

ENGINEERING EVALUATION

- Banking Application No. 24230, Plant No. 3246 (GWF Power Systems, L.P., Site 5)**
- Banking Application No. 24231, Plant No. 3981 (GWF Power Systems, L.P., Site 4)**
- Banking Application No. 24232, Plant No. 3245 (GWF Power Systems, L.P., Site 3)**
- Banking Application No. 24233, Plant No. 3244 (GWF Power Systems, L.P., Site 2)**
- Banking Application No. 24234, Plant No. 3243 (GWF Power Systems, L.P., Site 1)**

BACKGROUND

GWF Power Systems, L.P. (GWF) has applied for emission reduction credits (ERCs) corresponding to the permanent shutdown of the following equipment:

Under Application No. 24230, at Plant No. 3246 (GWF, Site 5):

- S-1 Circulating Fluidized Bed Combustor with Integral Cyclones**
- S-2 Fluidized Bed Preheat Burner**

Under Application No. 24231, at Plant No. 3981 (GWF, Site 4):

- S-1 Circulating Fluidized Bed Combustor with Integral Dryers**
- S-2 Fluidized Bed Preheat Burner**

Under Application No. 24232, at Plant No. 3245 (GWF, Site 3):

- S-1 Circulating Fluidized Bed Combustor with Integral Cyclones**
- S-2 Fluidized Bed Preheat Burner**

Under Application No. 24233, at Plant No. 3244 (GWF, Site 2):

- S-1 Circulating Fluidized Bed Combustor with Integral Cyclones**
- S-2 Fluidized Bed Preheat Burner**

Under Application No. 24234, at Plant No. 3243 (GWF, Site 1):

- S-1 Fluidized Bed Combustor with Integral Cyclones**
- S-2 Fluidized Bed Preheat Burner**

GWF operated five alternative fuel power plants that used petroleum coke, a by-product of the petroleum refining industry, to generate power. GWF ceased the operations of its five petroleum coke fired power plants on 2/16/2012.

The criteria pollutants for which GWF has requested ERCs are nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO₂), and particulate matter (PM₁₀). All of these pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

This evaluation report will estimate the ERCs associated with the permanent shutdown of S-1 and S-2 at each GWF plant and will discuss the compliance of the five projects with applicable rules and regulations.

EMISSIONS REDUCTION CREDITS SUMMARY

The District's ERC banking rule is Regulation 2, Rule 4. The emission calculation procedure in Section 2-4-601 refers to the emission calculation procedures in the New Source Review Rule, which is Regulation 2, Rule 2. For ERCs, the calculation procedure is described in Section 2-2-605.

These banking applications were deemed complete on March 28, 2012. However, because the data provided by GWF to calculate the ERCs are on a monthly basis, it is appropriate to start the baseline period from the beginning of April 2009. The baseline period for these applications is April 1, 2009 through March 31, 2012.

For purposes of ERC calculation:

- For each application, GWF has provided monthly mass emissions of NO_x, CO, and SO₂. These monthly data are based on Continuous Emissions Monitoring System (CEMS) and are as reported in the monthly compliance reports that GWF submitted to the District during the time the sources were still in active operation. Appendix A tabulates these data. District staff audited these data by reviewing raw data (i.e., daily mass emissions) for select months (i.e., August 2009, March 2010, July 2010, February 2011, June 2011, and January 2012) during the baseline period.
- For each application, GWF has also provided monthly operation hours of S-1 and S-2, to calculate POC and PM₁₀ ERCs. Appendix B tabulates these monthly operation hours. District staff audited these data by reviewing raw data (i.e., daily operation hours) for each month during the baseline period. The monthly operation hours will be multiplied by the source test results conducted for POC and PM₁₀ emissions from the sources when they were still in active operation. Appendix C tabulates these source test results.

The annual average mass emissions of NO_x, CO, and SO₂ at five GWF petroleum coke fired power plants in Appendix A are summarized in Table 1.

Table 1. NO_x, CO, and SO₂ ERCs at five GWF petroleum coke fired power plants

| Plant | NO _x (TPY) | SO ₂ (TPY) | CO (TPY) |
|------------------------------|--------------------------|--------------------------|-------------|
| Plant No. 3243 (GWF, Site 1) | 46.337 | 66.351 | 14.402 |
| Plant No. 3244 (GWF, Site 2) | 50.399 | 66.835 | 26.698 |
| Plant No. 3245 (GWF, Site 3) | 50.907 | 73.660 | 16.063 |
| Plant No. 3981 (GWF, Site 4) | 51.464 | 64.356 | 26.156 |
| Plant No. 3246 (GWF, Site 5) | 48.017 | 68.305 | 21.315 |

Results of the source tests in Appendix C are used to calculate POC emissions beginning from the month of the source test date to the month prior to the next source test date. For purposes of these calculations, the operation hours in Appendix B have been summarized in Table 2.

Table 2. Operation hours for S-1 and S-2 at five GWF petroleum coke fired power plants

| Period | Hours at Plant No. 3243 (GWF, Site 1) | Hours at Plant No. 3244 (GWF, Site 2) | Hours at Plant No. 3245 (GWF, Site 3) | Hours at Plant No. 3981 (GWF, Site 4) | Hours at Plant No. 3246 (GWF, Site 5) |
|-----------------|---|---|---|---|---|
| Apr 09 - Aug 09 | 3,585.9 | 3,523.6 | 3,364.5 | 3,511.9 | 3,203.0 |
| Sep 09 - Aug 10 | 7,490.8 | 8,388.7 | 7,851.0 | 8,107.8 | 8,532.3 |
| Sep 10 - Aug 11 | 7,575.0 | 8,552.0 | 8,058.5 | 8,467.0 | 8,514.5 |
| Sep 11 - Mar 12 | 3,136.5 | 3,805.0 | 3,628.5 | 3,592.5 | 3,647.5 |

Table 3 calculates and tabulates the POC emissions at five GWF petroleum coke fired power plants using the data from Table 2 and Appendix C.

Table 3. POC ERCs at five GWF petroleum coke fired power plants

| Period | POC Emissions (lbs) at Plant No. 3243 (GWF, Site 1) | POC Emissions (lbs) at Plant No. 3244 (GWF, Site 2) | POC Emissions (lbs) at Plant No. 3245 (GWF, Site 3) | POC Emissions (lbs) at Plant No. 3981 (GWF, Site 4) | POC Emissions (lbs) at Plant No. 3246 (GWF, Site 5) |
|------------------------------|---|---|---|---|---|
| Apr 09 - Aug 09 ¹ | 167 | 190 | 151 | 227 | 165 |
| Sep 09 - Aug 10 ² | 382 | 449 | 373 | 422 | 474 |
| Sep 10 - Aug 11 ³ | 227 | 787 | 266 | 1,668 | 434 |
| Sep 11 - Mar 12 ⁴ | 110 | 167 | 149 | 212 | 150 |
| Annual Average (TPY) | 0.148 | 0.266 | 0.157 | 0.421 | 0.204 |

Notes:

1. POC Emissions = Operation Hours from Table 2 * 2008 Source Test Results from Appendix C
2. POC Emissions = Operation Hours from Table 2 * 2009 Source Test Results from Appendix C
3. POC Emissions = Operation Hours from Table 2 * 2010 Source Test Results from Appendix C
4. POC Emissions = Operation Hours from Table 2 * 2011 Source Test Results from Appendix C

Prior to 2011, the permit limitation for PM emissions was in TSP (Total Suspended Particles); the source test method did not measure or calculate PM₁₀. The 2011 source tests, which are tabulated in Appendix C, were the only source tests performed for PM₁₀. Therefore, the PM₁₀ data for 2011 will be used to calculate PM₁₀ ERCs during the whole baseline period for these applications. The annual average mass emissions of PM₁₀ and PM_{2.5} at five GWF petroleum coke fired power plants are calculated using the data from Appendices B and C and are summarized in Table 4.

Table 4. PM₁₀ and PM_{2.5} ERCs at five GWF petroleum coke fired power plants

| Pollutant | PM Emissions at Plant No. 3243 (GWF, Site 1) | PM Emissions at Plant No. 3244 (GWF, Site 2) | PM Emissions at Plant No. 3245 (GWF, Site 3) | PM Emissions at Plant No. 3981 (GWF, Site 4) | PM Emissions at Plant No. 3246 (GWF, Site 5) |
|---------------------------------|--|--|--|--|--|
| PM-10 (lb/yr) | 7,190 | 7,928 | 10,001 | 5,920 | 10,355 |
| PM-2.5 ¹ (lb/yr) | 2,696 | 2,973 | 3,750 | 2,220 | 3,883 |
| PM-10 (TPY) | 3.595 | 3.964 | 5.000 | 2.960 | 5.178 |
| PM-2.5¹ (TPY) | 1.348 | 1.486 | 1.875 | 1.110 | 1.942 |

Note: 1. Per updated CEIDARS List with PM-2.5 Fractions, PM-2.5 fraction of PM-10 for coal or coke-fired external combustion equipment is 0.375.

The sources covered under these banking applications were subject to the following permit conditions:

- Permit Condition No. 20551, for S-1 and S-2 at Plant No. 3246 (GWF, Site 5)
- Permit Condition No. 20550, for S-1 and S-2 at Plant No. 3981 (GWF, Site 4)
- Permit Condition No. 20552, for S-1 and S-2 at Plant No. 3245 (GWF, Site 3)
- Permit Condition No. 20554, for S-1 and S-2 at Plant No. 3244 (GWF, Site 2)
- Permit Condition No. 20555, for S-1 and S-2 at Plant No. 3243 (GWF, Site 1)

Each of the above conditions limits the total combined daily and annual emissions from S-1 and S-2 at each plant to no greater than 360 lb/day and 63 TPY of NO_x, 528 lb/day and 83 TPY of SO₂, 521 lb/day and 95 TPY of CO, 130 lb/day and 24 TPY of POC. District's databank shows that none of the five GWF plants were issued any Notices of Violation (NOVs) between April 1, 2009 and March 31, 2012. This means the plants were in compliance with their permit limits during the baseline period of these banking applications.

As part of evaluation of a banking application, for purposes of verifying the data used to calculate ERCs, the District normally compares the data with those reported during annual updates. However, for these banking applications, because the data (i.e., CEMS emissions and operation hours data) used to calculate ERCs are different from the data (i.e., coke throughput data) reported during annual updates, the District cannot and will not compare the data with those reported during annual updates.

Regulation 2-2-605.5 requires adjustment of the baseline emission rate to comply with the most stringent of RACT, BARCT, and District rules and regulations in effect or contained in the most recently adopted Clean Air Plan (CAP). There are 18 stationary source control measures (SSMs) contained in the 2010 CAP, adopted on September 15, 2010. SSM 6 (General Particulate Matter Emission Limitation) recommends a reduced PM allowable emissions rate lower than that set forth in the current Regulation 6-1. The S-1 at each GWF plant had A-4, a pulsejet baghouse, to abate PM emissions with 0.0040-gr./dscf grain loading, which is already lower than the limit (0.15 gr./dscf) in the current Regulation 6-1. Therefore, there is no need for emission factor adjustments for these banking applications.

Additionally, the emission rates used in these banking applications need no RACT adjustments either because the Circulating Fluidized Bed Combustors (CFBCs) at GWF represent current BACT technology for burning solid coal or petroleum coke. Table 5 compares the existing GWF permit limits with the BACT limits of CFBC at Northern Michigan University (NMU) reported in the EPA 2009 BACT Clearinghouse. The NMU's CFBC is representative of the modern CFBC technology for burning solid fuels including coal or wood. Table 5 shows that the CFBCs at GWF had emission control technologies that are still current, and their regulated emission limits were at least as stringent as the BACT limits of CFBC at NMU. Because S-1 at each GWF plant satisfied the current BACT standards and because BACT is at least as stringent as RACT, no RACT adjustments to the baseline emission rates are required.

Table 5. Comparison of CFBC emission limits at GWF with modern CFBC BACT emission limit at NMU

| Pollutant | GWF's 245-MMBtu/hr Petroleum Coke or Coal Fired CFBCs Limits ¹ | GWF Control Technology | NMU's 185-MMBtu/hr (2009 EPA BACT Clearing house) Coal Fired CFBC Limits | NMU Control Technology |
|------------------|---|---|--|---|
| NOx | 0.07 lb/MMBtu (48 ppmvd @ 3% O ₂ , corresponding to hourly limit) | Selective Non-Catalytic Reduction (Ammonia Injection) | 0.1 lb/MMBtu | Selective Non-Catalytic Reduction (Ammonia Injection) |
| CO | 0.097 lb/MMBtu (110 ppmvd @ 3% O ₂ , corresponding to daily limit) | Good Combustion Practice | 0.17 lb/MMBtu | Good Combustion Practice |
| NMHC | 0.024 lb/MMBtu (42 ppmvd @ 3% O ₂ , corresponding to daily limit) | Good Combustion Practice | -- | Good Combustion Practice |
| SO ₂ | 0.10 lb/MMBtu (50 ppmvd @ 3% O ₂ , corresponding to hourly limit) | Limestone Injection with Fabric Filter | 0.2 lb/MMBtu | Limestone Injection with Fabric Filter |
| PM ₁₀ | 0.01 lb/MMBtu (0.004 gr/dscf, baghouse limit) | Fabric Filter | 0.03 lb/MMBtu | Fabric Filter |

Note: 1. From BAAQMD Synthetic Minor Permit Application Nos. 15601 – 15605.

Therefore, the ERCs for Banking Application Nos. 24230 through 24234 are summarized below.

Table 6. Summary of ERCs for Banking Application Nos. 24230 through 24234

| Pollutant | ERCs (TPY) at Plant No. 3243 (GWF, Site 1) | ERCs (TPY) at Plant No. 3244 (GWF, Site 2) | ERCs (TPY) at Plant No. 3245 (GWF, Site 3) | ERCs (TPY) at Plant No. 3981 (GWF, Site 4) | ERCs (TPY) at Plant No. 3246 (GWF, Site 5) |
|--------------------------------|--|--|--|--|--|
| NOx | 46.337 | 50.399 | 50.907 | 51.464 | 48.017 |
| CO | 14.402 | 26.698 | 16.063 | 26.156 | 21.315 |
| POC | 0.148 | 0.266 | 0.157 | 0.421 | 0.204 |
| PM ₁₀ ¹ | 3.595 | 3.964 | 5.000 | 2.960 | 5.178 |
| PM _{2.5} ¹ | 1.348 | 1.486 | 1.875 | 1.110 | 1.942 |
| SO ₂ | 66.351 | 66.835 | 73.66 | 64.356 | 68.305 |

Note: 1. GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

SMALL FACILITY BANK AND BANKING ACCOUNT

The five GWF plants (Plant Nos. 3246, 3981, 3245 through 3243) had not been the recipients of any offsets from the Small Facility Banking Account (SFBA). Therefore, no such emission offsets are required to be repaid to the SFBA as per Regulation 2-4-303.5.

STATEMENT OF COMPLIANCE

For each of Banking Application Nos. 24230 through 24234:

The ERCs are subject to and expected to comply with the standards of Regulation 2-4-302 for Bankable Reductions for Closures. The ERCs from the shutdown or closure of S-1 and S-2 are bankable because the reduction is permanent. However, because it is unclear whether the reduction will be replaced by an emissions increase elsewhere within the District, pursuant to Regulation 2-4-302.1, the applicant must accept a condition restricting use of the ERCs to offsetting emission increases in the same or closely related industries. In this case, Condition 25268 to restrict use of the ERCs to offsetting emission increases from other power generation sources will be imposed on the to-be-issued Banking Certificate. Per Regulation 2-4-302.2, issuance of a Banking Certificate for emission reductions resulting from the closure of S-1 and S-2 cancels the permit to operate the sources.

The ERC calculations were performed in accordance with the methodology outlined in Regulation 2-2-605. ERCs from the shutdown of S-1 and S-2 are calculated based on the following data during the three-year baseline period from April 1, 2009 through March 31, 2012: (1) CEMS-based mass emissions of NO_x, CO, and SO₂, (2) S-1 and S-2 operation hours, and (3) source test results conducted for POC and PM₁₀ emissions from S-1 and S-2 when the sources were still in active operation. The bankable ERCs did not require adjustments because the pulsejet baghouse (A-4) that abated S-1 had a grain loading (0.0040 gr./dscf) that is already lower than the limit (0.15 gr./dscf) set forth in the current Regulation 6-1. This is consistent with the recommendation found in SSM 6 (General Particulate Matter Emission Limitation) in the District's 2010 CAP. In addition, because S-1 satisfied the current BACT standards and because BACT is at least as stringent as RACT, no RACT adjustments to the baseline emission rates are required.

Based on the data provided by GWF, the ERCs are real, quantifiable, enforceable, and permanent as required by the definition of Emission Reduction Credit in Regulation 2-2-201.

The ERCs from the shutdown of S-1 and S-2 exceed 40 tons/yr for NO_x and SO₂, and the application is therefore subject to Publication, Public Comment and Inspection of Regulation 2-4-405.

The project is exempt from CEQA pursuant to Regulation 2-1-312.10. GWF has completed and signed a BAAQMD Appendix H Environmental Information Form to ensure that the project has no potential for causing a significant adverse impact on the environment.

A toxics risk screening analysis is not required since there is no emission increase associated with the project.

PSD, Offsets, NSPS, and NESHAPS do not apply.

CONDITION

The following condition will be imposed on all of the Banking Certificates to be issued under Banking Application Nos. 24230 through 24234:

Condition 25268 -----

1. The emission reduction credits (ERCs) can only be used to offset emission increases from other power generation sources. (Basis: Regulation 2-4-302.1)

End of Condition

RECOMMENDATION

Staff recommends the District issue a 30-day public notice regarding the preliminary decision to approve the following ERCs for emission reductions that occurred at five GWF plants (Plant Nos. 3246, 3981, 3245 through 3243).

Under Application No. 24230, for Plant No. 3246 (GWF, Site 5):

| Pollutant: | ERC Amount (TPY): |
|-------------------------------------|--------------------------|
| NOx | 48.017 |
| CO | 21.315 |
| POC | 0.204 |
| PM ₁₀ (see *Note below) | 5.178 |
| PM _{2.5} (see *Note below) | 1.942 |
| SO ₂ | 68.305 |

*Note: GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

Under Application No. 24231, for Plant No. 3981 (GWF, Site 4):

| Pollutant: | ERC Amount (TPY): |
|-------------------------------------|--------------------------|
| NOx | 51.464 |
| CO | 26.156 |
| POC | 0.421 |
| PM ₁₀ (see *Note below) | 2.960 |
| PM _{2.5} (see *Note below) | 1.110 |
| SO ₂ | 64.356 |

*Note: GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

Under Application No. 24232, for Plant No. 3245 (GWF, Site 3):

| Pollutant: | ERC Amount (TPY): |
|-------------------------------------|--------------------------|
| NOx | 50.907 |
| CO | 16.063 |
| POC | 0.157 |
| PM ₁₀ (see *Note below) | 5.000 |
| PM _{2.5} (see *Note below) | 1.875 |
| SO ₂ | 73.66 |

*Note: GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

Under Application No. 24233, for Plant No. 3244 (GWF, Site 2):

| Pollutant: | ERC Amount (TPY): |
|-------------------------------------|--------------------------|
| NOx | 50.399 |
| CO | 26.698 |
| POC | 0.266 |
| PM ₁₀ (see *Note below) | 3.964 |
| PM _{2.5} (see *Note below) | 1.486 |
| SO ₂ | 66.835 |

*Note: GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

Under Application No. 24234, at Plant No. 3243 (GWF, Site 1):

| Pollutant: | ERC Amount (TPY): |
|-------------------------------------|--------------------------|
| NOx | 46.337 |
| CO | 14.402 |
| POC | 0.148 |
| PM ₁₀ (see *Note below) | 3.595 |
| PM _{2.5} (see *Note below) | 1.348 |
| SO ₂ | 66.351 |

*Note: GWF does not get both PM₁₀ and PM_{2.5} but it has the option of using either one for offsetting purposes, assuming District's Regulation 2-2 amendments are adopted in the summer of 2012.

Mail the five Banking Certificates to the owner:

Douglas Wheeler
Vice President
GWF Power Systems, L.P.
4300 Railroad Avenue
Pittsburg, CA 94565

By: _____
Kevin Oei
Air Quality Engineer

Date: _____

Appendix A
Monthly Mass Emissions of NO_x, CO, and SO₂

Table A1. Monthly mass emissions of NO_x, CO, and SO₂ for S-1 and S-2 at Plant No. 3243 (GWF, Site 1)

| Month | NO_x (lb/mo) | SO₂ (lb/mo) | CO (lb/mo) |
|-------------------------------|-----------------------------------|-----------------------------------|-----------------------|
| Apr-09 | 9,028 | 12,709 | 2,205 |
| May-09 | 9,383 | 13,320 | 1,951 |
| Jun-09 | 9,081 | 13,209 | 1,732 |
| Jul-09 | 9,637 | 13,812 | 2,164 |
| Aug-09 | 8,694 | 12,585 | 2,126 |
| Sep-09 | 8,672 | 12,504 | 2,244 |
| Oct-09 | 5,915 | 8,189 | 1,971 |
| Nov-09 | 9,400 | 12,613 | 2,408 |
| Dec-09 | 9,534 | 13,396 | 2,580 |
| Jan-10 | 9,449 | 13,574 | 2,796 |
| Feb-10 | 8,427 | 11,912 | 2,154 |
| Mar-10 | 9,162 | 13,221 | 2,592 |
| Apr-10 | 8,842 | 12,814 | 2,811 |
| May-10 | 8,387 | 11,917 | 2,950 |
| Jun-10 | 8,527 | 11,959 | 3,366 |
| Jul-10 | 5,487 | 7,706 | 3,327 |
| Aug-10 | 6,380 | 8,411 | 3,719 |
| Sep-10 | 9,108 | 13,012 | 3,484 |
| Oct-10 | 8,753 | 12,245 | 2,715 |
| Nov-10 | 8,228 | 11,893 | 3,072 |
| Dec-10 | 8,246 | 11,977 | 3,741 |
| Jan-11 | 5,381 | 7,617 | 2,610 |
| Feb-11 | 7,027 | 10,037 | 3,083 |
| Mar-11 | 9,455 | 13,489 | 2,236 |
| Apr-11 | 8,516 | 11,824 | 1,485 |
| May-11 | 9,214 | 12,697 | 1,621 |
| Jun-11 | 7,334 | 10,314 | 1,717 |
| Jul-11 | 9,274 | 12,849 | 1,857 |
| Aug-11 | 7,763 | 12,687 | 1,903 |
| Sep-11 | 8,664 | 12,431 | 2,139 |
| Oct-11 | 8,454 | 12,107 | 3,189 |
| Nov-11 | 4,312 | 6,836 | 2,147 |
| Dec-11 | 8,132 | 12,570 | 3,345 |
| Jan-12 | 3,771 | 6,012 | 1,812 |
| Feb-12 | 2,385 | 3,655 | 1,160 |
| Mar-12 | 0 | 0 | 0 |
| Apr-12 | 0 | 0 | 0 |
| Total Lbs 3 year (lbs) | 278,022 | 398,103 | 86,412 |
| Annual Average (lb/yr) | 92,674 | 132,701 | 28,804 |
| Annual Average (TPY) | 46.337 | 66.351 | 14.402 |

Table A2. Monthly mass emissions of NO_x, CO, and SO₂ for S-1 and S-2 at Plant No. 3244 (GWF, Site 2)

| Month | NO _x (lb/mo) | SO ₂ (lb/mo) | CO (lb/mo) |
|-------------------------------|----------------------------|----------------------------|---------------|
| Apr-09 | 9,324 | 12,045 | 3,690 |
| May-09 | 8,890 | 11,408 | 2,152 |
| Jun-09 | 9,654 | 11,581 | 5,491 |
| Jul-09 | 9,971 | 11,693 | 5,150 |
| Aug-09 | 9,025 | 11,112 | 3,631 |
| Sep-09 | 8,226 | 10,829 | 2,738 |
| Oct-09 | 9,565 | 11,845 | 3,674 |
| Nov-09 | 9,472 | 11,186 | 3,654 |
| Dec-09 | 9,845 | 12,154 | 3,789 |
| Jan-10 | 7,339 | 9,743 | 3,692 |
| Feb-10 | 8,750 | 11,194 | 3,852 |
| Mar-10 | 9,732 | 12,414 | 5,872 |
| Apr-10 | 9,123 | 12,371 | 5,655 |
| May-10 | 9,670 | 13,091 | 3,649 |
| Jun-10 | 9,164 | 11,544 | 5,688 |
| Jul-10 | 8,893 | 12,083 | 6,166 |
| Aug-10 | 8,615 | 12,015 | 7,243 |
| Sep-10 | 9,240 | 12,331 | 5,884 |
| Oct-10 | 9,611 | 12,725 | 5,421 |
| Nov-10 | 9,096 | 12,479 | 5,365 |
| Dec-10 | 9,341 | 12,265 | 5,955 |
| Jan-11 | 9,607 | 12,446 | 6,347 |
| Feb-11 | 8,549 | 10,817 | 7,197 |
| Mar-11 | 3,377 | 11,592 | 4,787 |
| Apr-11 | 8,508 | 9,774 | 2,931 |
| May-11 | 8,592 | 9,886 | 3,623 |
| Jun-11 | 9,024 | 12,487 | 3,615 |
| Jul-11 | 9,158 | 12,406 | 3,067 |
| Aug-11 | 9,417 | 12,689 | 4,141 |
| Sep-11 | 9,138 | 12,567 | 3,958 |
| Oct-11 | 8,690 | 12,568 | 4,949 |
| Nov-11 | 7,856 | 11,088 | 5,603 |
| Dec-11 | 5,898 | 7,736 | 4,159 |
| Jan-12 | 8,139 | 11,302 | 5,271 |
| Feb-12 | 3,895 | 5,546 | 2,126 |
| Mar-12 | 0 | 0 | 0 |
| Apr-12 | 0 | 0 | 0 |
| Total Lbs 3 year (lbs) | 302,394 | 401,012 | 160,185 |
| Annual Average (lb/yr) | 100,798 | 133,671 | 53,395 |
| Annual Average (TPY) | 50.399 | 66.835 | 26.698 |

Table A3. Monthly mass emissions of NO_x, CO, and SO₂ for S-1 and S-2 at Plant No. 3245 (GWF, Site 3)

| Month | NO _x (lb/mo) | SO ₂ (lb/mo) | CO (lb/mo) |
|-------------------------------|----------------------------|----------------------------|---------------|
| Apr-09 | 6,460 | 9,114 | 1,701 |
| May-09 | 9,838 | 14,151 | 2,044 |
| Jun-09 | 9,633 | 13,986 | 2,128 |
| Jul-09 | 10,071 | 14,682 | 2,227 |
| Aug-09 | 9,073 | 13,143 | 1,741 |
| Sep-09 | 9,508 | 13,489 | 1,978 |
| Oct-09 | 9,967 | 14,218 | 1,883 |
| Nov-09 | 9,483 | 13,152 | 2,178 |
| Dec-09 | 9,730 | 13,890 | 2,075 |
| Jan-10 | 9,432 | 13,556 | 2,466 |
| Feb-10 | 8,805 | 12,466 | 1,880 |
| Mar-10 | 9,800 | 13,969 | 2,175 |
| Apr-10 | 7,699 | 10,838 | 1,542 |
| May-10 | 8,719 | 11,966 | 3,061 |
| Jun-10 | 8,332 | 11,368 | 2,772 |
| Jul-10 | 6,458 | 8,734 | 2,863 |
| Aug-10 | 6,810 | 9,087 | 3,717 |
| Sep-10 | 9,941 | 14,028 | 3,216 |
| Oct-10 | 9,146 | 13,034 | 2,834 |
| Nov-10 | 10,036 | 14,345 | 3,215 |
| Dec-10 | 10,152 | 14,576 | 3,546 |
| Jan-11 | 6,584 | 9,386 | 3,089 |
| Feb-11 | 5,086 | 7,452 | 3,035 |
| Mar-11 | 9,909 | 14,777 | 3,050 |
| Apr-11 | 9,552 | 13,545 | 1,740 |
| May-11 | 10,057 | 14,726 | 3,074 |
| Jun-11 | 9,619 | 14,358 | 3,307 |
| Jul-11 | 9,946 | 14,859 | 3,022 |
| Aug-11 | 9,637 | 14,470 | 3,300 |
| Sep-11 | 9,605 | 14,266 | 3,605 |
| Oct-11 | 8,965 | 13,754 | 4,708 |
| Nov-11 | 7,070 | 9,796 | 3,679 |
| Dec-11 | 9,009 | 14,424 | 3,914 |
| Jan-12 | 7,077 | 11,629 | 3,393 |
| Feb-12 | 4,231 | 6,727 | 2,220 |
| Mar-12 | 0 | 0 | 0 |
| Apr-12 | 0 | 0 | 0 |
| Total Lbs 3 year (lbs) | 305,440 | 441,961 | 96,378 |
| Annual Average (lb/yr) | 101,813 | 147,320 | 32,126 |
| Annual Average (TPY) | 50.907 | 73.660 | 16.063 |

Table A4. Monthly mass emissions of NO_x, CO, and SO₂ for S-1 and S-2 at Plant No. 3981 (GWF, Site 4)

| Month | NO _x (lb/mo) | SO ₂ (lb/mo) | CO (lb/mo) |
|-------------------------------|----------------------------|----------------------------|---------------|
| Apr-09 | 9,067 | 11,406 | 3,973 |
| May-09 | 7,880 | 2,478 | 3,976 |
| Jun-09 | 9,148 | 11,354 | 3,145 |
| Jul-09 | 9,787 | 12,523 | 3,850 |
| Aug-09 | 8,439 | 11,347 | 3,094 |
| Sep-09 | 7,871 | 10,108 | 2,705 |
| Oct-09 | 9,400 | 11,142 | 5,397 |
| Nov-09 | 9,728 | 11,859 | 4,278 |
| Dec-09 | 9,170 | 11,688 | 4,619 |
| Jan-10 | 6,876 | 9,917 | 4,972 |
| Feb-10 | 8,478 | 11,825 | 3,933 |
| Mar-10 | 7,849 | 11,100 | 3,145 |
| Apr-10 | 9,291 | 13,080 | 3,727 |
| May-10 | 9,334 | 12,107 | 3,164 |
| Jun-10 | 9,537 | 11,036 | 5,157 |
| Jul-10 | 9,908 | 11,553 | 5,753 |
| Aug-10 | 9,923 | 11,854 | 6,847 |
| Sep-10 | 8,950 | 10,877 | 6,442 |
| Oct-10 | 9,940 | 13,737 | 4,673 |
| Nov-10 | 9,785 | 13,191 | 4,563 |
| Dec-10 | 10,129 | 13,036 | 6,128 |
| Jan-11 | 8,774 | 10,940 | 4,991 |
| Feb-11 | 8,757 | 10,212 | 6,887 |
| Mar-11 | 9,885 | 12,031 | 6,210 |
| Apr-11 | 9,036 | 8,593 | 4,238 |
| May-11 | 9,652 | 10,873 | 4,055 |
| Jun-11 | 9,135 | 12,403 | 3,673 |
| Jul-11 | 9,587 | 12,139 | 3,855 |
| Aug-11 | 9,537 | 11,827 | 4,837 |
| Sep-11 | 7,999 | 11,509 | 3,688 |
| Oct-11 | 9,506 | 13,135 | 4,126 |
| Nov-11 | 8,969 | 12,675 | 4,069 |
| Dec-11 | 4,867 | 5,689 | 4,300 |
| Jan-12 | 8,472 | 11,567 | 6,067 |
| Feb-12 | 4,117 | 5,322 | 2,396 |
| Mar-12 | 0 | 0 | 0 |
| Apr-12 | 0 | 0 | 0 |
| Total Lbs 3 year (lbs) | 308,783 | 386,133 | 156,933 |
| Annual Average (lb/yr) | 102,928 | 128,711 | 52,311 |
| Annual Average (TPY) | 51.464 | 64.356 | 26.156 |

Table A5. Monthly mass emissions of NO_x, CO, and SO₂ for S-1 and S-2 at Plant No. 3246 (GWF, Site 5)

| Month | NO _x (lb/mo) | SO ₂ (lb/mo) | CO (lb/mo) |
|-------------------------------|----------------------------|----------------------------|---------------|
| Apr-09 | 8,605 | 12,121 | 3,767 |
| May-09 | 4,915 | 7,038 | 1,530 |
| Jun-09 | 9,529 | 12,933 | 3,888 |
| Jul-09 | 9,724 | 13,089 | 4,383 |
| Aug-09 | 8,246 | 11,671 | 2,469 |
| Sep-09 | 9,242 | 13,225 | 1,927 |
| Oct-09 | 8,838 | 12,436 | 3,799 |
| Nov-09 | 9,031 | 12,473 | 2,651 |
| Dec-09 | 9,017 | 13,122 | 3,418 |
| Jan-10 | 9,240 | 13,119 | 3,198 |
| Feb-10 | 8,319 | 11,769 | 3,016 |
| Mar-10 | 9,101 | 13,153 | 3,177 |
| Apr-10 | 9,041 | 13,113 | 3,623 |
| May-10 | 7,329 | 10,174 | 2,868 |
| Jun-10 | 8,504 | 11,290 | 4,875 |
| Jul-10 | 8,767 | 12,255 | 3,836 |
| Aug-10 | 8,988 | 12,390 | 4,352 |
| Sep-10 | 8,576 | 12,201 | 4,340 |
| Oct-10 | 9,389 | 13,112 | 3,974 |
| Nov-10 | 9,276 | 13,265 | 3,946 |
| Dec-10 | 8,788 | 12,194 | 4,696 |
| Jan-11 | 8,603 | 12,128 | 4,973 |
| Feb-11 | 8,237 | 10,435 | 6,483 |
| Mar-11 | 8,175 | 12,036 | 4,509 |
| Apr-11 | 8,008 | 7,884 | 3,259 |
| May-11 | 9,023 | 12,013 | 3,940 |
| Jun-11 | 8,728 | 12,585 | 3,666 |
| Jul-11 | 5,826 | 13,648 | 2,556 |
| Aug-11 | 8,148 | 13,240 | 3,225 |
| Sep-11 | 9,169 | 13,146 | 3,539 |
| Oct-11 | 9,000 | 13,159 | 3,817 |
| Nov-11 | 7,863 | 11,302 | 3,387 |
| Dec-11 | 4,134 | 5,843 | 2,947 |
| Jan-12 | 7,177 | 10,211 | 5,886 |
| Feb-12 | 3,546 | 6,056 | 1,970 |
| Mar-12 | 0 | 0 | 0 |
| Apr-12 | 0 | 0 | 0 |
| Total for 3 years (lbs) | 288,102 | 409,829 | 127,890 |
| Annual Average (lb/yr) | 96,034 | 136,610 | 42,630 |
| Annual Average (TPY) | 48.017 | 68.305 | 21.315 |

**Appendix B
 Monthly Operation Hours**

Table B1. Monthly operation hours for S-1 and S-2 at five GWF petroleum coke fired power plants

| Month | Hours/month at Plant No. 3243 (GWF, Site 1) | Hours/month at Plant No. 3244 (GWF, Site 2) | Hours/month at Plant No. 3245 (GWF, Site 3) | Hours/month at Plant No. 3981 (GWF, Site 4) | Hours/month at Plant No. 3246 (GWF, Site 5) |
|-------------------------------|--|--|--|--|--|
| Apr-09 | 718.5 | 719.5 | 487 | 671 | 684.5 |
| May-09 | 735.9 | 686.5 | 742.5 | 736.5 | 415.5 |
| Jun-09 | 719.5 | 707.6 | 720 | 696.4 | 720 |
| Jul-09 | 744 | 739.5 | 744 | 737 | 744 |
| Aug-09 | 668 | 670.5 | 671 | 671 | 639 |
| Sep-09 | 657.5 | 662 | 701.5 | 715.5 | 720 |
| Oct-09 | 428 | 717.5 | 744 | 681.5 | 741.5 |
| Nov-09 | 716.5 | 713.5 | 714.5 | 719 | 721 |
| Dec-09 | 744 | 742.5 | 744 | 714 | 730.3 |
| Jan-10 | 744 | 534.5 | 744 | 525 | 744 |
| Feb-10 | 648 | 664 | 668 | 640 | 667 |
| Mar-10 | 694.2 | 738.7 | 737.5 | 570.8 | 729 |
| Apr-10 | 673.5 | 705.5 | 582 | 677.5 | 719.5 |
| May-10 | 619.5 | 739 | 653.5 | 668 | 555 |
| Jun-10 | 666 | 716 | 611 | 718.5 | 717 |
| Jul-10 | 420 | 743.5 | 463.5 | 743 | 744 |
| Aug-10 | 479.6 | 712 | 487.5 | 735 | 744 |
| Sep-10 | 719 | 686 | 713.5 | 639.5 | 660 |
| Oct-10 | 647 | 743 | 660.5 | 722.5 | 728.5 |
| Nov-10 | 589.5 | 720 | 718 | 718.5 | 711.5 |
| Dec-10 | 613.5 | 736.5 | 728.5 | 738 | 739.5 |
| Jan-11 | 375 | 742 | 470 | 626.5 | 714 |
| Feb-11 | 508.5 | 672 | 371 | 625.5 | 653.5 |
| Mar-11 | 680.5 | 740.5 | 743 | 743 | 739 |
| Apr-11 | 634 | 690.5 | 719 | 720 | 684.5 |
| May-11 | 742.5 | 642 | 735 | 742.5 | 736.5 |
| Jun-11 | 577.5 | 715 | 712 | 720 | 681.5 |
| Jul-11 | 744 | 720.5 | 744 | 728.5 | 736.5 |
| Aug-11 | 744 | 744 | 744 | 742.5 | 729.5 |
| Sep-11 | 717 | 717.5 | 717 | 675.5 | 713.5 |
| Oct-11 | 698 | 741.5 | 665.5 | 744 | 744 |
| Nov-11 | 389.5 | 705 | 561.5 | 692.5 | 692 |
| Dec-11 | 744 | 529 | 742.5 | 383 | 379.5 |
| Jan-12 | 362.5 | 744 | 590.5 | 732 | 744 |
| Feb-12 | 225.5 | 368 | 351.5 | 365.5 | 374.5 |
| Mar-12 | 0 | 0 | 0 | 0 | 0 |
| Annual Average (hr/yr) | 7,262.7 | 8,089.8 | 7,634.2 | 7,893.1 | 7,965.8 |

Appendix C
Source Test Results for POC and PM₁₀

Table C1. Source Test Results for S-1 and S-2 at five GWF petroleum coke fired power plants

| Pollutant | Plant No. 3243 (GWF, Site 1) | | Plant No. 3244 (GWF, Site 2) | | Plant No. 3245 (GWF, Site 3) | | Plant No. 3981 (GWF, Site 4) | | Plant No. 3246 (GWF, Site 5) | |
|----------------|---------------------------------|------------------|---------------------------------|------------------|---------------------------------|------------------|---------------------------------|------------------|---------------------------------|------------------|
| | (lb/hr) | Source Test Date | (lb/hr) | Source Test Date | (lb/hr) | Source Test Date | (lb/hr) | Source Test Date | (lb/hr) | Source Test Date |
| PM, Front Half | 0.50 | 9/13/2011 | 0.43 | 9/14/2011 | 0.26 | 9/16/2011 | 0.41 | 9/15/2011 | 0.38 | 9/12/2011 |
| PM, Back Half | 0.49 | 9/13/2011 | 0.55 | 9/14/2011 | 1.05 | 9/16/2011 | 0.34 | 9/15/2011 | 0.92 | 9/12/2011 |
| PM-10 | 0.99 | 9/13/2011 | 0.98 | 9/14/2011 | 1.31 | 9/16/2011 | 0.75 | 9/15/2011 | 1.30 | 9/12/2011 |
| POC | 0.047 | 8/26/2008 | 0.054 | 8/25/2008 | 0.045 | 8/28/2008 | 0.065 | 9/26/2008 | 0.052 | 8/27/2008 |
| | 0.051 | 9/3/2009 | 0.054 | 9/17/2009 | 0.048 | 9/4/2009 | 0.052 | 9/18/2009 | 0.056 | 9/2/2009 |
| | 0.030 | 9/14/2010 | 0.092 | 9/17/2010 | 0.033 | 9/15/2010 | 0.197 | 9/16/2010 | 0.051 | 9/13/2010 |
| | 0.035 | 9/13/2011 | 0.044 | 9/14/2011 | 0.041 | 9/16/2011 | 0.059 | 9/15/2011 | 0.041 | 9/12/2011 |