EVALUATION REPORT
GWF POWER SYSTEMS
APPLICATION #15602
PLANT A3244

BACKGROUND

GWF Power Systems operates a circulating fluidized bed combustor (CFBC) that can burn petroleum coke or coal at Plant A3244 in Pittsburg. GWF is applying for changes in the current permit condition #20554 for Plant A3244 under a synthetic minor operating permit (SMOP). The plant has the following permitted sources:

S-1 Fluidized Bed Combustor
S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr (Revised 1/99)
S-3 Solid Storage Silo abated by Bin Vent Filter, (A-1)
S-4 Sorbent Storage Silo abated by Bin Vent Filter (A-2)
S-5 Bed Material Handling System serving (S-1)
S-6 Ash Storage Silo abated by Bin Vent Filter (A-3), Fly Ash Primary Cyclone and Pulse Jet Bag Filter
S-8 Fuel Conveyor Systems abated by Bin Vent Filter (A-1)
S-9 Sorbent Conveyor System abated by Bin Vent Filter (A-2)
S-10 Fly Ash Handling System
S-15 Kaolin Storage Silo and Feed System, abated by A-7, Kaolin Bin Vent Filter (added 5/93)
S-16 Gypsum/Coke Storage Silo and Feed System, Wes-Co, abated by A-8, Gypsum Bin Vent Filter (added 5/93)(revised 11/98 to allow coke storage)
S-19 Emergency Standby Power Generator, 750 HP Diesel-Fired (added as permitted source due to loss of exemption effective 9/01)

The applicant proposes to modify the existing permit condition in anticipation of receiving coke of possibly higher levels of sulfur, nitrogen, metal, moisture, and/or heating value from their main coke supplier (Tesoro Refinery) or alternates. The anticipation is based in part on Tesoro Refinery's plan to install a new delayed coker to replace the existing fluid coker. The applicant claimed that the CFBC is capable of a higher heat input capacity without any physical modifications. In response, the District asked for a demonstration of the maximum heat input capacity to ensure that no new regulatory requirements are triggered such as District Regulation 9 Rule 11 for electric utility boilers or federal electric utility NSPS Subpart Da by exceeding 250 MMBtu/hr. The proposed permit condition modifications provide GWF more operating flexibility, without relaxing any of the existing permitted emission limits regulated under New Source Review.

ANALYSIS SUMMARY

<u>Maximum Heat Input Capacity of S-1 Circulating Fluidized Bed Combustor</u>

An independent combustion consultant, William Howe, approved by the District and retained by GWF, conducted a study of the maximum firing

capacity of the CFBC, without any physical modifications. The CFBC was originally permitted at 223 MMBtu/hr. The District has reviewed the report and agreed with the two approaches used by Howe to determine the maximum possible firing rate of S-1. The two approaches are:

1. Limits on steam generation rate and boiler thermal duty at the maximum allowable steam pressure entering the steam turbine, along with the range of normal and worst case boiler efficiency.
2. Limits due to heat transfer surface and maximum allowable bed temperature of the CFBC.

The District has crosschecked the maximum firing rate (245 MM BTU/hr) by using the following equation:

Maximum Firing Rate = m x (hs – hfw)/Boiler Efficiency ----(1)

Where:

m: maximum mass rate of the steam produced by the boiler, 185,738 lb/hr (established by the consultant)

hs: enthalpy of steam at the outlet of the boiler @1620 psig and 1000 ^{0}F, 1486 BTU/lb (by means of the attached steam table)

hfw: enthalpy of feedwater entering the boiler @1600 psig and 390 ^{0}F, 366 BTU/lb (by means of the attached steam table)

Boiler efficiency: in the range of 86% to 92% (based on the losses-method conducted by Howe)

By substituting the above data into equation (1), the maximum firing rate is calculated to be approximately 242 MM BTU/hr, which is close to the one (243.8 MM BTU/hr) determined by the consultant. The maximum capacity of the CFBC will be considered to be 245 MMBtu/Hr without any physical modification.

<u>Circulating Fluidized Bed Combustor Permitted Emission Limits, BACT and Offsets</u>

Table 1 summarizes the hourly, daily, and annual emission limits of the regulated pollutants NOx, CO, NMHC, SO2, and PM10 from the CFBC. These emission limits will all be retained after the allowed increase in CFBC firing capacity to 245 MMBtu/hr. To verify compliance with the respective emission limits, the CFBC is equipped with continuous emission monitors for NOx, CO, SO2, and opacity. It is supplemented by periodic source tests. Permitted daily emissions will not increase and BACT will not be triggered for any regulated pollutant. No new BACT requirements will be added. No permitted annual emissions increases of NOx, NMHC, or PM10 will be allowed and offsets will not be triggered. There is no facility cumulative emission increase.

Even if actual daily emissions were increased with the higher firing rate and associated flue gas flowrate, hypothetically triggering BACT, the GWF CFBC represents current BACT technology for burning solid coal or petroleum coke. Table 2 compares the existing GWF BACT limits with those of the Northern Michigan University (NMU) CFBC reported in the EPA 2009 BACT Clearinghouse. The NMU boiler is representative of the

modern CFBC technology for burning solid fuels including coal or wood. Table 2 indicates that the old existing GWF boiler's BACT emission control technologies are still current, and its regulated emission limits are at least as stringent.

Table 1 Source S-1 Fluidized Bed Combustor Permitted Emission Limits

	Hourly Permit Limit (or corresponding to daily limit)	Daily Permit Limit	Annual Permit Limit
NOx	48 ppmvd @ 3% O_2	360 lb/day	63 ton/yr
CO	(110 ppmvd @ 3% O_2 corresponding to daily limit)	521 lb/day	95 ton/yr
NMHC	(42 ppmvd @ 3% O_2 corresponding to daily limit)	130 lb/day	24 ton/yr
SO2	50 ppmvd @ 3% O_2	528 lb/day	83 ton/yr
PM10	0.004 gr/dscf Baghouse Limit	72 lb/day *	13 ton/yr *

* Includes fugitive material handling PM10 emissions. The baghouse grain loading limits combustor emissions to 10.7 ton/yr.

Table 2 Comparison of Existing GWF CFBC Emission Limits with Modern CFBC BACT Emission Limit at Northern Michigan University (NMU)

	GWF 245 MMBtu/hr Petroleum Coke or Coal	GWF Control Technology	NMU 185 MMBtu/hr (2009 EPA BACT Clearing house) Coal Limit	NMU Control Technology
NOx	0.07 lb/MMBTU (48 ppmvd @ 3% O_2)	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
SO2	0.10 lb/MMBTU (50 ppmvd @ 3% O_2)	Limestone Injection	0.2 lb/MMBTU	Limestone Injection

		with Fabric Filter		with Fabric Filter
PM10	0.01 lb/MMBTU (0.004 gr/dscf)	Fabric Filter	0.03 lb/MMBTU	Fabric Filter

Compliance with Toxics New Source Review

The proposed increased firing rate from 223 MMBtu/hr to 245 MMBtu/hr may increase TAC emissions proportionally. Thus, a Health Risk Screening Analysis was triggered and was conducted based on the projected future TAC emissions being increased by (245/223) or 10 percent for all modeled toxic air contaminants except for nickel (copy of report attached). The coke fuel nickel concentration was doubled from 1000 ppm w/w to 2000 ppm w/w (per Applicant Request 7) to verify continued compliance with Toxics New Source Review, even with such an extreme variation in coke composition. For the CFBC S-1, nickel was the largest single contributor to cancer risk. Results from the risk analysis indicate that the maximum cancer risk is 9.7 in a million, the chronic hazard index is 0.039, and the acute hazard index is 0.020. These are acceptable project risks since S-1 meets TBACT for PM (heavy metals) and POC (TAC) emissions. S-1 is being abated by integral cyclones and a pulse-jet baghouse (A-4) with a 0.004 gr/dscf limit considered TBACT for PM. TBACT for POC is considered to be good combustion practice in a CFBC. It is demonstrated by the relatively low CO concentration, 110 ppmv dry @3% O_2, necessary to meet the daily 521 lb/day limit, for solid fuel combustion.

Synthetic Minor Operating Permit (SMOP)

GWF operates Plant A3244 under an existing SMOP that limits emissions of NOx, CO, and SO_2 each to 95 ton/yr.

It has separate NSR limits of NMHC and PM10 of 24 ton/yr and 15 ton/yr respectively. Since these latter two pollutants each emit below the 25 ton/yr SMOP significance level as defined by Regulation 2-6-312, no additional synthetic minor permit condition limits are necessary for NMHC and PM10.

GWF Plant A3244 is not a significant source of Hazardous Air Pollutant (HAP) emissions, significant as defined by Regulation 2-6-312. Actual emissions of any single HAP are below 2.5 ton/yr and of any combination of HAPs are below 6.25 ton/yr. Thus no synthetic minor permit condition limit is necessary for HAPs.

PSD, NESHAP

GWF is a synthetic minor facility with regulated pollutants NOx, CO, and SO2 each limited to below 100 ton/yr. It has a separate NSR permit limit of 15 ton/yr of PM10. With no increase in annual emissions of any of these PSD regulated pollutants, no PSD review is triggered. NESHAPs

does not apply because GWF is not a major facility for HAPs: less than 10 ton/yr of any single HAP, and less than 25 ton/yr of any combination of HAPs.

NSPS

It has been demonstrated that physical heat transfer limits and allowable bed temperatures associated with the CFBC boiler prevent it from exceeding a heat input capacity of 245 MMBTU/hr. Thus the CFBC boiler is exempt (< 250 MMBTU/hr) from New Source Performance Standards Subpart Da for electric utility steam generating units.

NSPS Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) is applicable to the operations of the CFBC per Section 60.40b(a), because the CFBC was constructed after June 19, 1984, and is greater than 100 MMBTU/hr. The applicable emission standards, monitoring requirements and recording requirements of SO2, PM, and NOx are less stringent than the permit condition limits and requirements.

CEQA

The project allowing a demonstrated higher heat input capacity without any physical modification of the boiler or any relaxation of the hourly, daily or annual permit limits is considered ministerial. Fixed standards and standard review procedures were used, including compliance with the risk analysis requirements with any associated increase in toxic air contaminants.

Following are details of the proposed permit condition changes, including administrative clarifications.

APPLICANT REQUEST 1

1. Define S-1 as: "Circulating Fluidized Bed Combustor, **249** MMBtu/hr Maximum, Abated by Integral Cyclones (6), Ammonia Injection, Sorbent Injection, and Cantech Environmental System, Inc. Pulse-Jet Baghouse (per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4)

DISTRICT RECOMMENDATION 1

It is recommended to change the equipment descriptions in the Sources section of the subject permit condition #20552 per request:

> *S-1 Circulating Fluidized Bed Combustor, 245 MM Btu/hr Maximum; abated by Integral Cyclones (6), Ammonia Injection, Sorbent Injection, and Cantech Environmental System, Inc. Pulse-Jet Baghouse (per specification CPC*

Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4) (Source description amended under application #15602)

*** Underline: addition*

The source description of S-1 will be changed per request to reflect the actual equipment descriptions and arrangements. With concurrence of the applicant, the maximum firing rate of S-1 will be changed from 223 MMBtu/hr to 245 MM BTU/hr. The 245 MM BTU/hr value better reflects the maximum firing rate of S-1 based on the study (report attached) conducted by the combustion consultant, William Howe. The proposed description changes will not increase the permitted regulated air pollutant emissions of Table 1, or plant cumulative increase. Also the proposed changes will not subject the equipment to new BACT or offset requirements, as discussed previously in the Analysis Summary Section. The capacity increase will not subject the equipment to any regulatory requirements that were not previously applicable.

APPLICANT REQUEST 2

2. Define the following sources such that their definitions are consistent with the installed equipment and operational specifics of the plant:

   - Define S-3 as: "Solid Fuel Storage Silo abated by Bin Vent Filter (A-1)."
   - Define S-5 as: "Coarse Particle Co-Product Handling System that is serving the Circulating Fluidized Bed Combustor (S-1) Drain (screw cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank. S-5 is abated by Bin Vent Filter (A-3)."
   - Define S-6 as: "Fine Particle Co-Product Storage Silo abated by Bin Vent Filter (A-3)."
   - Define S-8 as: "Solid Fuel Conveyor System with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed and abated by Bin Vent Filter (A-1)."
   - Define S-10 as: "Fine Particle Co-Product Handling System serving two Economizer Hoppers, one Preheat Hopper, and the four Baghouse Hoppers connected to Fine Particle Co-Product Storage Silo (S-6). S-10 is abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6)."
   - Define S-16 as: "Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity; abated by Bin Vent Filter (A-8) (added 5/93, revised 11/98 to allow coke storage)."

DISTRICT RECOMMENDATION 2

It is recommended to change the equipment descriptions in the Sources section of the subject permit condition #20554 per request:

S-3 Solid Fuel Storage Silo; abated by Bin Vent Filter, (A-1) (Source description amended under application #15602)

S-5 ~~Bed Material~~ Coarse Particle Co-product Handling System serving (S-1)Drain (Screw Cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)

S-6 ~~Ash~~ Fine Particle Co-product Storage Silo; abated by Bin Vent Filter (A-3)~~, Fly Ash Primary Cyclone and Pulse Jet Bag Filter~~ (Source description amended under application #15602)

S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)

S-10 ~~Fly Ash Handling~~ Fine Particle Co-product Handling System serving two Economizer Hoppers, one Preheat Hopper, and the four Baghouse Hoppers connected to S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602)

S-16 ~~Gypsum/Coke~~ Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity; abated by ~~Gypsum~~ Bin Vent Filter (A-8) (added 5/93)(revised 11/98 to allow coke storage) (Source description amended under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

These changes more accurately reflect the actual equipment descriptions and arrangements. They will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to BACT, offset requirement or District regulation compliance issue. The changes will not subject the equipment to any District regulations or requirements that were not previously applicable.

APPLICANT REQUEST 3

3. Condition 2b: Delete fuel oil usage limitation of 25% of the total heat input. Delete the natural gas usage limitation of 2.678 MM therms per year.

DISTRICT RECOMMNDATION 3

No change is made necessary because the applicant has dropped this request.

APPLICANT REQUEST 4

4. Condition 3: Modify condition to 245 MMBtu/hr to reflect the actual capacity of the CFBC.

DISTRICT RECOMMENDATION 4

It is recommended to change the permit condition heat input capacity to reflect the demonstrated actual physical limit of 245 MMBtu/hr:

> **3. The firing rate of the circulating fluidized bed combustor (S-1) shall not exceed ~~223~~ <u>245</u> Million Btu/hr HHV @ 68 deg F and 60% Relative Humidity. <u>(Capacity increased under application #15602)</u>*
>
> *** Strikethrough: deletion*
> *** Underline: addition*

The Analysis Summary Section of this report details how the "245 MM BTU/hr" limit was derived from CFBC bed temperature limits, steam pressure and temperature limits and heat transfer surface limitations. The proposed change will allow GWF to burn coke that may have higher moisture content and heat content.

The proposed increased firing rate from 223 MMBtu/hr to 245 MMBtu/hr may increase TAC emissions proportionally. Thus, a Health Risk Screening Analysis was triggered and was conducted based on the projected future TAC emissions being increased by (245/223) or 10 percent for all modeled toxic air contaminants except for nickel (copy of report attached). The coke fuel nickel concentration was doubled from 1000 ppm w/w to 2000 ppm w/w (per Applicant Request 7) to verify continued compliance with Toxics New Source Review, even with such an extreme variation in coke composition. For the CFBC S-1, nickel was the largest single contributor to cancer risk. Results from the risk analysis indicate that the maximum cancer risk is 9.7 in a million, the chronic hazard index is 0.039, and the acute hazard index is 0.020. These are acceptable project risks since S-1 meets TBACT for PM (heavy metals) and POC (TAC) emissions. S-1 is being abated by integral cyclones and a pulse-jet baghouse (A-4) with a 0.004 gr/dscf limit considered TBACT for PM. TBACT for POC is considered to be good combustion practice in a CFBC. It is demonstrated by the relatively low CO concentration, 110 ppmv dry @3% O2, necessary to meet the daily 521 lb/day limit, for solid fuel combustion.

The proposed change will not cause exceedance of any of the concentration limits and emission cap permit limits. These changes will not increase daily or annual regulated air pollutant emissions, or the plant cumulative increase. Also the change will not subject the equipment to any new BACT, offset, or regulatory requirements that were not previously applicable, except for toxics risk analysis and TBACT requirements, which were satisfied.

APPLICANT REQUEST 5

5. Condition 4a: Delete the sulfur content limit of coke used in S-1.

DISTRICT RECOMMENDATION 5

To help ensure continued compliance with emission caps, the sulfur limit in coke was retained. The applicant has withdrawn this proposal.

APPLICANT REQUEST 6

6. Condition 4b: Delete the nitrogen content limit of coke used in S-1.

DISTRICT RECOMMENDATION 6

To help continued compliance with emission caps, the nitrogen limit in coke was retained. The applicant has withdrawn this proposal.

APPLICANT REQUEST 7

7. Condition 4e: Increase the concentration of nickel content of coke used in S-1 from 1000 ppm by weight to 2000 ppm, based on the Health Risk Assessment.

DISTRICT RECOMMENDATION 7

It is recommended to modify the permit condition as requested:

> **4e. ~~1,000~~ <u>2000</u> ppm by weight Nickel content on a dry basis for petroleum coke and 533 ppm for low sulfur bituminous coal (nickel ppm by wt increased for petroleum coke 9/94) <u>(nickel ppm by wt increased for petroleum coke under application # 15602)</u>*
>
> *** Strikethrough: deletion*
> *** Underline: addition*

The proposed increase in coke nickel content triggers health risk screening analysis, however it passes the analysis. Details of the health risk screening analysis results are provided in the Recommendation 4 section.

The coke fuel nickel concentration was doubled from 1000 ppm w/w to 2000 ppm w/w to verify continued compliance with Toxics New Source Review, even with such an extreme variation in coke composition. For the CFBC S-1, nickel was the largest single contributor to cancer risk. Results from the risk analysis indicate that the maximum cancer risk is

9.7 in a million, the chronic hazard index is 0.039, and the acute hazard index is 0.020. These are acceptable project risks since S-1 meets TBACT for PM (heavy metals) and POC (TAC) emissions. S-1 is being abated by integral cyclones and a pulse-jet baghouse (A-4) with a 0.004 gr/dscf limit considered TBACT for PM. TBACT for POC is considered to be good combustion practice in a CFBC. It is demonstrated by the relatively low CO concentration, 110 ppmv dry @3% O2, necessary to meet the daily 521 lb/day limit, for solid fuel combustion.

The proposed change will not cause any exceedance of any of the permitted emission concentration limits or emissions cap limits. This change may increase nickel emissions. However risk screening analysis shows compliance with acceptable risks. The change will not subject the equipment to any new BACT, offset, or regulatory requirements that were not previously applicable.

APPLICANT REQUEST 8

8. Condition 5: Delete the reference to composite samples from all five sites to clarify that compliance should be based on site-specific composite samples.

DISTRICT RECOMMENDATION 8

It is recommended to modify the permit as requested:

> **5. To determine compliance with conditions number 3 and 4, GWF shall take daily samples of fuel feed ~~at all sites~~; a single composite sample drawn from all the daily samples ~~for all sites~~ for a calendar month shall be analyzed for the higher heating value, sulfur, nitrogen, nickel, and chromium content. The coke and coal fuel feed rates, as appropriate, ~~for each site~~ plus the single fuel analyses shall be submitted to the District within two calendar months (i.e., fuel feed rates and fuel analyses for January must be submitted before the end of March). Daily samples ~~for each site~~ shall be retained for 90 days and shall be made available for analysis by GWF or the APCO upon request. (Analysis frequency reduced 5/94 to lessen GWF's administrative burden and costs. Vanadium analysis eliminated 9/94.) (Coke composite sample from 5 GWF facilities has been revised under application #15602).*
>
> *** Strikethrough: deletion*
> *** Underline: addition*

The requirement of preparing a composite sample of coke from all five GWF sites for fuel analysis is inappropriate. It is recommended that

site-specific coke samples for fuel analysis be obtained for each plant.

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 9

9. Condition 6: Modify condition to reference CARB fuel restrictions for sulfur content in diesel fuel. Eliminate "certification" requirements.

DISTRICT RECOMMENDATION 9

It is recommended to incorporate references to current CARB fuel specifications:

> *6. When firing fuel oil (as described in conditions number 2, 7 and 8) only distillate fuel oil with a maximum sulfur content of 0.05% (by weight) shall be used. Each fuel oil delivery receipt shall certify to a 0.05% sulfur content or less, or each fuel oil purchase record shall ~~be adequate to~~ demonstrate the purchase of CARB D~~d~~iesel Fuel No. 1~~-D~~ or No. 2~~-D~~ that meets the specifications in Title 13, CCR, Sections 2281 and 2282. These certifications and purchase records shall be made available to the District upon request and shall be maintained by GWF for a period of at least ~~two~~ five years. (Revised 11/98 since state limit for CARB diesel fuel No. 1-D and No. 2-D was 0.05% by weight.) (2-year recordkeeping revised to 5-yr recordkeeping under application #15602)

APPLICANT REQUEST 10

10. Condition 12b: Delete reference to "automatically" activated.

DISTRICT RECOMMENDATION 10

It is recommended to modify the proposed permit condition as requested:

> **12b. The ammonia (NH3) injection system shall also be in full use whenever the circulating fluidized bed combustor (S-1) is in operation with the exception of during a startup until a minimum freeboard temperature of 1560 degrees F is achieved. The NH3 injection rate shall be ~~automatically~~ activated and controlled at all times during the circulating fluidized bed combustor (S-1)*

operation. (Remainder of this paragraph deleted 4/93 since it was a condition of A/C phase only.) (Revised 11/98 to lower setpoint from 1600 degrees F and to not use bed temperature to start ammonia injection.) (Deleted "cold" from startup 1/99) (“automatically” deleted under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

As reported by GWF, it has never had any automatic system to activate and control the NH3 injection rate. The facility has been manually activating the NH3 injection rate to control NOx emissions since the startup of S-1, and has been operating in compliance with the permitted NH3 concentration limit (≤ 50 ppmv), and NOx concentration limits for different fuels and under different operation modes, as verified by NH3 and NOx continuous emission monitors.

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 11

11. Condition 13b: Delete reference to “automatically” activated.

DISTRICT RECOMMENDATION 11

It is recommended to modify the proposed permit condition as requested:

**13b. The sorbent injection system shall be in full use whenever the circulating fluidized bed combustor (S-1) is in operation with the exception of during a startup until a minimum bed temperature of 1400 degrees F is achieved for dolomite or 1500 degrees F for limestone. The sorbent injection rate shall be ~~automatically~~ activated and controlled at all times during the circulating fluidized bed operation. All delivery receipts shall certify the type, weight, and date of each shipment of sorbent. (Portion of this paragraph deleted 4/94 since it was a condition of A/C phase only. Calcium to sulfur mole ratio requirement deleted 5/95.) (Deleted "cold" from startup 1/99) (“automatically” deleted under application #15602).*

*** Strikethrough: deletion*
*** Underline: addition*

As reported by GWF, it has never had any automatic system to activate the sorbent injection rate. The facility has been manually activating and controlling the sorbent injection rate to control SO2 emissions

since the startup of S-1 and has been operating in compliance of the permitted SO2 concentration limits under different fuels firing and operation modes. Compliance has been demonstrated by the required installed SO2 CEM.

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 12

12. Condition 14 S-1: Increase S-1 firing rate limit to 249 MMBtu/hr …

DISTRICT RECOMMENDATION 12

It is recommended to modify the request to 245 MMBtu/hr as discussed in Recommendation 1 and 4 sections, as well as the Summary Analysis Section of this report.

**14. In no event shall the total combined daily and annual emissions from the following sources:*

**S-1 Circulating Fluidized Bed Combustor ~~223~~ 245 MMBtu/Hr Maximum, Abated By Integral Cyclones ~~(7)~~ (6), Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4). (Capacity increased under application #15602)*

*** Strikethrough: deletion*
*** Underline: addition*

APPLICANT REQUEST 13

13. Condition 15 S-1: Increase S-1 firing rate limit to 249 MMBtu/hr …

DISTRICT RECOMMENDATION 13

It is recommended to modify the request to 245 MMBtu/hr as discussed in Recommendation 1 and 4 sections, as well as the Summary Analysis Section of this report.

**15. In no event shall the total combined daily and annual emissions from the following sources:*

**S-1 Circulating Fluidized Bed Combustor ~~223~~ 245*

MMBtu/Hr Maximum, Abated By Integral Cyclones

~~(7)~~(6)

Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4).
(Capacity increased under application #15602)

** Strikethrough: deletion*
** Underline: addition*

APPLICANT REQUEST 14

14. Condition 15 S-3, S-5, S-6, S-8, S-10: Update the sources' definitions to be consistent with the installed equipment and operational specifics of the plant.

DISTRICT RECOMMENDATION 14

It is recommended to change the equipment descriptions per request:

**15. In no event shall the total combined daily and annual emissions from the following sources:*

** S-3 Solid Fuel Storage Silo Abated By Bin Vent Filter, (A1) (Source description amended under application #15602)*

** S-5 ~~Bed Ash~~ Coarse Particle Co-Product Handling System Serving The Circulating Fluidized Bed Combustor (S-1) Drain (screw ~~ash~~ cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)*

** S-6 ~~Ash~~ Fine Particle Co-Product storage Silo Abated By Bin Vent Filter (A-3)~~, Fly Ash Primary Cyclone Allen-Sherman-Hoff Model 1-42 (A- 5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD 18-100 (A-6).~~ (Source description amended under application #15602)*

** S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)*

** S-10 ~~Pneumatic Fly Ash Removal~~ Fine Particle Co-product Handling System Serving two Economizer Hoppers, One Preheat Hopper, and the Four Baghouse Hoppers connected to ~~a Fly Ash Primary~~ S-6; abated by Fine*

Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

These changes are to reflect the actual equipment descriptions and arrangements. They will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 15

15. Condition 16 S-1: Increase S-1 firing rate limit to 249 MMBtu/hr …

DISTRICT RECOMMENDATION 15

It is recommended to modify the request to 245 MMBtu/hr as discussed in Recommendation 1 and 4 sections, as well as the Summary Analysis Section of this report.

16. In no event shall the total combined emissions from the following sources:

S-1 Circulating Fluidized Bed Combustor ~~223~~ 245 MMBtu/Hr Maximum, Abated By Integral Cyclones ~~(7)~~ (6), Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4). (Source description amended under application #15602).

APPLICANT REQUEST 16

16. Condition 18: Delete calibration requirements.

DISTRICT RECOMMENDATION 16

It is recommended to revise the permit condition to provide GWF with operational flexibilities, not to delete the calibration requirements as proposed:

**18. For the purpose of compliance with conditions number 3, 12 and 13, GWF shall install, calibrate, maintain and operate devices, in accordance with the manufacturer's recommendation, for measuring the mass*

rate of sorbent, and fuel feed to the circulating fluidized bed combustor (S-1). ~~The measuring devices must be accurate to +/ 5 % of the mass rate over its entire range.~~ (Revised under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 17

17. Condition 28 S-3, S-5, S-6, S-8, S-10, S-16: Update the sources' definitions to be consistent with the installed equipment and operational specifics of the plant:

DISTRICT RECOMMENDATION 17

It is recommended to change the equipment descriptions per request:

**28. The following sources shall have no visible emissions:*

** S-3 Solid Fuel Storage Silo Abated By Bin Vent Filter, (A1) (Source description amended under application #15602)*

** S-5 ~~Bed Ash~~ Coarse Particle Co-Product Handling System Serving The Circulating Fluidized Bed Combustor (S-1) Drain (screw ~~ash~~ cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)*

** S-6 ~~Ash~~ Fine Particle Co-Product storage Silo Abated By Bin Vent Filter (A-3)~~, Fly Ash Primary Cyclone Allen-Sherman Hoff Model 1-42 (A- 5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6).~~ (Source description amended under application #15602)*

** S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)*

** S-10 ~~Pneumatic Fly Ash Removal~~ Fine Particle Co-product Handling System Serving two Economizer Hoppers, One Preheat Hopper, and the Four Baghouse Hoppers*

connected to ~~a Fly Ash Primary~~ S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602)

** S-16 ~~Gypsum/Coke~~ Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity~~, with Air Slide and Metering Screw~~; abated by ~~A-8, Gypsum~~ Bin Vent Filter (A-8) (added 5/93) (Revised 11/98 to allow for coke storage) (Source description amended under application #15602)*

*** Strikethrough: deletion*
*** Underline: addition*

These changes are to reflect the actual equipment descriptions and arrangements. They will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 18

18. Condition 34: Delete reference to S-5 for maintaining a negative differential pressure. Change the description from “bed ash removal system” to **coarse particle co-product** system.

DISTRICT RECOMMENDATION 18

It is recommended to modify the proposed permit condition as requested:

34. A ~~minimum differential~~ negative pressure ~~of 0.1 inches of water gage~~ shall be maintained at any point in all conveying systems for S-3, S-4, ~~S-5~~, S-6, S-15, and S-16. (modified 5/93) (Revised under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

S-5 has openings, therefore negative pressure requirement is inappropriate.

GWF reported that it has never had any differential pressure gauge installed at S-3, S-4, S-5, S-6, S-15, and S-16. Over 15 years of operations, GWF has demonstrated complying the negative differential pressure requirements at these pieces of equipment by means of no visible particle emissions. Therefore 0.1 inch water gauge differential pressure specification is recommended to be taken away too.

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 19

19. Condition 41(2): Delete record of fuel input rate required by condition 18.

DISTRICT RECOMMENDATION 19

It is recommended to keep the original fuel input rate requirement. The fuel rates for all the different fuels are needed by the District for the calculation of emission inventory and actual emissions of S-1:

41. The operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Permit to Operate. This file shall include, but not be limited to:

2. the records on fuel input rate, as required by condition number 18.

(No change made)

APPLICANT REQUEST 20

20. Condition 52a&b: Change baghouse (A-5) to "**Bin Vent Filter (A-3) that serves S-6**".

DISTRICT RECOMMENDATION 20

It is recommended to modify the proposed permit condition as requested to reflect the actual equipment arrangement:

**52a. The ~~baghouse (A-5)~~ Bin Vent Filter (A-3) serving S-6 shall be properly maintained and kept in good operating condition at all times. (Revised under application #15602)*

52b. The ~~baghouse (A-5)~~ Bin Vent Filter (A-3) serving S-6 shall be equipped and operated with a differential pressure gauge to indicate the differential pressure on the bags. This differential pressure shall be used by the plant operators to detect bag leakage or failure. (Revised under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

These changes are to reflect the actual equipment descriptions and arrangements. They will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 21

21. Condition 62: The Source 5 P-Tank shall be enclosed and vented to the Fine Particle Co-Product Storage Silo (S-6) that is abated by Bin Vent Filter (A-3).

DISTRICT RECOMMENDATION 22

It is recommended to modify the proposed permit condition as requested to reflect the actual equipment arrangement:

> *62. The Source 5 P-Tank shall be enclosed and vented to the Fine Particle Co-Product Storage Silo (S-6) that is abated by Bin Vent Filter (A-3) ~~A-3 Fly Ash Silo during all periods of operation.~~ (Revised under application #15602)*

These changes are to reflect the actual equipment descriptions and arrangements. They will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 22

22. Condition 65: Delete condition that references a hammer mill.

DISTRICT RECOMMENDATION 22

It is recommended to modify the proposed permit condition as requested to reflect the actual equipment installation:

> ~~*65. An obstruction to the hammer mill flow path shall be cleared as soon as possible.~~
> (Deleted under application #15602)
>
> *** Strikethrough: deletion*
> *** Underline: addition*

As reported by GWF, no hammer mill has ever been installed. This change is to reflect the actual equipment arrangement. It will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

APPLICANT REQUEST 23

23. Condition 74: Record retention of should be changed to 2 years.

DISTRICT RECOMMENDATION 23

Since GWF is a Synthetic Minor Operating facility, 5-year recordkeeping is required, and no change has been made as proposed:

> *74. All records associated with the above conditions shall be retained by GWF for at least five years for review by the District and shall be supplied to the District upon request. The recording format shall be subject to the approval of the APCO.*
>
> (No change made)

It is recommended to revise the 2-year recordkeeping requirements stipulated in Part 6 and Part 41.4 of the subject permit condition #20554 to 5-year recordkeeping requirement:

> **6. When firing fuel oil (as described in conditions number 2, 7 and 8) only distillate fuel oil with a maximum sulfur content of 0.05% (by weight) shall be used. Each fuel oil delivery receipt shall certify to 0.05% sulfur content or less or each fuel oil purchase record shall be adequate to demonstrate purchase of diesel No. 1-D or No. 2-D. These certifications and purchase records shall be made available to the District upon request and shall be maintained by GWF for a period of at least ~~two~~ five years. (Revised 11/98 since state limit for diesel fuel No. 1-D and No. 2-D is now 0.05% by weight.) (2-year recordkeeping revised to 5-yr recordkeeping under application #15602)*
>
> *41. The operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Permit to Operate. This file shall include, but not be limited to:*
>
> > *4. all other air pollution system performance evaluations and records of manufacturer's recommended calibration checks, adjustments and maintenance performed on all equipment which is subject to this conditional Permit to Operate. All measurements, records and other data required to be maintained by the applicant shall be retained for at least ~~two~~ five years following the date on which such measurements, records or data are recorded.*

(Revised under application #15602)

*** Strikethrough: deletion*
*** Underline: addition*

The proposed change will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to BACT, offset requirement, or Regulatory requirements that were not previously applicable.

Other permit condition changes:

Since the facility was permitted in 1987, the District has shifted the control of total suspended particulate (TSP) to PM10, And under the current District regulation, PSD requirements no longer apply to non-major facility. As such, the emission limits imposed on TSP in Conditions 15 and 19 are replaced with the same emission limits to PM10, and Condition 17 is recommended to be deleted. District policy is to consider PM emissions after baghouse abatement to be all PM10.

15a. 72 pounds per day ~~TSP~~ PM10

15b. 13 tons per year ~~TSP~~ PM10

*~~*17. The project is exempt from PSD review for TSP because the total emissions are conditioned (condition number 15) to less than 25 TPY. Any relaxation in this limit that increases the potential to emit above the applicable PSD threshold shall require a full PSD review of the source as through construction at the site had not yet commenced at the source.~~*
(Revised under application #15602)

19. The exhaust grain loading from the pulsejet baghouse (A- 4) abating the circulating fluidized bed combustor (S-1) shall not exceed 0.0040 gr/dscf ~~TSP~~ PM10 @ 12% CO2. (Reduced from 0.0045 gr/dscf ~~TSP~~ PM10 on 5/95.) (Revised under application #15602)

Current PSD requirements do not apply to non-major facilities.

In order to comply with the current ATCM requirements imposed on emergency standby power generators, 500 hours in Condition 71 is recommended to be updated with 20 hours:

**71. The S-19 Emergency Standby Power Generator, 750 HP Diesel-fired, shall be operated a maximum of ~~500~~ 20 non-emergency hours per any consecutive 12-month period. (Operating hours revised under application #15602)*

The proposed changes will not increase regulated air pollutant emissions, plant cumulative increase, or TAC emissions. Also the proposed changes will not subject the equipment to any new BACT, offset or Regulatory requirements that were not previously applicable.

CONDITIONS

Sources:

S-1 Circulating Fluidized Bed Combustor,~~245~~ 245 MM Btu/hr Maximum; abated by Integral Cyclones (6), Ammonia Injection, Sorbent Injection, and Cantech Environmental System, Inc. Pulse-Jet Baghouse (per specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4) (Source description amended under application #15602)

S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr (Revised 1/99)

S-3 Solid Fuel Storage Silo; abated by Bin Vent Filter,(A-1) (Source description amended under application #15602)

S-4 Sorbent Storage Silo; abated by Bin Vent Filter (A-2)

S-5 ~~Bed Material~~ Coarse Particle Co-product Handling System serving (S-1) Drain (Screw Cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)

S-6 ~~Ash~~ Fine Particle Co-product Storage Silo; abated by Bin Vent Filter (A-3)~~, Fly Ash Primary Cyclone and Pulse Jet Bag Filter~~ (Source description amended under application #15602)

S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)

S-9 Sorbent Conveyor System; abated by Bin Vent Filter (A-2)

S-10 ~~Fly Ash Handling~~ Fine Particle Co-product Handling System serving two Economizer Hoppers, one Preheat Hopper, and the four Baghouse Hoppers connected to S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602)

S-15 Kaolin Storage Silo and Feed System; abated by A-7, Kaolin Bin Vent Filter (added 5/93)

S-16 ~~Gypsum/Coke~~ Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity; abated by ~~Gypsum~~ Bin Vent Filter (A-8) (added 5/93)(revised 11/98 to allow coke storage) (Source description amended under application #15602)

S-19 Emergency Standby Power Generator, 750 HP Diesel-Fired (added as permitted source due to loss of exemption effective 9/01)

The exempt sources at this facility are:

S-11 Startup Oil Fuel Storage Tank, 40,000 gal capacity

S-12 Power 5 System Ammonia Storage Tank

S-18 Paint Operation
Diesel Fueling Station

Welding Operation
Oil/Water Separator
Steam Turbine Lubricating Oil Demister
Waste Oil Storage, Four 55 gal tanks
Cooling Tower
Wet Petroleum Coke unloading and handling system

GWF Power Systems, Plant #3244, has a synthetic minor operating permit. This operating permit covers all sources existing at this facility as of permit issuance. The sources are listed above.

Asterisks denote permit conditions that are part of this permit but do not contribute to establishing the synthetic minor limits. Each facility must comply with all conditions, regardless of asterisks. The following conditions do not negate the applicability of any District, state, or federal requirements.

*1. The Circulating Fluidized bed combustor (S-1) shall be properly maintained and kept in good operating condition at all times.

*2. The circulating fluidized bed combustor (S-1) shall be fired only on petroleum coke, except as described in 2a through 2c.

*2a. During a startup of the bed, the circulating fluidized bed combustor (S-1) shall be fired on natural gas and/or fuel oil subject to the limitations set forth in conditions number 6, 7, 8, 12 and 13.

*2b. Low sulfur bituminous coal and fuel oil may be used for a period not to exceed 25% of the total heat input to the Circulating Fluidized Bed Combustor (S-1) during any one calendar year provided all the conditions specified for the circulating fluidized bed combustor (S-1) are met. Not more than 2.678 million therms of natural gas may be used during any calendar year. GWF shall submit a written report to the District within 10 days of any period of low sulfur bituminous coal use detailing the duration and circumstances of its use.

*2c. 1) The operator of this source shall immediately notify the District of any breakdown condition (as defined in District Regulation 1-208). During any such breakdown condition, the operator shall reduce plant emissions by whatever means necessary to assure the emission limitations set forth in conditions Numbers 7, 8, 9, 10, 14, 15 and 19 are not exceeded.

*2c. 2) In the event that monitoring data demonstrates that emissions from the facility exceed any limitations set forth in Conditions Number 14 and 15, or cause an exceedance of ground level ambient air quality standards, the applicant will take immediate corrective action to bring the facility's emissions within these limitations.

In addition, emissions in excess of those allowed shall be cause for the District to order an immediate reduction in fuel feed rate or to take other appropriate action. (Natural gas firing with annual limit added 1/99 and other startup limits deleted)

*3. The firing rate of the circulating fluidized bed combustor (S-1) shall not exceed ~~223~~ 245 Million Btu/hr HHV @ 68 deg F and 60% Relative Humidity. (Capacity increased under application #15602)

*4. Only petroleum coke or low sulfur bituminous coal which does not exceed any of the following limits shall be fired in the circulating fluidized bed combustor (S-1):

*a. 4.5% by weight sulfur content on a dry basis for petroleum coke (sulfur wt % increased 9/94)

*b. 4.5% by weight nitrogen content on a dry basis for petroleum coke (nitrogen wt % increased 9/94)

*c. 0.5% by weight sulfur content on a dry basis for low sulfur bituminous coal

*d. 0.4% by weight nitrogen content on a dry basis for low sulfur bituminous coal

*e. ~~1,000~~ 2000 ppm by weight Nickel content on a dry basis for petroleum coke and 533 ppm for low sulfur bituminous coal (nickel ppm by wt increased for petroleum coke 9/94) (nickel ppm by wt increased for petroleum coke under application # 15602)

*f. 15 ppm by weight chromium content on a dry basis for petroleum coke (chromium ppm by wt increased 9/94)

*g. 9 ppm by weight chromium content on a dry basis for low sulfur bituminous coal

*h. Deleted (vanadium limit deleted, condition 58 added 9/94)

*5. To determine compliance with conditions number 3 and 4, GWF shall take daily samples of fuel feed ~~at all sites~~; a single composite sample drawn from all the daily samples ~~for all sites~~ for a calendar month shall be analyzed for the higher heating value, sulfur, nitrogen, nickel, and chromium content. The coke and coal fuel feed rates, as appropriate, ~~for each site~~ plus the single fuel analyses shall be submitted to the District within two calendar months (i.e., fuel feed rates and fuel analyses for January must be submitted before the end of March). Daily samples ~~for each site~~ shall be retained for 90 days and shall be made available for analysis by GWF or the APCO upon request. (Analysis frequency reduced 5/94 to lessen GWF's administrative burden and costs. Vanadium analysis eliminated 9/94.) (Coke

composite sample from 5 GWF facilities has been revised under application #15602).

*a. Deleted (condition on A/C only).

*b. (Conditional mandatory daily analyses requirements for sulfur and nitrogen eliminated 5/94.)

*c. (Conditional mandatory weekly analyses reporting for Nickel and Chromium eliminated 5/94.)

*6. When firing fuel oil (as described in conditions number 2, 7 and 8) only distillate fuel oil with a maximum sulfur content of 0.05% (by weight) shall be used. Each fuel oil delivery receipt shall certify to 0.05% sulfur content or less or each fuel oil purchase record shall be adequate to demonstrate purchase of diesel No. 1-D or No. 2-D. These certifications and purchase records shall be made available to the District upon request and shall be maintained by GWF for a period of at least ~~two~~ five years. (Revised 11/98 since state limit for diesel fuel No. 1-D and No. 2-D is now 0.05% by weight.) (2-year recordkeeping revised to 5-yr recordkeeping under application #15602)

*7. The fluidized bed preheat burner (S-2), for preheating of the combustion air, shall not exceed 20 ppmdv NOx @ 3% oxygen, averaged over any consecutive 3 hour period, when firing natural gas. When firing fuel oil, the concentration shall not exceed 118 ppmdv NOx @ 3% oxygen, averaged over any consecutive 3 hour period. (Added natural gas with limit 1/99)

*8. During a startup, the distillate fuel oil start-up guns in the circulating fluidized bed combustor (S-1) shall not exceed 118 ppmdv NOx @ 3% oxygen, averaged over any consecutive 3 hour period. (deleted "cold" 1/99)

*9. The oxides of nitrogen (NOx) concentration emitted to the atmosphere from the circulating bed combustor (S-1) and including emissions from fluidized bed preheat burner (S-2) shall not exceed, except during the 2-hour transition from natural gas or oil to petroleum coke during a startup and during the first 3 hours of a shutdown:

*a. 48 ppmdv@ 3% oxygen, averaged over any consecutive 3 hour period, when firing petroleum coke

*b. 30 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing distillate fuel oil, except during a startup as described in condition numbers 2, 6 and 8.

*c. 45 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing low sulfur bituminous coal

*d. 20 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing natural gas in S-2.

*e. a concentration determined by the following equation:

*NOx ppmv @ 3 % oxygen =((~~wt~~ heat input % fuel oil) x (30) + (~~wt~~ heat input % coke or coal) x (48 for coke or 45 for coal) + (~~wt~~ heat input % natural gas) x (20))/100

(Added natural gas limit and deleted "cold" and time period from startup 1/99) (wt% corrected to heat input % under application #15602)

*10. The sulfur dioxide (SO2) concentration emitted to the atmosphere from the circulating fluidized bed combustor (S-1) shall not exceed, except during the startup period and during the first 3 hours of a shutdown:

*a. 50 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing petroleum coke

*b. 48 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing distillate fuel oil

*c. 37 ppmdv @ 3% oxygen, averaged over any consecutive 3 hour period, when firing low sulfur bituminous coal

*d. a concentration determined by the following equation:

*SO2 ppmv @ 3% oxygen = ((~~wt~~ heat input % fuel oil) x (48) + (~~wt~~ heat input % coke or coal) x (50 for coke or 37 for coal))/100

(Deleted "cold" and time period from startup 1/99) (wt% corrected to heat input % under application #15602)

*11. Deleted. (Condition on Start-up phase only).

*12a. The ammonia injection system shall be properly maintained and kept in good operating condition at all times.

*12b. The ammonia (NH3) injection system shall also be in full use whenever the circulating fluidized bed combustor (S-1) is in operation with the exception of during a startup until a minimum freeboard temperature of 1560 degrees F is achieved. The NH3 injection rate shall be ~~automatically~~ activated and controlled at all times during the circulating fluidized bed combustor (S-1) operation. (Remainder of this paragraph deleted 4/93 since it was a condition of A/C phase only.) (Revised 11/98 to lower setpoint from 1600 degrees F and to not use bed temperature to start ammonia injection.) (Deleted "cold" from startup 1/99) (delete “automatically” under application #15602).

*13a. The sorbent injection system shall be properly maintained and kept in good operating condition at all times.

*13b. The sorbent injection system shall be in full use whenever the circulating fluidized bed combustor (S-1) is in operation with the exception of during a startup until a minimum bed temperature of 1400 degrees F is achieved for dolomite or 1500 degrees F for limestone. The sorbent injection rate shall be ~~automatically~~ activated and controlled at all times during the circulating fluidized bed operation. All delivery receipts shall certify the type, weight, and date of each shipment of sorbent. (Portion of this paragraph deleted 4/94 since it was a condition of A/C phase only. Calcium to sulfur mole ratio requirement deleted 5/95.) (Deleted "cold" from startup 1/99) (delete "automatically" under application #15602).

*14. In no event shall the total combined daily and annual emissions from the following sources:

*S-1 Circulating Fluidized Bed Combustor ~~223~~ 245 MMBtu/Hr Maximum, Abated By Integral Cyclones ~~(7)~~ (6), Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4). (Capacity increased under application #15602)

*S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr. (Revised 1/99)

exceed:

*a. 360 pounds per day of NOx (as NO2)

*b. 528 pounds per day of SO2

*c. 521 pounds per day of CO

*d. 130 pounds per day NMHC

*e. 63 tons per year of NOx (as NO2)

*f. 83 tons per year of SO2. (Reduced from 93 tpy on 5/95)

*g. 95 tons per year of CO

*h. 24 tons per year NMHC

*15. In no event shall the total combined daily and annual emissions from the following sources:

*S-1 Circulating Fluidized Bed Combustor ~~223~~ 245 MMBtu/Hr Maximum, Abated By Integral Cyclones ~~(7)~~ (6), Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4). (Capacity increased under application #15602)

*S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr. (Revised 1/99)

*S-3 Solid Fuel Storage Silo Abated By Bin Vent Filter, (A-1) (Source description amended under application #15602)

*S-4 Sorbent Storage Silo Abated By Bin Vent Filter (A- 2)

*S-5 ~~Bed Ash~~ Coarse Particle Co-Product Handling System Serving The Circulating Fluidized Bed Combustor (S-1) Drain (screw ~~ash~~ cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)

*S-6 Ash Fine Particle Co-product Storage Silo; Abated By Bin Vent Filter (A-3), Fly Ash Primary Cyclone Allen-Sherman-Hoff Model 1-42 (A- 5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18 100 (A-6). (Source description amended under application #15602)

*S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)

*S-9 Sorbent Conveyor System With Pneumatic Sorbent Fill Line, And Transfer Points Enclosed And Abated By Bin Vent Filter (A-2)

*S-10 ~~Pneumatic Fly Ash Removal~~ Fine Particle Co-product Handling System Serving two Economizer Hoppers, One Preheat Hopper, and the Four Baghouse Hoppers connected to ~~a Fly Ash Primary~~ S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602).

exceed:

*a. 72 pounds per day ~~TSP~~ PM10

*b. 13 tons per year ~~TSP~~ PM10

16. In no event shall the total combined emissions from the following sources:

S-1 Circulating Fluidized Bed Combustor ~~223~~ 245 MMBtu/Hr Maximum, Abated By Integral Cyclones ~~(7)~~ (6), Ammonia Injection, Sorbent Injection, And Cantech Environmental System Inc. Pulse-Jet Baghouse (Per Specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4). (Source description amended under application #15602).

S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr. (Revised 1/99)

S-19 Emergency Standby Power Generator, 750 HP Diesel-fired

exceed:

a. 95 tons of NOx (as NO2) per any consecutive twelve-month period

b. 95 tons of SO2 per any consecutive twelve-month period

c. 95 tons of CO per any consecutive twelve-month period

For the purposes of Condition 16, month is defined as a calendar month.

*17. ~~The project is exempt from PSD review for TSP because the total emissions are conditioned (condition number 15) to less than 25 TPY. Any relaxation in this limit that increases the potential to emit above the applicable PSD threshold shall require a full PSD review of the source as through construction at the site had not yet commenced at the source.~~ (Deleted under Application #15602: current PSD requirements do not apply to non-major facility)

*18. For the purpose of compliance with conditions number 3, 12 and 13, GWF shall install, calibrate, maintain and operate devices, in accordance with the manufacturer's recommendation, for measuring the mass rate of sorbent, and fuel feed to the circulating fluidized bed combustor (S-1). ~~The measuring devices must be accurate to +/- 5 % of the mass rate over its entire range.~~ (Revised under application #15602)

19. The exhaust grain loading from the pulsejet baghouse (A- 4) abating the circulating fluidized bed combustor (S-1) shall not exceed 0.0040 gr/dscf ~~TSP~~ PM10 @ 12% CO2. (Reduced from 0.0045 gr/dscf ~~TSP~~ PM10 on 5/95.)

*20. (Condition for the baghouse to contain fiberglass bags lined with gortex deleted 5/95.)

*21. The concentration of ammonia emitted to the atmosphere from the circulating fluidized bed combustor (S-1) shall not exceed 50 ppmv, averaged over any consecutive 3 hour period.

*22. Deleted. (Condition on start-up for source testing).

*23. Deleted. (Condition for pre-construction of facility).

24. The baghouse (A-4) shall be equipped with District approved particle flow monitors and alarms in order to detect bag leakage or failure.

*25. The baghouse (A-4) shall be properly maintained and kept in good operating condition at all times.

26. Each fabric collector compartment of the baghouse (A-4) shall have a differential pressure indicator and an access door.

*27. GWF shall maintain logs of the baghouse (A-4) temperatures. This data shall be made available, upon request, to the APCO.

*28. The following sources shall have no visible emissions:

S-3 Solid Fuel Storage Silo; abated by Bin Vent Filter, (A-1) (Source description amended under application #15602)

S-4 Sorbent Storage Silo Abated By Bin Vent Filter (A-2).

S-5 ~~Bed Ash~~ Coarse Particle Co-product Handling System serving (S-1) Drain (Screw Cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)

S-6 Ash Fine Particle Co-product Storage Silo; Abated By Bin Vent Filter (A-3), Fly Ash Primary Cyclone Allen-Sherman-Hoff Model 1-42 (A- 5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6). (Source description amended under application #15602)

S-8 Solid Fuel Conveyor Systems With Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations Enclosed; ~~And~~ abated By Bin Vent Filter (A-1). (Source description amended under application #15602)

S-9 Sorbent Conveyor System With Pneumatic Sorbent Fill Line, And Transfer Points Enclosed And Abated By Bin Vent Filter (A-2).

S-10 ~~Pneumatic Fly Ash Removal~~ Fine Particle Co-product Handling System Serving two Economizer Hoppers, One Preheat Hopper, and the Four Baghouse Hoppers connected to ~~a Fly Ash Primary~~ S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602).

S-15 Kaolin Storage Silo and Feed System, Wes-Co, 1280 cubic feet capacity, with Air Slide and Metering Screw; abated by A-7, Kaolin Bin Vent Filter (added 5/93)

S-16 ~~Gypsum/Coke~~ Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity~~, with Air Slide and Metering Screw~~; abated by ~~A-8, Gypsum~~ Bin Vent Filter (A-8) (added 5/93) (Revised 11/98 to allow for coke storage) (Source description amended under application #15602)

29. There shall be no coal crushing, coal pulverizing or any other forms of coal preparation done at this facility.

30a. GWF shall calibrate and operate District approved continuous in-stack emission monitors and recorders for oxides of nitrogen, sulfur dioxide, carbon monoxide, opacity and either oxygen or carbon dioxide.

*30b. (deleted, applies to Plant 3981, GWF Power Systems Site IV)

*30c. ~~If the APCO deems an ammonia monitor is necessary for GWF to insure compliance with any of the conditions of this Permit to Operate, based on the information gathered from the operation of GWF Power Systems Site IV, GWF shall install an APCO approved ammonia monitor at Plant 3243, 3244, 3245, or 3246 within 6 months of notification in writing by the APCO to GWF Power Systems Co., LP.~~ (deleted under application #15602)

*31. GWF shall maintain stack and sampling ports and platforms.

32. All solid fuels shall be stored in fuel storage silo (S-3) and gypsum/coke storage silo (S-16). No open stock piles of petroleum coke or coal shall be permitted. (Added S-16 1/99)

33. Filter bags in the bin vent filter systems A-1, A-2, A-7, and A-8 shall be visually inspected at intervals not to exceed 500 hours of operation. The ash silo bin vent filter, A-3, shall be inspected annually during a scheduled maintenance outage. A District approved log shall be kept to verify the maintenance schedule. This log shall be made available to the District upon request. (modified 5/93)

34. A ~~minimum differential~~ negative pressure ~~of 0.1 inches of water gage~~ shall be maintained at any point in all conveying systems for S-3, S-4, S-5, S-6, S-15, and S-16. (modified 5/93) (Revised under application #15602)

*35. Deleted.

36. Truck unloading shall be operated without causing over pressurization of A-1, A-2, A-7, or A-8. This shall be accomplished by setting up operation procedures. (modified 5/93)

37. GWF shall properly maintain and operate a continuous volumetric flow in-stack monitor which meets EPA performance specifications (40 CFR 60.13 and 40 CFR 60 Appendix B, Performance Specification 2).

38. GWF shall maintain cooling tower drift eliminators capable of maintaining drift loss below 0.02%

39. Cooling tower additives shall not contain chromium based materials.

*40. Deleted. (Condition on A/C).

41. The operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Permit to Operate. This file shall include, but not be limited to:

    1. the data collected from in-stack monitoring instruments

    2. the records on fuel input rate, as required by conditions number 18.

    3. the results of all source test or performance tests conducted

    4. all other air pollution system performance evaluations and records of manufacturer's recommended calibration checks, adjustments and maintenance performed on all equipment which is subject to this conditional Permit to Operate. All measurements, records and other data required to be maintained by the applicant shall be retained for at least ~~two~~ five years following the date on which such measurements, records or data are recorded. (Revised under application #15602)

The APCO or his representatives shall have access to the plant in accordance with Section 1-440 of District Regulations and with Section 41510 of the Health and Safety Code.

The APCO or his representatives shall have the right to inspect and audit all records which are required to be maintained above in accordance with District Regulations 1-441.

*This permit is also subject to the following conditions for the mitigation of potential adverse environmental impacts as identified in the EIR:

*42. Deleted. Requirements of this condition were moved to Conditions 4 and 5.

*43. Deleted.

*44. The Fluidized Bed Preheat Burner (S-2) shall not be subject to the limitations set forth in Conditions 7 and 9 during a cumulative 48 hour operating period in which a new or refurbished burner is being fired for the sole purpose of tuning. (Revised 1/99)

*45. (Deleted 1/99 since firing limit included in condition 2.)

*46. The S-2, Fluidized Bed Preheat Burner 70 MMBtu/hr shall only be fired on fuel oil during a natural gas curtailment and for a check-out period not to exceed 4 hours per calendar year. In no event shall it be fired on fuel oil when the circulating fluidized bed combustor (S-1) is operating at greater than 1100oF

averaged over one hour. (Revised 1/99 to limit firing of S-2 on fuel oil but not natural gas.)

*47. District approved fuel oil flow and natural gas flow monitors shall be installed and calibrated to read the fuel flow to S-2 Fluidized Bed Preheat Burner. A District approved recorder shall be used to keep record of the fuel flow to S-2 Fluidized Bed Preheat Burner. The fuel flow shall be recorded whenever S-2 Fluidized Bed Preheat Burner is in operation. The fuel rate to S-2 shall be included, in a format approved by the District, in the monthly Site report to the District. (Added natural gas flow monitor 1/99)

*48. Deleted (Deleted 4/03 since same as Condition 60.)

*49. Deleted (Deleted 4/03 since same as Condition 61.)

*50. Source 6 shall be properly maintained and kept in good operating condition at all times.

*51. In no event shall particulate emissions from S-6 when added to the particulate emissions from all other sources at this GWF facility exceed 15 TPY PM10.

*52a. The ~~baghouse (A-5)~~ Bin Vent Filter (A-3) serving S-6 shall be properly maintained and kept in good operating condition at all times. (Revised under application #15602)

52b. The ~~baghouse (A-5)~~ Bin Vent Filter (A-3) serving S-6 shall be equipped and operated with a differential pressure gauge to indicate the differential pressure on the bags. This differential pressure shall be used by the plant operators to detect bag leakage or failure. (Revised under application #15602)

*53. Source 10 shall be properly maintained and kept in good operating condition at all times.

*54. In no event shall particulate emissions from S-10 when added to the particulate emissions from all other sources at this GWF facility exceed 15 TPY PM10.

Permit Conditions for S-15 and S-16: (added 5/93)

*55. In no event shall the emissions from S-15 and S-16, when added to the PM10 emissions from all other sources at this facility, exceed 15 TPY. (added 5/93)

56. S-15 and S-16 shall be enclosed and vented to their associated Bin Vent Filters during all periods of operation. (added 5/93)

57. The loading of S-15 and S-16, and all material transfers within the sources, shall be done pneumatically, with closed connections. (added 5/93)

*58. Deleted (This condition, to not include material from S-15 or S-16 in the Ca/S mole ratio determination of permit condition no. 13, was deleted 5/95 when the minimum Ca/S mole ratio requirement in condition no. 13 was deleted.)

*This permit is also subject to the following conditions for the mitigation of potential adverse environmental impacts as identified in the EIR: (Added 9/94)

*59. No co-product, by-product, ash or other solid wastes generated during coke and/or coal combustion shall be sent to a disposal site in Contra Costa County. (Condition added 9/94 when vanadium limit deleted.)

Conditions for Source 5:

*60. This source shall be properly maintained and kept in good operating condition at all times.

*61. In no event shall the emissions from this source when added to the particulate matter emissions from all other sources at this GWF facility exceed 15 TPY PM10.

62. The Source 5 P-Tank shall be enclosed and vented to the A-3 Fly Ash Silo during all periods of operation.

63. The unloading of the Source 5 P-Tank shall be done pneumatically with closed connections to an enclosed top loading truck.

*64. (deleted 3/03, exempt source removed)

~~*65. An obstruction to the hammer mill flow path shall be cleared as soon as possible.~~ (Deleted under application #15602)

*66. (deleted 3/03, exempt source removed)

67. (deleted 3/03, exempt source removed)

*68. (deleted 3/03, exempt source removed)

*69. (deleted 3/03, exempt source removed)

*70. (deleted 3/03, exempt source removed)

*71. The S-19 Emergency Standby Power Generator, 750 HP Diesel-fired, shall be operated a maximum of ~~500~~ 20 non-emergency hours per any consecutive 12-month period. (Operating hours revised under application #15602)

*72. (deleted 3/03, did not apply to this plant)

73. Monthly reports of emissions of SO2, NOX, and CO shall be submitted to the Enforcement Division. The reports shall be submitted within twenty business days after the end of each

month. The reports will contain the emissions of SO2, NOX, and CO for the preceding month and the preceding consecutive twelve months. The consecutive twelve-month period totals shall be derived every month by summing the totals for the last twelve calendar months. These records and reports shall contain the SO2, NOX, and CO emissions from the S-19 emergency diesel generator. The emissions shall be based on hours of operation and the following emission factors:

NOX: 17.9 lb NOX/hr
SO2: 2.8 lb SO2/hr
CO: 3.9 lb CO/hr

74. All records associated with the above conditions shall be retained by GWF for at least five years for review by the District and shall be supplied to the District upon request. The recording format shall be subject to the approval of the APCO.

75. The facility shall notify the District within 96 hours of determining that the facility has exceeded any emission limit.

76. Continuous emission monitoring data may be used to determine compliance with the consecutive twelve month emission limits.

RECOMMENDATION

I recommend a modified Synthetic Minor Operating Permit be issued to GWF Power Systems for the following equipment:

Sources:

S-1 Circulating Fluidized Bed Combustor, ~~245~~ 245 MM Btu/hr Maximum; abated by Integral Cyclones (6), Ammonia Injection, Sorbent Injection, and Cantech Environmental System, Inc. Pulse-Jet Baghouse (per specification CPC Doc. No 1112-4053 and 1/28/88 Letter of Guarantee) (A-4) (Source description amended under application #15602)
S-2 Fluidized Bed Preheat Burner, 70 MMBtu/hr (Revised 1/99)
S-3 Solid Fuel Storage Silo; abated by Bin Vent Filter, (A-1) (Source description amended under application #15602)
S-4 Sorbent Storage Silo; abated by Bin Vent Filter (A-2)
S-5 ~~Bed Material~~ Coarse Particle Co-product Handling System serving (S-1) Drain (Screw Cooler), with mechanical drag conveyor, pneumatically sealed portable skid mounted tank; abated by Bin Vent Filter (A-3) (Source description amended under application #15602)
S-6 ~~Ash~~ Fine Particle Co-product Storage Silo; abated by Bin Vent Filter (A-3)~~, Fly Ash Primary Cyclone and Pulse Jet Bag Filter~~ (Source description amended under application #15602)
S-8 Solid Fuel Conveyor System~~s~~ with Pneumatic Coke Fill Line, Transfer Points, and Scalper/Feeder Operations enclosed; abated by Bin Vent Filter (A-1) (Source description amended under application #15602)

S-9 Sorbent Conveyor System; abated by Bin Vent Filter (A-2)
S-10 ~~Fly Ash Handling~~ Fine Particle Co-product Handling System serving two Economizer Hoppers, one Preheat Hopper, and the four Baghouse Hoppers connected to S-6; abated by Fine Particle Cyclone Allen-Sherman-Hoff Model 1-42 (A-5) and Pulse Jet Bag Filter Secondary Separator, Ultra Industries CD-18-100 (A-6) (Source description amended under application #15602)
S-15 Kaolin Storage Silo and Feed System; abated by A-7, Kaolin Bin Vent Filter (added 5/93)
S-16 ~~Gypsum/Coke~~ Utility Storage Silo and Feed System, Wes-Co, 1600 cubic feet capacity; abated by ~~Gypsum~~ Bin Vent Filter (A-8) (added 5/93)(revised 11/98 to allow coke storage) (Source description amended under application #15602)
S-19 Emergency Standby Power Generator, 750 HP Diesel-Fired (added as permitted source due to loss of exemption effective 9/01)

The exempt sources at this facility are:

S-11 Startup Oil Fuel Storage Tank, 40,000 gal capacity
S-12 Power 5 System Ammonia Storage Tank
S-17 Paint Operation
Diesel Fueling Station
Welding Operation
Oil/Water Separator
Steam Turbine Lubricating Oil Demister
Waste Oil Storage, Four 55 gal tanks
Cooling Tower
Wet Petroleum Coke unloading and handling system

_____
Hon-ting Man
Air Quality Engineer II
August 24, 2010