ENGINEERING ANALYSIS

Source Name: **Gateway Cogeneration 1 LLC** Permit No.: **52375-002**

Source Location: **Chudoba Parkway, Prince George, Virginia** Engineer: **AMS**

Date: **August 23, 2012**

I. Introduction and Background

A. Company Background

The facility, as proposed, will be a new combined cycle electrical power generating facility. The facility will be located on Chudoba Parkway in Prince George County, which is in attainment for all pollutants. It will be a major source of greenhouse gas (GHG), triggering Prevention of Significant Deterioration (PSD) permitting for GHG, PM_{10}, and $PM_{2.5}$ emissions.

The company is located on a site which is suitable from an air pollution standpoint. Additionally, the county of Prince George has certified that the location and operation of the facility are consistent with all applicable ordinances adopted pursuant to Chapter 22 (§15.2-2200 et seq.) of Title 15.2 of the Code of Virginia (see attached Local Governing Body Certification Form).

B. Proposed Project Summary

The proposed project will be a nominal 160 MW combined cycle electrical power generating facility utilizing two combustion turbines each with a heat recovery steam generator (HRSG) and no duct burning. The proposed fuels are natural gas and ultra low sulfur diesel (ULSD) as back up (with a maximum of 500 hours of operation on ULSD). Emissions from the turbines will be controlled by the use of low carbon fuels and high efficiency design (for GHG), clean fuels and good combustion practices (for PM_{10} and $PM_{2.5}$ emissions), SCR and water injection (for NOx), and oxidation catalyst (for CO and VOC). A cooling tower and fuel tanks are also proposed, as well as an emergency diesel fire pump. Electrical circuit breakers potentially emit GHG pollutants (expressed as carbon dioxide equivalents, or CO_2-e) so they will be covered in the permit as well.

C. Process and Equipment Description

Equipment to be Constructed			
Ref. No.	**Equipment Description**	**Rated Capacity**	**Federal Requirements**
CT01	Rolls Royce Trent 60 WLE Combustion Turbine with associated HRSG	64 MW (CT only) 593 MMBtu/hr on natural gas 583 MMBtu/hr on ultra low sulfur diesel	NSPS Subpart KKKK
CT02	Rolls Royce Trent 60 WLE Combustion Turbine with associated HRSG	64 MW (CT only) 593 MMBtu/hr on natural gas 583 MMBtu/hr on ultra low sulfur diesel	NSPS Subpart KKKK
FP01	Emergency Diesel Fire Pump	1.86 MMBtu/hr (250 BHP)	NSPS Subpart IIII (non-delegated) MACT Subpart ZZZZ (non-delegated)
TR01	Mechanical Draft Cooling tower	55,000 gallons/min.	
EB01	Four electrical circuit breakers	60 lb SF_6 per breaker	

Equipment Exempt from Permitting				
Ref. No.	**Equipment Description**	**Rated Capacity**	**Exemption Citation**	**Exemption Date**
TK01	Vertical fixed roof storage tank for ultra low sulfur diesel	115,000 gallons	9 VAC 5-80-1320 B 4	August 27, 2012

D. Project Schedule

Date permit application received in region: January 11, 2012
Date application was deemed complete: January 11, 2012
Proposed construction commencement date: September 1, 2012
Proposed start-up date: December 1, 2013

II. Emissions Calculations (see attached spreadsheets)

Emissions from startup and shutdown were included in the annual permit emissions limits for the combustion turbines, but separate limits will not be included. Short-term CO_2-e emissions were not included in the permit because there is no regulatory basis to do so, however, annual limits on a ton/yr and lb/MWh basis will be included.

The turbines will be limited to 4.2 x 10^6 gallons of ULSD fuel per year. This is equivalent to 500 hours of operation using the following equation:

$$583\frac{MMBtu}{hr}\ per\ turbine\ x\ 2\ turbines\ \div 0.138\frac{MMBtu}{gal}x\ 500\frac{hours}{yr} = 4{,}224{,}637.7\frac{gals}{yr} = 4.2\ x\ 10^6\frac{gals}{yr}$$

III. Regulatory Review

The proposed project is a major new source with projected permitted emissions of CO_2-e over 100,000 tons and PM_{10} emissions over 15 TPY. The source is located in an area that is in attainment for all pollutants.

Federal Regulatory Review:

Greenhouse Gas Tailoring Rule:

After July 1, 2011, new sources that have the potential to emit 100,000 tons or more of CO_2-e and modified sources with a net emission increase of CO_2-e over 75,000 tons year will be required to obtain a PSD permit. The total CO2-e is based on taking the mass emissions of each GHG and multiplying by its Global Warming Potential (GWP). These GWP factors are as follows: CO_2: 1; CH_4: 21; N_20: 310; SF_6: 23,900; HFCs: 140 to over 11,700; and PFCs: 5,210 to 9,200. The first three GHG pollutants are primarily from fuel burning and the latter pollutants are from semi-conductor and other production processes. This facility has electrical circuit breakers which contain SF_6.

Since any permit for the project would be issued after July 1, 2011 and permitted CO_2-e emissions will be greater than 100,000 tons, the source would be subject to PSD permitting.

PSD Permitting: The source is subject to PSD permitting for CO_2-e emissions which are over 100,000 tons/yr (see Table 1 below). Because one pollutant is subject to PSD, the other pollutants at the source need to be evaluated for PSD at their significance level. PM_{10} and $PM_{2.5}$ both exceed the PSD significance level for each pollutant so the facility will be subject to PSD for GHG (CO2-e), PM_{10}, and $PM_{2.5}$. The source is required to apply BACT for these pollutants. BACT for these pollutants is discussed in Section III.C.

Table 1- PSD Permitting applicability

Pollutant	Potential to Emit (TPY)	PSD Major Threshold (TPY)	Over Major Threshold?	PSD Significance Rate (TPY)	PSD Required?
CO	49.9	100	N	100	N
NOx	39.2	100	N	40	N
PM_{10}	48.9	100	N	15	Y
$PM_{2.5}$	48.9	100	N	10	Y

Pollutant	Potential to Emit (TPY)	PSD Major Threshold (TPY)	Over Major Threshold?	PSD Significance Rate (TPY)	PSD Required?
SO_2	7.7	100	N	40	N
VOC	23.5	100	N	40	N
GHG (CO_2 + CH_4 + N_2O + SF_6	591,265.1	100	Y		
CO_2-e	591,978	100,000	Y		Y

NSPS Requirements: The combustion turbines are subject to NSPS subpart KKKK (Standards of Performance for Stationary Combustion Turbines) which requires the source to meet NO_x and SO_2 standards. The source must meet a NO_x limit of 25 ppm when burning natural gas, and a 74 ppm limit when firing ULSD oil. The source proposes the use of water injection (WLE) and SCR to control NO_x emissions. NO_x emissions from the proposed combustion turbines are expected to be around 2.0 ppmvd when burning natural gas, and 5.0 ppmvd when burning ULSD – which are below the NSPS standards and are considered Best Available Control Technology (BACT). The source will put NO_x CEMS on the turbine stacks to show compliance with the BACT limits.

The source proposes using low-sulfur fuels (ULSD at 0.0015% sulfur and natural gas) to control SO_2. To be in compliance with NSPS KKKK, they must not exceed 0.90 lb SO_2/MWh emissions, or 0.06 lb SO_2/MMBtu from fuel burning. The source has proposed a voluntary emission limit of 0.0016 lb SO_2/MMBtu or 0.3 ppmvd @ 15% O_2 (PSD and State BACT do not apply). BACT is discussed in more detail in Section III.C.

A new NSPS (Subpart TTTT) could possibly be in place before this source constructs the turbines so the turbines could be subject to that subpart. The proposed standard is a CO_2 emission limit of 1,000 lb/MWh (gross annual average considering all operation), although a range has been examined that covers 950-1100 lb/MWh. Expected emissions of CO_2 from the facility are around 1050 lb/MWh on the same basis, though the specific value is dependent on actual operating modes. When the source conducts Part 75 monitoring for Acid Rain, it will fulfill the proposed monitoring requirements for NSPS Subpart TTTT.

Finally, the diesel fire pump is subject to NSPS Subpart IIII. It is subject to a NOx + non-methane hydrocarbon (NMHC) limit of 3.0 g/hp-hr, a PM limit of 0.15 g/hp-hr, a CO limit of 2.6 g/hp-hr, and a requirement to use ULSD with no more than 15 ppm sulfur content. Although the source must be in compliance with these limits, DEQ has not elected to receive delegation for enforcement of this regulation, so no requirements specific to this regulation will be included in this permit. BACT limits will be used to ensure the NSPS standards are met.

MACT Requirements: The diesel fire pump (emergency, stationary, RICE less than 500 hp located at an area source) is also subject to MACT Subpart ZZZZ (40 CFR 63.6590.c.1). Compliance with this MACT is met by complying with NSPS Subpart IIII requirements. DEQ has not elected to receive delegation to enforce this EPA regulation so requirements for this specific regulation will not be included in the permit.

As an area HAP source, the facility will not be subject to MACT Subpart YYYY for turbines or MACT Subpart Q for cooling towers.

Other: The source will also be subject to the Acid Rain permit regulations but will seek an Acid Rain permit at a later date. The source will be subject to Title V permitting and must submit a Title V application within a year of commencing operation.

State New Source Review:

The combustion turbines are subject to Virginia Article 6 permitting for new and modified sources as their uncontrolled emissions exceed the values in 9 VAC 5-80-1320 C for PM_{10}, CO, NOx and VOC. The other emissions units at the facility are exempt from Article 6 permitting (see Table 2 below.

Table 2- Article 6 Emissions Applicability

	PM_{10}	CO	SO_2	NOx	VOC
CT01	65.7	114.9	4.09	812.03	56.56
CT02	65.7	114.9	4.09	812.03	56.56
Tanks	-	-	-	-	0.02
Fire Pump	0.01	0.14	0.01	0.17	0.06
Cooling Tower	0.45	-	-	-	-
Electrical Circuit Breaker	-	-	-	-	-
Totals	131.86	229.94	8.19	1624.23	113.20
Article 6 threshold	25	100	15	40	40
Subject to Article 6?	Yes	Yes	No	Yes	Yes

Note: Uncontrolled emissions from the combustion turbines were back-calculated based on the following assumptions:
Control efficiency for NOx from SCR + WLE = 94%
Control efficiency for CO from Ox Cat = 80%
Control efficiency for VOC from Ox Cat = 80%

Existing Source Rules:

The exempt fuel oil tank is not subject to Rule 4-37 (Emission Standards for Petroleum Liquid Storage and Transfer Operations) because it holds only diesel oil with a vapor pressure less than 1.5 psia. The fire pump is subject to Rule 4-4 (Emission Standards for General Process Operations) as a combustion installation but must meet the standards of NSPS IIII, which are more stringent.

A. Criteria Pollutants

Criteria pollutant modeling was conducted to ensure that the facility will not violate the NAAQS.

PSD increment
Modeled impacts are below the Significant Impact Level (SIL) for PM_{10} for both Class I and Class II modeling. For $PM_{2.5}$, class I impacts are below the SIL, while Class II impacts exceed the SIL. As such, full modeling was performed for Class II for $PM_{2.5}$. The results of that modeling show that all impacts are below the $PM_{2.5}$ NAAQS and Class II $PM_{2.5}$ increment.

B. Toxic Pollutants

MACTs have been promulgated for Combustion Turbines that are major sources of Hazardous Air Pollutants (HAP) (Subpart YYYY National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines) and for cooling towers at major sources of HAP (Subpart Q National Emission Standards for Hazardous Air Pollutants For Industrial Process Cooling Towers). HAP emissions from this facility will be below major levels, so there will be no MACT requirements for the Combustion Turbines or Cooling Towers and, therefore, the State Toxics Rule will apply. The source will need to demonstrate that they are minor for HAPs. The only HAP that exceeds the exemption rate in 9 VAC 5-60-300 is formaldehyde. It will appear in a State Only section of the permit. Modeling has shown that formaldehyde emissions will not exceed the Standard Ambient Air Concentration (SAAC) with impacts less than 1% of the SAAC for both short-term (hourly) and long-term (annual) intervals.

The emergency diesel fire pump is subject to MACT Subpart ZZZZ as an area source as per the application submitted by GGE. The requirements for this unit will be to comply with NSPS subpart IIII requirements, which will be enforced by EPA, not DEQ.

The State Toxics Rule will not apply to either the turbines or the emergency fire pump because the units are subject to a promulgated MACT standard.

C. Control Technology

PSD BACT: Sources that are subject to PSD permitting, must apply BACT to those pollutants that triggered PSD permitting (see Table 1 in Section III). The determination of BACT usually involves a top-down method:

Step 1 – Identify all possible control technologies;
Step 2 – Eliminate technically infeasible options;
Step 3 – Rank the technically feasible control technologies based upon emission reduction potential;
Step 4 – Evaluate ranked controls based on energy, environmental, and/or economic considerations; and
Step 5 – Select BACT.

Greenhouse gasses: In this case, CO_2-e emissions from the proposed facility trigger PSD permitting (on both a mass basis and CO2-e basis, see Table 1 above) so BACT must be determined for CO_2-e. CO_2-e is a relatively new regulated pollutant so there are few determinations in the RACT/BACT/LAER Clearinghouse to compare, especially for smaller natural gas combined cycle turbines.

Combustion Turbines

1. Possible Control Technologies:

- Carbon capture and sequestration/storage: One such technology that is being discussed to control CO_2 is Carbon Capture and Sequestration/Storage (CCS). CCS consists of concentrating/capturing CO_2 from exhaust and transporting it to a location where it can be stored for a long time, deep in the ground. It is being demonstrated on pilot-scale power plant projects and on other types of facilities around the world.

- Efficient power generation: Another strategy being used to minimize CO_2 emissions is to maximize the energy efficiency and performance of the turbines. This has been the most accepted BACT for natural gas, combined-cycle plants. By using more efficient turbines (a Trent 60 can reach 42% efficiency from the CT alone) and including the steam system to capture heat from the exhaust, less fuel can be used and CO_2 emissions can be minimized.

- Using low carbon fuel, like natural gas instead of coal, can reduce GHG.

2. Technically infeasible options:

The GGE application concluded that CCS was technically infeasible for a plant such as theirs, but discussed this control option in further steps in the BACT determination process and revisited this argument in a follow-up document (July 5, 2012). Although the CCS technology is available and technically feasible for some applications (such as natural gas processing industries and petroleum refining), and in certain areas of the country, it is not a proven control option for a small, natural gas, combined cycle combustion turbine whose exhaust is characterized by high flow and low CO_2 concentration. There are no instances that could be found of CCS being used on such a facility. The proposed location does not appear to be geologically ideal for CCS but could offer some marginal options. The technology can cause a significant energy penalty (estimated to be up to 15%) which could cause the units to have to burn more fuel and create more air pollution than would otherwise be emitted, and/or reduced power output. CCS works best on larger units, especially coal burning units, which have the potential to emit CO_2 in larger concentrations than this plant.

Efficient power generation and the use of low carbon fuel are feasible for this GGE project.

3. Rank technologies

Since BACT is based on an emission limitation which reflects the maximum degree of reduction for a particular pollutant, then the best means of comparison is of emission limits rather than % control efficiency. Since energy efficiency plays a role in emissions, one must compare efficiency limits based on output (Btu/kWh) rather than mass limits based on heat input (lb/MMBtu). This is because, as a unit gets older and less efficient, it may still meet a lb/MMBtu limit while, at the same time, using more fuel to achieve its heat input need, therefore increasing emissions. Only a handful of CCT have been permitted for GHG so a quick comparison can be made. As can be seen in Table 3 below, this project is much smaller than most of the other, recently permitted or proposed NGCC projects. Keeping in mind that thermal efficiency increases with larger turbines, and the net heat rate (Btu/kWh) decreases, the difference in BACT levels between the proposed 160 MW plant and the permitted or proposed 500+MW plants can be explained. The Gateway plant also has oil backup which could impact efficiency. When comparing a heat rate limit, it is important to know whether it is based on a HHV or LHV and whether it is for a gross power output or a net power output. This is not always evident. Also, some GHG BACT proposals include a "degradation factor" which takes into consideration the heat rate of a unit as it gets older and less efficient. Other GHG BACT proposals may not (see discussion of the proposed BACT in GGE's July 5, 2012 submittal).

Table 3 – Comparison of GHG BACT determinations

Facility	Type	GHG BACT	
Gateway Cogeneration 1	160 MW NGCC w/oil backup	8983 Btu/kWh (gross HHV, including degradation)	Thermal Efficiency
Cheyenne Light, Fuel, & Power	220 MW NGCC	7062 Btu/KWh (gross HHV)	Thermal Efficiency
Palmdale Hybrid Power	570 MW NGCC and 50 MW solar collectors	7319 Btu/kWh	Thermal Efficiency
Lower Colorado River Authority	590 MW NGCC	7720 Btu/kWh	Thermal Efficiency
Russell City Energy Ctr	600 MW NGCC	7730 Btu/kWh (including degredation)	Thermal Efficiency
PacifiCorp	629 MW NGCC	950 lb/MWh	Thermal Efficiency
CPV (St. Charles, MD)	725 MW NGCC	7605 Btu/kW	Thermal Efficiency
Cricket Valley Energy Ctr	1,000 MW NGCC	7605 Btu/kWh (net LHV)	Thermal Efficiency

No information could be found on GHG BACT limits for a natural gas combined cycle power plant using CCS for comparison with a thermal efficiency approach but estimates have shown it to be about 90% effective in reducing GHG emissions. One study[1] predicted that a natural gas-fired power plant that had a CO_2 emission rate of 803 lb/MWh could reduce emissions to 94 lb/MWh by adding CCS, but at a cost of $1336/kW.

4. Most effective Controls

Of the technologies mentioned in Step 1 above, construction of a carbon capture control, transport and storage system for CO_2 gas in the Prince George County region would be cost-prohibitive. The capital cost for the project is estimated to be $136 million. A recent study suggested that adding CCS technology could increase plant construction costs up to $200 million[2]. These factors, and the cost from a 15% energy penalty which increases fuel usage, would make CCS economically infeasible at this time (see discussion from GGE's July 5, 2012 submittal).

1 Rubin, Edward S and Haibo Zhai. The Cost of Carbon Capture and Storage for Natural Gas Combined Cycle Power Plants. *Environ. Sci. Technol.* 46:3076-3084 (2012)

2 Fishbeck, Paul S, David Gerard, and Sean T McCoy. Sensitivity analysis of the build decision for carbon capture and sequestration projects. *Greenhouse Gas Sci. Technol. 2:36-45* (2012)

The remaining technologies, namely efficient power generation and the use of low carbon fuels, are proposed for this facility and are accepted as BACT. The plant will be required to use no more than 500 hours/yr of fuel other than natural gas (ULSD) and to operate at a higher heating value heat rate 8,983 Btu/KWh.

Fire Pump
Add-on CO_2 controls are not feasible for emergency generators so BACT for the fire pump will be fuel-efficient design and a limit of 200 operating hours/yr.

Electrical Breakers
The electrical circuit breakers contain SF_6 which is a GHG. There is a small potential for these sealed units to release SF_6 from leaks. Although an alternative to the SF_6 would be to use oil or air-blast circuit breakers, which would not have the potential to release SF_6, this technology is being replaced by the sealed SF_6 circuit breakers due to the superior insulating and arc-quenching capabilities of the SF_6 type units. The oil and air-blast units are also larger than the SF_6 units, generate more noise, and the dielectric oil is flammable and also has adverse environmental impact if released. Studies have shown that the leakage rate for SF_6 from these circuit breakers is between 0.2 and 2.5 percent over the lifetime of the unit.[3] Therefore, BACT for the circuit breakers will be to minimize SF_6 leakage by using an enclosed-pressure circuit breaker with a 1.0 percent annual leakage rate (equivalent to 0.0012 lb/yr) and a leak detection system.

Particulate Matter (PM_{10} and $PM_{2.5}$, including condensable) – Because the turbines are subject to PSD for GHG, other pollutants need to be compared to the significance rates in 9 VAC 5-80-1615. If the annual emission rate of any pollutant is higher than the significance rate, that pollutant is subject to PSD. Table 1 above shows that Particulate Matter (PM_{10} and $PM_{2.5}$) also triggers PSD review, and therefore determination of BACT.

Combustion Turbines
Add-on PM controls (such as scrubbers or baghouses) are not recommended for combustion turbines burning natural gas because the PM particles are quite small (<1 micron) and the air volume is quite large, thus diluting PM. Therefore, turbine design and operation limitations must be reviewed. The use of low-ash fuel (natural gas and ULSD) and good combustion practices are widely accepted as PSD BACT for PM_{10} and $PM_{2.5}$ from combustion turbines and so are accepted as BACT for these units to achieve emission limits of 5.0 lb/hr when burning natural gas and 15.0 lb/hr when burning ULSD.

Fire Pump
Possible PM controls for an emergency generator consist of the following: catalysts, including diesel particulate filters, clean fuels and good combustion practices. Of these, catalysts are not used for units that are only run on an as-needed basis, making them not technically feasible for this unit. Therefore, PSD BACT for PM from the fire pump shall be the use of clean fuels (i.e., natural gas and ULSD) and good combustion practices to achieve an emission limit for PM_{10} and $PM_{2.5}$ of 0.15 g/hp-hr (0.083 lb/hr).

Cooling Tower

Cooling towers produce drift, which is composed of fine water droplets that may contain dissolved solids and thus contribute to PM emissions. The only feasible PM controls for cooling towers is to use water with low total dissolved solids content and drift eliminators. The facility will use clean cooling water and has proposed the use of drift eliminators. BACT for PM from

3 *SF_6 Leak Rates from High Voltage Circuit Breakers – U.S. EPA Investigates Potential Greenhouse Gas Emissions Source*, J. Blackman (U.S. EPA, Program Manager, SF6 Emission Reduction Partnership for Electric Power Systems), M. Averyt (ICF Consulting), and Z. Taylor (ICF Consulting), June 2006.

the cooling towers will be to keep dissolved solids below 1200 mg/l and to achieve a drift rate of 0.001 percent of the circulating water flow (equivalent to 0.5 TPY of PM_{10} and 0.3 TPY of $PM_{2.5}$.

State BACT: New units, whose uncontrolled emissions exceed the exemption levels in 9 VAC 5-80-1320 C, are required to apply State BACT to emissions (See Table 2 in Section III). State BACT does not require a formal top-down analysis of control options, but must be no less stringent than any NSPS or MACT standard. State BACT is determined on a case-by-case basis, taking into consideration energy, environmental and economic impacts and other costs.

Since emissions from the combustion turbines exceed the exemption level for PM_{10}, NOx, CO, and VOC, State BACT applies to those pollutants (no other units trigger BACT). However, since PM_{10} is subject to federal BACT, state BACT for PM_{10} is redundant.

Combustion Turbines

PM – State BACT for PM and PM_{10} from the combustion turbines will be the same as for the PSD BACT, namely the use of low-ash fuel (natural gas and ULSD) and good combustion practices.

NOx – The facility proposes a NO_x limit of 2 ppm on NG and 5 ppm on ULSD, using wet, low emission (WLE) turbines and SCR to control NO_x. This is comparable to other facilities that have been recently permitted across the country (see tables in permit application). In most cases, lower emission rates reflect LAER rather than BACT so they are not comparable with this facility.

CO – CO emissions from the turbines are proposed to be 4 ppm (on either NG or ULSD) using good combustion practices and oxidation catalyst. This is a lower BACT than many similar combustion turbines permitted across the country (see tables in permit application). Those combustion turbines that have a lower BACT for CO (around 2-3 ppm) have a larger NOx emission rate (2.5 ppm). This facility chooses to minimize NOx and CO at the same time, so the proposed State BACT is acceptable.

VOC - The facility proposes a VOC limit of 2 ppm (on either NG or ULSD) using good combustion practices and oxidation catalyst. This is comparable to most units which were recently permitted (see tables in permit application). Those projects that had a lower VOC limit had a much higher NO_x limit. As with CO, by minimizing both NO_x and VOC at the same time, VOC emissions might be a bit higher than similar facilities with a higher NO_x limit.

SU/SD – During startup and shutdown, post-combustion controls are not as effective as during normal operation. The source proposes secondary state BACT limits for NOx, CO and VOC during these periods. The source will use CEMS for NOx and CO and, since VOC and CO are produced from similar conditions and both are controlled with oxidation catalyst, then the CO CEMS will also act as a surrogate parameter for VOC emissions, in that, complying with the CO limit will demonstrate compliance with the VOC limit.

Table 4 below summarizes BACT for the facility:

Pollutant	Primary BACT	Control	Secondary BACT (State)	Compliance
NO_x (State)	Turbines 2.0 ppmvd – gas (3-hour avg.) 5.0 ppmvd – ULSD (3-hour avg.)	Water injection and SCR	19.5 tons/yr	NOx CEMS
CO (State)	Turbines 4.0 ppmvd (3-hour avg.)	Oxidation catalyst	24.9 tons/yr	CO CEMS

Pollutant	Primary BACT	Control	Secondary BACT (State)	Compliance
PM_{10} (Federal and State) and $PM_{2.5}$ (Federal)	Turbines 5.0 lbs/hr gas (3-hour avg.) 15.0 lbs/hr ULSD (3-hour avg.)	Proper operation and maintenance on the turbines		stack test
	Fire Pump 0.15 g/hp-hr	Clean fuel and good combustion practices		
	Cooling Tower Drift rate of 0.001% of circulating water flow	Low total dissolved solids (TDS) and drift eliminators		Weekly water quality testing for TDS
VOC (State)	Turbines 2.0 ppmvd (3-hour avg.)	Oxidation catalyst	11.7 tons/yr	stack test and CO CEMS compliance
CO_2-e (Federal)	Turbines 8,983 Btu/kWh (HHV gross) and 1050 lb/MWh	Energy efficient combustion practices and low GHG fuels		ASME Performance Test Code on Overall Plant Performance (PTC 46) and CO_2 CEMS (Part 75)
	Fire Pump 74.21 kg/MMBtu	Fuel-efficient design		74.21 kg/MMBtu HHV and fuel usage monitoring
	Electrical Circuit breakers	Enclosed-pressure type breaker and leak detection		Audible alarm with decreased pressure.

The proposed control strategies are considered to be the Best Available Control Technology (BACT) for this source type and are more stringent than NSPS standards.

IV. Initial Compliance Determination

A. Testing – stack testing is required for PM_{10} from the turbines to show compliance with the BACT limit. An initial compliance test using ASME Performance Test Code on Overall Plant Performance (ASME PTC 46-1996) is to be conducted on the turbine power blocks to show compliance with the heat rate limit of 8,983 Btu/kWh (HHV gross). SO_2 will be monitored by fuel testing and certification to show compliance with the voluntary limit of 0.3 ppmvd @ 15% O_2 for the turbines.

B. VEEs – an initial VEE will be required for the combustion turbines while burning ULSD oil, within 60 days of burning ULSD oil for the first time.

V. Continuing Compliance Determination

A. CEMS – will be required for NO_x (NSPS) and is also proposed for CO (and CO as a surrogate for VOC). Requirements for CEMS performance evaluations, quality assurance, and excess emissions reports will be included in the permit.

B. Recordkeeping – The following records will be kept by the permittee for the most recent five years:

a. Annual hours of operation of the emergency fire pump (FP01), calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

b. Annual throughput of natural gas and ULSD to the combustion turbines (CT01, CT02), calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most

recently completed calendar month to the individual monthly totals for the preceding 11 months.

c. Time, date and duration of each malfunction period for each combustion turbine (CT01, CT02)

d. All fuel supplier certifications.

e. Continuous monitoring system emissions data, calibrations and calibration checks, percent operating time, and excess emissions.

f. Operation and control device monitoring records for each SCR system and oxidation catalyst as required in Conditions 8 and 9.

g. Weekly log of dissolved solids content of cooling water.

h. Scheduled and unscheduled maintenance, and operator training.

i. Results of all stack tests, visible emission evaluations, and performance evaluations.

C. Further Testing – fuel sulfur monitoring and CEMS for NOx and CO will be required in lieu of additional testing.

VI. Public Participation

The applicant held a public information session on March 13, 2012 at the JEJ Moore Middle School in Prince George County to provide the community with information about the project. As with the earlier rezoning meeting only comments in favor of the project were received at the public information session.

Pursuant to 9 VAC 5-80-1775 (Article 8) of the Regulations, the proposed project is subject to a public comment period of at least 30 days, followed by a public hearing.

An information meeting and public hearing was held on August 8, 2012, followed by 15 more days of public comment.

The following documents are attached:

A. Public hearing notice
B. Public hearing opening statement
C. Public briefing
D. Virginia Register notice
E. Documents concerning public comment period

VII. Other Considerations

A. File Consistency Review – This is the first permit action for this source

B. PRO Policy Consistency Review – A review of similar combustion turbine permits proposed or issued in the USA was conducted. The most recent boilerplate was used for this permit.

C. Confidentiality – The source has not claimed confidentiality of any data.

D. Permit History – This is the first permit issued for this source

VIII. Recommendations

Based on the information submitted, it is recommended that this permit be issued. Recommendations and limitations are provided in the draft permit letter.

Regional Engineer: _____ Date: 8/23/2012

Reviewing Engineer: _____ Date: 8/23/2012

Attachments: Permit application
Local Governing Body Certification Form
Calculation sheets

Gateway Smart Water Project
Prince George County
52375-02
AMS

Totals

	CT01		CT02		FP		Cooling Tower		Circuit Breakers	Totals	
pollutant	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	tpy	lb/hr	tpy
PM	15.00	24.40	15.00	24.40	0.08	0.01	0.10	0.45	--	30.19	49.26
PM10	15.00	24.40	15.00	24.40	0.08	0.01	0.10	0.45	--	30.19	49.26
PM2.5	15.00	24.40	15.00	24.40	0.08	0.01	0.06	0.27	--	30.15	49.08
CO	5.25	24.87	5.25	24.87	1.43	0.14	--	--	--	11.93	49.88
NOx	11.12	19.49	11.12	19.49	1.65	0.17	--	--	--	23.90	39.15
SO2	0.93	3.85	0.93	3.85	0.00	0.00	--	--	--	1.87	7.71
VOC	2.58	11.74	2.58	11.74	0.67	0.07	--	--	--	5.84	23.55
CO_2	94,928.92	295,617.36	94,928.92	295,617.36	304.08	30.41	--	--	--	190,161.92	591,265.13
CH_4	3.86	6.07	3.86	6.07	0.01	0.0012	--	--	--	7.72	12.13
N2O	0.77	0.68	0.77	0.68	0.00	0.0002	--	--	--	1.54	1.35
SF6	--	--	--	--	--	--	--	--	0.0012		
CO2-e	95,248.66	295,959.63	95,248.66	295,959.63	305.10	30.51	--	--	28.68	190,802.43	591,978.45

HAPs Total 1.61 tpy
Max Single 1.11 tpy

Gateway Smart Water Project
Prince George County
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Emissions from EACH of the combustion turbines

Capacity	64 MW			
	592.6 MMBtu/hr	gas	8760 hrs/yr	
	583.0 MMBtu/hr	oil	500 hrs/yr	8260 hrs/yr (gas)

Natural Gas Combustion		Uncontrolled		Controlled @ 8760 hours				Adjusted for average annual temperature	Controlled @ 8260 hours		Adjusted for average annual temperature
pollutant	EF (lb/MMBtu)	lb/hr	ton/yr	Control	%	lb/hr	tons/yr	tons/yr	lb/hr	tons/yr	tons/yr
PM	0.0084	5.00	21.90	None	0	5.00	21.90	21.90	5.00	20.65	20.65
PM10	0.0084	5.00	21.90	None	0	5.00	21.90	21.90	5.00	20.65	20.65
PM2.5	0.0084	5.00	21.90	None	0	5.00	21.90	21.90	5.00	20.65	20.65
CO	0.0441	26.14	114.50	Ox Cat	80	5.23	22.90	21.86	5.23	21.59	20.61
NOx	0.1245	73.78	323.15	SCR + WLE	94	4.43	19.39	18.53	4.43	18.28	17.47
SO2	0.0016	0.92	4.02	None	0	0.92	4.02	3.85	0.92	3.79	3.63
VOC	0.0216	12.83	56.18	Ox Cat	80	2.57	11.24	10.73	2.57	10.59	10.12
CO_2	123.03	72,910.12	319,346.32	Efficiency	5	69,264.61	303,379.00	289,895.93	69,264.61	286,062.85	273,349.36
CH_4	0.0023	1.38	6.02	Efficiency	5	1.31	5.72	5.48	1.31	5.40	5.16
N2O	0.0002	0.14	0.60	Efficiency	5	0.13	0.57	0.53	0.13	0.54	0.50
CO2-e	123.16	72,981.77	319,660.14	Efficiency	5	69,332.68	303,677.14	290179.38	69,332.68	286,343.97	273,616.63

Oil Combustion		Uncontrolled		Controlled @8760 hours				Controlled @ 500 hours		Adjusted for average annual temperature
pollutant	EF (lb/MMBtu)	lb/hr	ton/yr	Control	%	lb/hr	tons/yr	lb/hr	tons/yr	tons/yr
PM	0.0257	15.00	65.70	None	0	15.00	65.70	15.00	3.75	3.75
PM10	0.0257	15.00	65.70	None	0	15.00	65.70	15.00	3.75	3.75
PM2.5	0.0257	15.00	65.70	None	0	15.00	65.70	15.00	3.75	3.75
CO	0.0450	26.24	114.91	Ox Cat	80	5.25	22.98	5.25	1.31	1.23
NOx	0.3180	185.39	812.03	SCR + WLE	94	11.12	48.72	11.12	2.78	2.61
SO2	0.0016	0.93	4.09	None	0	0.93	4.09	0.93	0.23	0.22
VOC	0.0222	12.91	56.56	Ox Cat	80	2.58	11.31	2.58	0.65	0.61
CO_2	171.40	99,925.18	437,672.27	Efficiency	5	94,928.92	415,788.66	94,928.92	23,732.23	22,268.00
CH_4	0.0070	4.06	17.78	Efficiency	5	3.86	16.89	3.86	0.96	0.90
N2O	0.0014	0.81	3.56	Efficiency	5	0.77	3.38	0.77	0.19	0.18
CO2-e	171.98	100,261.75	439,146.46	Efficiency	5	95,248.66	417,189.14	95,248.66	23,812.17	22,343.00

Worst Case Emissions from EACH turbine			
pollutant	lb/hr	tons/yr	secondary BACT TPY*
PM	15.00	24.40	
PM10	15.00	24.40	
PM2.5	15.00	24.40	
CO	5.25	21.86	24.87
NOx	11.12	20.08	19.49
SO2	0.93	3.85	
VOC	2.58	10.73	11.74
CO_2	94,928.92	295,617.36	
CH_4	3.86	6.07	
N2O	0.77	0.68	
CO2-e	95,248.66	295,959.63	

* The source proposes a secondary BACT from the combustion tu for NOx, CO and VOC that includes emissions from startup and shutdown, or that is needed to stay below the PSD significance value.

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startup	0.167 hr/event	10 min/event
shutdown	0.272 hr/event	16.3 min/event

Pollutant	Natural Gas		ULSD		Annual Emissions from SU/SD
	SU	SD	SU	SD	
	lb/event		lb/event		
NOx	5.17	11.21	10.34	28.37	
CO	7.75	11.14	8.09	12.74	3.0 tpy
VOC	0.65	1.01	1.19	1.16	1.0 tpy
PM10/2.5	0.64	1.36	1.79	4.070	
SO2	0.02	0.03	0.02	0.03	

Gateway Smart Water Project
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Fire Water Pump

250	hp	200	hrs/yr operation
453.59	g/lb	138	MMBtu/kgal
7000	Btu/hp-hr	1.754	MMBtu/hr LHV
138	MMBtu/kgal	1.8649	MMBtu/hr HHV

				Emissions	
Pollutant	EF	unit	lb/hr		tons/yr
PM10	0.150	g/hp-hr		0.083	0.0083
PM2.5	0.150	g/hp-hr		0.003	0.0003
CO	2.6	g/hp-hr		1.433	0.143
NOx	3	g/hp-hr		1.653	0.165
SO2	15	ppmw		0.0028	0.00028
VOC	0.36	lb/MMBtu		0.671	0.0671
CO2	163.055	lb/MMBtu		304.081	30.408
CH4	0.007	lb/MMBtu		0.012	0.001
N2O	0.001	lb/MMBtu		0.002	0.000
CO2e	163.604	lb/MMBtu		305.105	30.510

PM10, CO, SO2 and NOx EF from NSPS Subpart IIII, Table 4
VOC EF from AP-42 Table 3.3-1 (Oct 96)
GHG EF from 40 CFR Part 98, Table C-1

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Cooling Tower

Water Flow Rate (gpm)	Total Dissolved Solids [1] (mg/L)	Liquid Drift Loss (%)	Drift Mass Governed by Atmospheric Deposition[2] (%)	Drift Mass Flow Rate[3] (lb/hr)	Total PM/PM10 Emission Rate[4, 5] (lb/hr)	(tpy)	Total PM2.5 Emission Rate[5, 6] (lb/hr)	(tpy)
55,000	1200	0.001%	31.3%	275.22	0.10	0.45	0.06	0.27

Footnotes

[1]Cooling Tower makeup water is a blend of water from different sources. Value is maximum recirculated water TDS

[2]Based on *Effects of Pathogenic and Toxic Material Transport Via Cooling Device Drift - Vol 1* Technical Report EPA 600 7-79-251a, November 1979.

[3]Drift mass flow rate (lb/hr) = Cooling Tower capacity (gpm) x Density of water (8.34 lb/gal) x 60 (min/hr) x Drift loss (%)

[4]Hourly PM/PM10/PM2.5 emission rate (ton/yr) = Drift mass flow rate (lb/hr) x Drift mass (%) x TDS (mg/L)

[5]Annual PM/pm10/pm2.5 emission rate (ton/yr) = Hourly rate (lb/hr) x 8760 hrs/yr /2000 lb/ton

[6]Hourly PM2.5 emission rate (lb/hr) = 60% x PM10 rate (California Emission Inventory Development and Reporting System)

Gateway Smart Water Project
Prince George County
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Combustion Turbines 592.6 MMBtu/hr total (natural gas)
582.2 MMBtu/hr total (ULSD)

All emission factors are from AP-42 Table

NATURAL GAS		**Uncontrolled**		**Control**	**Controlled**	
Pollutant	**EF**	**Emissions**		**efficiency**	**Emissions**	
	(Lb/MMBtu)	**lb/hr**	**tpy**		**lb/hr**	**tpy**
1,3-Butadiene	4.30E-07	2.55E-04	1.12E-03	85%	3.82E-05	1.67E-04
Acetaldehyde	4.00E-05	2.37E-02	1.04E-01	85%	3.56E-03	1.56E-02
Acrolein	6.40E-06	3.79E-03	1.66E-02	85%	5.69E-04	2.49E-03
Benzene	1.20E-05	7.11E-03	3.11E-02	85%	1.07E-03	4.67E-03
Ethyl Benzene	3.20E-05	1.90E-02	8.31E-02	85%	2.84E-03	1.25E-02
Formaldehyde	7.10E-04	4.21E-01	1.84E+00	85%	6.31E-02	2.76E-01
Naphthalene	1.30E-06	7.70E-04	3.37E-03	85%	1.16E-04	5.06E-04
PAH	2.20E-06	1.30E-03	5.71E-03	85%	1.96E-04	8.57E-04
Propylene Oxide	2.90E-05	1.72E-02	7.53E-02	85%	2.58E-03	1.13E-02
Toluene	1.30E-04	7.70E-02	3.37E-01	85%	1.16E-02	5.06E-02
Xylenes	6.40E-05	3.79E-02	1.66E-01	85%	5.69E-03	2.49E-02

ULSD		**Uncontrolled**		**Control**	**Controlled**	
Pollutant	**EF**	**Emissions**		**efficiency**	**Emissions**	
	(Lb/MMBtu)	**lb/hr**	**tpy**		**lb/hr**	**tpy**
1,3-Butadiene	1.60E-05	9.32E-03	2.33E-03	85%	1.40E-03	3.49E-04
Benzene	5.50E-05	3.20E-02	8.01E-03	85%	4.80E-03	1.20E-03
Formaldehyde	2.80E-04	1.63E-01	4.08E-02	85%	2.45E-02	6.11E-03
Naphthalene	3.50E-05	2.04E-02	5.09E-03	85%	3.06E-03	7.64E-04
PAH	4.00E-05	2.33E-02	5.82E-03	85%	3.49E-03	8.73E-04

Totals

Total annual HAP based on either 8760 hrs on natural gas or 500 hrs on ULSD and 8260 hrs on natural gas

Total hourly HAP based on the max for either NG or ULSD fuels

			Exemption Levels		Exempt?	
	lb/hr	**ton/yr**	**lb/hr**	**tpy**	lb/hr	tpy
1,3-Butadiene	2.79E-03	2.08E-03	1.452	3.19	Yes	Yes
Acetaldehyde	7.11E-03	3.11E-02	8.91	26.1	Yes	Yes
Acrolein	1.14E-03	4.98E-03	0.02277	0.03335	Yes	Yes
Benzene	9.61E-03	1.12E-02	2.112	4.64	Yes	Yes
Ethyl Benzene	5.69E-03	2.49E-02	17.919	62.93	Yes	Yes
Formaldehyde	1.26E-01	5.53E-01	0.0825	0.174	No	No
Naphthalene	6.11E-03	2.48E-03	2.607	7.54	Yes	Yes
PAH[a]	6.99E-03	3.36E-03	0.0132	0.029	Yes	Yes
Propylene Oxide	5.16E-03	2.26E-02	3.168	6.96	Yes	Yes
Toluene	2.31E-02	1.01E-01	18.645	54.665	Yes	Yes
Xylenes	1.14E-02	4.98E-02	21.483	62.93	Yes	Yes

Gateway Smart Water Project
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Fire Water Pump

250	hp	200	hrs/yr operation
0.45359	kg/lb	138	MMBtu/kgal
7000	Btu/hp-hr	1.754	MMBtu/hr LHV
138	MMBtu/kgal	1.8649	MMBtu/hr HHV

			Emissions	
Pollutant	EF	unit	lb/hr	tons/yr
1,3-butadiene	3.91E-05	lb/MMBtu	7.29E-05	7.29E-06
acenaphthene	1.42E-06	lb/MMBtu	2.65E-06	2.65E-07
acenaphthylene	5.06E-06	lb/MMBtu	9.44E-06	9.44E-07
acetaldehyde	7.67E-04	lb/MMBtu	1.43E-03	1.43E-04
acrolein	9.25E-05	lb/MMBtu	1.73E-04	1.73E-05
anthracene	1.87E-06	lb/MMBtu	3.49E-06	3.49E-07
benzene	9.33E-04	lb/MMBtu	1.74E-03	1.74E-04
benzoanthracene	1.68E-06	lb/MMBtu	3.13E-06	3.13E-07
benzopyrene	1.88E-07	lb/MMBtu	3.51E-07	3.51E-08
benzo(b)fluoranthene	9.91E-08	lb/MMBtu	1.85E-07	1.85E-08
benzoperylene	4.89E-07	lb/MMBtu	9.12E-07	9.12E-08
benzo(k)fluoranthene	1.55E-07	lb/MMBtu	2.89E-07	2.89E-08
chrysene	3.53E-07	lb/MMBtu	6.58E-07	6.58E-08
dibenzo anthracene	5.83E-07	lb/MMBtu	1.09E-06	1.09E-07
fluoranthene	7.61E-06	lb/MMBtu	1.42E-05	1.42E-06
fluorene	2.92E-05	lb/MMBtu	5.45E-05	5.45E-06
formaldehyde	1.18E-03	lb/MMBtu	2.20E-03	2.20E-04
indeno pyrene	3.75E-07	lb/MMBtu	6.99E-07	6.99E-08
naphthalene	8.48E-05	lb/MMBtu	1.58E-04	1.58E-05
phenanthrene	2.94E-05	lb/MMBtu	5.48E-05	5.48E-06
propylene	2.58E-03	lb/MMBtu	4.81E-03	4.81E-04
pyrene	4.78E-06	lb/MMBtu	8.91E-06	8.91E-07
toluene	4.09E-04	lb/MMBtu	7.63E-04	7.63E-05
xylene	2.85E-04	lb/MMBtu	5.31E-04	5.31E-05

Gateway Smart Water Project
Prince George County
52375-02
AMS

Four Electical Circuit Breakers

60	lb of SF6/breaker
4	breakers
1.0%	leakage rate
2.4	lb/yr leakage
0.0012	tpy SF6
28.68	tpy CO2-e (@ 23,900 GWP)

Leakage will be monitored by
gas density gauges on the breakers

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment and announce a public hearing and an information briefing on a draft permit from the Department of Environmental Quality to limit air pollution from a facility in Prince George County, Virginia.

PUBLIC COMMENT PERIOD: July 9, 2012 to August 23, 2012

INFORMATION BRIEFING AND PUBLIC HEARING: Prince George County Administration Building Meeting Room, 6602 Courts Drive in Prince George, Virginia on August 8, 2012 from 5:30 to 6pm (information briefing) and then from 6-7 pm (public hearing for comments).

PERMIT NAME: Prevention of Significant Deterioration Permit issued by DEQ, under the authority of the Air Pollution Control Board

APPLICANT NAME AND REGISTRATION NUMBER: Gateway Cogeneration 1, LLC; #52375

FACILITY NAME AND ADDRESS: Smart Water Project, Chudoba Parkway, Prince George, VA 23875

PROJECT DESCRIPTION: Gateway Cogeneration 1, LLC has applied for a permit to build the Smart Water Project. The facility will be classified as a major source of air pollution and will be located on Chudoba Parkway, east of 295, one mile from the interchange with Rte. 460. The maximum annual emissions of air pollutants from the facility are expected to be: 592,000 tons of carbon dioxide equivalents, 48.8 tons of particulate matter, 49.8 tons of carbon monoxide, 39.0 tons of nitrogen oxides, 23.4 tons of volatile organic compounds, 7.8 tons of sulfur dioxide, and 0.6 tons of formaldehyde. The applicant proposes to use 10,100 million cubic feet of natural gas and 4.2 million gallons of ultra low sulfur diesel. Modeling has shown that the proposed project does not cause or significantly contribute to a predicted violation of any applicable NAAQS, Class I or Class II PSD increment. Air emissions from the facility and associated construction and industrial growth are not anticipated to adversely impact visibility, soils, or vegetation.

HOW TO COMMENT AND/OR REQUEST BOARD CONSIDERATION: DEQ accepts comments and requests for Board consideration by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for Board consideration must also include: 1) The reason why Board consideration is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. Board consideration may be granted if public response is significant, based on individual requests for Board consideration, and there are substantial, disputed issues relevant to the permit.

Contact for public comments, document requests and additional information: Alison Sinclair, DEQ Piedmont Office, 4949-A Cox Rd., Glen Allen, VA 23060; Phone: (804) 527-5155; E-mail: alison.sinclair@deq.virginia.gov; Fax: (804) 527-5106. The public may review the draft permit and application at the DEQ office named above, on the DEQ website (www.deq.virginia.gov), or may request copies of the documents from the contact person listed above.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

4949A Cox Road, Glen Allen, Virginia 23060

(804) 527-5020 Fax (804) 527-5106

www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

July 10, 2012

Mr. Henry D. Parker, Jr.
Chairman – Prince George County Board of Supervisors
14001 James River Dr.
Hopewell, VA 23860

Dear Mr. Parker:

Attached, please find a Public Notice seeking public comment on a draft air pollution permit for Gateway Green Energy's Smart Water project to be located in Prince George County, Virginia. A copy of the draft permit can be found at http://www.deq.virginia.gov/Programs/Air/PublicNotices/AirPermits.aspx . Please contact me if you would like additional information.

Sincerely,

Alison M. Sinclair
Environmental Specialist II, Sr.

Sinclair, Alison (DEQ)

From: Sinclair, Alison (DEQ)
Sent: Monday, July 09, 2012 2:28 PM
To: 'DelRDance@house.virginia.gov'; 'DelRIngram@house.virginia.gov'; 'DelRMorris@house.virginia.gov'; 'DelRTyler@house.virginia.gov'; 'district13 @senate.virginia.gov'; 'martindistrict@comcast.net'; 'district16@senate.virginia.gov'; 'rbailey@trinityconsultants.com'; 'tballo@earthjustice.org'; 'mbandyk@snl.com'; 'mebarker@cox.net'; 'barrarh@chesterfield.gov'; 'cbednar@smurfit.com'; 'Robert_M_Bisha@dom.com'; 'mek67@law.georgetown.edu'; 'jchristman@hunton.com'; 'john@johnclinelaw.com'; 'pamela_faggert@dom.com'; 'bfults@esswetlands.com'; 'john.fuoto@amec.com'; 'andy_gates@dom.com'; 'ragesser@gapac.com'; 'jgrandstaff@hrwtf.org'; 'rgreene@ingenco.com'; 'thansell@appalshop.org'; 'drewh@dominioncarolina.com'; 'dkaiser@stratusenvironmental.com'; 'dkleis@monsol.com'; 'cjaffe@selcva.org'; 'tknauer@Tkenvirolaw.com'; 'philip_knause@dom.com'; 'dskoger@kogerair.com'; 'bkoski@compassenergy.net'; 'chad@bartlettcontrols.com'; 'smullins@industrialinfo.com'; 'smullins@industrialinfo.com'; 'oldag84@yahoo.com'; 'jpnovotny@aep.com'; 'jpeterson@environmentalintegrity.org'; 'mlphilli@kaufcan.com'; 'lpowell@chemtradelogistics.com'; 'gprelewicz@fairfaxwater.org'; 'loriroth58@gmail.com'; 'claudlaw@aol.com'; 'nsaji@fairfaxwater.org'; 'mark.singer@ramca.info'; 'walterrep@msn.com'; 'dmorris@craterpdc.org'; 'administration@princegeorgeva.org'; 'Robert.Middaugh@jamescitycountyva.gov'; 'countyadministrator@chesterfield.gov'; 'wjohnson@petersburg-va.org'; 'jccboard@jamescitycountyva.gov'; 'geckerd@chesterfield.gov'; 'citycouncil@petersburg-va.org'
Subject: Notice of Public Comment
Attachments: 52375_002_12_PN.pdf

Attached, please find a Public Notice seeking public comment on a draft air pollution permit for Gateway Green Energy's Smart Water project to be located in Prince George County, Virginia. A copy of the draft permit can be found at http://www.deq.virginia.gov/Programs/Air/PublicNotices/AirPermits.aspx

Alison Sinclair
Environmental Specialist II
DEQ Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Ph. (804) 527-5155
Fax. (804) 527-5106

The Progress Index (Under act P.L. 877 No 160. July 9,1976)

Commonwealth of Virginia, City of Petersburg

OF DEQ PIEDMONT RE
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4949 A COX ROAD RICHMOND VA 23220

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Vickie Jacobs
Being duly sworn according to law deposes and says that she is Billing clerk for The Progress Index, owner and publisher of The Progress Index, a newspaper of general circulation, established in 1865, published in the city of Petersburg , county and state aforesaid, and that the printed notice or publication hereto attached is exactly as printed in the regular editions of the said newspaper on the following dates:

07/08/2012

Affiant further deposes and says that neither the affiant nor The Progress Index is interested in the subject matter of the aforesaid notice or advertisement and that all allegations in the foregoing statement as time, place and character or publication are true.

Sworn and subscribed to before me
this 11th day of July A.D., 2012

(Notary Public)

Carmen C. Hardy
Commonwealth of Virginia
Notary Public
7030357
Exp 5/31/2014

Legals & Notices

Public Notice
Environmental Permit

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APPLICANT NAME AND REGISTRATION NUMBER: Gateway Cogeneration 1, LLC; #52375

FACILITY NAME AND ADDRESS: Smart Water Project, Chudoba Parkway, Prince George, VA 23875

PROJECT DESCRIPTION: Gateway Cogeneration 1, LLC has applied for a permit to build the Smart Water Project. The facility will be classified as a major source of air pollution and will be located on Chudoba Parkway, east of 295, one mile from the interchange with Rte. 460. The maximum annual emissions of air pollutants from the facility are expected to be: 592,000 tons of carbon dioxide equivalents, 48.8 tons of particulate matter, 49.8 tons of carbon monoxide, 39.0 tons of nitrogen oxides, 23.4 tons of volatile organic compounds, 7.8 tons of sulfur dioxide, and 0.6 tons of formaldehyde. The applicant proposes to use 10,100 million cubic feet of natural gas and 4.2 million gallons of ultra low sulfur diesel. Modeling has shown that the proposed project does not cause or significantly contribute to a predicted violation of any applicable NAAQS, Class I or Class II PSD increment. Air emissions from the facility and associated construction and industrial growth are not anticipated to adversely impact visibility, soils, or vegetation.

HOW TO COMMENT AND/OR REQUEST BOARD CONSIDERATION: DEQ accepts comments and requests for Board consideration by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for Board consideration must also include: 1) The reason why Board consideration is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. Board consideration may be granted if public response is significant, based on individual requests for Board consideration, and there are substantial, disputed issues relevant to the permit.

Contact for public comments, document requests and additional information: Alison Sinclair, DEQ Piedmont Office, 4949-A Cox Rd., Glen Allen, VA 23060; Phone: (804) 527-5155; E-mail: alison.sinclair@deq.virginia.gov; Fax: (804) 527-5106. The public may review the draft permit and application at the DEQ office named above, on the DEQ website (www.deq.virginia.gov), or may request copies of the documents from the contact person listed above.

Information Briefing for Gateway Cogeneration 1 LLC – Smart Water Project in Prince George County Virginia

- Project is to be located on Chudoba Parkway between Purdue and the Crosspoint Business Park, 1 mile east of the interchange of 295 and Rt. 460.
- Consists of two combustion turbines, each with a heat recovery steam generator (total of 160 MW power output), an emergency diesel fire pump, a cooling tower, four electrical circuit breakers and a diesel storage tank.
- Burns primarily natural gas but has the capacity to burn up to 500 hours of ultra low sulfur diesel oil as backup.
- Because the facility is located in an attainment area for all pollutants, and the source is proposing to add a major new source of pollutants (greenhouse gasses), the source must show that they will not contribute to a significant deterioration of air quality in the region.
- The source submitted a Prevention of Significant Deterioration (PSD) permit application to DEQ in January 2012.
- EPA had issued new Greenhouse Gas (GHG) permitting regulations which required any major new source of GHG (including CO_2, methane, nitrous oxide, sulfur hexafluoride and HFCs) to receive a PSD permit after July 1, 2011.
- Gateway proposed GHG emissions over 100,000 tons/yr so that triggered PSD permitting for a major new source of pollutants in an attainment area. In addition, the proposed emissions of Particulate Matter (including PM_{10} and $PM_{2.5}$) was over the PSD significance level (15 tons/yr and 10 tons, respectively) and so PSD permitting applied to PM as well.
- Proposed emissions:

PM10	48.8 tons/yr
PM2.5	48.8 tons/yr
SO2	7.8 tons/yr
NOx	39.0 tons/yr
CO	49.8 tons/yr
VOC	23.4 tons/yr
CO2-e	591,981.0 tons/yr
Formaldehyde	1100.0 lbs/yr

- Because GHG, PM_{10} and $PM_{2.5}$ were subject to PSD permitting, they were also subject to applying Best Available Control Technology (BACT). Other pollutants triggered minor New Source Review permitting and were also subject to State BACT. Following is a summary of BACT for the source:

Pollutant	Primary BACT	Control	Secondary BACT (State)	Compliance
NO_x (State)	Turbines 2.0 ppmvd – gas (3-hour avg.) 5.0 ppmvd – ULSD (3-hour avg.)	Water injection and SCR	19.5 tons/yr	NOx CEMS

Pollutant	Primary BACT	Control	Secondary BACT (State)	Compliance
CO (State)	Turbines 4.0 ppmvd (3-hour avg.)	Oxidation catalyst	24.9 tons/yr	CO CEMS
PM_{10} (Federal and State)/$PM_{2.5}$ (Federal)	Turbines 5.0 lbs/hr gas (3-hour avg.) 15.0 lbs/hr ULSD (3-hour avg.)	Proper operation and maintenance on the turbines		stack test
	Fire Pump 0.15 g/hp-hr	Clean fuel and good combustion practices		
	Cooling Tower Drift rate of 0.001% of circulating water flow	Low total dissolved solids (TDS) and drift eliminators		Weekly water quality testing for TDS
VOC (State)	Turbines 2.0 ppmvd (3-hour avg.)	Oxidation catalyst	11.7 tons/yr	stack test and CO CEMS compliance
CO_2-e (Federal)	Turbines 8,983 Btu/kWh (HHV gross) and 1050 lb/MWh	Energy efficient combustion practices and low GHG fuels		ASME Performance Test Code on Overall Plant Performance (PTC 46) and CO_2 CEMS (Part 75)
	Fire Pump 74.21 kg/MMBtu	Fuel-efficient design		74.21 kg/MMBtu HHV and fuel usage monitoring
	Electrical Circuit breakers	Enclosed-pressure type breaker and leak detection		Audible alarm with decreased pressure.

- The source also modeled pollutants (PM_{10}, $PM_{2.5}$, and formaldehyde) to make sure they would be in compliance with the National Ambient Air Quality Standards (NAAQS) and PSD increment, and, in the case of formaldehyde, the Significant Ambient Air Concentrations (SAAC). DEQ reviewed this modeling carefully and found no violation of any standards or PSD increment.
- The source will have to test for PM_{10} emissions from the turbines and will have to conduct an Overall Plant Performance Test for the heat rate limit of the combustion turbine.
- The source will have to operate and maintain Continuous Emissions Monitors (CEMS) for NOx, CO2 and CO.
- The source will have to conduct Visible Emission Evaluations for opacity from the turbines while burning oil to make sure they aren't contributing to visibility problems.
- The source will have to keep records of annual fuel consumption (monthly basis), hours of operation of the fire pump, start up and shutdown emissions, CEMS performance data, weekly total dissolved solids content of the cooling water and records of unscheduled maintenance and operator training.
- The source must submit to annual inspections by DEQ inspectors and emission reporting.