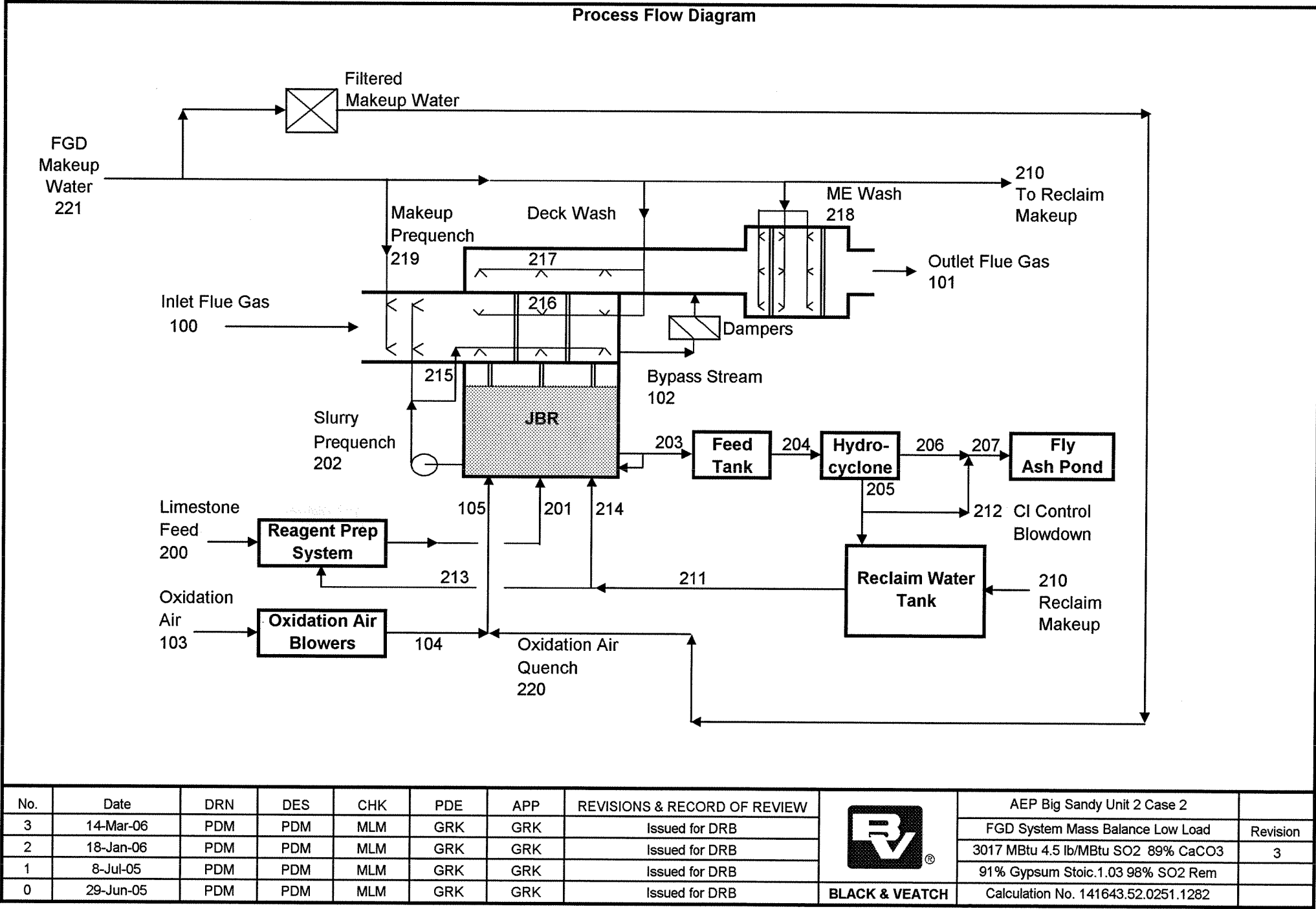




DESIGN BASIS SUMMARY	
FGD System Mass Balance Low Load	
Unit Rating, MW (net)	300
Boiler Heat Input, MMBtu/hr	3,017
Fuel Burn Rate, lb/hr	241,553
Altitude, ft. above MSL	568
Ambient Pressure, in H ₂ O	399
Ambient Temperature, °F	56
SO ₂ Inlet Loading, lb of SO ₂ /MMBtu	4.50
SO ₂ Removal Efficiency, %	98
Excess Air, %	21.3
Air Heater Leakage, %	39.5
Oxygen at FGD Inlet, %	8.5

COAL ANALYSIS ¹	
Carbon, %	69.33
Hydrogen, %	4.67
Sulfur, %	2.81
Nitrogen, %	1.34
Oxygen, %	5.10
Moisture, %	6.63
Chlorine, %	0.20
Ash, %	9.89
High Heating Value (HHV), Btu/lb	12,490

LIMESTONE ANALYSIS	
CaCO ₃ , %	89.0
Reactive MgCO ₃ , %	2.0
Total MgCO ₃ , %	4.0
Inerts, %	7.0
Slurry Solids, %	30.0
Specific gravity	1.23
Bond Work Index (BWI)	12
Delivered size	3/4" x 0"

GYPSUM QUALITY (Dry Basis)	
CaSO ₄ -2H ₂ O, %	90.7
CaSO ₃ -1/2 H ₂ O, %	0.0
CaCO ₃ , %	1.6
Inerts, %	4.3
MgCO ₃ , %	1.7
Fly Ash, %	1.6
Maximum Chloride Content, ppm	12,000
Solids, % min	50
Crystal Size (Stokes Mean Size), microns	40 - 70

Note:

- 1 Coal analysis is the ultimate analysis adjusted for moisture
2 All the flows denoted are on per unit basis

Gas Streams	100	101	102	103	104	105
	Total Inlet Flue Gas	Total Outlet Flue Gas	Bypass Stream	Oxidation Air-Inlet	Oxidation Air-Outlet	Oxidation Air-Humidified
Flow, acfm	1,284,494	1,132,726	0	33,845	24,427	33,132
Flow, lb/hr	4,198,493	4,517,922	0	156,193	156,193	228,106
H ₂ O, lb/hr	143,733	317,767	0	1,055	1,055	72,968
O ₂ , lb/hr	386,298	418,893	0	35,905	35,905	35,905
N ₂ , lb/hr	3,040,750	3,157,922	0	117,172	117,172	117,172
CO ₂ , lb/hr	613,595	623,070	0	71	71	71
SO ₂ , lb/hr	13,513	270	0	0	0	0
HCl, lb/hr	497	0	0	0	0	0
Fly ash lb/hr	712	60	0	0	0	0
Temp, F	290	120	290	56	128	75.2
Pressure, inwg	14.0	1.0	14.0	0.0	235.0	235.0

Liquid Streams	200	201	202	203	204	205	206	207	208	209	210
	Limestone Feed	Reagent Feed	Slurry Prequench	Absorber Bleed	H'cyclone Feed	H'cyclone Overflow	H'cyclone Underflow	Inlet to Fly Ash Pond	Not Used	Not Used	Reclaim Make Up
Flow, gpm	--	138	22,838	377	377	265	112	116			50
Frequency, min/day	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous			Continuous
Flow, lb/hr	24,340	85,415	12,892,430	212,914	212,914	134,472	78,442	80,112			25,036
Total SS, lb/hr	24,340	25,625	2,578,486	42,583	42,583	3,362	39,221	39,263			0
Total SS, %	100	30	20	20	20	2.5	50	49			0
Specific gravity	--	1.23	1.13	1.13	1.13	1.01	1.39	1.38			1.00
H ₂ O, lb/hr	0	59,791	10,313,944	170,331	170,331	131,110	39,221	40,849			25,036
CaCO ₃ , lb/hr	21,662	21,822	63,151	1,043	1,043	417	626	631			0
MgCO ₃ , lb/hr	974	1,147	68,697	1,135	1,135	454	681	686			0
CaSO ₄ -2H ₂ O, lb/hr	0	68	2,165,757	35,767	35,767	179	35,588	35,590			0
CaSO ₃ -1/2H ₂ O, lb/hr	0	0	0	0	0	0	0	0			0
Fly ash, lb/hr	0	720	152,186	2,513	2,513	1,885	628	652			0
Inerts, lb/hr	1,704	1,867	128,695	2,125	2,125	427	1,698	1,704			0
Cl, lb/hr	0	602	123,767	2,044	2,044	1,573	471	490			1
Cl, mg/L	0	10,061	12,000	12,000	12,000	12,000	12,000	12,000			32
pH	NA	7.5 - 8.5	4.5 - 5.5	4.5 - 5.5	4.5 - 5.5	4.5 - 5.5	4.5 - 5.5	4.5 - 5.5			5.5 - 7.5

Liquid Streams	211	212	213	214	215	216	217	218	219	220	221
	Reclaim Water	Cl Control Blowdown	Reclaim to Reagent	Reclaim to JBR	Lower Deck Wash	Inlet Deck Wash	Upper Deck Wash	Makeup ME Wash	Makeup Prequench	Oxid Air Quench	Total Makeup
Flow, gpm	311	3	121	191	6,657	437	316	651	91	144	442
Frequency, min/day	Continuous	Continuous	Continuous	Continuous	Continuous	393	100	36	Continuous	Continuous	Continuous
Flow, lb/hr	157,838	1,670	61,075	96,763	3,758,150	59,727	10,940	8,200	45,461	71,913	221,277
Total SS, lb/hr	3,320	42	1,285	2,035	751,630	0	0	0	0	0	0
Total SS, %	2.1	2.5	2.1	2.1	20	0	0	0	0	0	0
Specific gravity	1.01	1.01	1.01	1.01	1.13	1.00	1.00	1.00	1.00	1.00	1.00
H ₂ O, lb/hr	154,518	1,628	59,791	94,727	3,006,520	59,727	10,940	8,200	45,461	71,913	221,277
CaCO ₃ , lb/hr	412	5	159	253	18,409	0	0	0	0	0	0
MgCO ₃ , lb/hr	448	6	173	275	20,025	0	0	0	0	0	0
CaSO ₄ -2H ₂ O, lb/hr	177	2	68	108	631,319	0	0	0	0	0	0
CaSO ₃ -1/2H ₂ O, lb/hr	0	0	0	0	0	0	0	0	0	0	0
Fly ash, lb/hr	1,862	23	720	1,141	44,362	0	0	0	0	0	0
Inerts, lb/hr	422	5	163	258	37,515	0	0	0	0	0	0
Cl, lb/hr	1,555	20	602	953	36,078	1.9	0.4	0.3	1	2.3	7
Cl, mg/L	10,061	12,000	10,061	10,061	12,000	32	32	32	32	32	32
pH	5.5 - 7.5	4.5 - 5.5	5.5 - 7.5	5.5 - 7.5	4.5 - 5.5	5.5 - 7.5	5.5 - 7.5	5.5 - 7.5	5.5 - 7.5	5.5 - 7.5	5.5 - 7.5

PERFORMANCE DATA	
SO ₂ removed, lb/hr	13,243
HCl removed, lb/hr	497
Fly ash removed, lb/hr	652
Limestone Reagent Stoichiometry Guarantee in Waste Solids	1.03
Limestone consumption, tph	12.2
Makeup water required, gpm	442
Chloride blowdown, gpm	3.3
Gypsum byproduct production (wet basis), tph	39.2

NO.	DATE	DRN	DES	CHK	PDE	APP	REVISIONS & RECORD OF REVIEW	 BLACK & VEATCH	AEP Big Sandy Unit 2 Case 2	Revision
3	14-Mar-06	PDM	PDM	MLM	GRK	GRK	Issued for DRB		FGD System Mass Balance Low Load	
2	18-Jan-06	PDM	PDM	MLM	GRK	GRK	Issued for DRB		3017 MBtu 4.5 lb/MBtu SO2 89% CaCO3	
1	8-Jul-05	PDM	PDM	MLM	GRK	GRK	Issued for DRB		91% Gypsum Stoic.1.03 98% SO2 Rem	
0	29-Jun-05	PDM	PDM	MLM	GRK	GRK	Issued for DRB		Calculation No. 141643.52.0251.1282	