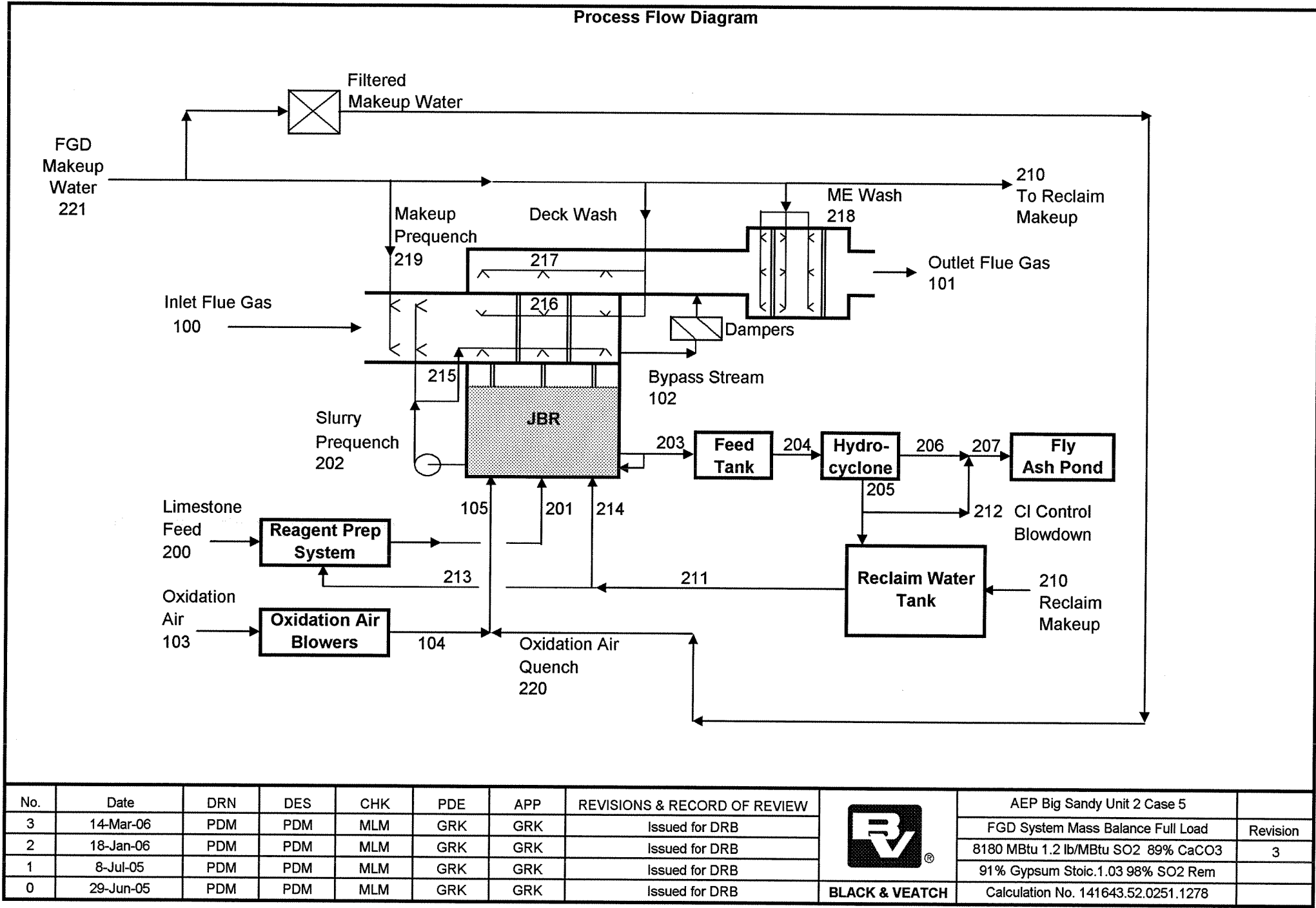




| DESIGN BASIS SUMMARY                                        |         |
|-------------------------------------------------------------|---------|
| FGD System Mass Balance Full Load                           |         |
| Unit Rating, MW (net)                                       | 800     |
| Boiler Heat Input, MMBtu/hr                                 | 8,180   |
| Fuel Burn Rate, lb/hr                                       | 654,924 |
| Altitude, ft. above MSL                                     | 568     |
| Ambient Pressure, in H <sub>2</sub> O                       | 399     |
| Ambient Temperature, °F                                     | 56      |
| SO <sub>2</sub> Inlet Loading, lb of SO <sub>2</sub> /MMBtu | 1.20    |
| SO <sub>2</sub> Removal Efficiency, %                       | 98      |
| Excess Air, %                                               | 21.4    |
| Air Heater Leakage, %                                       | 16.4    |
| Oxygen at FGD Inlet, %                                      | 6.0     |

| COAL ANALYSIS <sup>1</sup>       |        |
|----------------------------------|--------|
| Carbon, %                        | 69.33  |
| Hydrogen, %                      | 4.67   |
| Sulfur, %                        | 0.75   |
| Nitrogen, %                      | 1.34   |
| Oxygen, %                        | 7.15   |
| Moisture, %                      | 6.63   |
| Chlorine, %                      | 0.20   |
| Ash, %                           | 9.89   |
| High Heating Value (HHV), Btu/lb | 12,490 |

| LIMESTONE ANALYSIS             |           |
|--------------------------------|-----------|
| CaCO <sub>3</sub> , %          | 89.0      |
| Reactive MgCO <sub>3</sub> , % | 2.0       |
| Total MgCO <sub>3</sub> , %    | 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 <sub>4</sub> -2H <sub>2</sub> O, %    | 92.0    |
| CaSO <sub>3</sub> -1/2 H <sub>2</sub> O, % | 0.0     |
| CaCO <sub>3</sub> , %                      | 1.1     |
| Inerts, %                                  | 3.9     |
| MgCO <sub>3</sub> , %                      | 1.2     |
| Fly Ash, %                                 | 1.7     |
| 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<br>Flue Gas | Total Outlet<br>Flue Gas | Bypass<br>Stream | Oxidation<br>Air-Inlet | Oxidation<br>Air-Outlet | Oxidation<br>Air-Humidified |
| Flow, acfm              | 3,104,604               | 2,549,671                | 0                | 33,845                 | 24,427                  | 33,132                      |
| Flow, lb/hr             | 9,341,121               | 10,004,012               | 0                | 156,193                | 156,193                 | 228,106                     |
| H <sub>2</sub> O, lb/hr | 375,881                 | 891,858                  | 0                | 1,055                  | 1,055                   | 72,968                      |
| O <sub>2</sub> , lb/hr  | 604,561                 | 638,062                  | 0                | 35,905                 | 35,905                  | 35,905                      |
| N <sub>2</sub> , lb/hr  | 6,685,587               | 6,802,759                | 0                | 117,172                | 117,172                 | 117,172                     |
| CO <sub>2</sub> , lb/hr | 1,663,641               | 1,671,136                | 0                | 71                     | 71                      | 71                          |
| SO <sub>2</sub> , lb/hr | 9,814                   | 196                      | 0                | 0                      | 0                       | 0                           |
| HCl, lb/hr              | 1,347                   | 0                        | 0                | 0                      | 0                       | 0                           |
| Fly ash lb/hr           | 1,930                   | 164                      | 0                | 0                      | 0                       | 0                           |
| Temp, F                 | 350                     | 128                      | 350              | 56                     | 128                     | 75.2                        |
| Pressure, inwg          | 10.0                    | 1.0                      | 10.0             | 0.0                    | 235.0                   | 235.0                       |

| Liquid Streams                                | 200               | 201             | 202                 | 203               | 204               | 205                   | 206                    | 207                      | 208         | 209         | 210                |
|-----------------------------------------------|-------------------|-----------------|---------------------|-------------------|-------------------|-----------------------|------------------------|--------------------------|-------------|-------------|--------------------|
|                                               | Limestone<br>Feed | Reagent<br>Feed | Slurry<br>Prequench | Absorber<br>Bleed | H'cyclone<br>Feed | H'cyclone<br>Overflow | H'cyclone<br>Underflow | Inlet to<br>Fly Ash Pond | Not<br>Used | Not<br>Used | Reclaim<br>Make Up |
| Flow, gpm                                     | --                | 104             | 42,518              | 268               | 268               | 188                   | 80                     | 247                      |             |             | 400                |
| Frequency, min/day                            | Continuous        | Continuous      | Continuous          | Continuous        | Continuous        | Continuous            | Continuous             | Continuous               |             |             | Continuous         |
| Flow, lb/hr                                   | 19,215            | 64,238          | 24,001,740          | 151,307           | 151,307           | 95,562                | 55,745                 | 140,837                  |             |             | 200,287            |
| Total SS, lb/hr                               | 19,215            | 19,271          | 4,800,348           | 30,261            | 30,261            | 2,389                 | 27,872                 | 30,000                   |             |             | 0                  |
| Total SS, %                                   | 100               | 30              | 20                  | 20                | 20                | 2.5                   | 50                     | 21                       |             |             | 0                  |
| Specific gravity                              | --                | 1.23            | 1.13                | 1.13              | 1.13              | 1.01                  | 1.39                   | 1.14                     |             |             | 1.00               |
| H <sub>2</sub> O, lb/hr                       | 0                 | 44,966          | 19,201,392          | 121,046           | 121,046           | 93,173                | 27,872                 | 110,837                  |             |             | 200,287            |
| CaCO <sub>3</sub> , lb/hr                     | 17,102            | 17,107          | 82,636              | 521               | 521               | 208                   | 313                    | 498                      |             |             | 0                  |
| MgCO <sub>3</sub> , lb/hr                     | 769               | 774             | 89,894              | 567               | 567               | 227                   | 340                    | 542                      |             |             | 0                  |
| CaSO <sub>4</sub> -2H <sub>2</sub> O, lb/hr   | 0                 | 5               | 4,104,260           | 25,873            | 25,873            | 234                   | 25,639                 | 25,848                   |             |             | 0                  |
| CaSO <sub>3</sub> -1/2H <sub>2</sub> O, lb/hr | 0                 | 0               | 0                   | 0                 | 0                 | 0                     | 0                      | 0                        |             |             | 0                  |
| Fly ash, lb/hr                                | 0                 | 34              | 305,388             | 1,925             | 1,925             | 1,444                 | 481                    | 1,767                    |             |             | 0                  |
| Inerts, lb/hr                                 | 1,345             | 1,352           | 218,170             | 1,375             | 1,375             | 276                   | 1,099                  | 1,345                    |             |             | 0                  |
| Cl, lb/hr                                     | 0                 | 28              | 230,417             | 1,453             | 1,453             | 1,118                 | 334                    | 1,330                    |             |             | 6                  |
| Cl, mg/L                                      | 0                 | 612             | 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<br>Water | Cl Control<br>Blowdown | Reclaim<br>to Reagent | Reclaim<br>to JBR | Lower<br>Deck Wash | Inlet<br>Deck Wash | Upper<br>Deck Wash | Makeup<br>ME Wash | Makeup<br>Prequench | Oxid Air<br>Quench | Total<br>Makeup |
| Flow, gpm                                     | 421              | 168                    | 90                    | 331               | 6,657              | 437                | 316                | 651               | 559                 | 144                | 1,261           |
| Frequency, min/day                            | Continuous       | Continuous             | Continuous            | Continuous        | Continuous         | 393                | 100                | 36                | Continuous          | Continuous         | Continuous      |
| Flow, lb/hr                                   | 210,757          | 85,092                 | 45,022                | 165,735           | 3,758,150          | 59,727             | 10,940             | 8,200             | 280,102             | 71,913             | 631,169         |
| Total SS, lb/hr                               | 262              | 2,127                  | 56                    | 206               | 751,630            | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| Total SS, %                                   | 0.1              | 2.5                    | 0.1                   | 0.1               | 20                 | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| Specific gravity                              | 1.00             | 1.01                   | 1.00                  | 1.00              | 1.13               | 1.00               | 1.00               | 1.00              | 1.00                | 1.00               | 1.00            |
| H <sub>2</sub> O, lb/hr                       | 210,496          | 82,965                 | 44,966                | 165,529           | 3,006,520          | 59,727             | 10,940             | 8,200             | 280,102             | 71,913             | 631,169         |
| CaCO <sub>3</sub> , lb/hr                     | 23               | 186                    | 5                     | 18                | 12,939             | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| MgCO <sub>3</sub> , lb/hr                     | 25               | 202                    | 5                     | 20                | 14,075             | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| CaSO <sub>4</sub> -2H <sub>2</sub> O, lb/hr   | 26               | 208                    | 5                     | 20                | 642,638            | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| CaSO <sub>3</sub> -1/2H <sub>2</sub> O, lb/hr | 0                | 0                      | 0                     | 0                 | 0                  | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| Fly ash, lb/hr                                | 158              | 1,286                  | 34                    | 124               | 47,817             | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| Inerts, lb/hr                                 | 30               | 246                    | 6                     | 24                | 34,161             | 0                  | 0                  | 0                 | 0                   | 0                  | 0               |
| Cl, lb/hr                                     | 129              | 996                    | 28                    | 101               | 36,078             | 1.9                | 0.4                | 0.3               | 9                   | 2.3                | 20              |
| Cl, mg/L                                      | 612              | 12,000                 | 612                   | 612               | 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 <sub>2</sub> removed, lb/hr                            | 9,618 |
| HCl removed, lb/hr                                        | 1,347 |
| Fly ash removed, lb/hr                                    | 1,767 |
| Limestone Reagent Stoichiometry Guarantee in Waste Solids | 1.02  |
| Limestone consumption, tph                                | 9.6   |
| Makeup water required, gpm                                | 1,261 |
| Chloride blowdown, gpm                                    | 167.5 |
| Gypsum byproduct production (wet basis), tph              | 27.9  |

| NO. | DATE      | DRN | DES | CHK | PDE | APP | REVISIONS & RECORD OF REVIEW |  | AEP Big Sandy Unit 2 Case 5         | Revision |
|-----|-----------|-----|-----|-----|-----|-----|------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|----------|
| 3   | 14-Mar-06 | PDM | PDM | MLM | GRK | GRK | Issued for DRB               |                                                                                       | FGD System Mass Balance Full Load   |          |
| 2   | 18-Jan-06 | PDM | PDM | MLM | GRK | GRK | Issued for DRB               |                                                                                       | 8180 MBtu 1.2 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               | BLACK & VEATCH                                                                        | Calculation No. 141643.52.0251.1278 |          |