

REQUEST FOR QUOTE

1. GENERAL INFORMATION

1.1 Introduction

Sargent & Lundy (S&L) is working with AEP to estimate the capital cost for several different flue gas desulfurization (FGD) options at Big Sandy Unit 2 (865 MW). AEP is investigating the use of:

- Wet FGD (WFGD) limestone-based, forced oxidation with an integral wet ESP that produces a disposal grade gypsum product, dewatered to nominally 85% solids.
- Lime-based, spray dryer absorber FGD (DFGD).
- Lime-based, circulating dry scrubber or NID FGD (NID)
- Lime-based SDA FGD to remove SO₃ and other hazardous air pollutants (HAPs) followed by a limestone-based, forced oxidation WFGD to remove SO₂ from the flue gas (IAQCS)

All of the technologies should remove SO₂, SO₃, HCl, and HF from the flue gas. Four different fuel options are considered. However, all of the fuels do not apply to all of the technologies.

1.1 Fuel Data					
Fuel Designation		1.75	3.0	4.5	7.5
Carbon	wt%	69.41	67.04	69.33	67.15
Hydrogen	wt%	4.69	4.56	4.67	4.76
Nitrogen	wt%	1.31	1.32	1.34	1.16
Sulfur	wt%	0.94	1.81	2.69	4.02
Oxygen	wt%	5.66	6.49	5.41	5.74
Chlorine	wt%	0.19	0.12	0.05	0.05
Moisture	wt%	6.20	8.35	6.63	6.73
Ash	wt%	11.60	10.31	9.89	10.40
HHV	Btu/lb	12,242	12,007	12,490	12,390

As part of the conceptual engineering phase, we are requesting a budgetary cost estimate and preliminary design information for the supply (no installation) of the FGD systems. Given the volatile steel/alloy prices, as part of this request, S&L would like the FGD vendor to provide both the unit pricing (\$/ton) for the structural steel and alloy, as well as what percentage of the total project cost each represents.

As part of the process of competing the budget estimate, S&L is looking for FGD specific information only (reagent preparation, absorber island, by-product handling). With a rapid yet thorough response being vital, S&L will be responsible for non-FGD specific equipment (ductwork, chimney, booster fans, civil work, material handling, etc). In the body of this document there are details concerning the estimate boundaries.



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1.2 Scope

The following areas shall be addressed in this document:

1. General Information
2. Division of Responsibility
3. Mechanical Design Information
4. Process Data
5. Estimated Pricing & Technical Process Data

The FGD vendor is to fill in the “Estimated Pricing Data” and “Requested Technical / Process Data” and provide exceptions if the FGD vendor feels them to be necessary.

1.3 Questions

Direct questions as well as full responses should be sent to:

Name: **TBD**

Phone:

E-mail:

1.4 Due Date

Please provide the information requested by September 20, 2010. Responses to the request on or before that date would be appreciated.

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2. DIVISION OF RESPONSIBILITY

Refer to attached process flow diagrams (Figures 1 through 4) for a delineation of the responsibility break points.

2.1 Mechanical Equipment (WFGD)

Flue Gas Path – absorber module (C276) with internals, wet ESP integral to the absorber, and the inlet duct only through the C22 wet/dry interface.	FGD Vendor
Flue Gas Path – duct from booster fans to wet/dry interface, duct from absorber module to stack breach, and new wet stack.	Owner
Absorber Module & Area – all internals, recycle pumps, oxidation compressors, mist eliminator wash pumps, etc...	FGD Vendor
Reagent Preparation – limestone feeders through the slurry storage tanks and transfer pumps.	FGD Vendor
Primary & Secondary Dewatering – hydroclone feed tanks through the belt vacuum filter.	FGD Vendor

2.2 Mechanical Equipment (DFGD)

Flue Gas Path – absorber module and atomizers, duct work from the absorbers to the fabric filter, and a single fabric filter unit for all of the flue gas.	FGD Vendor
Flue Gas Path – duct from booster fans to stack breach and new stack.	Owner
Absorber Module & Area – all internals, rotary atomizers or dual fluid nozzles, and recycle system.	FGD Vendor
FF – all internal elements including bags, cages, ash hoppers, 2 broken bag detectors per compartment, and ash conveying system from the FF to the recycle silo.	FGD Vendor
Reagent Preparation – rotary feeders, chain conveyors, and slakers through the lime slurry pumps and lime slurry storage tanks. Recycle storage silo, recycle slurry mix tanks, slurry storage tanks, pumps, and any other ancillary systems.	FGD Vendor

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2.3 Mechanical Equipment (NID)

Flue Gas Path – J-duct reactor(s) and duct work from the reactors to the fabric filter(s).	FGD Vendor
Flue Gas Path – duct from booster fans to stack breach and new stack.	Owner
Absorber Module & Area – all internals, distribution duct work for modules, hydrators and mixers, and air slide system.	FGD Vendor
FF – all internal elements including bags, cages, 2 broken bag detectors per compartment, and ash hoppers.	FGD Vendor
Reagent Preparation – day silos and lime hydrators.	FGD Vendor

2.4 Mechanical Equipment (IAQCS)

Flue Gas Path (SDA FGD) – absorber module and atomizers, duct work from the absorbers to the fabric filter, and a single fabric filter unit for all of the flue gas.	FGD Vendor
Absorber Module & Area (SDA FGD) – all internals, rotary atomizers or dual fluid nozzles, and recycle system.	FGD Vendor
FF (SDA FGD) – all internal elements including bags, cages, ash hoppers, 2 broken bag detectors per compartment, and ash conveying system from the FF to the recycle silo.	FGD Vendor
Reagent Preparation (SDA FGD) – rotary feeders, chain conveyors, and slakers through the lime slurry pumps and lime slurry storage tanks. Recycle storage silo, recycle slurry mix tanks, slurry storage tanks, pumps, and any other ancillary systems.	FGD Vendor
Flue Gas Path (WFGD) – absorber module (C276) with internals and the inlet duct only through the C22 wet/dry interface.	FGD Vendor
Flue Gas Path (WFGD) – duct from fans to wet/dry interface, duct from absorber module to stack breach, and new wet stack.	Owner
Absorber Module & Area (WFGD) – all internals, recycle pumps, oxidation compressors, mist eliminator wash pumps, etc...	FGD Vendor
Reagent Preparation (WFGD) – limestone feeders through the slurry storage tanks and transfer pumps.	FGD Vendor
Primary & Secondary Dewatering (WFGD) – hydroclone feed tanks through the belt vacuum filter.	FGD Vendor

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2.5 Mechanical Equipment (Common for All Technologies)

Piping – inside FGD buildings to terminal point	FGD Vendor
Piping – from terminal point out to plant	Owner
Booster Fans – including motors and all ancillary equipment	Owner

2.6 Electrical Equipment

Motors – those required by the FGD vendor scope of supply	FGD Vendor
Transformers/Cables – conduit, cables, etc. to FGD vendor's motors	Owner

2.7 Civil Work

Civil Work – site grading, roads, foundations, etc.	Owner
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2.8 Structural Steel

Steel – all steel integral to support the FGD vendor's equipment	FGD Vendor
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2.9 Material Handling

Reagent Unloading and By-product Handling – conveyors, stacking, storage areas, etc.	Owner
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2.10 Instrumentation & Control

Control Systems – process instruments and control logic	FGD Vendor
DCS – all required upgrades	Owner

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3. MECHANICAL DESIGN INFORMATION

Refer to attached process flow diagrams (Figures 1 through 4) for the sparing philosophy.

3.1 Absorber Area (WFGD)

Absorber Module	1 x 100% made of solid C276 Wetted portion of inlet duct = C22 Outlet duct = C276 Wet ESP integral to the absorber
Maximum Gas Velocity	14 ft/s
Retention Times	16 hours (solids) & 5 minutes (liquid)
Recycle Pumps & Spray Levels	one full installed spare (N+1)
Oxidation Air Compressors	3:1 O/SO ₂ ratio – 99%+ oxidation
Mist Eliminator	high-efficiency, two-stage
SO ₂ Removal	98% guarantee w/o organic acid additives (97.3% for the 1.75 coal)
Outlet Particulate	no net increase

3.2 Absorber Area (DFGD)

Absorber Module	Quantity of absorbers and atomizers to be determined by FGD Vendor
Fabric Filter	Air-to-cloth ratio maximum with one compartment off line (n-1) is 3.7. The fabric filter should include 2 broken bag detectors per compartment.
SDA Residence Time	10 seconds minimum
SO ₂ Removal	95% guarantee (for the 1.75 and 3.0 fuel ONLY)
Outlet Particulate	0.015 lb/MMBtu



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3.3 Absorber Area (NID)

Absorber Module	Quantity of absorbers to be determined by FGD Vendor
Fabric Filter	Air-to-cloth ratio maximum with one compartment off line (n-1) is 3.4. The fabric filter should include 2 broken bag detectors per compartment.
SO ₂ Removal	97.3% for the 1.75 fuel 98% for the 3.0 fuel 98% for the 4.5 fuel 96% for the 7.5 fuel
Outlet Particulate	0.015 lb/MMBtu

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3.4 Absorber Area (IAQCS)

Absorber Module (SDA FGD)	Quantity of absorbers and atomizers to be determined by FGD Vendor
Fabric Filter (SDA FGD)	Air-to-cloth ratio maximum with one compartment off line (n-1) is 3.7. The fabric filter should include 2 broken bag detectors per compartment.
SDA Residence Time (SDA FGD)	10 seconds minimum
SO ₂ Removal (SDA FGD)	As low as possible
SO ₃ Removal (SDA FGD)	93% Minimum
HCl Removal (SDA FGD)	As high as possible
Outlet Particulate (SDA FGD)	0.015 lb/MMBtu
Absorber Module (WFGD)	1 x 100% made of solid C276 Wetted portion of inlet duct = C22 Outlet duct = C276
Maximum Gas Velocity (WFGD)	14 ft/s
Retention Times (WFGD)	16 hours (solids) & 5 minutes (liquid)
Recycle Pumps & Spray Levels (WFGD)	one full installed spare (N+1)
Oxidation Air Compressors (WFGD)	3:1 O/SO ₂ ratio – 99%+ oxidation
Mist Eliminator (WFGD)	high-efficiency, two-stage
SO ₂ Removal (WFGD)	98% guarantee w/o organic acid additives (97.3% for the 1.75 coal)
Outlet Particulate (WFGD)	no net increase

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4. PROCESS DATA

4.1 Unit Information

Gross Power	865	MW
Heat Input	8,180	MMBtu/hr

4.2 Flue Gas @ WFGD Inlet

Fuel Designation	1.75	3.0	4.5	7.5	
Pressure	+15	+15	+15	+15	in WC
Temperature	370	370	370	370	°F
Flow Rate	10,100,000	9,955,000	9,950,000	9,855,000	lb/hr
Flow Rate	3,420,000	3,380,000	3,375,000	3,345,000	acfm
SO ₂ Rate	12,600	24,700	35,300	53,100	lb/hr
SO ₂ Conc.	1.5	3.0	4.3	6.5	lb/MMBtu
HCl Rate	1,305	840	340	340	lb/hr

4.3 Flue Gas @ DFGD Inlet

Designation	1.75 w/o ESP	3.0 w/o ESP	1.75 w/ ESP	3.0 w/ ESP	
Pressure	-19	-19	-1	-1	in WC
Temperature	350	350	361	361	°F
Flow Rate	10,100,000	9,955,000	10,100,000	9,955,000	lb/hr
Flow Rate	3,650,000	3,600,000	3,525,000	3,490,000	acfm
SO ₂ Rate	12,600	24,700	12,600	24,700	lb/hr
SO ₂ Conc.	1.5	3.0	1.5	3.0	lb/MMBtu
HCl Rate	1,305	840	1,305	840	lb/hr

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4.4 Flue Gas @ NID Inlet

Designation	1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
Pressure	-19	-19	-19	-19	in WC
Temperature	350	350	350	350	°F
Flow Rate	10,100,000	9,955,000	9,950,000	9,855,000	lb/hr
Flow Rate	3,650,000	3,600,000	3,600,000	3,565,000	acfm
SO ₂ Rate	12,600	24,700	35,300	53,100	lb/hr
SO ₂ Conc.	1.5	3.0	4.3	6.5	lb/MMBtu
HCl Rate	1,305	840	340	340	lb/hr
Designation	1.75 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	
Pressure	-1	-1	-1	-1	in WC
Temperature	361	361	361	361	°F
Flow Rate	10,100,000	9,955,000	9,950,000	9,855,000	lb/hr
Flow Rate	3,525,000	3,490,000	3,480,000	3,450,000	acfm
SO ₂ Rate	12,600	24,700	35,300	53,100	lb/hr
SO ₂ Conc.	1.5	3.0	4.3	6.5	lb/MMBtu
HCl Rate	1,305	840	340	340	lb/hr

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4.5 Flue Gas @ IAQCS SDA FGD Inlet

Designation	1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
Pressure	-19	-19	-19	-19	in WC
Temperature	350	350	350	350	°F
Flow Rate	10,100,000	9,955,000	9,950,000	9,855,000	lb/hr
Flow Rate	3,650,000	3,600,000	3,600,000	3,565,000	acfm
SO ₂ Rate	12,600	24,700	35,300	53,100	lb/hr
SO ₂ Conc.	1.5	3.0	4.3	6.5	lb/MMBtu
SO ₃ Rate	220	440	630	975	lb/hr
HCl Rate	1,305	840	340	340	lb/hr
Designation	1.75 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	
Pressure	-1	-1	-1	-1	in WC
Temperature	361	361	361	361	°F
Flow Rate	10,100,000	9,955,000	9,950,000	9,855,000	lb/hr
Flow Rate	3,525,000	3,490,000	3,480,000	3,450,000	acfm
SO ₂ Rate	12,600	24,700	35,300	53,100	lb/hr
SO ₂ Conc.	1.5	3.0	4.3	6.5	lb/MMBtu
SO ₃ Rate	220	440	630	975	lb/hr
HCl Rate	1,305	840	340	340	lb/hr

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5. ESTIMATED PRICING AND TECHNICAL & PROCESS DATA

5.1 Total Equipment Cost (WFGD)

Fuel Designation	1.75	3.0	4.5	7.5	
Reagent Preparation					\$
Absorber Area					\$
% of Absorber Area Attributed to Alloy					%
By-Product Dewatering					\$
Baseline Cost – Structural Steel					\$/ton
Baseline Cost – Alloy C276					\$/ton
% of Total Cost Attributed to Structural Steel					%

5.2 Technical & Process Data (WFGD)

Fuel Designation	1.75	3.0	4.5	7.5	
L/G Ratio					gpm/kacfm
Total Make-up Water					gpm
Number of Spray Levels					(N+1)
Number of Recycle Pumps					(N+1)
Limestone Use (89% active CaCO ₃)					ton/hr
Gypsum Production					ton/hr
Vendor Scope Pressure Drop					in WC
Max. Equilibrium Chloride	12,000	12,000	12,000	12,000	ppmw
Chloride Blowdown					gpm

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5.3 Total Equipment Cost (DFGD)

Designation	1.75 w/o ESP	3.0 w/o ESP	1.75 w/ ESP	3.0 w/ ESP	
Reagent Preparation					\$
Absorber(s)					\$
Absorber/Atomizer Quantities	/	/	/	/	
Fabric Filter (Qty of 1)					\$
By-Product Handling					\$
Baseline Cost – Structural Steel					\$/ton
% of Total Cost Attributed to Structural Steel					%

5.4 Technical & Process Data (DFGD)

Designation	1.75 w/o ESP	3.0 w/o ESP	1.75 w/ ESP	3.0 w/ ESP	
SO ₃ Removal Efficiency					%
Approach to Saturation Temperature					°F
Recycle Ratio					
Total Make-up Water					gpm
Lime Use (93% active CaO)					ton/hr
Byproduct Production					ton/hr
Vendor Scope Pressure Drop					in WC
Auxiliary Power Use					kW
Absorber Diameter					ft
Absorber Height					ft
FF Air-to-Cloth (all compartments on-line)					
Fabric Filter Number of Compartments					
Casing Length in Direction of Flow					ft
Casing Width					ft
Casing Height					ft

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5.5 Total Equipment Cost (NID)

Designation	1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
Reagent Preparation					\$
J-duct Reactors					\$
Quantity					
Fabric Filter					\$
By-Product Handling					\$
Baseline Cost – Structural Steel					\$/ton
% of Total Cost Attributed to Structural Steel					%

5.6 Technical & Process Data (NID)

Designation	1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
SO ₃ Removal Efficiency					%
Approach to Saturation Temperature					°F
Recycle Ratio					
Total Make-up Water					gpm
Lime Use (93% active CaO)					ton/hr
Byproduct Production					ton/hr
Vendor Scope Pressure Drop					in WC
Auxiliary Power Use					kW
FF Air-to-Cloth (all compartments on-line)					
NID Module Total Quantity					
Fabric Filter Compartments or NID Module Total Quantity					
Casing Length in Direction of Flow (Total)					ft
Casing Width (Total)					ft
Casing Height					ft

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5.7 Total Equipment Cost (NID)

Designation	1.75 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	
Reagent Preparation					\$
J-duct Reactors					\$
Quantity					
Fabric Filter					\$
By-Product Handling					\$
Baseline Cost – Structural Steel					\$/ton
% of Total Cost Attributed to Structural Steel					%

5.8 Technical & Process Data (NID)

Designation	1.75 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	
SO ₃ Removal Efficiency					%
Approach to Saturation Temperature					°F
Recycle Ratio					
Total Make-up Water					gpm
Lime Use (93% active CaO)					ton/hr
Byproduct Production					ton/hr
Vendor Scope Pressure Drop					in WC
Auxiliary Power Use					kW
FF Air-to-Cloth (all compartments on-line)					
NID Module Total Quantity					
Casing Length in Direction of Flow (Total)					ft
Casing Width (Total)					ft
Casing Height					ft

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5.9 Total Equipment Cost (IAQCS)

Designation	1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
Reagent Preparation (Lime)					\$
SDA Absorber(s)					\$
Absorber/Atomizer Quantities	/	/	/	/	
Fabric Filter (Qty of 1)					\$
SDA By-Product Handling					\$
Reagent Preparation (Limestone)					\$
WFGD Absorber Area					\$
% of Absorber Area Attributed to Alloy					%
WFGD By-Product Dewatering					\$
Baseline Cost – Alloy C276					\$/ton
Baseline Cost – Structural Steel					\$/ton
% of Total Cost Attributed to Structural Steel					%

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5.10 Technical & Process Data (IAQCS)

Designation		1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
SDA FGD Portion	SO ₃ Removal Efficiency					%
	HCl Removal Efficiency					%
	Approach to Saturation Temperature					°F
	Recycle Ratio					
	Lime Use (93% active CaO)					ton/hr
	Byproduct Production					ton/hr
WFGD Portion	L/G Ratio					gpm/kacfm
	Total Make-up Water					gpm
	Number of Spray Levels					(N+1)
	Number of Recycle Pumps					(N+1)
	Limestone Use (89% active CaCO ₃)					ton/hr
	Gypsum Production					ton/hr
	Max. Equilibrium Chloride					ppmw
	Chloride Blowdown					gpm
Total Make-up Water						gpm
Vendor Scope Pressure Drop						in WC
Total Auxiliary Power Use						kW
SDA Absorber Diameter						ft
SDA Absorber Height						ft
FF Air-to-Cloth (all compartments on-line)						
Fabric Filter Number of Compartments						
Casing Length in Direction of Flow						ft
Casing Width						ft
Casing Height						ft

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5.11 Total Equipment Cost (IAQCS)

Designation	1.75 w/ ESP	3.0 w/ ESP	4.5 w/ ESP	7.5 w/ ESP	
Reagent Preparation (Lime)					\$
SDA Absorber(s)					\$
Absorber/Atomizer Quantities	/	/	/	/	
Fabric Filter (Qty of 1)					\$
SDA By-Product Handling					\$
Reagent Preparation (Limestone)					\$
WFGD Absorber Area					\$
% of Absorber Area Attributed to Alloy					%
WFGD By-Product Dewatering					\$
Baseline Cost – Alloy C276					\$/ton
Baseline Cost – Structural Steel					\$/ton
% of Total Cost Attributed to Structural Steel					%

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5.12 Technical & Process Data (IAQCS)

Designation		1.75 w/o ESP	3.0 w/o ESP	4.5 w/o ESP	7.5 w/o ESP	
SDA FGD Portion	SO ₃ Removal Efficiency					%
	HCl Removal Efficiency					%
	Approach to Saturation Temperature					°F
	Recycle Ratio					
	Lime Use (93% active CaO)					ton/hr
	Byproduct Production					ton/hr
WFGD Portion	L/G Ratio					gpm/kacfm
	Total Make-up Water					gpm
	Number of Spray Levels					(N+1)
	Number of Recycle Pumps					(N+1)
	Limestone Use (89% active CaCO ₃)					ton/hr
	Gypsum Production					ton/hr
	Max. Equilibrium Chloride					ppmw
	Chloride Blowdown					gpm
Total Make-up Water						gpm
Vendor Scope Pressure Drop						in WC
Total Auxiliary Power Use						kW
SDA Absorber Diameter						ft
SDA Absorber Height						ft
FF Air-to-Cloth (all compartments on-line)						
Fabric Filter Number of Compartments						
Casing Length in Direction of Flow						ft
Casing Width						ft
Casing Height						ft

AEP

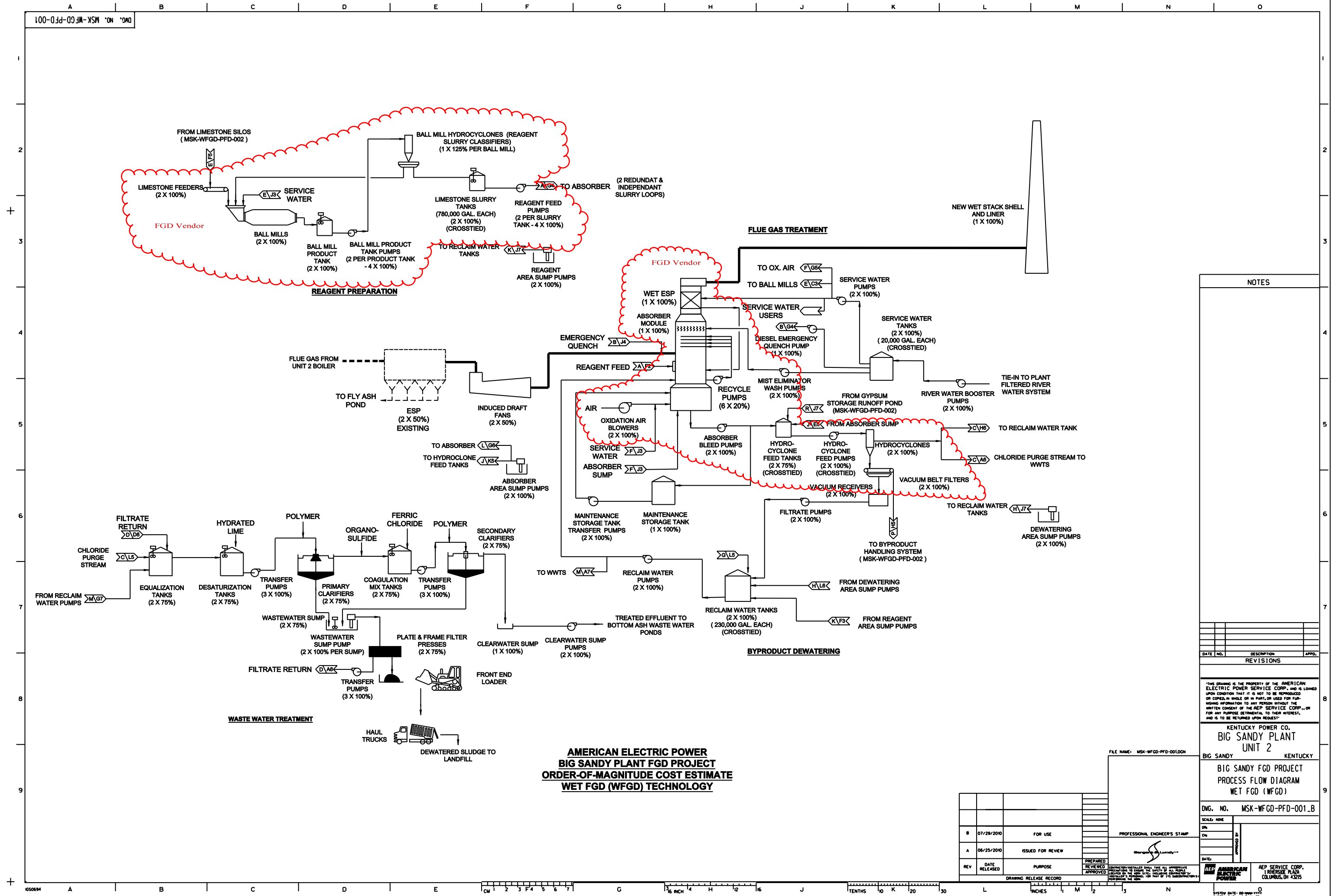
Cost Estimate
Big Sandy - Unit 2



Project No. 12721-000
August 18, 2010

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FIGURE 1 – WFGD SYSTEM PFD



AEP

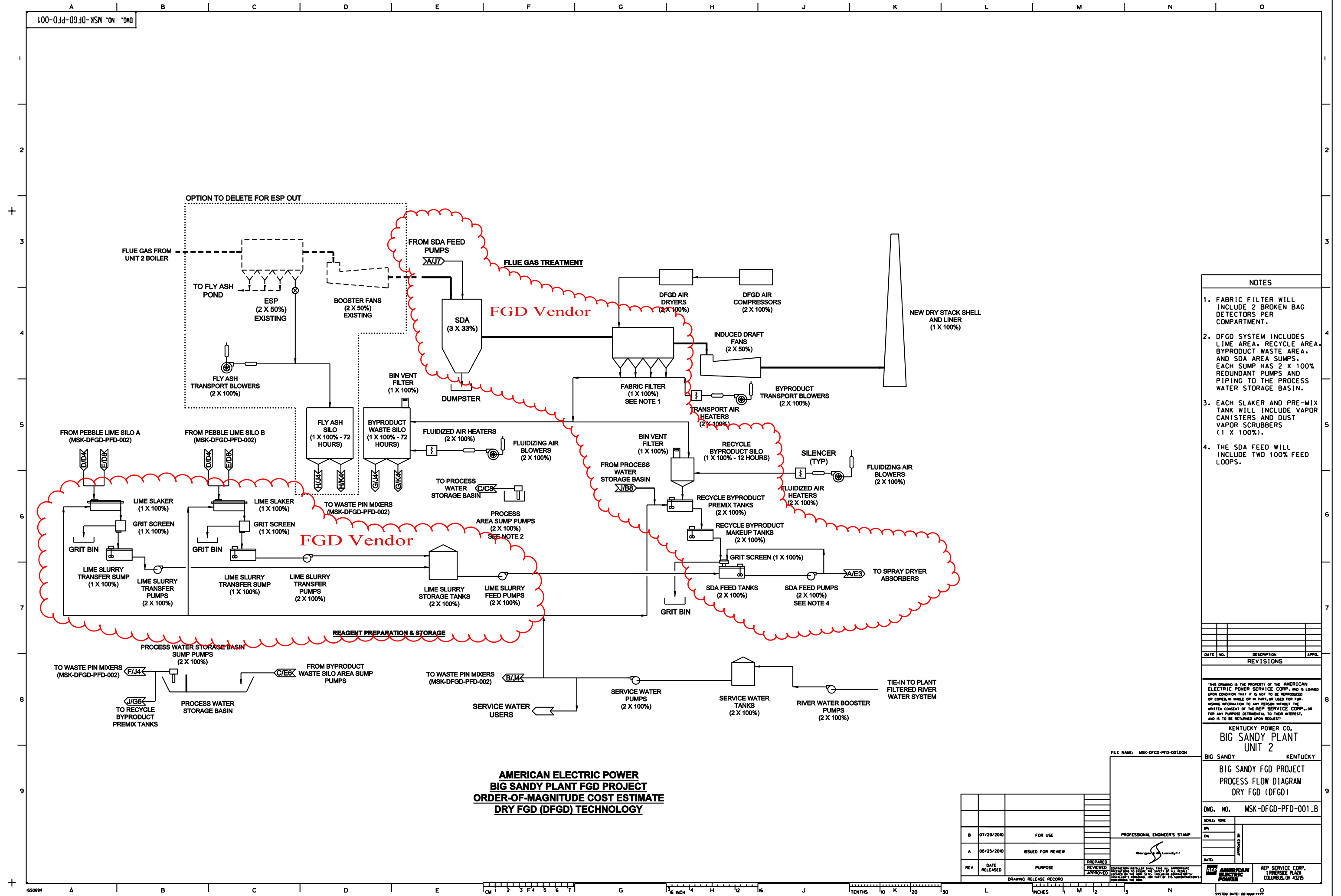
Cost Estimate
Big Sandy - Unit 2



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FIGURE 2 – DFGD SYSTEM PFD



AEP

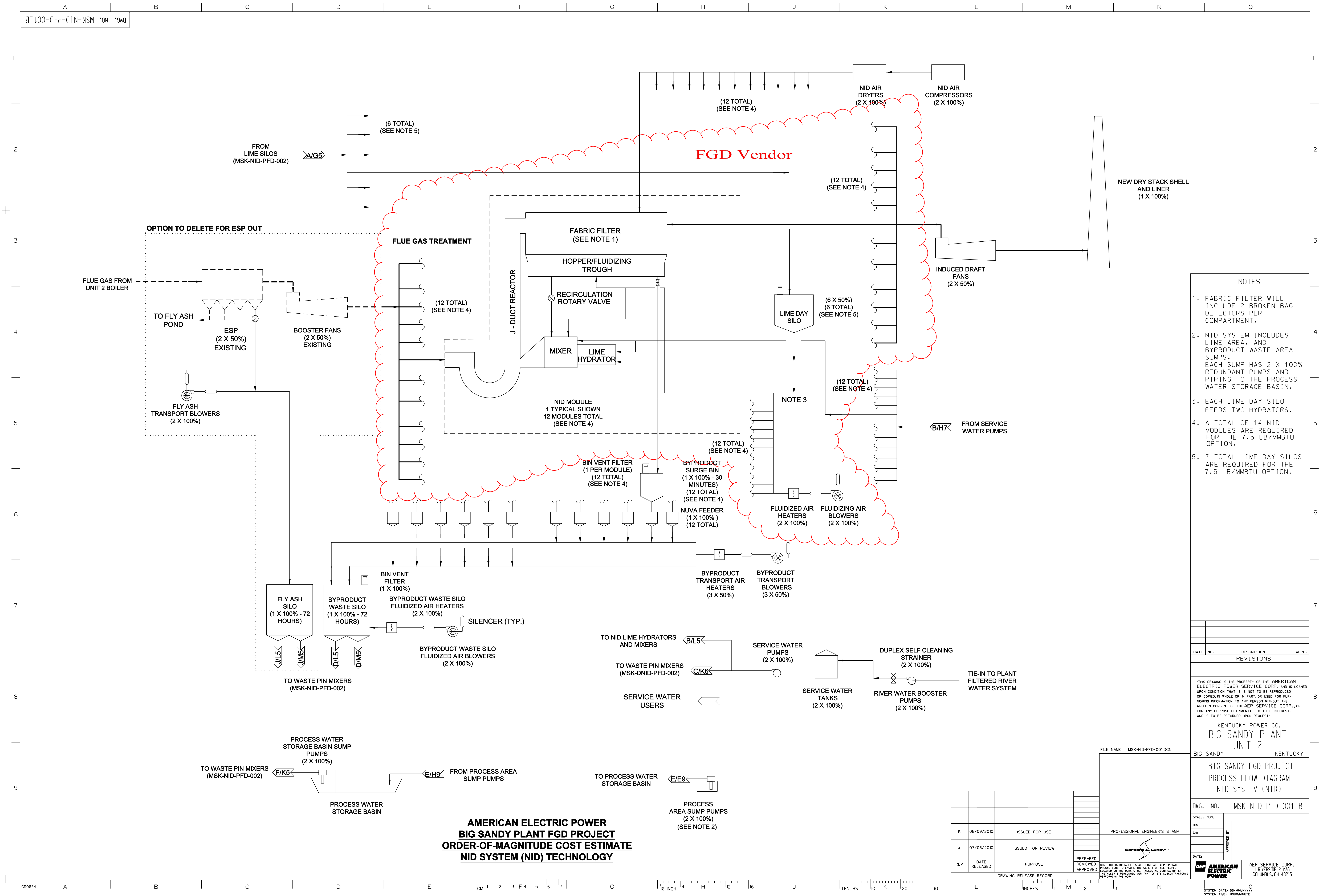
Cost Estimate
Big Sandy - Unit 2



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FIGURE 3 – NID SYSTEM PFD



- NOTES
1. FABRIC FILTER WILL INCLUDE 2 BROKEN BAG DETECTORS PER COMPARTMENT.
 2. NID SYSTEM INCLUDES LIME AREA, AND BYPRODUCT WASTE AREA SUMPS. EACH SUMP HAS 2 X 100% REDUNDANT PUMPS AND PIPING TO THE PROCESS WATER STORAGE BASIN.
 3. EACH LIME DAY SILO FEEDS TWO HYDRATORS.
 4. A TOTAL OF 14 NID MODULES ARE REQUIRED FOR THE 7.5 LB/MMBTU OPTION.
 5. 7 TOTAL LIME DAY SILOS ARE REQUIRED FOR THE 7.5 LB/MMBTU OPTION.

DATE	NO.	DESCRIPTION	APPR.
REVISIONS			

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

BIG SANDY FGD PROJECT
PROCESS FLOW DIAGRAM
NID SYSTEM (NID)

DWG. NO. MSK-NID-PFD-001.B

SCALE: NONE

DR:

CH:

DATE:

APPROVED BY:

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

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

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

REV	DATE RELEASED	PURPOSE
B	08/09/2010	ISSUED FOR USE
A	07/06/2010	ISSUED FOR REVIEW

PROFESSIONAL ENGINEER'S STAMP
Bernard E. Lundy
Bernard E. Lundy, Inc.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PERSONS LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S, INSTALLER'S PERSONNEL, OR THAT OF ITS SUBCONTRACTORS, PERFORMING THE WORK.

DRAWING RELEASE RECORD

AEP

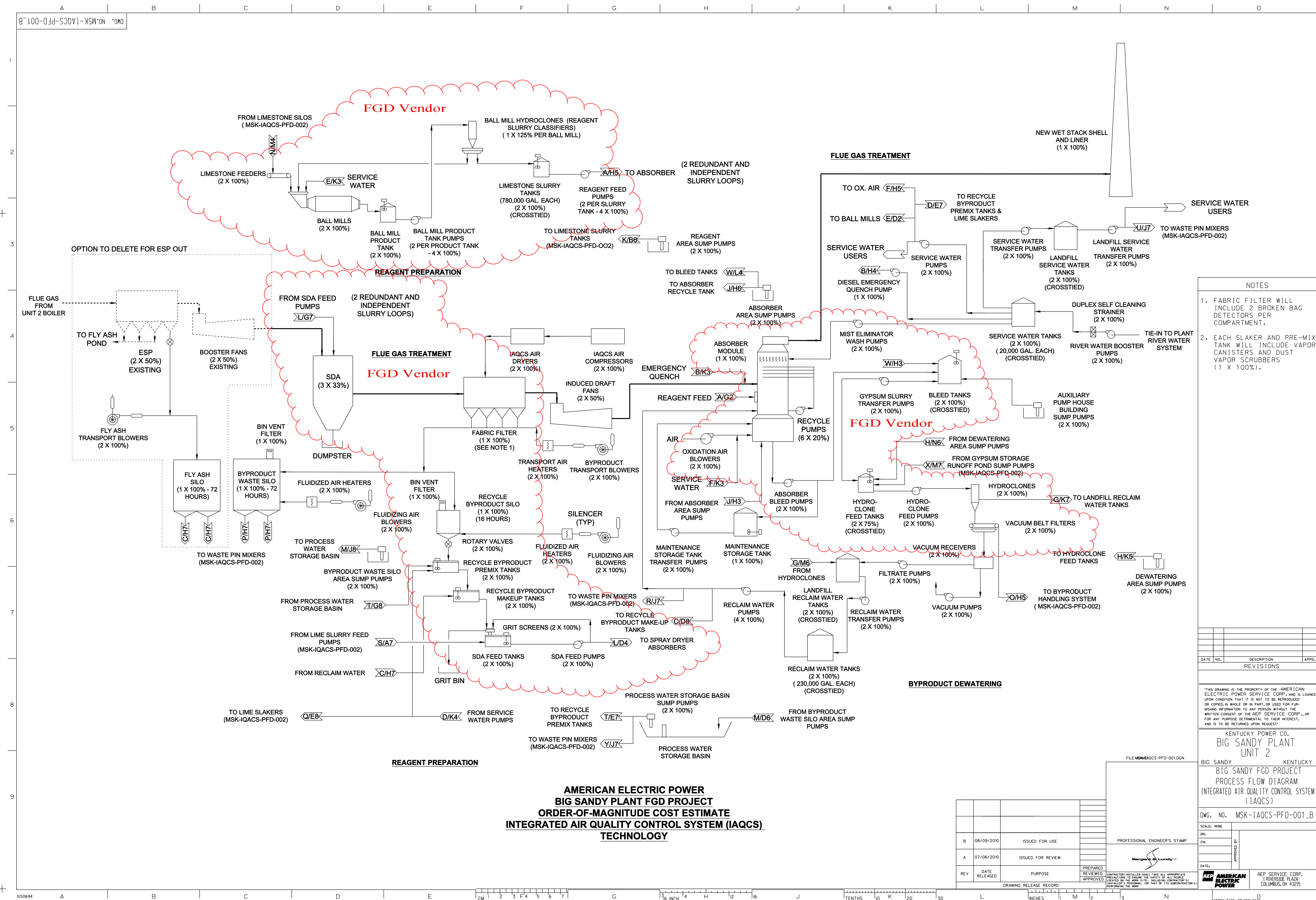
Cost Estimate
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FIGURE 4 – IAQCS PFD



- NOTES
- FABRIC FILTER WILL INCLUDE 2 BROKEN BAG DETECTORS PER COMPARTMENT.
 - EACH SLAKER AND PRE-MIX TANK WILL INCLUDE VAPOR CANISTERS AND DUST VAPOR SCRUBBERS (1 X 100%).

DATE	NO.	DESCRIPTION	APPRO.
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KENTUCKY POWER CO.
BIG SANDY PLANT
UNIT 2

BIG SANDY KENTUCKY
BIG SANDY FGD PROJECT
PROCESS FLOW DIAGRAM
INTEGRATED AIR QUALITY CONTROL SYSTEM
(IAQCS)

DWG. NO. MSK-IAQCS-PFD-001_B

SCALE: NONE

PREPARED BY

DATE

APPROVED BY

DATE

APPROVED

FILE NAME: IAQCS-PFD-001.DGN

SYSTEM DATE: 00-MMM-YY
SYSTEM TIME: HOUR:MINUTE

REV	DATE RELEASED	PURPOSE	PREPARED	REVIEWED	APPROVED
B	08/09/2010	ISSUED FOR USE			
A	07/06/2010	ISSUED FOR REVIEW			

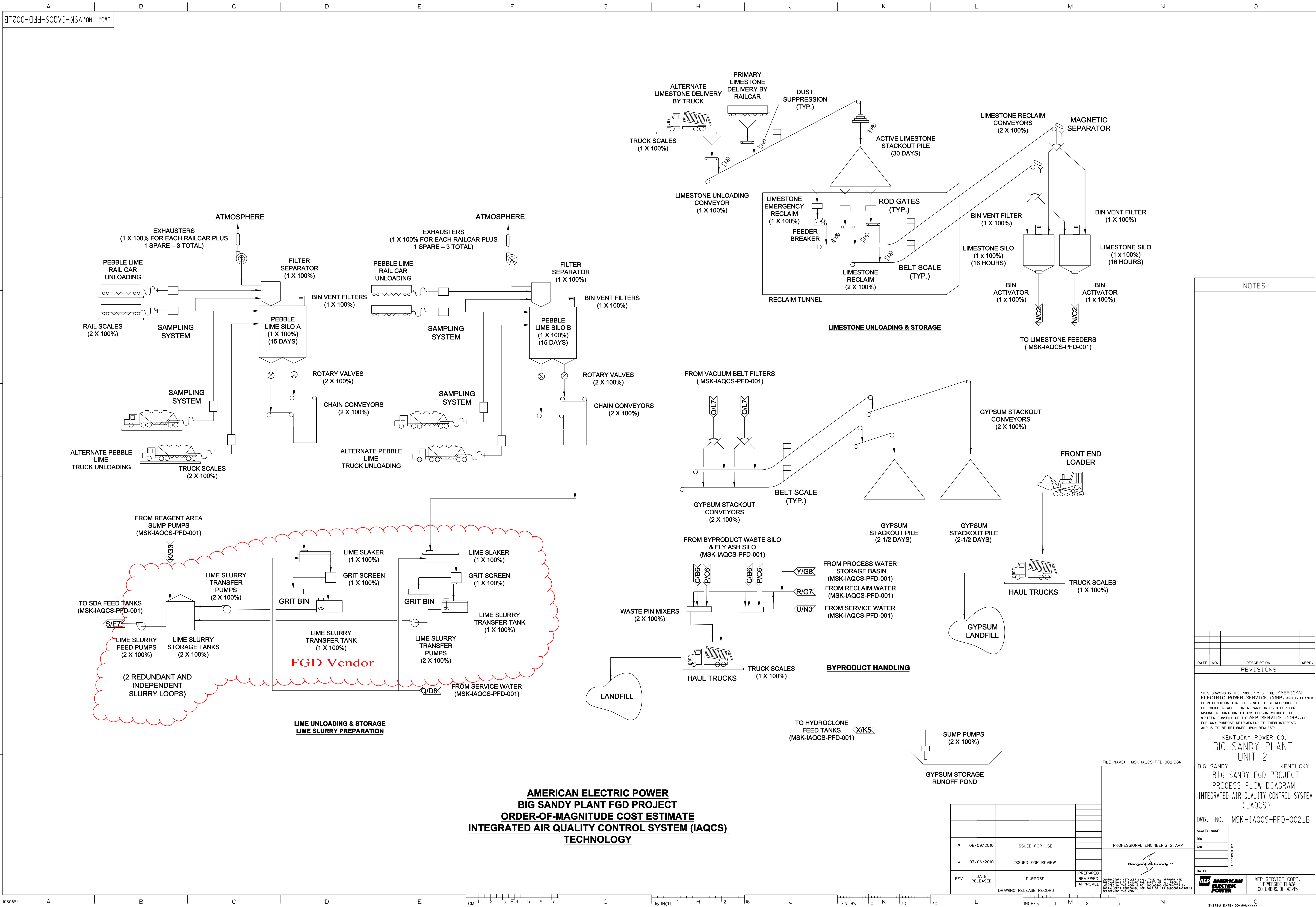
PROFESSIONAL ENGINEER'S STAMP

George E. Lundy

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PERSONS LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S, INSTALLER'S PERSONNEL FOR THAT OF ITS SUBCONTRACTORS, EMPLOYEES, AND VISITORS.

APPROVED

DATE



NOTES

DATE	NO.	DESCRIPTION	APPD.
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KENTUCKY POWER CO. BIG SANDY PLANT UNIT 2			
BIG SANDY KENTUCKY BIG SANDY FGD PROJECT PROCESS FLOW DIAGRAM INTEGRATED AIR QUALITY CONTROL SYSTEM (IAQCS)			
DWG. NO. MSK-IAQCS-PFD-002_B			
SCALE: NONE			
DR: CH: APPROVED BY: DATE:			
PREPARED: REVIEWED: APPROVED: CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S, INSTALLER'S PERSONNEL FOR THAT OF ITS SUBCONTRACTORS, PERFORMING THE WORK.			
AEP AMERICAN ELECTRIC POWER			
AEP SERVICE CORP., 1 RIVERSIDE PLAZA COLUMBUS, OH 43215			

FILE NAME: MSK-IAQCS-PFD-002.DGN

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PROFESSIONAL ENGINEER'S STAMP

George E. Lundy, Inc.

DRAWING RELEASE RECORD

TO HYDROCLONE FEED TANKS (MSK-IAQCS-PFD-001)

SUMP PUMPS (2 X 100%)

GYPSUM STORAGE RUNOFF POND