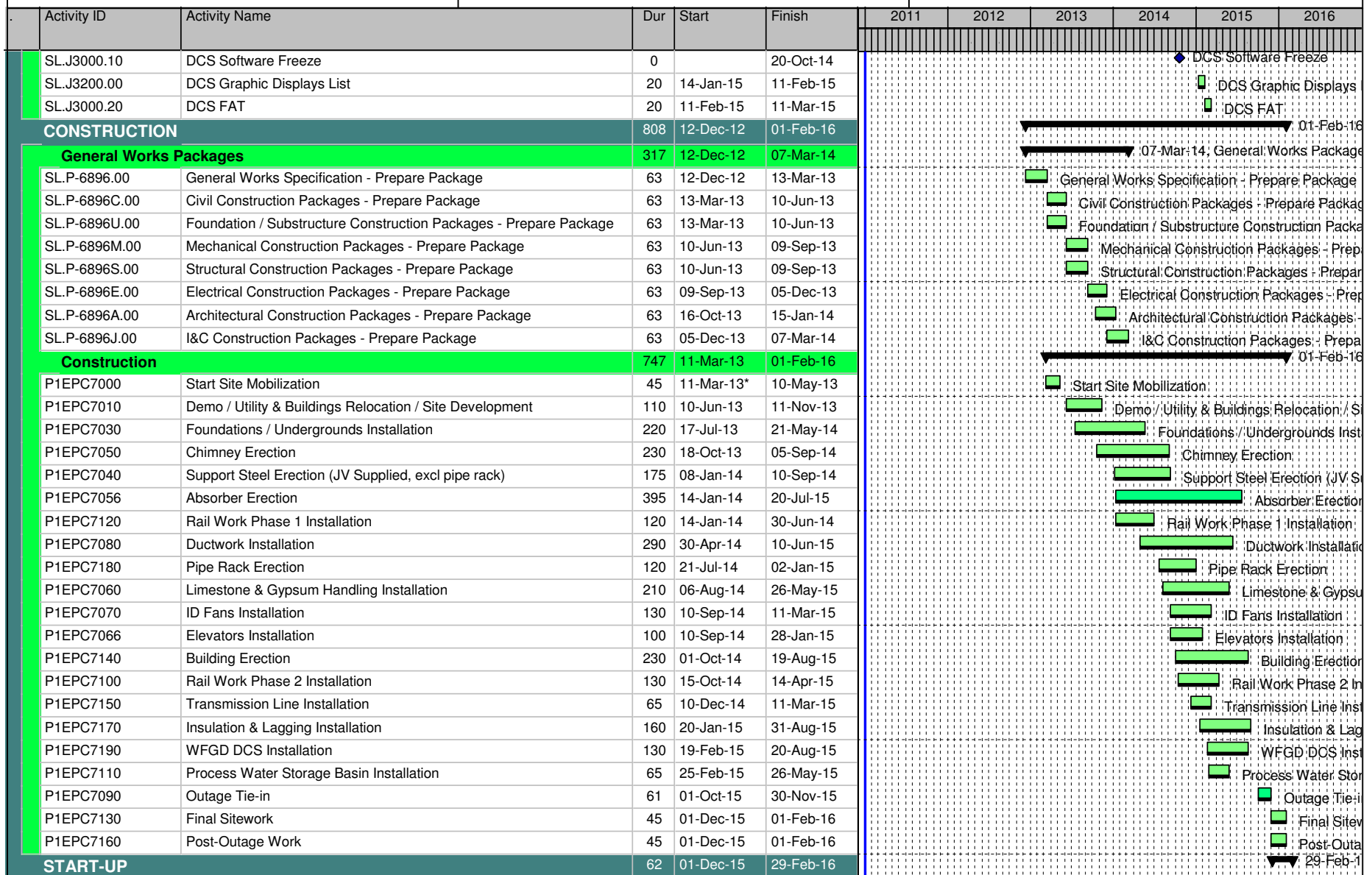
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