



Orlando Cogeneration Ltd.  
8275 Exchange Drive  
Orlando, FL 32809  
Telephone: (407) 851-1350  
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August 17, 2007

RECEIVED

AUG 21 2007

BUREAU OF AIR REGULATION

Mr. Jeff Koerner  
FDEP/DARM  
North Permitting Section  
Division of Air Resource Management  
2600 Blair Stone Road MS 5500  
Tallahassee, Florida 32399-2400

Re: Orlando Cogeneration Facility; Request for Heat Input Increase  
Facility No. 0950203

Dear Mr. Koerner:

The enclosed air quality construction permit application package is submitted by Northern Star Generation Services Company LLC (Northern Star). Northern Star is the operating agent for Orlando CoGen Limited, L.P. ("Orlando CoGen"), owners of a 137 MW (nominal) natural gas fired cogeneration power plant in Orlando, Florida. This facility operates under the authority of Title V Air Operation Permit Number 0950203-006-AV, which has an effective date of January 24, 2006. This Title V permit expires on December 31, 2008, and a renewal application is due by July 5, 2008. Given the time constraints of this project, Northern Star is submitting a construction permit application. Northern Star is amenable to the concurrent procession of this application as a Title V renewal, if the Department has sufficient resources to meet our schedule. Should this situation be the case, Northern Star would provide the additional information required for the Title V renewal as a supplemental submittal upon request from the Department.

The enclosed permit application serves as a construction permit application to provide for an upgrade to the gas turbine compressor that will be performed as part of a scheduled end-of-life replacement of the gas turbine rotor. This change is considered a modification to the unit as it will potentially increase the short-term emission rates from the unit. The projected net emissions increase for all pollutants is less than the Prevention of Significant Deterioration (PSD) Significant Emission Rate (SER), hence this project is not subject to PSD permitting review.

This letter addresses the following items associated with this project:

- Background Information
- Project Description
- Emission Estimates
- Regulatory Review
- Requested Permit Conditions

#### **BACKGROUND INFORMATION**

The Orlando facility consists of a single Alstom (ABB) GT 11NM gas turbine in combined cycle operation. The exhaust from the gas turbine is directed into a heat recovery steam generator (HRSG) which is equipped with a duct burner. Both the gas turbine and duct burner are single fuel pipeline quality natural gas emission sources. The facility does not have dual fuel capability. Power output from the plant is delivered through the Progress Energy Florida (PEF) transmission grid along an existing 69

kV transmission line to two customers, PEF and Reedy Creek Improvement District (RCID). Power is sold to both customers under existing long-term power purchase agreements. The facility utilizes a steam absorption chiller to produce chilled water for the adjacent Air Products facility and maintains Federal Energy Regulatory Commission (FERC) Qualified Facility (QF) status. The power plant is a base load facility that has operated at a capacity factor averaging approximately 89% for the period 2001 through 2006.

The Orlando CoGen's Alstom GT 11N1 gas turbine has been in service since the start of plant operations in 1993. This gas turbine was upgraded to a GT 11NM in 2005. Orlando Cogen submitted a permit application to the DEP on February 22, 2005 to provide for this upgrade. It was not anticipated at that time that the turbine upgrade would require any increase in the permit limits. Subsequently, it was discovered that the GT 11NM turbine upgrade could allow additional firing of the unit and another permit application was filed on August 8, 2005 to revise the permitted capacity (as defined in Condition A.1 of the permit) from 856.9 MMBtu/hr (LHV, ISO) to 890 MMBtu/hr. The final revised Title V permit (Permit No. 0950203-006-AV) was issued on January 24, 2006.

## **PROJECT DESCRIPTION**

A major scheduled maintenance outage is planned for March 2008. This outage is expected to last approximately 2-3 weeks. One of the major outage activities will be the normal, end-of-life replacement of the gas turbine rotor. Alstom has also recommended that Orlando Cogen replace the existing compressor section due to normal end-of-life issues within the next three years based on current operation. Based on this recommendation, Orlando Cogen has elected to replace the compressor section during the scheduled rotor replacement to minimize the impact on plant operations and utilize the opportunity provided during this replacement to upgrade the compressor section of the gas turbine. This upgrade to the GT 11 NMC will:

1. Increase gas turbine output by up to 10%;
2. Decrease the need to fire the duct burner; and,
3. Improve the overall plant efficiency.

The compressor upgrade will consist of the replacement of the following parts:

1. Row #1-17 compressor blades
2. Row #1-18 inlet compressor guide vanes
3. Stage #18 filler pieces

In addition, the work may include one upgraded blow off valve and startup piping with a motor-driven valve or modifications to the inlet bellmouth assembly. The use of these advanced blades will provide a performance enhancement that may result in an increase in gas turbine heat input under certain plant operating conditions.

The improved compressor blade design will result in an increase in compressor discharge pressure, which in turn produces an increase in the total mass flow through the turbine. The increase in air flow allows increased fuel firing and power output at approximately the same (or a slightly improved) heat rate. One advantage of this upgrade is that the additional power output from the gas turbine can greatly reduce (or in some situations eliminate) fuel firing in the duct burner.

The compressor upgrade would produce an increase of up to 10% in the combustion turbine exhaust flow and fuel flow, while producing 10% – 12% more power output. The vendor of the compressor upgrade has provided guarantees to Orlando Cogen that the plant will continue to meet the NO<sub>x</sub> and CO permit emission limitations of 15 ppm<sub>dv</sub>@15% O<sub>2</sub> and 10 ppm<sub>dv</sub>, respectively.

## **EMISSION ESTIMATES**

The permit application package, including forms and emission tables, are presented in Attachment 1 to this letter. Attachment 2 provides requested changes to the current TV permit. Previous criteria pollutant emissions from the Orlando CoGen facility are summarized in Table 1 (Attachment 1), which follows this letter. These data are presented for Calendar Years (CYs) 2001 through 2006. These data were obtained from the Annual Operating Reports (AORs) submitted to the Florida Department of Environmental Protection (FDEP).

As stated previously, the improved compressor blade design is expected to increase the firing capability of the combustion turbine by up to 10%. Table 2 provides the CY 2006 estimated annual emissions and the projected annual emission after the completion of the compressor upgrade project. These projected emissions conservatively assume that the combustion turbine (EU 001) emissions increase from CY 2006 levels by 10%, and there is no change in the duct burner (EU 002) from CY 2006. These are conservative assumptions as:

1. The combustion turbine is not likely to consistently run at 10% greater load conditions than for CY 2006; and,
2. The duct burner usage will likely decrease due to the increased capability of the combustion turbine.

## **REGULATORY REVIEW**

The first aspect of the regulatory review involves the classification of the change from a programmatic perspective. The facility is considered an existing major source for the Prevention of Significant Determination (PSD) regulations as the permitted potential emissions for the site exceed the 100 ton per year threshold for both oxides of nitrogen (NO<sub>x</sub>) and carbon monoxide (CO). Hence, the projected emissions increases (past actual to future projected actual) are compared to the PSD Significant Emission Rates (SERs). The emission increases are presented in Table 3. The projected criteria pollutant emission increases are considerably less than the corresponding PSD SERs. Hence, PSD review is not required for this construction permit application.

Table 3 summarizes the greatest past actual 2-year average annual emission per pollutant (TPY) for the facility. Recent revisions to the State of Florida's new source review program (62-210.200) now allow for "actual emissions" to be determined over "consecutive 24-month periods"; however, for purposes of this analysis, the highest 2 calendar year periods in the previous 5 years were considered.

Because this combustion activity upgrade occurs in the same 5 year window as the CY 2005 upgrade, it may be considered a contemporaneous project. Therefore, the baseline emissions for the emission increase are from the period prior to the CY 2005 combustion turbine upgrade.

Note that the emission netting information was developed using the simplifying assumption that the compressor upgrade would produce the maximum heat input increase of 10% compared to baseline operations. This assumption greatly overestimates the likely emission change, as the additional heat input capability would only be exercised during those periods in which the plant is operating the turbine at base load in order to sell power into the grid during conditions of extremely high demand. The impact of the compressor upgrade on fuel firing and emissions during the typical plant dispatch conditions of 97 MWe and 114 MWe will likely be to reduce fuel firing and emissions as compared to the existing condition. This reduction is because the improved capabilities of the combustion turbine after the compressor upgrade will allow the plant to rely less on the need to use the duct burner in order to achieve the contractually required levels of power production.

Even with the use of conservative simplifying assumptions, Table 3 demonstrates that emissions increases after the compressor upgrade will not exceed the SERs that would trigger PSD review for affected pollutants. Table 2 includes a comparison of the anticipated actual emissions with the permitted emission limits. From an annual facility-wide emission limit perspective, the emissions are expected to be approximately 3% of the limit for CO, and 70% of the limits for the remainder of the criteria pollutants.

As discussed in the following section that addresses requested changes to the current permit, Table 2 includes requested revised emission limits for NO<sub>x</sub> (hourly only), and VOC, PM, and PM<sub>10</sub> (hourly and annual). These revised limits result from the increased heat input capacity of the combustion turbine, and do not represent an increase in concentration (e.g., ppm) of these criteria pollutants.

This request will trigger applicability of the recently promulgated New Source Performance Standard (NSPS), Subpart KKKK, *Standards of Performance for Stationary Combustion Turbines*. This applicability is due to the fact that this request constitutes a change in the method of operation accompanied by an increase in the actual hourly emission rate of a regulated pollutant, commencing after February 18, 2005. The facility, as currently permitted, will meet the allowable emissions requirements in this newly promulgated NSPS. This NSPS regulates the pollutants SO<sub>2</sub> and NO<sub>x</sub>. The SO<sub>2</sub> emission limit involves a choice of two limits, one that is expressed based on mass per power output, and one that is based on fuel sulfur content. These two limits are contained in 40 CFR §60.4330, and are summarized following:

1. 0.90 pounds SO<sub>2</sub> per megawatt-hour gross output; or,
2. 0.060 pounds SO<sub>2</sub> per MMBtu heat input.

The facility uses pipeline quality natural gas, which because of its low sulfur content, enables the combustion turbine to meet either of these two limits with a large margin of compliance.

The NO<sub>x</sub> emission limit for this combustion turbine (based on maximum heat input rating being greater than 850 MMBtu/hr) is similarly stated as a choice of two limits. One limit is based on concentration in the effluent gas, and the other limit is based on mass per power output. These two limits are contained in Table 1 of the NSPS, and are summarized following:

1. 15 ppm at 15 percent O<sub>2</sub>; or,
2. 0.43 pounds per megawatt-hour gross output.

The 15 ppm limit is the same limit as contained in permit Condition A.5. Hence, no changes to the emission limit are required for the NO<sub>x</sub> limit to incorporate the NSPS. Permit Condition A.10 addresses sulfur dioxide, and will need to be changed to include the NSPS limits. The proposed changes to this permit are discussed following in this letter.

Northern Star has reviewed the remaining requirements of NSPS Subpart KKKK (e.g., recordkeeping and testing), and believes that the current permit addresses these requirements. Hence, no other changes are requested to the operating permit to accommodate the NSPS.

## **REQUESTED PERMIT CONDITIONS**

The requested permit conditions are expressed based on the current Title V operating permit and are included in Attachment 2. Northern Star requests that the construction permit be similar to the current Title V operating permit.

The requested revised emission limits are for NO<sub>x</sub> (hourly only), and VOC, PM, and PM<sub>10</sub> (hourly and annual). These revised limits result from the increased heat input capacity of the combustion turbine, and do not represent an increase in concentration (e.g., ppm) of these criteria pollutants. The total annual NO<sub>x</sub> emission limit is not increased as Northern Star believes there is sufficient margin in the current emission limit. A ten percent increase in the hourly NO<sub>x</sub> emission rate for EU 001 is requested. This requested increase is also requested for the combined hourly NO<sub>x</sub> limit for EU 001 and 002.

The PM and PM<sub>10</sub> emission limit for EU 001 is stated in terms of pounds per million British Thermal Units (lbs/MMBtu), with the mass emission rates of lb/hr and tpy stated parenthetically. The requested revisions for the PM and PM<sub>10</sub> hourly and annual emission rate is requested for consistency with the primary limit that is stated in units of lbs/MMBtu.

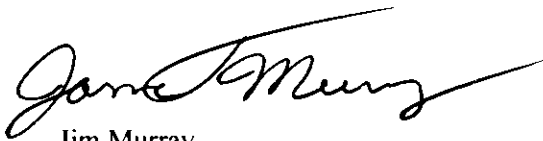
A ten percent increase in the hourly and annual VOC emission limit for EU 001 is requested. This increase provides for the ten percent increased heat input capacity of the combustion turbine.

The proposed changes also address the addition of the NSPS Subpart KKKK emission limits.

### **CLOSING**

Northern Star and Orlando CoGen Limited, L.P. appreciates the Department's timely consideration of this construction permit application. If you have any questions regarding this application, please contact either Dave Kellermeyer of Northern Star at (713) 580-6368 or Scott Osbourn of Golder Associates at (813) 287-1717. David Good and I can be reached at Orlando Cogen at (407) 851-1350.

Sincerely,



Jim Murray  
Plant Manager

cc: David Good, Orlando CoGen  
Dave Kellermeyer, Northern Star Generation Services Company LLC  
Scott Osbourn, P.E., Golder Associates Inc.

### **Attachments**

- 1 – Permit Application Forms
- 2 – Requested Changes to Title V permit

**ATTACHMENT 1**

**Minor Source Air Construction Permit Application**



# Department of Environmental Protection

## Division of Air Resource Management

### APPLICATION FOR AIR PERMIT - LONG FORM

#### I. APPLICATION INFORMATION

**Air Construction Permit** – Use this form to apply for any air construction permit at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air permit. Also use this form to apply for an air construction permit:

- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- Where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- Where the applicant proposes to establish, revise, or renew a plantwide applicability limit (PAL).

**Air Operation Permit** – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial/revised/renewal Title V air operation permit.

**Air Construction Permit & Title V Air Operation Permit (Concurrent Processing Option)** – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

#### Identification of Facility

1. Facility Owner/Company Name: <b>Northern Star Generation Services</b>	
2. Site Name: <b>Orlando CoGen Limited, L.P.</b>	
3. Facility Identification Number: <b>0950203</b>	
4. Facility Location... Street Address or Other Locator: <b>8275 Exchange Drive</b> City: <b>Orlando</b> County: <b>Orange</b> Zip Code: <b>32809</b>	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

#### Application Contact

1. Application Contact Name: <b>Dave Kellermeyer, Vice President, EH&amp;S</b>	
2. Application Contact Mailing Address... Organization/Firm: <b>Northern Star Generation Services Company, LLC</b> Street Address: <b>2929 Allen Parkway, Suite 2200</b> City: <b>Houston</b> State: <b>Texas</b> Zip Code: <b>77019</b>	
3. Application Contact Telephone Numbers... Telephone: <b>(713) 580 - 6368</b> ext. Fax: <b>(713) 580 - 6320</b>	
4. Application Contact Email Address: <b>dave.kellermeyer@northernstargen.com</b>	

#### Application Processing Information (DEP Use)

1. Date of Receipt of Application: <b>8/21/07</b>	3. PSD Number (if applicable):
2. Project Number(s): <b>0950203 - 007-AC</b>	4. Siting Number (if applicable):

## APPLICATION INFORMATION

### Purpose of Application

This application for air permit is submitted to obtain: (Check one)

#### **Air Construction Permit**

- Air construction permit.
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

#### **Air Operation Permit**

- Initial Title V air operation permit.
- Title V air operation permit revision.
- Title V air operation permit renewal.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

#### **Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)**

- Air construction permit and Title V permit revision, incorporating the proposed project.
- Air construction permit and Title V permit renewal, incorporating the proposed project.

**Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:**

- I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

### Application Comment

This permit application serves to request an increase in the allowable fuel firing rate of the combustion turbine (EU 001) from 890 MMBtu/hr (LHV at ISO conditions) to 980 MMBtu/hr (LHV at ISO conditions), an increase of approximately ten percent. This increase is associated with the planned end-of-life replacement of the gas turbine rotor and the associated upgrade of the compressor section of the gas turbine. This change will serve to (1) increase gas turbine output, (2) decrease the need to fire the duct burner, and (3) improve the overall plant efficiency. The projected net emissions increase (past actual to future actual emissions) are less than the Prevention of Significant Deterioration (PSD) Significant Emission Rates (SERs), hence this project is not subject to PSD review. This permit application is, therefore, a minor source construction permit application. Additional information regarding this project is provided in the cover letter and attachments.



**APPLICATION INFORMATION**

**Scope of Application**

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
001	Combustion turbine, Phase II Acid Rain Unit	AF2B	\$0
002	HRSG and Duct Burner System, Phase II Acid Rain Unit	AF2B	\$0

**Application Processing Fee**

Check one:  Attached - Amount: \$ \_\_\_\_\_  Not Applicable

**APPLICATION INFORMATION**

**Owner/Authorized Representative Statement**

**Complete if applying for an air construction permit or an initial FESOP.**

1. Owner/Authorized Representative Name : <b>Jim Murray – Plant Manager</b>
2. Owner/Authorized Representative Mailing Address... Organization/Firm: <b>Orlando Cogen – Northern Star Generation Services</b> Street Address: <b>8275 Exchange Drive</b> City: <b>Orlando</b> State: <b>FL</b> Zip Code: <b>32809</b>
3. Owner/Authorized Representative Telephone Numbers... Telephone: <b>(407)851-1350</b> ext. Fax: <b>(407)851-1686</b>
4. Owner/Authorized Representative Email Address: <b>jim.murray@northernstargen.com</b>
5. Owner/Authorized Representative Statement:  <i>I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.</i>   Signature  <u>8-16-07</u> Date

## APPLICATION INFORMATION

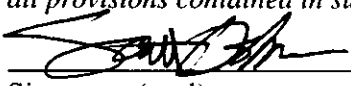
### Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input type="checkbox"/> For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input type="checkbox"/> The designated representative at an Acid Rain source.
3. Application Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
4. Application Responsible Official Telephone Numbers... Telephone: ext. Fax:
5. Application Responsible Official Email Address:
6. Application Responsible Official Certification: <i>I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.</i>  _____ Signature  _____ Date

**APPLICATION INFORMATION**

**Professional Engineer Certification**

1. Professional Engineer Name: <b>Scott Osbourn</b> Registration Number: <b>PE 57557</b>
2. Professional Engineer Mailing Address... Organization/Firm: <b>Golder Associates Inc.</b> Street Address: <b>5100 W. Lemon Street, Suite 114</b> City: <b>Tampa</b> State: <b>FL</b> Zip Code: <b>33609</b>
3. Professional Engineer Telephone Numbers... Telephone: <b>(813)287-1717</b> ext. Fax: <b>(813)287-1716</b>
4. Professional Engineer Email Address: <b>sosbourn@golder.com</b>
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and</i> <i>(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/> , if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input checked="" type="checkbox"/> , if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here <input type="checkbox"/> , if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.</i> <i>(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here <input type="checkbox"/> , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.</i>   _____ Signature (seal)  8/17/07 _____ Date

\*Attach any exception to certification statement.\*\*Board of Professional Engineers Certificate of Authorization No. 00001670



## II. FACILITY INFORMATION

### A. GENERAL FACILITY INFORMATION

#### Facility Location and Type

1. Facility UTM Coordinates... Zone <b>17</b> East (km) <b>459.5</b> North (km) <b>3146.1</b>		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) <b>28/26/23</b> Longitude (DD/MM/SS) <b>81/24/28</b>	
3. Governmental Facility Code: <b>NONE</b>	4. Facility Status Code: <b>A</b>	5. Facility Major Group SIC Code: <b>49</b>	6. Facility SIC(s): <b>4931 Combination Electric &amp; Gas &amp; Other Utility Services</b>
7. Facility Comment : <b>137 MW nominal Combined Cycle Gas Turbine with a HRSG and Duct Burner System Cogeneration facility</b>			

#### Facility Contact

1. Facility Contact Name: <b>Jim Murray</b>
2. Facility Contact Mailing Address... Organization/Firm: <b>Orlando Cogen – Northern Star Generation Services</b> Street Address: <b>8275 Exchange Drive</b> City: <b>Orlando</b> State: <b>FL</b> Zip Code: <b>32809</b>
3. Facility Contact Telephone Numbers: Telephone: <b>(407)851-1350</b> ext. Fax: <b>(407)851-1686</b>
4. Facility Contact Email Address: <a href="mailto:jim.murray@northernstargen.com">jim.murray@northernstargen.com</a>

#### Facility Primary Responsible Official

**Complete if an “application responsible official” is identified in Section I. that is not the facility “primary responsible official.”**

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official Email Address:

**Facility Regulatory Classifications**

**Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a “major source” and a “synthetic minor source.”**

1. <input type="checkbox"/> Small Business Stationary Source	<input type="checkbox"/> Unknown
2. <input type="checkbox"/> Synthetic Non-Title V Source	
3. <input checked="" type="checkbox"/> Title V Source	
4. <input checked="" type="checkbox"/> Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. <input type="checkbox"/> Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. <input type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)	
7. <input type="checkbox"/> Synthetic Minor Source of HAPs	
8. <input checked="" type="checkbox"/> One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. <input type="checkbox"/> One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. <input type="checkbox"/> One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. <input type="checkbox"/> Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:  <b>The proposed modification is subject to the NSPS, Subpart KKKK.</b>	

**List of Pollutants Emitted by Facility**

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
<b>Carbon Monoxide</b>	<b>A</b>	
<b>Nitrogen Oxides</b>	<b>A</b>	
<b>Particulate Matter - Total</b>	<b>B</b>	
<b>Particulate Matter - PM10</b>	<b>B</b>	
<b>Sulfur Dioxide</b>	<b>B</b>	
<b>Volatile Organic Compounds</b>	<b>B</b>	

## B. EMISSIONS CAPS

### Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
NO <sub>x</sub>		001	63.1	251.4	Title V Permit A.5
CO		001	22.3	92.1	Title V Permit A.6
PM		001	9.9	43.3	Title V Permit A.7
PM <sub>10</sub>		001	9.9	43.3	Title V Permit A.7
VOC		001	3.3	14.3	Title V Permit A.8
NO <sub>x</sub>		002	12.2	22.5	Title V Permit B.5
CO		002	12.2	22.5	Title V Permit B.6
PM		002	1.2	2.2	Title V Permit B.7
PM <sub>10</sub>		002	1.2	2.2	Title V Permit B.7
VOC		002	3.7	6.8	Title V Permit B.8
NO <sub>x</sub>		001 & 002	75.3	N/A	Title V Permit C.0

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

**Requested hourly emission caps for EU001 (combustion turbine) are current hourly emission rates contained in the Title V operating permit for all pollutants other than NO<sub>x</sub>, PM/PM<sub>10</sub>, and VOC. The NO<sub>x</sub>, PM/PM<sub>10</sub>, and VOC limits have a 10% increase for the combustion turbine to account for the requested increased heat input rate. The limits for other pollutants have an adequate margin of compliance that allows for continuance of the limit without adjustment. The annual emission caps are changed from the current Title V permit limits for VOC and PM/PM<sub>10</sub> only. The NO<sub>x</sub> and CO annual caps have sufficient margin of compliance to not require an increase in the annual limits. Emission limits for EU 002 (duct burner) are unchanged from current Title V permit.**



### C. FACILITY ADDITIONAL INFORMATION

#### Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>9/2003</u>
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>9/2003</u>
3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>9/2003</u>

#### Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable (existing permitted facility)
2. Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): <input checked="" type="checkbox"/> Attached, Document ID: <u>Cover Letter</u>
3. Rule Applicability Analysis: <input checked="" type="checkbox"/> Attached, Document ID: <u>Cover Letter</u>
4. List of Exempt Emissions Units (Rule 62-210.300(3), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
5. Fugitive Emissions Identification: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

**Additional Requirements for FESOP Applications**

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):  
 Attached, Document ID: \_\_\_\_\_  Not Applicable (no exempt units at facility)

**Additional Requirements for Title V Air Operation Permit Applications**

1. List of Insignificant Activities (Required for initial/renewal applications only):  
 Attached, Document ID: \_\_\_\_  Not Applicable (revision application)
2. Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought):  
 Attached, Document ID: \_\_\_\_  
 Not Applicable (revision application with no change in applicable requirements)
3. Compliance Report and Plan (Required for all initial/revision/renewal applications):  
 Attached, Document ID: \_\_\_\_  
Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.
4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only):  
 Attached, Document ID: \_\_\_\_  
 Equipment/Activities On site but Not Required to be Individually Listed  
 Not Applicable
5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) :  
 Attached, Document ID: \_\_\_\_\_  Not Applicable
6. Requested Changes to Current Title V Air Operation Permit:  
 Attached, Document ID: \_\_\_\_  Not Applicable

**Additional Requirements Comment**

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**TABLE 1**

**Orlando Cogen Facility - Historical Annual Emissions by Unit**

Year		2001			2002			2003		
Pollutant		EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)	EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)	EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)
Volatile Organic Compounds	VOC	11.4	3.1	14.4	11.8	2.5	14.3	12.0	5.4	17.4
Sulfur Dioxide	SO <sub>2</sub>	2.1	0.1	2.2	2.2	0.1	2.3	2.3	0.1	2.5
Particulate Matter	PM	30.0	0.9	30.9	31.1	0.8	31.8	31.6	1.6	33.2
Nitrogen Oxides	NO <sub>x</sub>	234.0	7.2	241.2	220.0	5.3	225.3	229.7	9.9	239.5
Carbon Monoxide	CO	2.5	1.4	3.8	2.0	0.7	2.7	2.1	0.4	2.6
Particulate Matter 10	PM <sub>10</sub>	30.0	0.9	30.9	31.1	0.8	31.8	31.6	1.6	33.2

Source: AOR Data

**TABLE 1 (continued)**

**Orlando Cogen Facility - Historical Annual Emissions by Unit**

Year		2004			2005			2006		
Pollutant		EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)	EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)	EU 001 CT (tpy)	EU 002 DB (tpy)	<i>Total</i> (tpy)
Volatile Organic Compounds	<b>VOC</b>	9.3	5.3	<i>14.6</i>	10.5	3.8	<i>14.3</i>	11.5	3.5	<i>15.0</i>
Sulfur Dioxide	<b>SO<sub>2</sub></b>	1.8	0.1	1.9	2.0	0.1	2.1	2.2	0.1	2.3
Particulate Matter	<b>PM</b>	24.6	1.6	<i>26.2</i>	27.7	1.2	<i>28.9</i>	30.3	1.1	<i>31.4</i>
Nitrogen Oxides	<b>NO<sub>x</sub></b>	142.0	0.7	<i>142.7</i>	184.5	11.2	<i>195.7</i>	192.5	5.2	<i>197.6</i>
Carbon Monoxide	<b>CO</b>	3.1	0.3	<i>3.4</i>	2.3	1.1	<i>3.3</i>	3.7	0.3	<i>4.0</i>
Particulate Matter 10	<b>PM<sub>10</sub></b>	24.6	1.6	<i>26.2</i>	27.7	1.2	<i>28.9</i>	30.3	1.05	<i>31.4</i>

Source: AOR Data

TABLE 2

## Orlando Cogen Facility - Projected Actual Emissions

Year		2006 (Past Actual)			Post Change (Projected Actual)			Permit Limit	Projected Emissions
Pollutant		EU 001 CT (tpy)	EU 002 DB (tpy)	Total (tpy)	EU 001 CT (tpy)	EU 002 DB (tpy)	Total (tpy)	Total (tpy)	% of Emission Limit
Volatile Organic Compounds	VOC	11.5	3.5	15.0	12.7	3.5	16.1	21.1	71%
Sulfur Dioxide	SO <sub>2</sub>	2.2	0.1	2.3	2.4	0.1	2.5	n/a	n/a
Particulate Matter	PM	30.3	1.1	31.4	33.4	1.1	34.4	45.5	69%
Nitrogen Oxides	NO <sub>x</sub>	192.5	5.2	197.6	211.7	5.2	216.9	273.9	72%
Carbon Monoxide	CO	3.7	0.3	4.0	4.1	0.3	4.4	114.6	3%
Particulate Matter 10	PM <sub>10</sub>	30.3	1.05	31.4	33.4	1.1	34.4	45.5	69%

## Assumptions:

1. CY 2006 dispatch is representative of future dispatch
2. EU001 (CT) emissions post change are conservatively estimated as 10% greater than CY 2006 due to increased compressor capacity
3. EU002 (DB) emissions are conservatively assumed to be not affected by change.
4. Permit Limit is for EU 001 and 002 combined, including requested revisions for VOC and PM/PM<sub>10</sub>

TABLE 3 - PSD Netting Analysis

Orlando Cogen Facility

Year		Pre-2005 (Past Actual)				Post Change (Projected)			PSD Netting Analysis		
Pollutant		EU 001 CT (tpy)	EU 002 DB (tpy)	Total (tpy)	CY for Past Actual Emissions	EU 001 CT (tpy)	EU 002 DB (tpy)	Total (tpy)	Total (tpy)	PSD SER	Increase Greater than SER?
Volatile Organic Compounds	VOC	11.9	3.9	15.8	2002-2003	12.7	3.5	16.1	0.3	40	No
Sulfur Dioxide	SO <sub>2</sub>	2.3	0.1	2.4	2002-2003	2.4	0.1	2.5	0.2	40	No
Particulate Matter	PM	31.3	1.2	32.5	2002-2003	33.4	1.1	34.4	1.9	25	No
Nitrogen Oxides	NO <sub>x</sub>	227.0	6.2	233.2	2001-2002	211.7	5.2	216.9	-16.4	40	No
Carbon Monoxide	CO	2.6	0.4	3.0	2003-2004	4.1	0.3	4.4	1.4	100	No
Particulate Matter 10	PM <sub>10</sub>	31.3	1.2	32.5	2002-2003	33.4	1.1	34.4	1.9	15	No

Assumptions / Notes:

1. CY 2006 dispatch is representative of future dispatch
2. EU001 (CT) emissions post change are conservatively estimated as 10% greater than CY 2006 due to increased compressor capacity
3. EU002 (DB) emissions are conservatively assumed to be not affected by change.
4. Pre-2005 (Past Actual) based on the greatest 2-year average using annual data.
5. The site is major for PSD for NO<sub>x</sub> and CO only

**ATTACHMENT 2**

**Requested TV Permit Revisions**

## Attachment 2 – Suggested Permit Condition Changes

Suggested changes are provided in redline strikethrough mode. Blue normal text is for revised text, ~~red strikethrough text~~ is for suggested deleted text.

Section I. Subsection A. (page 2) Facility Description. First paragraph.

...The facility's nominal output is ~~128.9~~ 137 megawatts (MW).

Section III. Subsection A. (page 7), first paragraph.

The combined cycle combustion turbine (CT) is an Alstom Model GT 11NM with a nameplate rating of ~~78.9~~ 86.8 MW at ISO conditions.

Section III, Condition A.5. (page 8)

Nitrogen Oxides. Nitrogen oxide emissions, expressed as NO<sub>x</sub>, shall not exceed 15 ppmvd (24-hr rolling average) @ 15% O<sub>2</sub> (~~57.4~~ 63.1 lbs/hr, 251.4 TPY). (See also Specific Condition C.0.)

Section III, Condition A.7. (page 8)

Particulate Matter. Particulate matter emissions, expressed as PM/PM<sub>10</sub>, shall not exceed 0.1 lb/MMBtu (~~9.0~~ 9.9 lbs/hr; ~~39.4~~ 43.3 TPY).

Section III, Condition A.7. (page 8)

Volatile Organic Compounds. Volatile organic compound emissions, expressed as VOC, shall not exceed ~~3.0~~ 3.3 lbs/hr; ~~13.0~~ 14.3 TPY.

Section III, Condition A.10. (page 8)

Sulfur Dioxide. No fuels shall be burned at this source which contain sulfur in excess of 0.8 percent by weight.

In addition the permittee shall not discharge from the combustion turbine any exhaust that contains sulfur dioxide in excess of:

1. 0.90 pounds SO<sub>2</sub> per megawatt-hour gross output; or,
2. 0.060 pounds SO<sub>2</sub> per MMBtu heat input.

Section III, Condition C.0. (page 15)

When both the CT and DB are operating, NO<sub>x</sub> emissions shall not exceed ~~69.6~~ 75.3 lbs/hr.

*Note – based on 63.1 lb/hr for combustion turbine and 12.2 lb/hr for duct burner.*



Section III, Condition C.5. (page 16)

Combustion control shall be utilized for CO control. ~~The permittee shall have designed the facility to allow for future installation of an oxidation catalyst. Once the performance testing has been completed, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.~~

*Note – performance testing was completed, oxidation catalyst is not cost effective, hence this portion of the requirement can be removed.*

Section III, Condition C.22. (page 19)

...compliance is considered to occur when the NO<sub>x</sub> emissions are less than or equal to ~~57.4~~ 63.1 lb/hr when only the CT is operating and less than or equal to ~~69.6~~ 75.3 lb/hr when both the CT and DB are operating.

Section III, Condition C.22. (page 20)

Example Calculated Emission Limitation =  $[(\del{57.4} 63.1 \text{ lb/hr} \times 20 \text{ hrs}) + (\del{69.6} 75.3 \text{ lb/hr} \times 4 \text{ hrs})]/24 \text{ hours}$

24 hour rolling average NO<sub>x</sub> compliance level = ~~59.4~~ 65.1 lb/hr

Section III, Condition C.32. (page 23)

....The baseline emissions for operation prior to the project are 3.0 tons per year of CO (CY 2003 – 2004) and ~~232~~ 233.2 tons per year of NO<sub>x</sub> (CY 2001 – 2002).