HOWARD F. CURREN ADVANCED WASTEWATER TREATMENT FACILITY

AIR CONSTRUCTION PERMIT APPLICATION

Prepared for:

CITY OF TAMPA
and

TECO
TAMPA ELECTRIC
Tampa, Florida

Prepared by:

ECT
Environmental Consulting & Technology, Inc.
3701 Northwest 98th Street
Gainesville, Florida 32606

ECT No. 000191-0100

April 2000

Jeb Bush
Governor

Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

P.E. Certification Statement

City of Tampa
Howard F. Curren AWT Facility

DEP File No.: 0570373-009-AC, PSD-FL-291
Facility ID No.: 0570373

Project: Air Construction Permit (PSD permit), Engines 7 and 8

I HEREBY CERTIFY that the engineering features described in the above referenced application and related additional information submittals, if any, and subject to the proposed permit conditions, provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).

This review was conducted by me.

(Seal)

Joseph Kahn, P.E.
Registration # 45268

6/16/00
Date

Permitting Authority:
Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
New Source Review Section
Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Telephone: 850/488-0114
Fax: 850/922-6979

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2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

June 19, 2000

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ralph L. Metcalf, II, P.E.
Director, Department of Sanitary Sewers
City of Tampa
City Hall Plaza, 6th Floor
Tampa, Florida 33602

Re: DEP File No. 0570373-009-AC, PSD-FL-291
Howard F. Curren AWT Facility

Dear Mr. Metcalf:

Enclosed is one copy of the draft air construction permit (PSD permit) to construct two natural gas fired reciprocating engine driven generators at the Howard F. Curren AWT Facility located at 2700 Maritime Boulevard, Tampa, Hillsborough County. The Technical Evaluation and Preliminary Determination, the Department's Intent to Issue Air Construction Permit and the Public Notice of Intent to Issue Air Construction Permit are also included.

The Public Notice of Intent to Issue Air Construction Permit must be published one time only, as soon as possible, in the legal advertisement section of a newspaper of general circulation in the area affected, pursuant to the requirements Chapter 50, Florida Statutes. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within seven days of publication. Failure to publish the notice and provide proof of publication may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any other questions, please contact Joseph Kahn, P.E., at 850/921-9519 or Mr. Linero at 850/488-0114.

Sincerely,

FOR CHF

C. H. Fancy, P.E., Chief,
Bureau of Air Regulation

CHF/jk

Enclosures

In the Matter of an
Application for Permit by:

Ralph L. Metcalf, II, P.E., Director
Department of Sanitary Sewers, City of Tampa
City Hall Plaza, 6th Floor
Tampa, Florida 33602

DEP File No. 0570373-009-AC, PSD-FL-291
Engines 7 and 8, Howard F. Curren AWT Facility
Hillsborough County

INTENT TO ISSUE AIR CONSTRUCTION PERMIT

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (PSD permit, copy of draft permit attached) for the proposed project, detailed in the application specified above and the enclosed Technical Evaluation and Preliminary Determination, for the reasons stated below.

The applicant, City of Tampa, Department of Sanitary Sewers, applied on April 26, 2000, to the Department for an air construction permit for its Howard F. Curren AWT Facility located at 2700 Maritime Boulevard, Tampa, Hillsborough County. The permit is to construct two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit is required to construct the project.

The Department intends to issue this air construction permit based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1., F.A.C., you (the applicant) are required to publish at your own expense the enclosed Public Notice of Intent to Issue Air Construction Permit. The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. Rule 62-110.106(7)(b), F.A.C., requires that the applicant cause the notice to be published as soon as possible after notification by the Department of its intended action. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114; Fax 850/ 922-6979). You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in section 50.051, F.S. to the office of the Department issuing the permit. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rules 62-110.106(9) & (11), F.A.C.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed permit issuance action for a period of thirty (30) days from the date of publication of Public Notice of Intent to Issue Air Permit. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation is not available in this proceeding.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

for CHF

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Intent to Issue Air Construction Permit (including the Public Notice of Intent to Issue Air Construction Permit, Technical Evaluation and Preliminary Determination, and the Draft permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 6/19/00 to the person(s) listed:

Ralph L. Metcalf, II, P.E. *
Shannon K. Todd, TECO
Tom Davis, P.E., ECT
Bill Thomas, P.E., SWD
Jerry Campbell, HCEPC
Mr. Gregg Worley, EPA
Mr. John Bunyak, NPS

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Charlotte J. Hayes 6/19/00
(Clerk) (Date)

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 0570373-009-AC, PSD-FL-291

City of Tampa
Howard F. Curren AWT Facility
Hillsborough County

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (PSD permit) to City of Tampa, for its Howard F. Curren AWT Facility located at 2700 Maritime Boulevard, Tampa, Hillsborough County. The permit is to construct two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8. The applicant's mailing address is: Department of Sanitary Sewers, City of Tampa, City Hall Plaza, 6^{th} Floor, Tampa, Florida 33602. A Best Available Control Technology (BACT) determination was required for nitrogen oxides pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21, Prevention of Significant Deterioration (PSD).

Total emissions of pollutants shall not exceed the annual emission rates in tons per year: NOx, 91.0; CO, 96.8; VOC, 32.5; PM_{10}, 5.8; SO_2, 0.5.

This project is not subject to review under Section 403.506 F.S. (Power Plant Siting Act), because it provides for no expansion in steam generating capacity.

An air quality impact analysis was conducted. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards or PSD increment.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for public meetings concerning the proposed permit issuance action for a period of thirty (30) days from the date of publication of this Public Notice of Intent to Issue Air Construction Permit. Written comments and requests for public meetings should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Protection
Bureau of Air Regulation
Suite 4, 111 S. Magnolia Drive
Tallahassee, Florida, 32301
Telephone: 850/488-0114
Fax: 850/922-6979

Air Management Division
Hillsborough County Environmental Protection Commission
1410 North 21 Street
Tampa, Florida 33605
Telephone: 813/272-5530

Dept. of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218
Telephone: 813/744-6100

The complete project file includes the application, technical evaluations, draft permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Source Review Section, or the Department's reviewing engineer for this project, Joseph Kahn, P.E., at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

TECHNICAL EVALUATION

AND

PRELIMINARY DETERMINATION

City of Tampa

Howard F. Curren Advanced Wastewater Treatment Facility

Two Natural Gas Fired Reciprocating Engine Driven Generators

Engines 7 and 8

Hillsborough County

DEP File No. 0570373-009-AC

PSD-FL-291

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

June 19, 2000

1.1 APPLICANT NAME AND ADDRESS

City of Tampa
Howard F. Curren Advanced Wastewater Treatment Facility
City Hall Plaza, 6th Floor
Tampa, Florida 33602

Authorized Representative: Ralph L. Metcalf, II, P.E., Director, Department of Sanitary Sewers

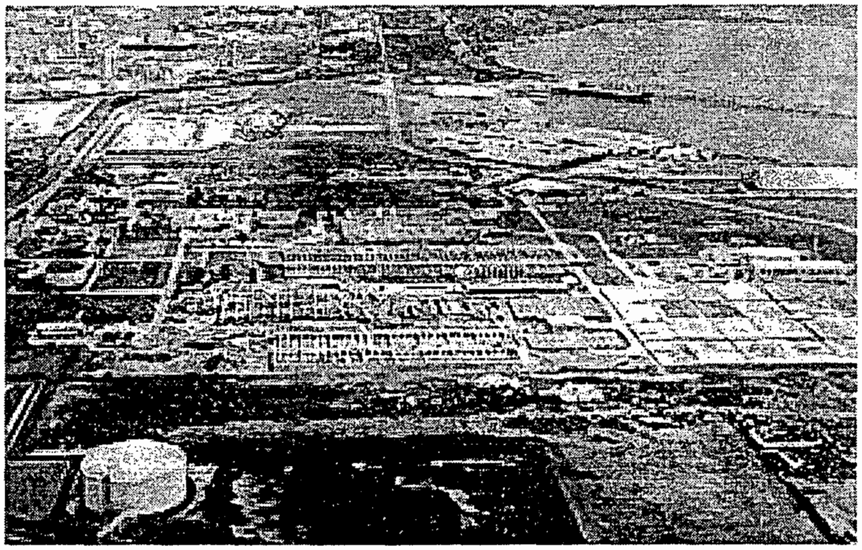
1.2 REVIEWING AND PROCESS SCHEDULE

4/26/00	Receipt of application and fee
4/26/00	Department completeness request
5/5/00	Additional Department completeness request
5/16/00, 6/1/00	Received applicant's responses to completeness requests
6/1/00	Application complete

2. FACILITY INFORMATION

The facility, the Howard F. Curren Advanced Wastewater Treatment Facility, is located at Hookers Point between east McKay Bay and Hillsborough Bay, 2700 Maritime Boulevard, Tampa, Hillsborough County. UTM coordinates are: Zone 17; 364.0 km E and 3089.5 km N. The Standard Industrial Classification (SIC) Codes for the facility are Industry Group 49, Electric, Gas and Sanitary Services, and Industry Number 4952, Sewerage Systems.

The facility is an existing municipally owned wastewater treatment plant with a design treatment capacity of 96 million gallons per day, average daily flow. It treats all wastewater discharged to the City of Tampa system. The final product, or effluent water, is discharged to Hillsborough Bay and meets all state and federal requirements. Following is an aerial photograph of the Howard F. Curren Advanced Wastewater Treatment Facility.[1]



This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 250 TPY for at least one criteria pollutant (at least NOx at this facility), the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD).

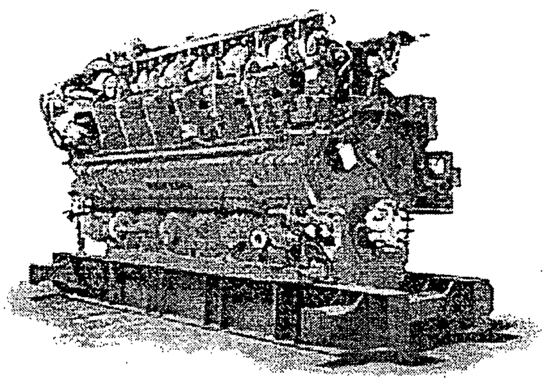
According to the applicant, this project is not a major source of hazardous air pollutants (HAPs). This facility is not subject to the provisions of Title IV, Acid Rain, Clean Air Act as amended in 1990.

3. PROJECT DESCRIPTION, EMISSIONS AND RULE APPLICABILITY

This permitting action is to authorize construction of two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8. As noted above, this is an existing PSD major facility, and emissions from this project are significant for NOx. Hours of operation of each engine will be limited to 6500 hours per year to limit emissions of CO and VOC to levels below the PSD significance criteria. The emissions units are two identical Waukesha 16V-AT27GL engines, 4 stroke, spark ignition, each rated at 4073 bhp, fired exclusively on natural gas, each coupled to a nominal 2.9 MW electrical generator. The applicant has proposed BACT to be lean burn combustion technology incorporated into the engine design. Emissions units addressed by this permit are:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
017	Engine 7 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.
018	Engine 8 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.

The Model 16V-AT27GL engine is a sixteen cylinder engine in Waukesha's ATGL series natural gas fueled engines. Waukesha characterizes this series as high horsepower, high torque engines that are designed for reliable operation, fuel economy and low emissions. The Model 16V-AT27GL has a "V" cylinder arrangement, with a bore and stroke of 10.83 x 11.81 in. (275 x 300 mm) and displacement of 17398 cu. in (285 liters), and operates at a compression ratio of 9:1. This is a turbocharged engine, and maximum power output at the design intercooler operating temperature of 130° F is 4073 bhp (3037 kW_b) at 900 rpm. The electrical generator has a maximum power output rating of 2910 kW. The exhaust temperature is 731 °F. The waste heat will be used in the existing sludge drying operation, and will offset heat currently generated by firing natural gas in a combustion chamber in this operation. Following is a figure of a typical ATGL series engine.[2]



The emissions associated with this project result from combustion of natural gas in the engines. Potential emissions at full load in units of g/bhp-hr are: PM_{10}, 0.10; NOx, 1.56; CO, 1.66; VOC, 0.55. Annual potential emissions from this project were estimated based on operating at maximum capacity for 6500 hours per year. Emissions were estimated from manufacturer supplied factors for PM_{10}, NOx, CO and VOC.

The following table summarizes the potential maximum emissions for this project in TPY:

Pollutant	Existing Combustion Chamber	Future Potential New Engines	Maximum Emissions Change [1]	PSD Significance Levels [2]	Subject to PSD Review?
NOx	2.3	91.0	91.0	40	Yes
CO	2.0	96.8	96.8	100	No
PM_{10}		5.8 [3]	5.8	25/15	No
SO_2		0.5 [4]	1.0	40	No
VOC		32.5	32.5	40	No

[1] The applicant is not seeking to net the existing combustion emissions from firing natural gas in the combustion chamber for sludge drying against the future potential emissions from the new engines. The applicant is not seeking limitations on the existing sludge drying operation.

[2] Florida Administrative Code 212.400-2.

[3] Emissions of PM_{10} were estimated using the highest manufacturer's emission factor of 0.10 g/bhp-hr.

[4] Emissions of SO_2 were estimated by the Department assuming 2 grains of sulfur per 100 cubic feet of natural gas. This is assumed to be the maximum sulfur content likely with pipeline natural gas. The applicant estimated typical annual SO_2 emissions to be 0.15 TPY.

The proposed project is subject to preconstruction review requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-214, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.). The proposed project is subject to review under Rule 62-212.400., F.A.C., Prevention of Significant Deterioration (PSD) because emissions of NOx exceed the PSD significant emission level per Table 212.400-2, F.A.C. Emissions of CO, VOC, SO_2 and PM_{10} are less than PSD significance levels. Emissions of other PSD pollutants are negligible.

This facility is located in an area designated, in accordance with Rule 62-204.340, F.A.C., as attainment or unclassifiable for the criteria pollutants ozone, PM_{10}, carbon monoxide, SO_2, nitrogen dioxide, and lead. Hillsborough County is also designated as a maintenance area for ozone, PM (part of the county) and lead (part of the county).

The emission units affected by this permit shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations incorporated therein).

4. AIR POLLUTION CONTROL TECHNIQUES

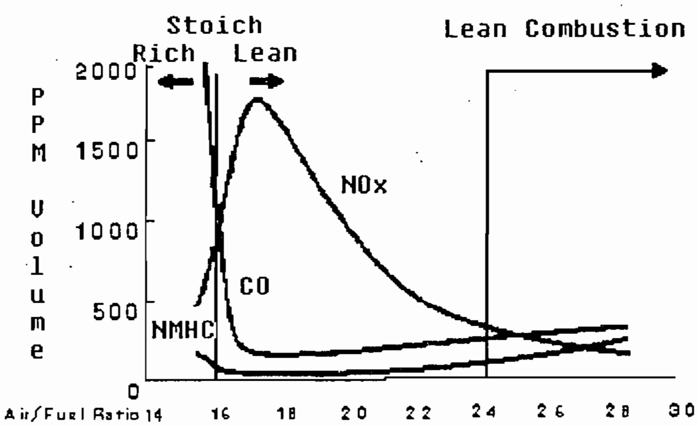
Emissions from this project are those that typically result from combustion of natural gas in internal combustion reciprocating engines: NOx, PM_{10}, CO and VOC. SO_2 is not a pollutant emitted in substantial quantity by engines that fire pipeline natural gas because of the inherently low sulfur content. CO, VOC and PM_{10} emissions from this project do not exceed the PSD significance levels. Combustion design and control are the techniques used to control emissions from these engines. The specific emission limit for NOx is described in the BACT determination. Combustion is controlled by electronic engine controls which are discussed in more detail below.[3]

4.1 NITROGEN OXIDES (NOX) EMISSIONS

Nitrogen oxides form in the combustion process as a result of the dissociation of molecular nitrogen and oxygen to their atomic forms and subsequent recombination into different oxides of nitrogen. Nearly all of the NOx emitted is in the form of nitric oxide (NO), which is readily oxidized in the exhaust environment or the atmosphere to nitrogen dioxide (NO_2). The source of the nitrogen is the incoming combustion air and chemically bound nitrogen in the fuel. Thermal NOx forms as a result of high temperatures in the combustion chamber (cylinders in IC engines). Increased combustion temperatures lead to increased NOx formation. In internal combustion engines, combustion temperature is dependent upon the ratio of air to fuel, and the formation of thermal NOx is highly dependent on this ratio. Prompt NOx forms near the flame front as intermediate combustion products and is a relatively small fraction of the NOx formed under near stoichiometric conditions. Under lean conditions prompt NOx formation becomes more significant. Fuel NOx forms from the nitrogen in the fuel and is not an important phenomenon when combusting natural gas or distillate fuel oil, which contain little nitrogen.

The figure on the following page illustrates the effect of the air/fuel ratio on emissions of NOx in natural gas fired internal combustion engines. To the rich side of the stoichiometric ratio, NOx decreases because of a lack of oxygen in the combustion chamber and lower combustion temperatures. Fuel quenching occurs under these conditions, which keeps combustion temperatures low. To the lean side of the stoichiometric ratio, NOx reaches a peak where combustion temperature is high and ample oxygen exists for thermal NOx formation. As conditions become leaner (air/fuel ratio increases) the combustion temperature decreases because of air quenching, The lowest NOx emissions occur in under the leanest combustion conditions. These engines are designed and controlled to operate under lean combustion conditions.

Maximum potential emissions of NOx from both engines is 91.0 tons per year. Emissions will be limited by the draft permit pursuant to the BACT determination.



Exhaust Emissions from Natural Gas Engines (ppmv at 15% O_2 vs. Air/Fuel Ratio)

4.2 CARBON MONOXIDE (CO) AND VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS

Carbon monoxide is emitted from combustion processes due to incomplete fuel combustion. Incomplete combustion occurs when insufficient oxygen exists near the fuel molecule or when quenching of combustion occurs, thus preventing complete conversion of fuel carbon to carbon dioxide. Proper combustion design and operation ensure that CO emissions are minimized. The previous figure also illustrates the effect of fuel to air ratio on CO emissions. CO emissions are lowest under combustion conditions that are slightly lean of the stoichiometric ratio because sufficient oxygen is present for complete oxidation of the fuel carbon while temperature is at its greatest. Under fuel rich conditions, there is not sufficient oxygen for complete combustion. CO emissions increase slightly under the leanest combustion conditions because of lower combustion temperatures and lower fuel mixture flammability.

VOC emissions also result from incomplete combustion. Natural gas is composed of several gaseous hydrocarbons including methane, ethane, propane, butane and heavier hydrocarbons. A portion of these will pass through the combustion chamber without reacting and will be found in the engine exhaust. Regulated VOCs are comprised of the non-methane portion of the total hydrocarbons, because methane is considered to not be photochemically reactive. Emissions of VOC are similar to CO emissions: higher at operating conditions that are richer and leaner than the stoichiometric ratio. This is illustrated in the previous figure.

The combustion design for these engines incorporates the principals of lean combustion. Because lean combustion occurs in the presence of a large amount of excess air, efficient combustion of fuel occurs, leaving relatively little CO and VOC. Further, because the exhaust oxygen concentration is high, there is opportunity for oxidation of CO and VOC to occur as the exhaust gases leave the combustion chamber. The fuel for this project is natural gas, which is readily combusted in spark ignition engines. Maximum potential emissions of CO and VOC from both engines are 96.8 and 32.5 tons per year, respectively. Emissions of CO and VOC will be limited by the draft permit to ensure that these pollutants do not exceed PSD significance criteria.

4.3 PARTICULATE MATTER (PM/PM_{10}) EMISSIONS

Particulate matter is formed in internal combustion engines primarily through combustion of fuel oil and lubricating oil. The particulate matter emitted from IC engines will mainly be less than 10 microns in diameter (PM_{10}). PM emissions from natural gas fired engines is very low because natural gas is efficiently combusted and contains no ash. Combustion of natural gas under lean fuel conditions results in low PM and PM_{10} emissions. In this project, all PM emissions are considered to be PM_{10} and maximum potential emissions from both engines is 5.8 tons per year. PM_{10} emissions will not be limited by the draft permit because the engines are fired only with natural gas, a clean burning fuel, and emissions are well below the PSD significance criteria.

4.4 SULFUR DIOXIDE (SO_2) EMISSIONS

Emissions of sulfur dioxide are a function of the sulfur content of the fuel. Sulfur in fuel is oxidized during combustion to sulfur dioxide. Further reaction including the water vapor inherent in the inlet air and the exhaust gas leads to the formation of sulfuric acid. Limiting the sulfur content of the fuel is the most effective control measure. In this project, the applicant has proposed to limit fuel to pipeline natural gas, with an expected maximum sulfur content of 2 grains per 100 cubic feet. Use of pipeline natural gas, as required by the permit, will limit maximum potential emissions of sulfur dioxide to less than 0.5 tons per year. Sulfuric acid mist emissions will be negligible.

4.5 EMISSIONS CONTROL TECHNIQUES

Generally emissions are controlled in these engines by operating under lean combustion conditions. Operation in the lean combustion range results in the lowest NOx emissions, while still minimizing CO and VOC emissions. Although CO and VOC emissions are lower under conditions just leaner than the stoichiometric ratio, emissions of these pollutants do not substantially increase under the leanest conditions. Operation under the leanest conditions results in a good compromise between dramatically reducing emissions of NOx and slightly increasing emissions of CO and VOC.

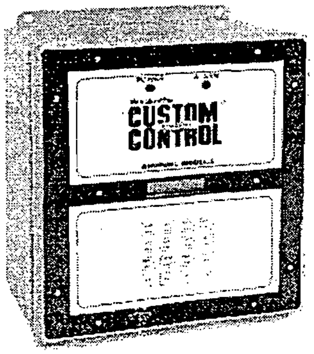
Careful control is required to enable the engines to operate under lean combustion conditions without sacrificing power output from misfiring or improper ignition. Waukesha also provides a number of electronic engine controls that optimize engine operation by continually balancing power output, fuel economy and air/fuel ratio. While not specifically designed for emissions control, these controls work to maintain lean combustion conditions, which result in the lowest emissions, while maintaining a large operating range for the engines. A discussion of these controls follows.[4]

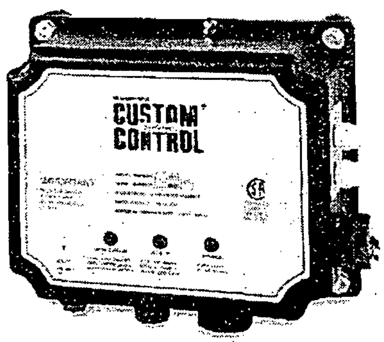
Waukesha's Custom Engine Control® (CEC) Air/Fuel Module (AFM) has the ability to actively monitor exhaust temperature and oxygen content to adjust the air/fuel ratio for lean burn natural gas engines. Unlike other systems which have single set-point control, the AFM permits the air/fuel mixture to be tailored with engine load to meet the specific needs of any application. It also employs safety limits to be sure no unsafe fueling conditions occur. The AFM can be used with other CEC modules to optimize engine performance even with changes to engine load, speed, fuel pressure, fuel quality, and ambient conditions.

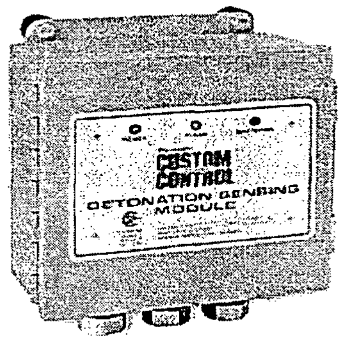
Waukesha's Custom Engine Control® (CEC) Ignition Module (IM) provides accurate and reliable ignition timing for optimum stationary engine operation. The IM offers improved starting, smoother operation, and increased spark plug life. The IM is an electronic, microcircuit-based digital ignition system that is standard on AT-GL and VHP engines. When the IM is integrated with the CEC Detonation Sensing Module (DSM) system, the ignition system protects the engine from detonation and costly downtime, and maximizes power availability under adverse conditions.

Waukesha's Custom Engine Control® (CEC) Detonation Sensing Module (DSM) has the ability to sense detonation occurring in a cylinder and retard timing as necessary on an individual cylinder basis. The DSM works directly through the CEC Ignition Module's (IM) expansion port to adjust timing. Timing is adjusted every second. Sensors located on or near the cylinder heads send a continuous signal to a DSM filter when the engine is operating. The filter sorts out the signals that represent detonation, and relays that information to the DSM. The DSM evaluates the filtered signal and adjusts timing accordingly until detonation is eliminated or a maximum timing retard value is reached.

Following are figures of Waukesha's AFM, IM and DSM.[5]







The ATGL engine also includes Waukesha's Custom Engine Control® (CEC) electronic Turbocharger Control Module (TCM) that allows one turbocharger to perform under a range of loads and speeds without experiencing turbocharger surge. Turbocharger surge is a phenomenon that occurs under less than full load where sudden changes in air flow produce instability in the compressor side of the engine's turbocharger. This phenomenon results in wasted energy, poor engine performance and speed instability. The module allows for more precise control than mechanical methods of bypass valving and wastegate valving. The TCM improves engine turndown capability.[6]

4.6 COMPLIANCE PROCEDURES

Compliance will be demonstrated by stack test. Annual tests are required for NOx because NOx is subject to a BACT limit and CO emissions are very close to the PSD significance criteria. An initial test is required for VOC, with tests repeated every five years thereafter. Regular emission testing for visible emissions and PM_{10} shall not be required because it is unlikely that visible emissions will result from the combustion of natural gas, and PM_{10} emissions are well below any major source or PSD significance criteria. No testing is required for SO_2, as emissions may be estimated stoichiometrically. Records of fuel consumption are required. Compliance procedures are detailed in the draft permit.

For this project, the Department will exercise its authority pursuant to Rule 62-210.700(5), F.A.C., to provide for a different period than specified at Rule 62-210.700(1), F.A.C., for allowable excess emissions. Because the time required for startup and shutdown of the engines is short, and the emission limitations are expressed as mass emissions, which will decrease with decreasing load, excess emissions are not allowed for startup and shutdown. Because of the uncertainty associated with malfunctions, excess emissions are allowed for malfunctions, but since the engines can be stopped within five minutes under normal conditions, excess emissions for malfunctions are limited to 15 minutes in any 24 hour period. These limits are described in the draft permit.

5. SOURCE IMPACT ANALYSIS

An impact analysis was required for this project because it is subject to the requirements of PSD for NOx.

5.1 AIR QUALITY ANALYSIS—INTRODUCTION

The proposed project will increase emissions of NO_2 at levels in excess of the PSD significant amount. NO_2 is a criteria pollutant and has national and state ambient air quality standards (AAQS), PSD increments, and significant impact levels defined for it.

The applicant's initial NO_2 analysis revealed a significant impact in the Class II area surrounding the proposed facility; therefore, a Class II AAQS and PSD increment analysis for NO_2 was conducted. However, the maximum predicted impact for NO_2 was below its *de minimis* ambient impact level. Therefore, pre-construction monitoring of NO_2 at the proposed site was not required for this project. Based on the preceding discussion, the air quality analyses required by the PSD regulations for this project were the following:

- A significant impact analysis for NO_2 in the Class I and Class II Areas;
- A Class II AAQS and PSD increment analysis for NO_2;
- An analysis of impacts on soils, vegetation, visibility, and of growth-related air quality modeling impacts.

Based on these required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following

EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A more detailed discussion of the required analyses follows.

5.2 MODELS AND METEOROLOGICAL DATA USED IN THE AIR QUALITY ANALYSIS

PSD Class II Area

The EPA-approved Industrial Source Complex Short-Term (ISCST3) dispersion model was used to evaluate the pollutant emissions from the proposed project in the surrounding Class II Area. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. It incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfied the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at St. Petersburg/Clearwater, Florida (surface data) and Ruskin, Florida (upper air data). The 5-year period of meteorological data was from 1992 through 1996. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

PSD Class I Area

The California Puff (CALPUFF) dispersion model was used to evaluate the pollutant emissions from the proposed project in the Chassahowitzka National Wilderness Area (CNWA). CALPUFF is a non-steady state, Lagrangian, long-range transport model that incorporates Gaussian puff dispersion algorithms. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, line, area, and volume sources. The CALPUFF model has the capability to treat time-varying sources. It is also suitable for modeling domains from tens of meters to hundreds of kilometers, and has mechanisms to handle rough or complex terrain situations. Finally, the CALPUFF model is applicable for inert pollutants as well as pollutants that are subject to linear removal and chemical conversion mechanisms.

The meteorological data used in the CALPUFF model was processed by the California Meteorological (CALMET) model. The CALMET model utilizes data from multiple meteorological stations and produces a three-dimensional gridded modeling domain of hourly temperature and wind fields. The wind field is enhanced by the use of terrain data which is also input into the model. Two-dimensional fields such as mixing heights, dispersion properties, and surface characteristics are produced by the CALMET model as well. For this project, the CALMET model produced a modeling domain centered over Pasco County that was approximately 200 km by 200 km. This modeling domain was produced by utilizing 1990 meteorological data from 3 upper air, 6 surface, and 19 precipitation stations located throughout the state of Florida.

5.3 SIGNIFICANT IMPACT ANALYSIS

Typically, in order to conduct a significant impact analysis, the applicant conducts modeling using only the proposed project's emissions at worst load conditions. The highest predicted short-term concentrations and highest predicted annual averages predicted by this modeling are compared to the appropriate significant impact levels for the Class I and Class II Areas. If this modeling at worst load conditions shows significant impacts, additional modeling that includes the emissions from surrounding facilities is required to determine the project's impacts on the existing air quality and any applicable AAQS or PSD increments. If no significant impacts are shown, the applicant does not have to conduct any further modeling.

The significant impact analysis submitted for this project contained two separate analyses; one for the surrounding Class II Area, and another for the CNWA, which is the nearest Class I Area. The following paragraphs explain the methodologies and results of these analyses:

PSD Class II Area

Receptors were placed around the proposed facility, which is located in a PSD Class II area. A combination of fence line, near-field, mid-field, and far-field receptors were utilized for predicting maximum concentrations in the vicinity of the project. The fence line and near-field receptors consisted of discrete Cartesian receptors spaced at 100 meter intervals from the facility fence line out to the first mid-field polar receptor ring. The mid-field receptors consisted of a polar receptor grid with 8 rings and 10° spacing radials out to a distance 4 km from the facility. The far-field receptors consisted of polar receptor grid with 12 rings and 10° spacing radials out to a distance of 10 km from the facility. To improve the spatial distribution of the polar receptors, each polar ring was offset by 5°. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant impacts due to the project are predicted in the vicinity of the facility. The table below shows the results of the significant impact modeling for the Class II area:

MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO THE PSD CLASS II SIGNIFICANT IMPACT LEVELS IN THE VICINITY OF THE FACILITY

Pollutant	Averaging Time	Max Predicted Impact (ug/m^3)	Significant Impact Level (ug/m^3)	Significant Impact?
NO_2	Annual	4.8	1	YES

The results of the significant impact modeling revealed that the maximum predicted air quality impact due to NO_2 emissions from the proposed project was greater than the significant impact level for the annual averaging period. Therefore, the applicant was required to conduct full impact modeling in the Class II area for NO_2.

PSD Class I Area

Thirteen discrete receptors were placed along the border of the Chassahowitzka National Wilderness Area (CNWA), which is the closest PSD Class I area. The CNWA is located approximately 79 km northwest of the project. The maximum predicted annual impact for NO_2 due to the proposed project was compared to the Class I significant impact level to determine whether there was a significant impact in the CNWA. The table below shows the results of the Class I significant impact modeling:

MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO THE PSD CLASS I SIGNIFICANT IMPACT LEVELS (CNWA)

Pollutant	Averaging Time	Max. Predicted Impact at Class I Area (ug/m^3)	Proposed EPA Significant Impact Level (ug/m^3)	Significant Impact?
NO_2	Annual	0.0008	0.1	NO

The results of the significant impact modeling revealed that there were no significant impacts predicted due to the emissions of NO_2 from this project in the CNWA Class I area. Therefore, full impact modeling was not required for this project in the CNWA.

5.4 FULL IMPACT MODELING

Full impact modeling is modeling that combines the impact of the proposed project along with the impact of other major sources located within the vicinity of the project. The results of this modeling are compared to the applicable AAQS and PSD Increments.

PSD Class II AAQS Analysis

The AAQS represents the maximum concentration of a pollutant that ambient air may contain. Atmospheric dispersion modeling, as previously described, was performed to quantify the amount of NO_2 in the ambient air surrounding the facility. To make the modeling conservative, the maximum predicted impact was added to a background concentration that was observed at a local air monitor. The results of this analysis are shown in the table below. Maximum NO_2 concentrations predicted for the proposed project at receptors in the Class II Area did not show any impacts greater than the AAQS for the annual averaging period. Therefore, the proposed project will not contribute to a violation of the AAQS for NO_2, and may be permitted by Department rules.

PSD AAQS ANALYSIS

Pollutant	Averaging Time	Max. Predicted Impact (ug/m^3)	Background Concentration (ug/m^3)	Total Predicted Impact (ug/m^3)	AAQS (ug/m^3)	Impact Greater Than AAQS?
NO_2	Annual	62.3	20.7	83.0	100	NO

PSD Class II Increment Analysis

The PSD increment represents the amount that sources constructed after the PSD "baseline date", (February 8, 1988 for NO_2), may increase ambient ground level concentrations of a pollutant. Atmospheric dispersion modeling, as previously described, was performed to quantify the amount of PSD increment consumed in the Class II area surrounding the facility. The results of this analysis are shown in the table below. Maximum NO_2 concentrations predicted for the proposed project at receptors in the Class II Area do not show any impacts greater than the PSD Class II increment for the annual averaging period. Therefore, the proposed project will not contribute to a violation of the Class II increment for NO_2, and may be permitted by Department rules.

PSD CLASS II INCREMENT ANALYSIS

Pollutant	Averaging Time	Max. Predicted Impact (ug/m^3)	Allowable Increment (ug/m^3)	Impact Greater Than Allowable Increment?
NO_2	Annual	23.9	25	NO

The applicant excluded certain existing sources at the Curren Facility from the PSD Class II increment analysis. According to the applicant, digester gas internal combustion engines 1-3 were constructed prior to the PSD baseline date. The applicant has not completed an evaluation of PSD applicability for some or all of these sources. If this evaluation shows that these sources were constructed after the PSD baseline date, the increment modeling will have to be revised to include these sources. If this modeling shows a PSD Class II increment violation, limits on operation of these sources may be required to ensure that an impact greater than the allowable PSD increment does not occur.

5.5 ADDITIONAL IMPACTS ANALYSIS

Impact On Soils, Vegetation, And Wildlife

Very low emissions are expected from these natural gas-fired internal combustion engines. The maximum ground-level concentrations predicted to occur for NO_2, as a result of the proposed project, including background concentrations and all other nearby sources, will be less than the respective ambient air quality standard (AAQS). The project impacts are less than the AAQS for NO_2, and less than the applicable allowable increments for NO_2. Because the AAQS are designed to protect both the public health and welfare, it is reasonable to assume the impacts on soils, vegetation, and wildlife will be minimal or insignificant.

Impact On Visibility

Natural gas is a clean fuel and produces little particulate emissions. The low NO_2 and SO_2 emissions will also minimize plume opacity. Because no add-on control equipment and no reagents are required, there will be no steam plume or tendency to form ammoniated particulate species.

Due to the close proximity of this project to the CNWA Class I area, a regional haze analysis was performed. The CALPUFF dispersion model was recommended by the Department of the Interior for use this regional haze analyses because of its ability to handle atmospheric chemical transformations as well as wet/dry deposition. The results of the refined CALPUFF analysis predicted a change in visibility of 0.39%. This impact is below the NPS threshold of 5%, and it indicates that the proposed project will not have an adverse impact on visibility and regional haze in the CNWA.

Growth-Related Air Quality Impacts

There will be short-term increases in the labor force to construct the project. These temporary increases will not result in significant commercial and residential growth in the vicinity of the project. Operation of the additional internal combustion engines will require few new permanent employees, which will cause no significant impact on the local area.

Over the past few years the Public Service Commission has determined that a number of power projects are needed to help meet the low electrical reserve capacity throughout the State of Florida. This project is a response to state-wide and regional growth and also accommodates more growth. There are no adequate procedures under the PSD rules to fully assess these impacts. However, the type of project proposed has a small overall physical "footprint," low water requirements, and is among the lowest air emissions per unit of electric power generating capacity for intermittent duty reciprocating engines.

Hazardous Air Pollutants

The project is not a major source of hazardous air pollutants (HAPs) and is not subject to any specific industry or HAP control requirements pursuant to Section 112 of the Clean Air Act.

6. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant and other available information, the Department has made a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations. The Department will issue a draft permit to the applicant that allows for construction of this project pursuant to the conditions of the draft permit.

This evaluation was prepared by:

Joseph Kahn, P.E.
Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
850/921-9519

REFERENCES

[1] Information and photo from the City of Tampa's website at http://www.ci.tampa.fl.us.

[2] Information and photo from Waukesha's promotional and technical information found at www.waukeshaengine.com.

[3] The text of this section and the figure presented are adapted from *Gas Engine Emissions Technology*, Form 536, Third Edition, Waukesha Engine Division, Dresser Industries, Inc., Waukesha, WI, 1993 (printed 5/96).

[4] The information about Waukesha's engine controls described in this section is excerpted from Waukesha's promotional and technical information found at www.waukeshaengine.com.

[5] Figures are from Waukesha's web site at www.waukeshaengine.com.

[6] Adapted from a Waukesha White Paper about the Turbocharger Control Module, Form M1565, Waukesha Engine Division, Dresser Industries, Inc., Waukesha, WI, Nov. 1, 1996.

PERMITTEE

City of Tampa
Howard F. Curren AWT Facility
City Hall Plaza, 6th Floor
Tampa, Florida 33602

Permit No.	0570373-009-AC, PSD-FL-291
Project	Engines 7 and 8
SIC No.	4952
Expires:	^DRAFT

Authorized Representative:

Ralph L. Metcalf, II, P.E., Director
Department of Sanitary Sewers

PROJECT AND LOCATION

This permit authorizes the city of Tampa to construct two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8.

The facility, the Howard F. Curren Advanced Wastewater Treatment Facility, is located at Hookers Point between east McKay Bay and Hillsborough Bay, 2700 Maritime Boulevard, Tampa, Hillsborough County. UTM coordinates are: Zone 17; 364.0 km E and 3089.5 km N.

STATEMENT OF BASIS

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to construct the emissions units in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

APPENDICES

The attached appendices are a part of this permit:

Appendix BD BACT Determination
Appendix GC General Permit Conditions

DRAFT

Howard L. Rhodes, Director
Division of Air Resources
Management

FACILITY DESCRIPTION

The facility is an existing municipally owned wastewater treatment plant with a design treatment capacity of 96 million gallons per day, average daily flow. It treats all wastewater discharged to the City of Tampa system.

PROJECT DETAILS

This permitting action is to authorize construction of two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8. The emissions units are two identical Waukesha 16V-AT27GL engines, 4 stroke, spark ignition, each rated at 4073 bhp, fired exclusively on natural gas, each coupled to a nominal 2.9 MW electrical generator. Emissions units addressed by this permit are:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
017	Engine 7 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.
018	Engine 8 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.

The Model 16V-AT27GL engine is a sixteen cylinder engine in Waukesha's ATGL series natural gas fueled engines. Waukesha characterizes this series as high horsepower, high torque engines that are designed for reliable operation, fuel economy and low emissions. The Model 16V-AT27GL has a "V" cylinder arrangement, with a bore and stroke of 10.83 x 11.81 in. (275 x 300 mm) and displacement of 17398 cu. in (285 liters), and operates at a compression ratio of 9:1. This is a turbocharged engine, and maximum power output at the design intercooler operating temperature of 130° F is 4073 bhp (3037 kW_b) at 900 rpm. The electrical generator has a maximum power output rating of 2910 kW. The exhaust temperature is 731 °F. The waste heat will be used in the existing sludge drying operation, and will offset heat currently generated by firing natural gas in a combustion chamber in this operation.

REGULATORY CLASSIFICATION

This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 250 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD).

This project is subject to the requirements of Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), because emissions of NOx, CO and VOC exceed the significance criteria of Table 212.400-2, of Rule 62-212, F.A.C. According to the applicant, this project is not a major source of hazardous air pollutants (HAPs). This facility is not subject to the provisions of Title IV, Acid Rain, Clean Air Act as amended in 1990.

REVIEWING AND PROCESS SCHEDULE

4/26/00	Receipt of application and fee
4/26/00	Department completeness request
5/5/00	Additional Department completeness request
5/16/00, 6/1/00	Received applicant's responses to completeness requests
6/1/00	Application complete
^DRAFT	Distributed Notice of Intent to Issue and supporting documents
^DRAFT	Notice of Intent published in ^

RELEVANT DOCUMENTS

The documents listed below are the basis of the permit. They are specifically related to this permitting action. These documents are on file with the Department.

- Permit application
- Department's request for additional information
- Applicant's additional information
- Department's Technical Evaluation and Preliminary Determination
- Department's Intent to Issue

The following specific conditions apply to all emissions units at this facility addressed by this permit.

ADMINISTRATIVE

1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify these emissions units should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, phone number 850/488-0114. All documents related to reports, tests, minor modifications and notifications shall be submitted to the Hillsborough County Environmental Protection Commission's Air Management Division at 1410 North 21st Street, Tampa, Florida 33605, phone number 813/272-5530; copies of these documents should be submitted to the Department's Southwest District office at 3804 Coconut Palm Drive, Tampa, Florida 33619-8218, and phone number 813/744-6100.

2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]

3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-110, 62-204, 62-212, 62-213, 62-296, 62-297 and the Code of Federal Regulations Title 40, Part 60, adopted by reference in the Florida Administrative Code (F.A.C.) regulations. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]

5. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Expiration: This air construction permit shall expire on ^DRAFT. The permittee, for good cause, may request that this construction (PSD) permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit. [Rules 62-210.300(1), 62-4.070(4), 62-4.080, and 62-4.210, F.A.C]

   PSD Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [Rules 62-4.070(4), 62-4.210(2) & (3), and 62-210.300(1)(a), F.A.C.]

BACT Determination Review: In conjunction with extension of the 18 month periods to commence or continue construction, extension of the permit expiration date, or where construction is conducted in two or more phases, the permittee may be required to demonstrate the adequacy of any previous determination of Best Available Control Technology (BACT) for the source. [Rules 62-4.070(4), 62-4.210(2) & (3), 62-210.300(1)(a), and 62-212.400(6)(b), F.A.C.]

7. Modifications: No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit must be obtained prior to the beginning of construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

8. Title V Operation Permit Required: This permit authorizes construction and/or installation of the permitted emissions unit and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The owner or operator shall apply for a Title V operation permit at least ninety days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Hillsborough County Environmental Protection Commission's Air Management Division, and a copy sent to the Department's Southwest District office. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

EMISSION LIMITING STANDARDS

9. General Visible Emissions Standard: Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer, or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density if which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20% opacity). The test method for visible emissions shall be EPA Method 9, incorporated and adopted by reference in Chapter 62-297, F.A.C. Test procedures shall meet all applicable requirements of Chapter 62-297, F.A.C. [Rule 62-296.320(4)(b)1, F.A.C.]

10. Unconfined Emissions of Particulate Matter: [Rule 62-296.320(4)(c), F.A.C.]

    (a) No person shall cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any activity, including vehicular movement; transportation of materials; construction, alteration, demolition or wrecking; or industrially related activities such as loading, unloading, storing or handling; without taking reasonable precautions to prevent such emissions.

    (b) Any permit issued to a facility with emissions of unconfined particulate matter shall specify the reasonable precautions to be taken by that facility to control the emissions of unconfined particulate matter.

    (c) Reasonable precautions include the following:

    - Paving and maintenance of roads, parking areas and yards.
    - Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.

- Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar activities.
- Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.
- Landscaping or planting of vegetation.
- Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
- Confining abrasive blasting where possible.
- Enclosure or covering of conveyor systems.

(d) In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

11. General Pollutant Emission Limiting Standards: [Rule 62-296.320(1)(a)&(2), F.A.C.]

(a) No person shall store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department.

(b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

[Note: An objectionable odor is defined in Rule 62-210.200(198), F.A.C., as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance.]

OPERATIONAL REQUIREMENTS

12. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by hazard of fire, wind or by other cause, the permittee shall immediately notify the Department's district office and, if applicable, appropriate local program. The notification shall include pertinent information as to the cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with Department rules. [Rule 62-4.130, F.A.C.]

13. Circumvention: No person shall circumvent any air pollution control device or allow the emission of air pollutants without the applicable air pollution control device operating properly. [Rule 62-210.650, F.A.C.]

14. Excess Emissions:

 (a) Excess emissions resulting from malfunction of these emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed 15 minutes in any 24 hour period. Excess emissions for startup and shutdown are not allowed for any duration. [Rules 62-210.700(1) & (5), F.A.C.]

 (b) Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during start-up, shutdown, or malfunction shall be prohibited. [Rule 62-210.700(4), F.A.C.]

COMPLIANCE MONITORING AND TESTING REQUIREMENTS

15. Required Number of Test Runs: For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured; provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five-day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five-day period allowed for the test, the Secretary or his or her designee may accept the results of two complete runs as proof of compliance, provided that the arithmetic mean of the two complete runs is at least 20% below the allowable emission limiting standard. [Rule 62-297.310(1), F.A.C.]

16. Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2), F.A.C.]

17. Calculation of Emission Rate: The indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule. [Rule 62-297.310(3), F.A.C.]

18. Test Procedures shall meet all applicable requirements of Rule 62-297.310(4), F.A.C. [Rule 62-297.310(4), F.A.C.]

19. Determination of Process Variables: [Rule 62-297.310(5), F.A.C.]
    (a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.
    (b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.
20. Required Stack Sampling Facilities: Sampling facilities include sampling ports, work platforms, access to work platforms, electrical power, and sampling equipment support. All stack sampling facilities must meet any Occupational Safety and Health Administration (OSHA) Safety and Health Standards described in 29 CFR Part 1910, Subparts D and E. Sampling facilities shall also conform to the requirements of Rule 62-297.310(6), F.A.C. [Rule 62-297.310(6), F.A.C.]
21. Test Notification: The owner or operator shall notify the Department's district office and, if applicable, appropriate local program, at least 15 days prior to the date on which each formal compliance test is to begin. Notification shall include the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator. [Rule 62-297.310(7)(a)9., F.A.C.]
22. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

REPORTING AND RECORD KEEPING REQUIREMENTS

23. Duration of Record Keeping: Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least five years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule. [Rules 62-4.160(14)(a)&(b) and 62-213.440(1)(b)2.b., F.A.C.]

24. Test Reports: The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test. The required test report shall be filed with the Department as soon as practical but no later than 45 days after the last sampling run of each test is completed. The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the applicable information listed in Rule 62-297.310(8)(c), F.A.C. [Rule 62-297.310(8), F.A.C.]

25. Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Department within one working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. [Rule 62-4.130, F.A.C.]

26. Excess Emissions Report - Malfunctions: In case of excess emissions resulting from malfunctions, each owner or operator shall notify the Department or the appropriate local program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report if requested by the Department. [Rule 62-210.700(6), F.A.C.]

27. Annual Operating Report for Air Pollutant Emitting Facility: The Annual Operating Report for Air Pollutant Emitting Facility shall be completed each year and shall be submitted to the Hillsborough County Environmental Protection Commission's Air Management Division by March 1 of the following year. [Rule 62-210.370(3), F.A.C.]

The following specific conditions apply to the following emissions units after construction:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
017	Engine 7 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.
018	Engine 8 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.

[Note: These emissions units are subject to the requirements for Prevention of Significant Deterioration pursuant to Rule 62-212.400, F.A.C., for NOx and of the state rules as indicated in this permit. Emissions of CO and VOC are limited to ensure that this project will not exceed the PSD significance level for these pollutants.]

OPERATIONAL REQUIREMENTS

1. Hours of Operation: Each emissions unit shall not operate more than 6,500 hours in any consecutive 12 month period. [Rule 62-210.200, F.A.C., Definitions-Potential to Emit (PTE), and limitation on PTE to avoid PSD for CO and VOC]

2. Natural Gas Fuel Only: These engines shall burn only pipeline natural gas. [Rules 62-4.070(3) and 62-210.200, F.A.C., Definitions-Potential to Emit (PTE)]

   [Note: This condition and the hours of operation limitation will effectively limit SO_2 emissions to approximately 0.5 tons per year, and use of natural gas will limit PM_{10} emissions to approximately 5.8 tons per year based on the highest manufacturer's emission factor.]

EMISSION LIMITATIONS AND PERFORMANCE STANDARDS

3. Visible Emissions: These emissions units are subject to the VE requirements of specific condition 9 in Section II of this permit. [Rule 62-296.320, F.A.C.]

   [Note: Regular compliance testing for visible emissions is not required by this permit.]

4. Emissions Limited: Emissions from each emissions unit shall not exceed the following limits for the following pollutants:

POLLUTANT	EMISSION LIMIT	AVERAGING TIME
VOC	5.0 pounds/hour	3 hours[1]
NOx	14.0 pounds/hour[2]	3 hours[1]
CO	14.9 pounds/hour	3 hours[1]

[1] The averaging times correspond to the required length of sampling for the initial and subsequent emission tests.
[2] NOx emissions are to be reported as NO_2.

[Note: The mass emission limits correspond to the following emissions at full load in units of g/bhp-hr: VOC, 0.55, NOx, 1.56, CO, 1.66. This condition and the hours of operation limitation will effectively limit VOC, NOx and CO emissions to 32.5, 91.0 and 96.8 tons per year, respectively.]

[Rules 62-4.070(3) and 62-212.400, F.A.C., and BACT (for NOx)]

COMPLIANCE MONITORING AND TESTING REQUIREMENTS

5. Emissions Tests: Compliance with the emission limit for VOC shall be demonstrated by compliance tests conducted initially and every five years thereafter. Compliance with the emission limits for NOx and CO shall be demonstrated by compliance tests conducted annually. Compliance tests shall be conducted using the test methods of 40 CFR 60 Appendix A specified below.

POLLUTANT	TEST METHOD
VOC	Method 25 or 25A, with optional Method 18[1]
NOx	Method 7 or 7E[2]
CO	Method 10

[1] Method 18 may be used to determine the methane content which may be excluded from the total VOC measured using Method 25 or 25A.
[2] NOx emissions are to be reported as NO_2.

[Rules 62-4.070(3), 62-212.400, 62-297.340, and 62-297.401, F.A.C.]

REPORTING AND RECORD KEEPING REQUIREMENTS

6. Monthly Records: The owner or operator shall equip each engine with a run hours meter and shall make and maintain monthly records of hours of operation, rolling 12-month total hours of operation, and fuel consumption for each emission unit no later than ten days after the end of each month. [Rule 62-4.070(3), F.A.C.]

INCREMENT MODELING

7. Additional Increment Modeling for NO_2: In the event that digester gas internal combustion engines 1 through 3 are found to have been constructed after the NO_2 increment PSD baseline date of February 8, 1988, the owner or operator shall perform ambient impact modeling for NO_2 PSD increment consumption, including all emissions units at this facility and all surrounding sources required by the Department that were constructed after the baseline date. If such modeling shows a violation of the NO_2 PSD increment, further operation of the emissions units at this facility shall be curtailed as required to provide that no modeled violation of the NO_2 PSD increment will occur. The current Title V permit shall be revised to incorporate restrictions on the curtailed emissions units to match the limitations assumed in the modeling effort. [Rules 62-4.070(3) and 62-212.400(5)(e), F.A.C.]

City of Tampa
Howard F. Curren Advanced Wastewater Treatment Facility
Engines 7 and 8
PSD-FL-291 and 0570373-009-AC
Hillsborough County

1. BACKGROUND

The applicant proposes to construct two natural gas fired reciprocating engine driven generators that the applicant has designated as engines 7 and 8, at the existing Howard F. Curren Advanced Wastewater Treatment Facility, is located at Hookers Point between east McKay Bay and Hillsborough Bay, 2700 Maritime Boulevard, Tampa, Hillsborough County.

The facility is an existing municipally owned wastewater treatment plant with a design treatment capacity of 96 million gallons per day, average daily flow. The engines are two identical Waukesha 16V-AT27GL engines, 4 stroke, spark ignition, each rated at 4073 bhp, fired exclusively on natural gas, each coupled to a nominal 2.9 MW electrical generator. The exhaust temperature is 731 °F. The waste heat will be used in the existing sludge drying operation, and will offset heat currently generated by firing natural gas in a combustion chamber in this operation. Hours of operation of each engine will be limited to 6500 hours per year to limit emissions of CO and VOC to levels below the PSD significance criteria.

This project addresses the following emissions unit(s):

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
017	Engine 7 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.
018	Engine 8 with nominal 2.9 MW generator: 4073 brake hp natural gas fired Waukesha Model 16V-AT27GL engine coupled to a nominal 2.9 MW electrical generator. Maximum heat input rate is 27.2 mmBtu/hr (HHV) based on a natural gas heating value of 1025 Btu/cf.

This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant exceeds 100 tons per year (TPY). This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because potential emissions are greater than 250 TPY for at least one criteria pollutant (at least NOx at this facility), the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD).

As discussed in the Technical Evaluation and Preliminary Determination, the annual potential emissions associated with this project are: NOx, 91.0; CO, 96.8; PM_{10}, 5.8; SO_2, 1.0; and VOC, 32.5. This project is subject to the requirements of Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), because emissions of NOx exceeds the significance criteria of Table 212.400-2, of Rule 62-212, F.A.C. Therefore, the emissions units are subject to limits determined as BACT for NOx. PM_{10} and SO_2 are not subject to PSD; because engine hours of operation are limited to 6500 hours per year per the applicant's request, CO and VOC are also not subject to PSD. Combustion design and control are the techniques used to control emissions from these engines. Emission control, process information, air quality effects, and rule applicability are discussed in more detail in the Department's Technical Evaluation and Preliminary Determination (TEPD).

According to the applicant, this project is not a major source of hazardous air pollutants (HAPs). This facility is not subject to the provisions of Title IV, Acid Rain, Clean Air Act as amended in 1990.

2. DATE OF RECEIPT OF A BACT APPLICATION

April 26, 2000, and updated by additional information as shown in the TEPD.

3. BACT DETERMINATION REQUESTED BY THE APPLICANT

The applicant proposed the control technology for BACT for the PSD pollutant NOx to be combustion design and control, with emissions limited to 1.56 g/bhp-hr. According to the applicant, the emissions in the exhaust from the selected engines have been minimized, given the design constraint that the engines' waste heat be utilized in the existing sludge drying operation. Because the applicant is using waste heat to offset fuel consumption in the existing sludge drying operation, the applicant may submit this project to EPA for consideration as a combined heat and power (CHP) project.

4. BACT DETERMINATION PROCEDURE

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques for control of each such pollutant. In addition, Rule 62-212.400(6)(a), F.A.C., states that in making the BACT determination, the Department shall give consideration to:

1. Any Environmental Protection Agency determination of BACT pursuant to Section 169 of the Clean Air Act, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).
2. All scientific, engineering, and technical material and other information available to the Department.
3. The emission limiting standards or BACT determination of any other state.
4. The social and economic impact of the application of such technology.

The EPA currently directs that BACT should be determined using the "top-down" approach. In this approach, available control technologies are ranked in order of control effectiveness for the emissions unit under review. The most stringent alternative is evaluated first. That alternative is selected as BACT unless the alternative is found to not be achievable based on technical considerations or energy, environmental or economic impacts. If this alternative is eliminated for these reasons, the next most stringent alternative is considered. This top-down approach is continued until BACT is determined. In general EPA has identified five key steps in the top-down BACT process: Identify alternative control technologies; eliminate technically infeasible options; rank remaining control technologies by control effectiveness; evaluate most effective controls; select BACT.

BACT evaluation should be performed for each emissions source and pollutant under consideration. In this case, the emissions units are identical, and the emissions are associated with combustion. The control technology for all PSD pollutants is the same.

The Department will consider the control or reduction of "non-regulated" air pollutants when determining the BACT limit for regulated pollutants, and will weigh control of non-regulated air pollutants favorably when considering control technologies for regulated pollutants. The Department will also favorably consider control technologies that utilize pollution prevention strategies. These approaches are consistent with EPA's consideration of environmental impacts.

The EPA has determined that a BACT determination shall not result in a selection of a control technology which would not meet any applicable emission limitation under 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants). There are no such limits applicable to this project.

In addition to the information submitted by the applicant and that information mentioned above, the Department may rely upon other available information in making its BACT determination. For this project, the Department also relied upon information in EPA's RACT/BACT/LAER Clearinghouse, and BACT guidelines for the California Air Resources Board, South Coast Air Quality Management District and the Texas Natural Resources Conservation Commission. For each emission source, the Department's BACT determination is based on the information provided by the applicant and the informed judgement of the Department.

5. BACT ANALYSIS AND DEPARTMENT'S DETERMINATION

For this project the PSD pollutant of concern is NOx, resulting from combustion of natural gas in the emissions units. The applicant's proposed control strategies and the Department's BACT determination for each pollutant is discussed below. The applicant's original BACT analysis included review of control technologies for CO and VOC, however, a later submittal requested reducing allowable operating hours from 8760 to 6500 hours per year to avoid PSD review for CO and VOC.

The processes that result in formation of NOx are discussed in the TEPD, as are the details of the applicant's proposed control technology: use of pipeline natural gas fuel, combusted under lean burn conditions with engine design and control to assure proper combustion. The applicant proposed that SCR for NOx control was not economically feasible. The applicant proposed that three way catalyst was not technically feasible for control of NOx because of the high oxygen content in the exhaust gases associated with lean combustion. A review of the RACT/BACT/LAER Clearinghouse (RBLC) data shows that BACT is the use of lean burn technology in many cases.

5.1 NOx

For control of NOx, the applicant evaluated combustion modifications, combustion design and exhaust control technologies.

The combustion modification strategies are lean combustion and ignition timing retardation. Lean air/fuel ratio (lean combustion) works by increasing the amount of air involved in the combustion process which acts as a heat sink or quenching mechanism to reduce the formation of thermal NOx. Generally lean combustion occurs at air/fuel ratios of two times, or more, the stoichiometric ratio. Ignition timing retardation reduces the effect of thermal NOx by allowing the air/fuel mixture to be ignited under conditions of lower peak pressure. The lower pressure provides for lower peak temperatures, with a reduction in thermal NOx. While these combustion modification strategies reduce NOx, they can reduce engine power output, increase fuel consumption and, as the lean fuel limit is approached, cause engine misfiring.

The combustion design strategy incorporates the principals of lean combustion and ignition timing retardation as part of the engine design. Considering these provisions at the design stage allows the design conditions to be changed to overcome some of the performance problems that are inherent in post-design combustion modifications. Other design provisions that will allow for maximum power output with stable engine operation and reasonable fuel economy can include high energy ignition systems, electronic air/fuel and ignition controls, engine turbocharging, mechanical and electronic turbocharger controls and turbocharger intercooling. For this project, the Waukesha engines selected will incorporate these design provisions as part of a low emission design that is based on lean combustion. The engine manufacturer has designed these engines such that emissions of NOx are very low in terms of g/bhp-hr. The specific controls are discussed in more detail in the Technical Evaluation.

The exhaust control technologies considered for control of NOx emissions were Selective Non-Catalytic Reduction (SNCR), Non-Selective Catalytic Reduction (NSCR) and Selective Catalytic Reduction (SCR).

In the SNCR process, ammonia or urea is injected at high temperatures without a catalyst to reduce NOx emissions to nitrogen and water vapor. However, the exhaust temperature must be maintained above 1600°F to allow the reaction to occur, otherwise uncontrolled NOx will be emitted as well as unreacted ammonia. In addition, the exhaust temperature must not exceed 2000°F or ammonia will actually be oxidized creating additional NOx emissions. For boilers, SNCR has achieved control efficiencies in the 40% to 60% range. SNCR is not technically feasible because the operating temperature required (1600 to 2000 °F) far exceeds the maximum exhaust temperature of the engines of 731 °F.

The NSCR process uses a platinum/rhodium catalyst to reduce NOx to nitrogen and water vapor in exhaust gas streams containing less than 3% oxygen. The catalyst is also called a three way catalyst because it simultaneously promotes the reduction of NOx and oxidation of CO and VOC emissions. The technology is essentially the same as that used on automobiles. The reaction proceeds without need for a separate reagent such as ammonia. The oxygen from NOx is stripped in the reaction and reacts with CO and VOC to oxidize those compounds to CO_2 and water. The nitrogen is emitted as elemental nitrogen, N_2. In order for the process to be effective for reduction of NOx, it must occur in a low oxygen environment. Control efficiency for NOx will decrease with increasing exhaust oxygen content. Because the exhaust from lean combustion engines has typically 10% oxygen, NSCR is not technically feasible for NOx control.

SCR is a control technology in which ammonia is injected into the exhaust gas stream in the presence of a catalyst bed to reduce NOx to elemental nitrogen (N_2)and water. Urea can be used as the reactant instead of ammonia. The urea is decomposed in the process to form ammonia, which reacts as above to reduce NOx, and carbon dioxide. Because urea poses less concerns regarding safe storage and handling, it is favored by some SCR vendors. For the SCR reaction to proceed satisfactorily, the exhaust gas temperature must be maintained between 450° F and 850°F. SCR is a commercially available, demonstrated control technology currently employed on several combined cycle combustion turbine projects SCR is capable of very low NOx emissions (approximately 0.16 g/bhp-hr) with control efficiencies over 90%. SCR is technically feasible, but was rejected by the applicant because of adverse economic impact. It support of its claim, the applicant cited a previous BACT Determination where the Department rejected SCR for a reciprocating engine (Miami-Dade Water and Sewer Department) even though costs were less than $2,000 per ton controlled. However, the Department rejected SCR for that project because of technical unfeasibility; exhaust temperatures in the range of engine operation were below those required for proper operation of the SCR system.

The applicants costs for SCR are summarized below, assuming the reduction of NOx from both engines of 90%, for a total of 81.9 tons per year controlled. The costs are based on a vendor's quote (Miratech) and the applicant's estimated capital and annual costs of installation and operation.

Option	Total Capital Cost	Total Annual Cost	Life	Interest	Control Cost
SCR	$709,108	$248,039	15 yr	7 %	$3,029/ton

The Department used the vendor's quote to develop its own control cost range which varied from $2,967 to $3,296 per ton controlled. This range agrees well with the applicant's cost estimate. The Department cannot agree with the applicant that SCR is not economically feasible for this project, because the control cost is well within the range that the Department considers to be economically feasible.

The Department's review of the RBLC data shows that lean combustion and NSCR are the two control technologies selected for most reciprocating engine projects. NSCR is not feasible for this project. Very few projects utilize SCR for control of NOx, particularly in the range of annual emissions proposed by the applicant. The applicant for a project in New Jersey with three 12 cylinder AT27GL engines proposed SCR and oxidation catalyst in a non-attainment area to avoid major source new source review including LAER and offsets.[1] Florida has not previously required SCR on reciprocating engines. Use of SCR for this project will result in emissions of ammonia, a "non-regulated" air pollutant. Based on an estimate provided to the Department by another SCR manufacturer that its SCR system for these engines would emit 50 ppm of ammonia slip, the Department estimated that potential emissions of ammonia will be about 8.5 tons per year.[2] As discussed previously, the Department will favorably consider control technologies that utilize pollution prevention strategies, such as those incorporated into the design of the engines. The Department is particularly concerned with the level of ammonia emissions in relation to the mass of NOx that will be controlled, particularly given the proximity to Tampa Bay. Although cost effective, the Department will not require SCR as BACT for NOx. Instead, based on the information provided by the applicant and the informed judgement of the Department, BACT for NOx for this project shall be combustion design incorporating lean combustion. Because the engine manufacturer's emission factors vary somewhat with load, NOx emissions will be limited in mass units of pounds per hour, rather than in terms of g/bhp-hr. Mass emissions are greatest for all pollutants at maximum load, and limiting emissions in terms of pounds per hour is consistent with limiting annual operating hours as requested by the applicant. Thus, NOx emissions shall be limited to14.0 pounds per hour. Permit conditions, including a limit on hours of operation, will limit potential NOx emissions to 91.0 tons per year.

5.2 SUMMARY OF BACT DETERMINATION

Pollutant	Emission Limit	Control Technology
NOx	14.0 pounds/hour	Lean combustion

6. COMPLIANCE

Emission testing shall be required for NOx annually.

7. DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

Joseph Kahn, P.E.
Department of Environmental Protection
Bureau of Air Regulation
Mail Station #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: 850/488-0114
Prepared June 19, 2000

Recommended By:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date:

REFERENCES

[1] Sycom Enterprises, Linden Pumping Facility. The project is listed on the BACT Internet site for the California Air Resources Board at http://arbis.arb.ca.gov/bact/bact.htm. Information provided by NJDEP, June 14, 2000.

[2] Information provided by Bill Kamerer of Johnson-Matthey during telephone conversation with Joe Kahn, June 14, 2000.

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

(a) Have access to and copy and records that must be kept under the conditions of the permit;
(b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
(c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

(a) A description of and cause of non-compliance; and
(b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extend it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

(a) Determination of Best Available Control Technology (X);
(b) Determination of Prevention of Significant Deterioration (X); and
(c) Compliance with New Source Performance Standards ( ).

G.14 The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
(c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

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1.0 INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

The City of Tampa is partnering with Tampa Electric Company (TEC) to construct and operate two internal combustion (IC) engine/generator sets at its existing Howard F. Curren Advanced Wastewater Treatment Facility (HFCAWTF). The HFCAWTF is located within the City of Tampa at 2700 Maritime Boulevard, Hillsborough County, Florida.

The new IC engine/generator sets will each have a nominal generation capacity of 2.9 megawatts (MW) and will be fired exclusively with natural gas. The IC engine/generator sets will serve as a source of standby power for the HFCAWTF, as well as generating supplemental grid power for TEC. Heat contained in the exhausts of the new IC engines will also be used to provide most of the energy necessary for the HFCAWTF's existing sludge drying process. Following installation and operation of the new IC engine/generator sets, the existing sludge drying combustion chambers, which presently provide all the heat needed for sludge drying, will only be used to furnish supplemental heat as needed.

Operation of the proposed project will result in airborne emissions. Therefore, a permit is required prior to the beginning of facility construction, per Rule 62-212.300(1)(a), Florida Administrative Code (F.A.C.). This report, including the required permit application forms and supporting documentation included in the attachments, constitutes the City of Tampa's application for authorization to commence construction in accordance with the Florida Department of Environmental Protection (FDEP) permitting rules contained in Chapter 62-212, *et. seq.*, F.A.C.

The existing HFCAWTF is located in an attainment area and has potential emissions of a regulated pollutant in excess of 250 tons per year (tpy). Potential emissions from the new IC engine/generator sets exceed the prevention of significant deterioration (PSD) significant emission rates specified in Chapter 62-212, Table 212.400-2, F.A.C., for several regulated pollutants. Accordingly, the proposed IC engine/generator sets qualify as a major modification to an existing major facility and are subject to the PSD new source review (NSR) requirements of Section 62-212.400, F.A.C. Therefore, this report and application are also submitted to satisfy the permitting requirements contained in the FDEP PSD rules and regulations.

This report is organized as follows:

- Section 1.2 provides an overview and summary of the key regulatory determinations.
- Section 2.0 describes the proposed facility and associated air emissions.
- Section 3.0 describes national and state air quality standards and discusses applicability of NSR procedures to the proposed project.
- Section 4.0 describes the PSD NSR review procedures.
- Section 5.0 provides an analysis of best available control technology (BACT).
- Sections 6.0 (Dispersion Modeling Methodology) and 7.0 (Dispersion Modeling Results) address ambient air quality impacts.
- Section 8.0 discusses current ambient air quality in the vicinity of the HFCAWTF and preconstruction ambient air quality monitoring.
- Section 9.0 addresses other potential air quality impact analyses.
- Section 10.0 lists the references used in preparing the report.

Attachments A through C provide the FDEP Application for Air Permit—Long Form, IC engine/generator set technical specifications and emissions data, and emission rate calculations, respectively. Section 7.0, Dispersion Modeling Results, is currently being prepared and will be submitted as a supplement to this application. All dispersion modeling input and output files for the ambient impact analysis will be provided in diskette format in Attachment D.

1.2 SUMMARY

The IC engine/generator sets planned for the HFCAWTF are Waukesha Engine Model 16V-AT27GL Gas Enginator® Generating Systems. The IC engines will be fired exclusively with pipeline-quality natural gas containing no more than 2.0 grains of total sulfur per one hundred standard cubic feet (gr S/100 scf).

The City of Tampa plans to commence construction upon receipt of department authorization. Completion of construction and initial operation is planned to occur within 30 days following commencement of construction.

Based on continuous operation (i.e., 8,760 hours per year [hr/yr]) at rated capacity, the two new IC engine/generator sets will have the potential to emit 122.8 tpy of nitrogen oxides (NO_x), 130.6 tpy of carbon monoxide (CO), 7.8 tpy of particulate matter/particulate matter less than or equal to 10 micrometers (PM/PM_{10}), 0.2 tpy of sulfur dioxide (SO_2), and 43.2 tpy of volatile organic compounds (VOCs). Based on these annual emission rate potentials, NO_x, CO, and VOC emissions are subject to PSD review.

As presented in this report, the analyses required for this permit application resulted in the following conclusions:

- The use of good combustion practices and clean fuel is considered to be BACT for PM/PM_{10}. The IC engines will use lean burn, low-emission combustion technology and will be fired exclusively with pipeline-quality natural gas.
- Lean burn, low-emission combustion technology and good operating practices to minimize incomplete combustion are proposed as CO and VOC BACT for the IC engines. IC engine CO and VOC emissions are projected to be 1.66 and 0.55 grams per horsepower hour (g/hp-hr), respectively. These emission rates are consistent with recent national BACT determinations for natural gas-fired IC engines.
- Lean burn, low-emission combustion technology is proposed as BACT for NO_x for the IC engines. The IC engine NO_x emission rate is projected to be 1.56 g/hp-hr. This emission rate is consistent with recent national BACT determinations for natural gas-fired IC engines.

- The new IC engine/generator sets are projected to emit NO_x, CO, and VOC in greater than significant amounts. The ambient impact analysis demonstrates that project impacts will be below the PSD *de minimis* monitoring significance levels for these pollutants. Accordingly, the IC engine modification project qualifies for the Section 62-212.400, Table 212.400-3, F.A.C., exemption from PSD preconstruction ambient air quality monitoring requirements for all PSD pollutants.
- The ambient impact analysis demonstrates that project impacts for all pollutants emitted in significant amounts will be below the PSD significant impact levels defined in Rule 62-210.200(260), F.A.C., with the exception of nitrogen dioxide (NO_2). Accordingly, a multisource interactive assessment of national ambient air quality standards (NAAQS) attainment and PSD Class II increment consumption is required for NO_2. The assessment of NO_2 ambient air impacts is currently underway and will be submitted as a supplement to this permit application.
- The nearest PSD Class I area (Chassahowitzka National Wildlife Refuge [NWR]) is located approximately 80 kilometers (km) north-northwest of the project site. Due to the exclusive use of natural gas and relatively minor project emissions, air quality and visibility impacts on this Class I area will be negligible.

2.0 DESCRIPTION OF THE PROPOSED FACILITY

2.1 PROJECT DESCRIPTION, AREA MAP, AND PLOT PLAN

The HFCAWTF is located at 2700 Maritime Boulevard within the City of Tampa in Hillsborough County, Florida. Figure 2-1 provides portions of a U.S. Geological Survey (USGS) topographical map showing the HFCAWTF site location and nearby prominent geographical features.

The proposed modification project consists of two IC engine/generator sets, each capable of generating a net nominal 2.9 MW of electricity. The IC engines will be fired exclusively with pipeline-quality natural gas. The IC engine/generator sets may operate at rated capacity for up to 8,760 hr/yr.

Combustion of natural gas in the IC engines will result in emissions of PM/PM_{10}, SO_2, NO_x, CO, and VOCs. Emission control systems proposed for the IC engines include the use of lean burn, low-emission combustion technology for the control of NO_x, CO, and VOCs, and exclusive use of clean, low-sulfur, low-ash natural gas to minimize PM/PM_{10} and SO_2 emissions.

A site plan showing the existing HFCAWTF, major process equipment and structures, and the new IC engine/generator emission points is provided as Figure 2-2. Primary access to the HFCAWTF is from Maritime Boulevard on the west side of the site. The HFCAWTF entrance has security to control site access.

2.2 PROCESS DESCRIPTION AND PROCESS FLOW DIAGRAM

The proposed modification project consists of two, four-cycle, turbocharged, lean burn, low-emission Waukesha Engine Model 16V-AT27GL Gas Enginator® Generating Systems. Each 4,073-brake horsepower (bhp) IC engine will burn natural gas to produce mechanical, rotary shaft power. This shaft power is used to drive a coupled electric generator capable of generating a nominal 2.9 MW of electricity. Electricity generated by the IC engine/generator sets will be used as standby power for the HFCAWTF, as well as being dispatched to the grid for distribution by TEC.

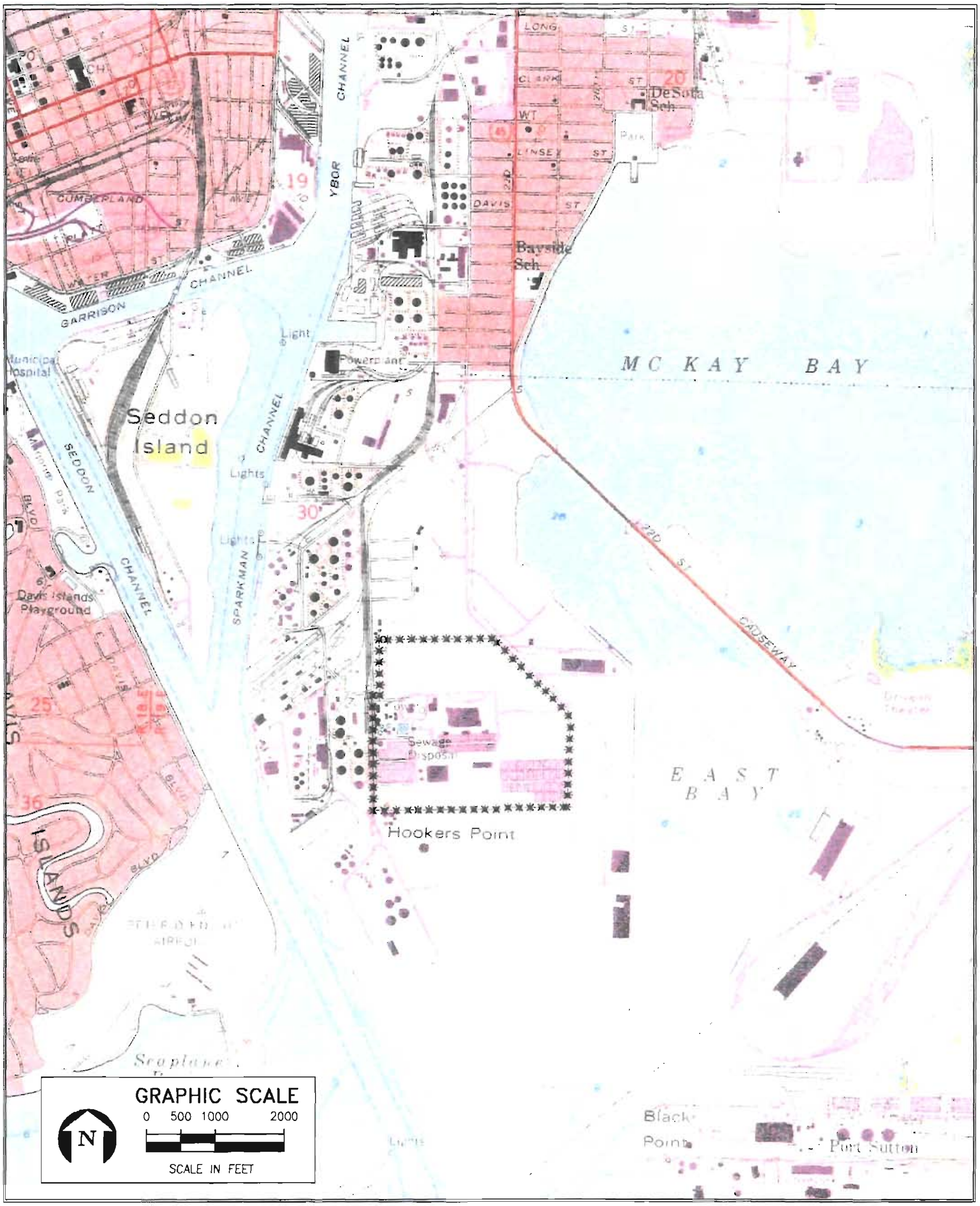

FIGURE 2-1.

HOWARD F. CURREN ADVANCED WASTEWATER TREATMENT PLANT

Source: USGS Quad: Tampa, FL, 1981.

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When needed, the hot exhaust gases from the IC engines will be used to provide heat for the HFCAWTF's existing sludge drying process. In this mode of operation, the IC engine exhaust gases will be routed through the existing sludge dryer afterburners for reduction of VOC and PM/PM_{10} emissions. When the existing sludge drying trains are not in operation, the IC engines will exhaust directly to the atmosphere. Figure 2-3 presents a process flow diagram of the modification project.

The IC engines will use lean burn, low-emission combustion technology to control NO_x, CO, and VOC emissions. The exclusive use of low-sulfur natural gas in the IC engines will minimize PM/PM_{10} and SO_2 emissions.

2.3 EMISSION AND STACK PARAMETERS

Tables 2-1 and 2-2 provide maximum hourly and annual criteria pollutant IC engine emission rates, respectively. These emission rates are based on engine vendor data (for NO_x, CO, VOC, and PM/PM_{10}) and U.S. Environmental Protection Agency (EPA) AP-42 emission factors (for SO_2). The maximum emission rates shown in Tables 2-1 and 2-2 are based on continuous operation at rated capacity and reflect the direct discharge of the IC engine exhausts to the atmosphere.

Stack parameters for the IC engine/generator sets are provided in Table 2-3.

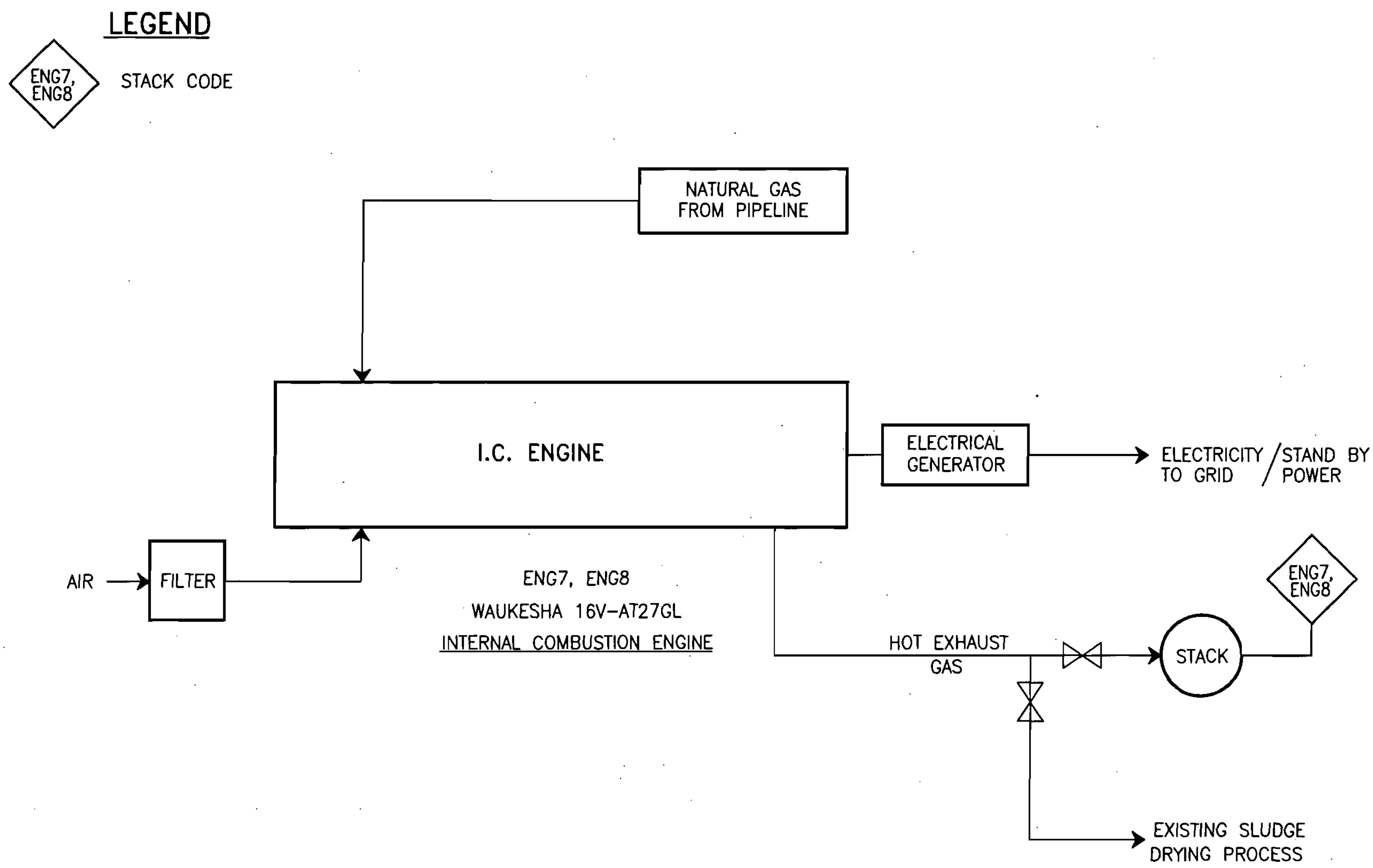

FIGURE 2-3.

INTERNAL COMBUSTION ENGINE - PROCESS FLOW DIAGRAM

Source: ECT, 2000.

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Table 2-1. Maximum Criteria Pollutant Emission Rates—Natural Gas Fired IC Engine/Generator Sets (per IC Engine/Generator Set)

Unit Load (%)	PM/PM_{10}*		SO_2		NO_x		CO		VOC		Lead	
	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
100	0.9	0.113	0.03	0.004	14.0	1.76	14.9	1.88	4.9	0.617	Neg.	Neg.

Note: g/s = gram per second.
lb/hr = pound per hour.
Neg. = negligible

*As measured by EPA Reference Method 5B or 17.

Sources: ECT, 2000.
Waukesha, 1999.

Table 2-2. Maximum Annual Emission Rates (tpy)

Pollutant	Two IC Engine/Generator Sets
NO_x	122.8
CO	130.6
PM/PM_{10}	7.8
SO_2	0.2
VOC	43.2

Sources: Waukesha, 1999.
ECT, 2000.

Table 2-3. Stack Parameters—Natural Gas-Fired IC Engine/Generator Sets (Per IC Engine/Generator Set)

Stack Height		Stack Exit Temperature		Stack Exit Velocity		Stack Diameter	
ft	meters	°F	K	ft/sec	m/sec	ft	meters
35	10.7	731	662	88.0	26.8	2.3	0.71

Note: K = Kelvin.
ft/sec = feet per second.
m/sec = meters per second.

Sources: TEC, 2000.
ECT, 2000.

3.0 AIR QUALITY STANDARDS AND NEW SOURCE REVIEW APPLICABILITY

3.1 NATIONAL AND STATE AAQS

As a result of the 1977 Clean Air Act (CAA) Amendments, EPA enacted primary and secondary NAAQS for six air pollutants (Chapter 40, Part 50, Code of Federal Regulations [CFR]). Primary NAAQS are intended to protect the public health, and secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Florida has also adopted AAQS (reference Section 62-204.240, F.A.C.). Table 3-1 presents the current national and Florida AAQS.

Areas of the country in violation of NAAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements. The HFCAWTF is located within the City of Tampa in Hillsborough County, Florida. Hillsborough County is presently designated in 40 CFR 81.310 as unclassifiable (for total suspended particulates [TSPs]; that portion of Hillsborough County which falls within the area of a circle having a centerpoint at the intersection of U.S. Highway 41 (U.S. 41) South an State Road (SR) 60 and a radius of 12 km, for SO_2 and for lead; the area encompassed within a radius of 5 km centered on Universal Transverse Mercatur (UTM) coordinates: 364.0 km East, 3093.5 km North, zone 17, in the City of Tampa), unclassifiable/attainment (for CO), and unclassifiable or better than national standards (for NO_2). 40 CFR 81.310 also indicates the 1-hour ozone standard is not applicable Statewide.

Hillsborough County is designated attainment (for ozone, CO, and NO_2) and unclassifiable (for SO_2, PM_{10}, and lead) by Section 62-204.340, F.A.C. Hillsborough County is also classified as an Air Quality Maintenance Area for ozone (entire county), PM (that portion of Hillsborough County which falls within the area of a circle having a centerpoint at the intersection of U.S. 41 South and SR 60 and a radius of 12 km), and lead (the area encompassed within a radius of 5 km centered on UTM coordinates 364.0 km East, 3093.5 km North, zone 17) by Section 62-204.340, F.A.C.

Table 3-1. National and Florida Air Quality Standards (micrograms per cubic meter [$\mu g/m^3$] unless otherwise stated)

Pollutant (units)	Averaging Periods	National Standards Primary	National Standards Secondary	Florida Standards
SO_2 (ppmv)	3-hour[1]		0.5	0.5
	24-hour[1]	0.14		0.1
	Annual[2]	0.030		0.02
SO_2	3-hour[1]			1,300
	24-hour[1]			260
	Annual[2]			60
PM_{10}[13]	24-hour[3]	150	150	
	Annual[4]	50	50	
PM_{10}	24-hour[5]			150
	Annual[6]			50
$PM_{2.5}$[11,12]	24-hour[7]	65	65	
	Annual[8]	15	15	
CO (ppmv)	1-hour[1]	35		35
	8-hour[1]	9		9
CO	1-hour[1]			40,000
	8-hour[1]			10,000
Ozone (ppmv)	1-hour[9]			0.12
	8-hour[10,11]	0.08	0.08	
NO_2 (ppmv)	Annual[2]	0.053	0.053	0.05
NO_2	Annual[2]			100
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5

Note: ppmv = parts per million by volume.

[1]Not to be exceeded more than once per calendar year.
[2]Arithmetic mean.
[3]Standard attained when the 99th percentile is less than or equal to the standard, as determined by 40 CFR 50, Appendix N.
[4]Arithmetic mean, as determined by 40 CFR 50, Appendix N.
[5]Not to be exceeded more than once per year, as determined by 40 CFR 50, Appendix K.
[6]Standard attained when the expected annual arithmetic mean is less than or equal to the standard, as determined by 40 CFR 50, Appendix K.
[7]Standard attained when the 98th percentile is less than or equal to the standard, as determined by 40 CFR 50, Appendix N.
[8]Arithmetic mean, as determined by 40 CFR 50, Appendix N.
[9]Standard attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1, as determined by 40 CFR 50, Appendix H.
[10]Standard attained when the average of the annual 4th highest daily maximum 8-hour average concentration is less than or equal to the standard, as determined by 40 CFR 50, Appendix I.
[11]The U.S. Court of Appeals for the District of Columbia Circuit (Circuit Court) held that these standards are not enforceable. American Trucking Association v. U.S.E.P.A., 1999 WL300618 (Circuit Court).
[12]The Circuit Court may vacate standards following briefing. Id.
[13]The Circuit Court held PM_{10} standards vacated upon promulgation of effective $PM_{2.5}$ standards.

Sources: 40 CFR 50.
Section 62-204.240, F.A.C.

3.2 NONATTAINMENT NSR APPLICABILITY

The HFCAWTF modification project will be located in Hillsborough County. As previously noted, Hillsborough County is presently designated as having air quality that is either better than the national standards or unclassifiable/attainment for all criteria pollutants. Accordingly, the modification project is not subject to the nonattainment NSR requirements of Section 62-212.500, F.A.C.

3.3 PSD NSR APPLICABILITY

The proposed new IC engine/generator sets will have potential emissions in excess of the significant emission rate thresholds. Therefore, the modification project is subject to the PSD NSR requirements of Section 62-212.400, F.A.C., for those pollutants that are emitted at or above the specified PSD significant emission rate levels. Comparisons of estimated potential annual emission rates for the IC engine/generator sets and the PSD significant emission rate thresholds are provided in Table 3-2. As shown in this table, potential emissions of NO_x, CO, and VOCs are each projected to exceed the applicable PSD significant emission rate level. These pollutants are, therefore, subject to the PSD NSR requirements of Section 62-212.400, F.A.C. Appendix C provides detailed emission rate estimates for the IC engine/generator sets.

Table 3-2. Projected Emissions Compared to PSD Significant Emission Rates

Pollutant	IC Engine Maximum Annual Emissions (tpy)	PSD Significant Emission Rate (tpy)	PSD Applicability
NO_x	122.8	40	Yes
CO	130.6	100	Yes
PM	7.8	25	No
PM_{10}	7.8	15	No
SO_2	0.2	40	No
Ozone/VOC	43.2	40	Yes
Lead	Negligible	0.6	No
Mercury	Negligible	0.1	No
Total fluorides	Not Present	3	No
Sulfuric acid mist	Negligible	7	No
Total reduced sulfur (including hydrogen sulfide)	Not Present	10	No
Reduced sulfur compounds (including hydrogen sulfide)	Not Present	10	No
Municipal waste combustor acid gases (measured as SO_2 and hydrogen chloride)	Not Present	40	No
Municipal waste combustor metals (measured as PM)	Not Present	15	No
Municipal waste combustor organics (measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans)	Not Present	3.5×10^{-6}	No

Sources: Section 62-212.400, Table 212.400-2, F.A.C.
ECT, 2000.

4.0 PSD NSR REQUIREMENTS

4.1 CONTROL TECHNOLOGY REVIEW

Pursuant to Rule 62-212.400(5)(c), F.A.C., an analysis of BACT is required for each pollutant emitted by the proposed modification project in amounts equal to or greater than the PSD significant emission rate levels. As defined by Rule 62-210.200(42), F.A.C., BACT is:

> "an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of an emissions unit or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation. Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results."

BACT determinations are made on a case-by-case basis as part of the FDEP NSR process and apply to each pollutant that exceeds the PSD significant emission rate thresholds shown in Table 3-2. All emission units involved in a major modification or a new major source that emit or increase emissions of the applicable pollutants must undergo BACT analysis. Because each applicable pollutant must be analyzed, particular emission units may undergo BACT analysis for more than one pollutant.

BACT is defined in terms of a numerical emissions limit unless determined to be infeasible. This numerical emissions limit can be based on the application of air pollution control equipment; specific production processes, methods, systems, or techniques; fuel cleaning; or combustion techniques. BACT limitations may not exceed any applicable federal new source performance standard (NSPS) or national emission standard for hazardous air pollutants (NESHAP), or any other emission limitation established by state regulations.

BACT analyses are conducted using the *top-down* analysis approach, which was outlined in a December 1, 1987, memorandum from Craig Potter, EPA Assistant Administrator, to EPA Regional Administrators on the subject of "Improving NSR Implementation." Using the top-down methodology, available control technology alternatives are identified based on knowledge of the particular industry of the applicant and previous control technology permitting decisions for other identical or similar sources. These alternatives are rank ordered by stringency into a control technology hierarchy. The hierarchy is evaluated starting with the *top*, or most stringent alternative, to determine economic, environmental, and energy impacts, and to assess the feasibility or appropriateness of each alternative as BACT based on site-specific factors. If the top control alternative is not applicable or is technically or economically infeasible, it is rejected as BACT, and the next most stringent alternative is then considered. This evaluation process continues until an applicable control alternative is determined to be both technologically and economically feasible, thereby defining the emission level corresponding to BACT for the pollutant in question emitted from the particular facility under consideration.

4.2 AMBIENT AIR QUALITY MONITORING

In accordance with the PSD requirements of Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain, for each pollutant subject to review, an analysis of ambient air quality data in the area affected by the proposed major stationary source or major modification. The affected pollutants are those that the source would potentially emit in significant amounts (i.e., those that exceed the PSD significant emission rate thresholds shown in Table 3-2).

Preconstruction ambient air monitoring for a period of up to 1 year generally is appropriate to complete the PSD requirements. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance (QA) requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided by EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (1987).

Rule 62-212.400(2)(e), F.A.C., provides an exemption from preconstruction monitoring requirements that excludes or limits the pollutants for which an air quality monitoring analysis is conducted. This exemption states that a proposed facility shall be exempt from the monitoring requirements of Rule 62-212.400(5)(f) and (g), F.A.C., with respect to a particular pollutant if the emissions increase of the pollution from the source or modification would cause, in any area, air quality impacts less than the PSD *de minimis* ambient impact levels presented in Section 62-212.400, Table 212.400-3, F.A.C. (see Table 4-1). In addition, an exemption may be granted if the air quality impacts due to existing sources in the area of concern are less than the PSD *de minimis* ambient impact levels.

Applicability of the PSD preconstruction ambient monitoring requirements to the proposed project is discussed in Section 8.0.

4.3 AMBIENT IMPACT ANALYSIS

An air quality or source impact analysis must be performed for a proposed major source subject to PSD for each pollutant for which the increase in emissions exceeds the significant emission rates (see Table 3-2). The FDEP rules specifically require the use of applicable EPA atmospheric dispersion models in determining estimates of ambient concentrations (refer to Rule 62-204.220[4], F.A.C.). Guidance for the use and application of dispersion models is presented in the EPA *Guideline on Air Quality Models* (GAQM) as published in Appendix W to 40 CFR 51. Criteria pollutants may be exempt from the full source impact analysis if the net increase in impacts due to the new source or modification is below the appropriate Rule 62-210.200(259), F.A.C., significant impact level, as presented in Table 4-2.

Ozone is one pollutant for which a source impact analysis is not normally required. Ozone is formed in the atmosphere as a result of complex photochemical reactions. Models for ozone generally are applied to entire urban areas.

Table 4-1. PSD *De Minimis* Ambient Impact Levels

Averaging Time	Pollutant	Significance Level ($\mu g/m^3$)
Annual	NO_2	14
Quarterly	Lead	0.1
24-Hour	PM_{10}	10
	SO_2	13
	Mercury	0.25
	Fluorides	0.25
8-Hour	CO	575
1-Hour	Hydrogen sulfide	0.2
NA	Ozone	100 tpy of VOC emissions

Note: $\mu g/m^3$ = micrograms per cubic meter.

Source: Section 62-212.400, Table 212.400-3, F.A.C.

Table 4-2. Significant Impact Levels

Pollutant	Averaging Period	Concentration ($\mu g/m^3$)
SO_2	Annual	1
	24-Hour	2
	3-Hour	25
PM_{10}	Annual	1
	24-Hour	5
NO_2	Annual	1
CO	8-Hour	500
	1-Hour	2,000
Lead	Quarterly	0.03

Source: Rule 62-210.200(260), F.A.C.

The ambient impact analysis for the project is provided in Sections 6.0 (methodology) and 7.0 (results).

4.4 ADDITIONAL IMPACT ANALYSES

Rule 62-212.400(5)(e), F.A.C., requires additional impact analyses for three areas: (1) associated growth, (2) soils and vegetation impact, and (3) visibility impairment. The level of analysis for each area should be commensurate with the scope of the project under review. A more extensive analysis would be conducted for projects having large emission increases than those that will cause a small increase in emissions.

The growth analysis generally includes:

- A projection of the associated industrial, commercial, and residential growth that will occur in the area.
- An estimate of the air pollution emissions generated by the permanent associated growth.
- An air quality analysis based on the associated growth emission estimates and the emissions expected to be generated directly by the new source or modification.

The soils and vegetation analysis is typically conducted by comparing projected ambient concentrations for the pollutants of concern with applicable susceptibility data from the air pollution literature. For most types of soils and vegetation, ambient air concentrations of criteria pollutants below the NAAQS will not result in harmful effects. Sensitive vegetation and emissions of toxic air pollutants could necessitate a more extensive assessment of potential adverse effects on soils and vegetation.

The visibility impairment analysis pertains particularly to Class I area impacts and other areas where good visibility is of special concern. A quantitative estimate of visibility impairment is conducted, if warranted by the scope of the project under review.

The additional impact analyses for the modification project is provided in Section 9.0.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

5.1 METHODOLOGY

BACT analyses were performed in accordance with the EPA top-down method as previously described in Section 4.1. The first step in the top-down BACT procedure is the identification of all available control technologies. Alternatives considered included process designs and operating practices that reduce the formation of emissions, postprocess stack controls that reduce emissions after they are formed, and combinations of these two control categories. Sources of information used to identify control alternatives included:

- EPA reasonably available control technology (RACT)/BACT/lowest achievable emission rate (LAER) Clearinghouse (RBLC) via the RBLC Information System database.
- EPA NSR web site.
- EPA Control Technology Center (CTC) web site.
- Recent FDEP BACT determinations for similar facilities.
- Vendor information.
- Environmental Consulting & Technology, Inc. (ECT), experience for similar projects.

Following the identification of available control technologies, the next step in the analysis is to determine which technologies may be technically infeasible. Technical feasibility was evaluated using the criteria contained in Chapter B of the *EPA NSR Workshop Manual* (EPA, 1990a). The third step in the top-down BACT process is the ranking of the remaining technically feasible control technologies from high to low in order of control effectiveness.

An assessment of energy, environmental, and economic impacts is then performed. The economic analysis employed the procedures found in the Office of Air Quality Planning and Standards (OAQPS) *Alternate Control Techniques Document—NO_x Emissions from Stationary Reciprocating Internal Combustion Engines* (EPA, 1993).

The fifth and final step is the selection of a BACT emission limitation corresponding to the most stringent, technically feasible control technology that was not eliminated based on adverse energy, environmental, or economic grounds.

As indicated in Section 3.3, Table 3-2, projected annual emission rates of NO_X, CO, and VOCs for the HFCAWTF IC engine/generator modification project exceed the PSD significance rates and, therefore, are subject to BACT analysis. Control technology analyses using the five-step top-down BACT method are provided in Sections 5.3 and 5.4 for products of incomplete combustion (CO and VOCs) and acid gases (NO_X), respectively.

5.2 FEDERAL AND FLORIDA EMISSION STANDARDS

Pursuant to Rule 62-212.400(5)(b), F.A.C., BACT emission limitations must be no less stringent than any applicable NSPS (40 CFR 60), NESHAP (40 CFR 61 and 63), and FDEP emission standards (Chapter 62-296, Stationary Sources—Emission Standards, F.A.C.).

There are no emission standards applicable to stationary IC engines on the federal level. FDEP emission standards for stationary sources are contained in Chapters 62-296, Stationary Sources—Emission Standards, F.A.C. Chapter 62-296, F.A.C., contains general emission standards for sources emitting PM (Section 62-296.320, F.A.C.) which are applicable to the HFCAWTF modification project. Visible emissions are limited to a maximum of 20-percent opacity pursuant to Rule 62-296.320(4)(b), F.A.C. Sections 62-296.401 through 62-296.417, F.A.C., specify emission standards for 17 categories of sources; none of these categories are applicable to stationary IC engines. RACT emission standards applicable to sources located in nonattainment areas are contained in Sections 62-296.500 (for ozone nonattainment areas) and 62-296.700, F.A.C. (for PM nonattainment areas). None of these RACT emission standards are applicable to IC engines. The VOC RACT emission standards of 62-296.500 through 62-296.516, F.A.C., and the NO_X RACT emission standards of 62-296.570 are also not applicable to modified VOC- and NO_X-emitting sources which are subject PSD review under 62-212.400, F.A.C. Finally, Section 62-204.800, F.A.C., adopts federal NSPS and NESHAP, respectively, by reference. As noted previously, there are no NSPS or NESHAP requirements applicable to stationary IC engines.

Table 5-1 summarizes the applicable state emission standard. As previously noted, there are no applicable federal emission standards.

5.3 BACT ANALYSIS FOR CO AND VOC

CO and VOC emissions result from the incomplete combustion of carbon and organic compounds. Factors affecting CO and VOC emissions include firing temperatures, residence time in the combustion zone, and combustion chamber mixing characteristics. Decreased combustion zone temperature due to combustion design for NO_x control will also result in an increase in CO and VOC emissions. An increase in combustion zone residence time and improved mixing of fuel and combustion air will increase oxidation rates and cause a decrease in CO and VOC emission rates. Generally, emissions of NO_x and CO/VOC are inversely related (i.e., decreasing NO_x emissions will result in an increase in CO/VOC emissions).

5.3.1 POTENTIAL CONTROL TECHNOLOGIES

There are three available technologies for controlling CO and VOC from IC engines: combustion process design, nonselective catalytic reduction (NSCR), and oxidation catalysts.

Combustion Process Design

Combustion process controls involve combustion chamber designs and operation practices that improve the oxidation process and minimize incomplete combustion. CO and VOCs are intermediate combustion products that are formed due to the incomplete oxidation of fuel carbon and hydrocarbons to carbon dioxide (CO_2) and water. Combustion designs that promote complete combustion include those that provide adequate combustion residence time, high combustion temperatures, and sufficient quantities of oxygen. The natural gas-fired IC engines planned for the HFCAWTF employ four-cycle, spark ignition, turbocharged, lean burn, low-emission combustion technology. Due to the

Table 5-1. Florida Emission Limitations

Pollutant	Emission Limitation
General Visible Emissions Standard Rule 62-296.320(4)(b)1., F.A.C.	
• Visible emissions	<20-percent opacity (averaged over a 6-minute period)

Source: Chapter 62-296, F.A.C.

large amount of excess air that occurs for this engine combustion technology (i.e., approximately twice the stoichiometric air-to-fuel [A/F] ratio), CO and VOC emissions are relatively low.

Nonselective Catalytic Reduction

NSCR is a control technology primarily used to reduce NO_x emissions. Also referred to as a three-way catalyst because it simultaneously reduces NO_x, CO, and VOC emissions, this control technology is essentially the same as the catalytic reduction systems used on automobiles.

In contrast to selective catalytic reduction (SCR) technology which uses ammonia as a reducing agent, the NSCR process achieves catalytic reduction of NO_x without the addition of a reductant that is specific for NO_x. The NSCR process uses a platinum/rhodium catalyst to reduce NO_x to nitrogen and water vapor under fuel-rich (less than 3 percent oxygen) conditions. Under these exhaust stream conditions, NSCR will use CO to reduce NO_x to nitrogen and CO as shown by the following reaction:

$$2CO + 2NO_x \rightarrow 2CO_2 + N_2$$

The NO_x control efficiency of NSCR technology increases with decreasing exhaust stream oxygen content. Although primarily used for NO_x abatement, NSCR will reduce CO and VOC emissions by approximately 80 and 50 percent, respectively. NSCR technology, which is effective within a temperature range of 700 to 1,500 degrees Fahrenheit (°F), has been applied to automobiles and rich burn stationary reciprocating engines.

Oxidation Catalysts

Noble metal (commonly platinum or palladium) oxidation catalysts are used to promote oxidation of CO and VOC to CO_2 and water at temperatures lower than would be necessary for oxidation without a catalyst. The operating temperature range for oxidation catalysts is between 650 and 1,150°F.

Efficiency of CO and VOC oxidation varies with inlet temperature. Control efficiency will increase with increasing temperature for both CO and VOC up to a temperature of approximately 1,100°F; further temperature increases will have little effect on control efficiency. Significant CO oxidation will occur at any temperature above roughly 500°F; higher temperatures on the order of 900°F are needed to oxidize VOC. Inlet temperature must also be maintained below 1,350 to 1,400°F to prevent thermal aging of the catalyst, which will reduce catalyst activity and pollutant removal efficiencies. Removal efficiency will also vary with gas residence time which is a function of catalyst bed depth. Increasing bed depth will increase removal efficiencies but will also cause an increase in pressure drop across the catalyst bed. Oxidation catalyst control systems typically achieve 80 to 90 percent oxidation of CO. VOC removal efficiency will vary with the species of hydrocarbon. In general, unsaturated hydrocarbons such as ethylene are more reactive with oxidation catalysts than saturated species such as ethane. A typical VOC control efficiency using oxidation catalyst is 50 percent.

Oxidation catalysts are susceptible to deactivation due to impurities present in the exhaust gas stream. Arsenic, iron, sodium, phosphorous, and silica will all act as catalyst poisons, causing a reduction in catalyst activity and pollutant removal efficiencies.

Oxidation catalysts are nonselective and will oxidize other compounds in addition to CO and VOC. The nonselectivity of oxidation catalysts is important in assessing applicability to exhaust streams containing sulfur compounds. Sulfur compounds that have been oxidized to SO_2 in the combustion process will be further oxidized by the catalyst to sulfur trioxide (SO_3). SO_3 will, in turn, combine with moisture in the gas stream to form sulfuric acid mist. Due to the oxidation of sulfur compounds and excessive formation of sulfuric acid mist emissions, oxidation catalysts are not considered to be technically feasible for combustion devices that are fired with fuels containing appreciable amounts of sulfur.

Technical Feasibility

Both IC engine combustion design and oxidation catalyst control systems are considered to be technically feasible for the proposed HFCAWTF IC engine/generator sets. NSCR control technology is only applicable to exhaust streams having low oxygen levels (i.e., less than 3 percent oxygen). Accordingly, NSCR is not a technically feasible control technology for lean burn IC engines, which typically have exhaust oxygen levels of 10 percent or greater. Information regarding energy, environmental, and economic impacts and proposed BACT limits for CO and VOC are provided in the following sections.

5.3.2 ENERGY AND ENVIRONMENTAL IMPACTS

There are no significant adverse energy or environmental impacts associated with the use of good combustor designs and operating practices to minimize CO and VOC emissions.

Because CO and VOC emission rates from IC engines are relatively low, further reductions through the use of oxidation catalysts will result in minimal air quality improvements (e.g., well below the defined PSD significant impact levels for CO). The location of the HFCAWTF (Hillsborough County, Florida) is classified attainment for all criteria pollutants. From an air quality perspective, the only potential benefit of CO oxidation catalyst is to prevent the possible formation of a localized area with elevated concentrations of CO. The catalyst does not remove CO but rather simply accelerates the natural atmospheric oxidation of CO to CO_2. Dispersion modeling of CO emissions from the proposed HFCAWTF IC engine/generator sets indicate maximum CO impacts, without oxidation catalyst, will be insignificant.

The application of oxidation catalyst technology to an IC engine will result in an increase in back pressure on the engine due to a pressure drop across the catalyst bed. The increased backpressure will, in turn, constrain engine output power, thereby decreasing the engine's fuel efficiency. An estimated pressure drop across the catalyst bed of approximately 1.5 inch of water will result in an increase in brake-specific fuel consumption (BSFC) of 0.2 percent. This backpressure is estimated to decrease engine power output by 0.75 percent.

5.3.3 ECONOMIC IMPACTS

The proposed Waukesha 16V-AT27GL IC engine/generator sets will employ lean burn, low-emissions combustion technology. CO and VOC emission rates will not exceed 1.66 and 0.55 g/hp-hr, respectively. For CO and VOC, these emission rates approximately represent the "top" cases based on the EPA RBLC data for natural gas-fired IC engines. The most stringent CO and VOC limits in the RBLC, excluding one California LAER determination and engines equipped with NSCR, are 1.6 and 0.5 g/hp-hr, respectively. As noted previously, NSCR technology is not technically feasible for lean burn IC engines. A review of the RBLC data shows there are no installations of oxidation catalyst control systems for natural gas-fired IC engines. Accordingly, no detailed economic analysis of oxidation catalyst controls for the HFCAWTF IC engine/generator set modification project was conducted.

5.3.4 PROPOSED BACT EMISSION LIMITATIONS

BACT CO and VOC limits obtained from the RBLC database for natural gas-fired IC engines are provided in Tables 5-3 and 5-4, respectively. The most stringent CO limit in the RBLC, excluding one California LAER determination and two engines equipped with NSCR, is 1.6 g/hp-hr. The most stringent VOC limit in the RBLC, excluding the California LAER determination and NSCR installations, is 0.5 g/hp-hr.

Because CO and VOC emission rates from IC engines are relatively low, further reductions through the use of oxidation catalysts will result in only minor improvement in air quality (i.e., well below the defined PSD significant impact levels for CO).

The application of lean burn, low-emission combustion for the proposed HFCAWTF IC engine/generator sets results in a trade-off between NO_x and CO emission rates. Because ambient CO concentrations in the vicinity of the HFCAWTF would be expected to be well below ambient standards, the reduction in NO_x emissions is considered to have a greater environmental benefit and would more than compensate for the higher CO emission rates associated with low-emission combustion technology.

Use of lean burn, low-emission combustion design and good operating practices to minimize incomplete combustion are proposed as BACT for CO and VOC. Table 5-5 summarizes the CO and VOC BACT emission limits proposed for the new HFCAWTF IC engine/generator sets.

Table 5-3. RBLC CO Summary for Natural Gas Fired IC Engines

RBLCID	Facility Name	City	Permit Dates Issuance	Permit Dates Update	Process Description	Thruput Rate	Emission Limit	Control System Description	Control Efficiency	Basis
AZ-0007	MOJAVE PIPELINE OPERATING COMPANY	TOPOCK	06/12/1991	03/24/1995	ENGINES, INTERIM BUILD-OUT, 3	13800 HP	441.81 T/YR	FUEL SPECIFICATION	0	BACT-PSD
AZ-0007	MOJAVE PIPELINE OPERATING COMPANY	TOPOCK	06/12/1991	03/24/1995	ENGINES, RECIPROCATING, 5, FULL BUILD-OUT	17500 HP	548.51 T/YR	FUEL SPECIFICATION	0	BACT-PSD
CA-0416	DE LA GUERRA POWER, INC		11/12/1991	01/31/1992	ENGINE IC & GEN (1 OF 3)	380 HP	2.46 LB/D	NON-SELECTIVE CATALYTIC CONVERTER	70	BACT-PSD
CA-0766	KAISER PERMANENTE MEDICAL CENTER	FRESNO	09/02/1997	03/16/1998	JOHN DEERE MODEL 6076AFN30 IC ENGINE	160 BHP	148 PPMV @ 15% O2	NATURAL GAS FUEL	0	LAER
CA-0788	VINTAGE PETROLEUM COMPANY	SANTA MARIA	02/04/1997	04/23/1998	IC ENGINES (13), RECIPROCATING PISTON-TYPE	117 - 186 BHP	215 PPMV @ 15% O2	NSCR AND ENGINE FUEL/AIR RATIO EMISSIONS CONTROL SYSTEM	0	LAER
CA-0791	CITY OF CLOVIS	CLOVIS	11/08/1996	03/16/1998	CATERPILLAR MODEL G3406TA NATURAL GAS, IC ENGINE	0	2 G/B-HP-H	NSCR THREE WAY CATALYTIC CONVERTER, PCV, AND AN O2 CONTROLLER	0	LAER
CA-0792	TOYS R" US"	CLOVIS	11/27/1996	03/16/1998	NATURAL GAS FIRED EMERGENCY IC ENGINE	0	0.78 G/B-HP-H	GOOD COMBUSTION	0	LAER
CO-0022	SNYDER OIL CORP. / ENTERPRISE STATION		11/13/1992	03/24/1995	ENGINES, RECIPROCATING (6)	2500 HP (EACH)	635.1 LBS/MILLION SCF	LEAN COMBUSTION & FUEL SPEC: FIRING RESIDUE QUALITY NAT. GAS	0	BACT-OTHER
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	IC ENGINE, WAUKESHA L5790-GSI, 2	1215 HP	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0029	VASTAR RESOUCRES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	05/03/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-1	738 HP	3.3 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	50	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-2	738 HP	3.3 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-3	1215 HP	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-1	421 HP	1.9 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-4	738 HP	3.3 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-3	1215 HP	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 1	1478 HP	8.6 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	5.4 LB/H 2 EACH	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-5, 1	421 HP	1.9 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-6, 1	1215 HP	5.4 LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
CO-0036	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIVE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINES, GAS-FIRED, 3	0	3.3 LB/H 3 EACH	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A NSCR CONVERTER.	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINE, COMPRESSOR	4000 HP	2.5 G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINES, COMPRESSOR, 2	2000 HP EACH	2.5 G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
IL-0043	NATURALGAS PIPELINE CO	GENESEO	03/01/1989	06/10/1993	ENGINE, MLV-10, 4 EA	4000 HP	5 G/B-HP-H	DESIGN & OPERATING PRACTICES	0	BACT-PSD
LA-0063	OXY NGL, INC.	JOHNSON BAYOU	11/14/1989	01/31/1990	GENERATOR, EMERGENCY	1.4 MMBTU/H	0.56 LB/H		0	BACT-PSD
LA-0063	OXY NGL, INC.	JOHNSON BAYOU	11/14/1989	01/31/1990	COMPRESSOR, AIR, DIESEL FIRED	0	2.4 LB/H		0	BACT-PSD
MA-0022	BERKSHIRE POWER DEVELOPMENT, INC.	AGAWAM	09/22/1997	04/19/1999	ENGINES, CHILLER, NATURAL GAS-FIRED, TWO	23.4 MMBTU/H	0.4 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.	0	BACT-PSD
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 2 CYCLE	6000 HP	0	INTERNAL COMBUSTION DESIGN	0	BACT-PSO
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 4 CYCLE	1076 HP	0	CATALYTIC OXIDIZER	83	BACT-PSD
MO-0009	MARSHALL MUNICIPAL UTILITIES (BD. OF PUBLIC WORKS)	MARSHALL	04/06/1993	10/06/1997	ENGINE, I.C. (RECIPROCATING)	8500 HP	2 G/B-HP-H	GOOD COMBUSTION	0	BACT-PSD
MO-0019	MARSHALL MUNICIPAL UTILITIES (BOARD OF PUBLIC WORK	MARSHALL	04/06/1993	10/06/1997	NEW COOPER-BESSEMER INTERNAL COMBUSTION ENGINE	6.3 MW	2 G/B-HP-H		0	BACT-PSD
MS-0021	FLORIDA GAS TRANSMISSION CO.		05/14/1991	05/31/1992	ENGINE, 412 KVSR DRESSER	2400 HP	2.46 G/B-HP-H	LEAN COMBUSTION	0	BACT-PSD
ND-0010	WESTERN GAS RESOURCES,INC.		08/24/1992	08/04/1994	COMPRESSOR ENGINE	1100 BHP	25.3 LB/HR	GOOD COMBUSTION PRACTICES	0	BACT-PSD
NM-0019	MERIDIAN OIL GATHERING INC	BLANCO	10/11/1990	01/14/1994	COMPRESSOR, IC, NATURAL GAS FIRED	2650 HP, 8 EACH	1.6 G/B-HP-H	CLEAN BURN ENGINE DESIGN	0	BACT-PSD
NM-0021	WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSOR	BLANCO	10/29/1993	03/02/1994	ENGINE, GAS-FIRED, RECIPROCATING	1000 HP	2.5 G/B-HP-H	CLEAN/LEAN BURN TECHNOLOGY	0	BACT-PSD
NM-0025	MERIDIAN OIL, INC. - FRANCIS MESA STA.	FARMINGTON	06/15/1995	09/01/1995	COMPRESSOR ENGINES (8) & GLYCOL DEHYDRATOR	2650 HP (EACH)	16 G/B-HP-H	COMPRESSOR ENGINE, CLEAN BURN ENGINE	0	BACT-PSO
NM-0026	MERIDIAN OIL, INC./VALVERDE GAS PROCESSING FAC.	FARMINGTON	10/27/1995	02/27/1996	RECIPROCATING ENGINE, NATURAL GAS (4)	0	2.2 G/B-HP-H	CLEAN BURN ENGINE; MODEL #: 3612 TA/SW66 MANUFACTURER: CATERPILLAR	0	BACT-PSD
NM-0030	WILLIAMS FIELD SERVICES--MIDDLE MESA CDP	ARCHULETA	12/03/1997	05/31/1997	NATURAL GAS COMPRESSOR STATION, 14 ENGINES	1478 HP, EACH	8 LB/HR EACH ENGINE	CLEAN/LEAN BURN TECHNOLOGY	0	BACT-PSD
NM-0032	WILLIAMS FIELD SERVICES CO.	CEDAR HILL	04/25/1998	01/20/1999	NATURAL GAS RECIPROCATING ENGINE	1478 HP	2.65 G/B-HP-H	LEAN BURN DESIGN	0	BACT-PSD
NM-0033	WILLIAMS FIELO SERVICES CO.	BLANCO	04/06/1998	04/19/1999	ENGINE, IC RECIPROCATING, NAT. GAS	1374 HP	2.65 G/B-HP-H	CLEAN BURN COMBUSTION TECHNOLOGY	0	BACT-PSD
NM-0035	WILLIAMS FIELD SERVICES CO.	ARCHULETA	07/24/1998	02/10/1999	RECIPROCATING ENGINE, NAT. GAS	1375 HP	2.65 G/B-HP-H	CLEAN BURN COMBUSTION TECHNOLOGY	0	BACT-PSD
NM-0036	WILLIAMS FIELD SERVICES CO.	ARCHULETA	06/10/1998	01/27/1999	RECIPROCATING ENGINES, NAT. GAS	21920 HP	2.65 G/B-HP-H	LEAN BURN ENGINE DESIGN	0	BACT-PSD
NY-0044	BROOKLYN NAVY YARO COGENERATION PARTNERS L.P.	NEW YORK CITY	06/06/1995	06/30/1995	GENERATOR, 3000 KW EMERGENCY	3000 KW	0.25 LB/MMBTU		0	LAER
NY-0046	SARANAC ENERGY COMPANY	PLATTSBURGH	07/31/1992	09/13/1994	GENERATOR, EMERGENCY (#2 DIESEL FUEL)	14.68 MMBTU/HR	1.76 LB/MMBTU	COMBUSTION CONTROL	0	BACT-OTHER
NY-0047	PASNY/HOLTSVILLE COMBINED CYCLE PLANT	HOLTSVILLE	09/01/1992	09/13/1994	GENERATOR, EMERGENCY (NATURAL GAS)	1.5 MMBTU/HR	6.5 LB/MMBTU	COMBUSTION CONTROL	0	BACT-OTHER
OH-0211	CGN TRANSMISSION	CANAL WINCHESTER	03/11/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	3200 HP	2.6 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0211	CGN TRANSMISSION	CANAL WINCHESTER	03/11/1992	03/23/1993	ENGINES, NATURAL GAS COMPRESSOR (2)	4200 HP (EACH)	2.8 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0212	CGN TRANSMISSION	LEBANON	04/08/1992	03/23/1993	ENGINES, NATURAL GAS COMPRESSOR (2)	4200 HP (EACH)	2.8 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0213	CGN TRANSMISSION	GILMORE	05/28/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	3200 HP	2.6 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0213	CGN TRANSMISSION	GILMORE	05/28/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	4200 HP	2.8 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0220	NORTH STAR RECYCLING CO.	TOLEDO	06/09/1993	08/15/1994	RECIPROCATING ENGINES (NATURAL GAS) (3)	1700 HP (EACH)	2.2 G/B-HP-H	3-WAY CATALYST	80	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	2400 HP	2.5 G/B-HP-H	LEAN BURN COMBUSTION	78	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	1600 HP	2.5 G/B-HP-H	LEAN BURN COMBUSTION	78	BACT-OTHER
OK-0026	SWIFT ENERGY		09/05/1991	12/07/1993	ENGINES, I.C.	1132 HP EACH	35.7 T/YR	CATALYTIC CONVERTER	67	OTHER
PA-0077	NATIONAL FUEL GAS SUPPLY	ALLEGANY TOWNSHIP	10/01/1990	03/24/1995	ENGINES, NAT GAS FIRED, RECIP (2)	1300 HP EACH	2.3 G/B-HP-H	CLEAN BURN TECHNOLOGY	0	OTHER
PA-0085	CNG TRANSMISSION CORPORATION	FINNEFROCK STATION	09/24/1991	03/24/1995	ENGINE, I.C., RECIP., GAS-FIRED, 2 CYCLE	4200 HP	2.8 G/B-HP-H	CLEAN BURN TECHNOLOGY	0	BACT-PSD
PA-0087	CNG TRANSMISSION CORP.	PITTSBURGH	03/13/1992	03/24/1995	ENGINES, RECIP I.C., 4, NAT. GAS	3200 HP	2.6 G/B-HP-H	LEAN BURN TECHNOLOGY	0	BACT-PSD
PA-0095	TEMPLE UNIVERSITY	PHILADELPHIA	10/02/1992	03/24/1995	ELECTRIC GENERATOR (NATURAL GAS)	1.6 MW	1.92 G/B-HP-H	LEAN BURN GAS ENGINE	0	BACT-OTHER
PA-0096	PHILADELPHIA SOUTHWEST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (2) (NATURAL GAS)	443 KW (EACH)	0	LEAN BURN ENGINE	0	OTHER
PA-0097	PHILADELPHIA NORTHEAST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (3) (NATURAL GAS)	443 KW (EACH)	0	LEAN BURN ENGINE	0	OTHER
RI-0006	THE WORCESTER CO.	CENTERDALE	09/27/1989	05/18/1990	ENGINE, I.C., 3 EA	2000 BHP	1.6 G/B-HP-H	LEAN BURN	0	BACT-PSD
SC-0029	SC ELECTRIC AND GAS COMPANY - HAGOOD STATION	CHARLESTON	12/11/1989	03/24/1995	INTERNAL COMBUSTION TURBINE	110 MEGAWATTS	23 LBS/HR	GOOD COMBUSTION PRACTICES	0	BACT-PSD
UT-0036	LEHT COGENERATION ASSOCIATES		10/22/1987	04/30/1990	ENGINE, GAS FIRED, 3 EA	16950 KW	155.59 T/YR	SEE NOTES	0	BACT-PSD
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	GENERATOR, AUXILARY	814 HP	1.6 G/B-HP-H		0	BACT-OTHER
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	ENGINE, NATURAL GAS COMPRESSOR	6060 HP	2.6 G/B-HP-H	LEAN BURN COMBUSTION	0	BACT-OTHER
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	2 GAS-FIRED GENERATOR ENGINES	385 HORSEPOWER	1.3 LBS/HR	GOOD COMBUSTION	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON OOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	NATURAL GAS-FIRED COMPRESSOR ENGINE	520 HORSEPOWER	1.7 LBS/HR	GOOD COMBUSTION	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	1 GAS-FIRED GENERATOR ENGINE	577 HORSEPOWER	1.9 LBS/HR	GOOD COMBUSTION	0	BACT
WY-0033	WESTERN GAS RESOURCES, INC. HILIGHT GAS PLANT	GILLETTE	03/31/1997	02/01/1999	COMPRESSOR ENGINES, NATURAL GAS FIRED, E ACH	1500 HP	3 G/B-HP-H	CATALYTIC CONVERTER	0	BACT-PSD
WY-0040	CHEVRON USA - PAINTER CENTRAL STATION	8 MILES NE OF EVANSTON	04/19/1993	03/10/1999	ENGINES, COMPRESSOR, 2 EACH	2650 BHP, EACH	1.6 G/B-HP-H	CLEAN BURN" TECHNOLOGY"	0	BACT-PSD
WY-0049	WESTERN GAS RESOURCES - HILIGHT GAS PLANT	GILLETTE	10/14/1998	06/08/1999	ENGINES, COMPRESSOR, 2 EA	1650 HP	2 G/B-HP-H	3 - WAY CATALYST SYSTEM AND AIR/FUEL RATIO CONTRO-LLER.	0	BACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	ENGINE, COMPRESSOR, 9 EA	3200 HP	0.5 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY AND CATALYTIC CRACKING.	0	BACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	COMPRESSOR, ENGINES, 2 EA	1200 HP	2.8 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY.	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/199B	06/17/1999	ENGINES, COMPRESSOR, 9 EA	3200 HP	0.5 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY. CATALYTIC CONVERTER.	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/1998	06/17/1999	ENGINES, COMPRESSOR, 2 EA	1200 HP	2.8 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY.	0	BACT-PSD

Minimum	0.50	G/B-HP-H
Maximum	16.00	G/B-HP-H
Average	2.67	G/B-HP-H
Count	76	

Table 5-4. RBLC VOC Summary for Natural Gas Fired IC Engines

RBLCID	Facility Name	City	Permit Dates		Process Description	Thruput Rate	Emission Limit	Control System Description	Control Efficiency	Basis
			Issuance	Update						
CA-0416	DE LA GUERRA POWER, INC		11/12/1991	01/31/1992	ENGINE IC & GEN (1 OF 3)	380 HP	7.68 LB/D	NON-SELECTIVE CATALYTIC CONVERTER	70	BACT-PSD
CA-0416	DE LA GUERRA POWER, INC		11/12/1991	01/31/1992	ENGINE IC & GEN (1 OF 3)	380 HP	0 UNQUANTIFIED CRANKC/	VENT CRANKCASE EMISSIONS TO INTAKE MANIFOLD	100	BACT-PSD
CA-0655	SOUTHERN CALIFORNIA GAS COMPANY	VISALIA	06/30/1995	03/25/1996	EMERGENCY IC ENGINE DRIVING A GENERATOR	132 HP	0	TWO-WAY CATALYST	0	BACT-OTHER
CA-0754	MOBIL EXPLORATION & PRODUCING U.S., INC.		07/02/1996	09/29/1997	LEAN BURN NATURAL GAS-FIRED IC ENGINE	280 BHP	1.5 G/B-HP-H	AIR/FUEL RATIO CONTROLLER AND CLEANBURN COMBUSTIONTECHNOLOGY WITH WEEKLY N	0	LAER
CA-0766	KAISER PERMANENTE MEDICAL CENTER	FRESNO	09/02/1997	03/16/1998	JOHN DEERE MODEL 6076AFN30 IC ENGINE	160 BHP	150 PPMV @ 15% O2	NATURAL GAS FUEL	0	LAER
CA-0791	CITY OF CLOVIS	CLOVIS	11/08/1996	03/16/1998	CATERPILLAR MODEL G3406TA NATURAL GAS, IC ENGINE	0	0.068 G/B-HP-H	THREE WAY CATALYTIC CONVERTER	0	LAER
CA-0829	G.E.N.Y. OPERATIONS COMPANY	BAKERSFIELD	11/03/1997	08/31/1999	IC ENGINE, NAT GAS FIRED, CATERPILLAR MODEL 333	145 8HP	2 G/B-HP-H	POSITIVE CRANKCASE VENTILATION	0	BACT
CO-0022	SNYOER OIL CORP. / ENTERPRISE STATION		11/13/1992	03/24/1995	ENGINES, RECIPROCATING (6)	2500 HP (EACH)	141.3 LBS/MILLION SCF	LEAN COMBUSTION & FUEL SPEC: FIRING RESIDUE QUALITY NAT. GAS	0	BACT-OTHER
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	0.03 LB/H	GOOD COMBUSTION PRACTICES.	0	BACT-PSD
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	IC ENGINE, WAUKESHA L5790-GSI, 2	1215 HP	0.03 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0029	VASTAR RESOUCRES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	05/03/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	0.03 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-1	738 HP	0.01 LB/H	GOOD COMBUSTION TECHNIQUES	50	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-2	738 HP	0.01 LB/H	GOOD COMBUSTION TECHNIQUES	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-3	1215 HP	0.01 LB/H	GOOD COMBUSTION	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-1	421 HP	0.01 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIREO, TS5-3	1215 HP	0.01 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIREO, TS5-4	738 HP	0.01 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 1	1478 HP	0.02 LB/H	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0	0.01 LB/H 2 EACH	GOOD COMBUSTION TECHNIQUES	0	BACT-PSO
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-5, 1	421 HP	0.01 LB/H	GOOD COMBUSTION TECHNIQUES	0	BACT-PSD
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-6, 1	1215 HP	0.01 LB/H	GOOD COMBUSTION TECHNIQUES	0	BACT-PSD
CO-0036	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIVE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINES, GAS-FIRED, 3	0	0.02 LB/H 3 EACH	GOOD COMBUSTION TECHNIOUES	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINE, COMPRESSOR	4000 HP	0.65 G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINES, COMPRESSOR, 2	2000 HP EACH	0.65 G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
LA-0082	TEXACO INC. - ONSHORE DIVISION	PARADIS	09/25/1992	08/04/1994	COMPRESSORS, RECIPROCATING (3)	1642 HP (EACH)	0	LEAN BURN ENGINE	0	BACT
MA-0022	BERKSHIRE POWER DEVELOPMENT, INC.	AGAWAM	09/22/1997	04/19/1999	ENGINES, CHILLER, NATURAL GAS-FIRED, TWO	23.4 MMBTU/H	0.3 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.	0	BACT-PSD
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 2 CYCLE	6000 HP	0	INTERNAL COMBUSTION DESIGN	0	BACT-PSD
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 4 CYCLE	1076 HP	0	CATALYTIC OXIDIZER	60	BACT-PSD
MO-0009	MARSHALL MUNICIPAL UTILITIES (BD. OF PUBLIC WORKS)	MARSHALL	04/06/1993	10/06/1997	ENGINE, I.C. (RECIPROCATING)	8500 HP	0.7 G/B-HP-H	GOOD COMBUSTION	0	BACT-PSD
MO-0019	MARSHALL MUNICIPAL UTILITIES (BOARD OF PUBLIC WORK	MARSHALL	04/06/1993	10/06/1997	NEW COOPER-BESSEMER INTERNAL COMBUSTION ENGINE	6.3 MW	0.7 G/B-HP-H		0	BACT-PSD
MS-0021	FLORIDA GAS TRANSMISSION CO.		05/14/1991	05/31/1992	ENGINE, 412 KVSR DRESSER	2400 HP	1.33 G/B-HP-H	LEAN COMBUSTION	0	BACT-PSD
NM-0021	WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSOR	BLANCO	10/29/1993	03/02/1994	ENGINE, GAS-FIRED, RECIPROCATING	1000 HP	1 G/B-HP-H	CLEAN/LEAN BURN TECHNOLOGY	0	BACT-PSD
NM-0025	MERIDIAN OIL, INC. - FRANCIS MESA STA.	FARMINGTON	06/15/1995	09/01/1995	COMPRESSOR ENGINES (8) & GLYCOL DEHYDRATOR	2650 HP (EACH)	6.6 G/B-HP-H	COMPRESSOR STATION, CLEAN BURN ENGINES	0	BACT-PSD
NM-0026	MERIDIAN OIL, INC./VALVERDE GAS PROCESSING FAC.	FARMINGTON	10/27/1995	02/27/1996	RECIPROCATING ENGINE, NATURAL GAS (4)	0	0.8 G/B-HP-H	CLEAN BURN ENGINE MODEL #: 3612 TA/SW66 MANUFACTURER: CATERPILLAR	0	BACT-PSD
NM-0030	WILLIAMS FIELD SERVICES--MIDDLE MESA CDP	ARCHULETA	12/03/1997	05/31/1997	NATURAL GAS COMPRESSOR STATION, 14 ENGINES	1478 HP, EACH	3 LB/HR EACH ENGINE	CLEAN/LEAN BURN TECHNOLOGY	0	BACT-PSD
NM-0032	WILLIAMS FIELD SERVICES CO.	CEDAR HILL	04/25/1998	01/20/1999	NATURAL GAS RECIPROCATING ENGINE	1478 HP	1 G/B-HP-H	LEAN BURN DESIGN	0	8ACT-PSD
NM-0033	WILLIAMS FIELD SERVICES CO.	BLANCO	04/06/1998	04/19/1999	ENGINE, IC RECIPROCATING, NAT. GAS	1374 HP	1 G/B-HP-H	CLEAN BURN COMBUSTION TECHNOLOGY	0	BACT-PSD
NM-0035	WILLIAMS FIELD SERVICES CO.	ARCHULETA	07/24/1998	02/10/1999	RECIPROCATING ENGINE, NAT. GAS	1375 HP	1 G/B-HP-H	CLEAN BURN COMBUSTION TECHNOLOGY	0	BACT-PSD
NM-0036	WILLIAMS FIELD SERVICES CO.	ARCHULETA	06/10/1998	01/27/1999	RECIPROCATING ENGINES, NAT. GAS	21920 HP	2.65 G/B-HP-H	LEAN BURN ENGINE DESIGN	0	BACT-PSD
OH-0211	CGN TRANSMISSION	CANAL WINCHESTER	03/11/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	3200 HP	0.8 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0211	CGN TRANSMISSION	CANAL WINCHESTER	03/11/1992	03/23/1993	ENGINES, NATURAL GAS COMPRESSOR (2)	4200 HP (EACH)	0.9 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0212	CGN TRANSMISSION	LEBANON	04/08/1992	03/23/1993	ENGINES, NATURAL GAS COMPRESSOR (2)	4200 HP (EACH)	0.98 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0213	CGN TRANSMISSION	GILMORE	05/28/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	3200 HP	0.8 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0213	CGN TRANSMISSION	GILMORE	05/28/1992	03/23/1993	ENGINE, NATURAL GAS COMPRESSOR	4200 HP	0.9 G/B-HP-H	ENGINE TUNING (SEE NOTES)	0	BACT-PSD
OH-0220	NORTH STAR RECYCLING CO.	TOLEDO	06/09/1993	08/15/1994	RECIPROCATING ENGINES (NATURAL GAS) (3)	1700 HP (EACH)	0.4 G/B-HP-H	3-WAY CATALYST	60	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	2400 HP	1 G/B-HP-H	LEAN BURN COMBUSTION	65	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	1600 HP	1 G/B-HP-H	LEAN BURN COMBUSTION	65	BACT-OTHER
OK-0026	SWIFT ENERGY		09/05/1991	12/07/1993	ENGINES, I.C.	1132 HP EACH	7.1 T/YR	CATALYTIC CONVERTER	70	OTHER
PA-0077	NATIONAL FUEL GAS SUPPLY	ALLEGANY TOWNSHIP	10/01/1990	03/24/1995	ENGINES, NAT GAS FIRED, RECIP (2)	1300 HP EACH	0.75 G/B-HP-H	CLEAN BURN TECHNOLOGY	0	OTHER
PA-0085	CNG TRANSMISSION CORPORATION	FINNEFROCK STATION	09/24/1991	03/24/1995	ENGINE, I.C., RECIP., GAS-FIRED, 2 CYCLE	4200 HP	0.9 G/B-HP-H	CLEAN BURN TECHNOLOGY	0	BACT-OTHER
PA-0087	CNG TRANSMISSION CORP.	PITTSBURGH	03/13/1992	03/24/1995	ENGINES, RECIP I.C., 4, NAT. GAS	3200 HP	0.8 G/B-HP-H	LEAN BURN TECHNOLOGY	0	BACT-OTHER
PA-0095	TEMPLE UNIVERSITY	PHILADELPHIA	10/02/1992	03/24/1995	ELECTRIC GENERATOR (NATURAL GAS)	1.6 MW	31 LBS/HR	LEAN 8URN GAS ENGINE	0	BACT-OTHER
PA-0096	PHILADELPHIA SOUTHWEST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (2) (NATURAL GAS)	443 KW (EACH)	0	LEAN 8URN ENGINE	0	OTHER
PA-0097	PHILADELPHIA NORTHEAST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (3) (NATURAL GAS)	443 KW (EACH)	0	LEAN BURN ENGINE	0	OTHER
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	3400 HP	0.83 G/B-HP-H		0	RACT
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	1000 HP	1.1 G/B-HP-H		0	RACT
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	2000 HP	1.65 G/B-HP-H		0	RACT
RI-0006	THE WORCESTER CO.	CENTERDALE	09/27/1989	05/18/1990	ENGINE, I.C., 3 EA	2000 BHP	0.6 G/B-HP-H	LEAN BURN	0	BACT-PSD
SC-0029	SC ELECTRIC AND GAS COMPANY - HAGOOD STATION	CHARLESTON	12/11/1989	03/24/1995	INTERNAL COMBUSTION TURBINE	110 MEGAWATTS	10 LBS/HR	GOOD COMBUSTION PRACTICES	0	BACT-PSD
UT-0036	LEHT COGENERATION ASSOCIATES		10/22/1987	04/30/1990	ENGINE, GAS FIRED, 3 EA	16950 KW	8.03 T/YR	SEE NOTES	0	BACT-PSD
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	GENERATOR, AUXILARY	814 HP	0.74 G/B-HP-H		0	8ACT-OTHER
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	ENGINE, NATURAL GAS COMPRESSOR	6060 HP	0.82 G/B-HP-H	LEAN BURN COMBUSTION	0	BACT-OTHER
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	2 GAS-FIRED GENERATOR ENGINES	385 HORSEPOWER	0.4 LBS/HR	GOOD COMBUSTION	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	NATURAL GAS-FIRED COMPRESSOR ENGINE	520 HORSEPOWER	0.5 LBS/HR	GOOD COMBUSTION	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	1 GAS-FIRED GENERATOR ENGINE	577 HORSEPOWER	0.6 LBS/HR	GOOD COMBUSTION	0	8ACT
WY-0040	CHEVRON USA - PAINTER CENTRAL STATION	8 MILES NE OF EVANSTON	04/19/1993	03/10/1999	ENGINES, COMPRESSOR, 2 EACH	2650 8HP, EACH	0.6 G/B-HP-H	CLEAN BURN" TECHNOLOGY"	0	BACT-PSD
WY-0049	WESTERN GAS RESOURCES - HILIGHT GAS PLANT	GILLETTE	10/14/1998	06/08/1999	ENGINES, COMPRESSOR, 2 EA	1650 HP	1 G/B-HP-H	3 - WAY CATALYST SYSTEM AND AIR/FUEL RATIO CONTRO-LLER	0	8ACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	ENGINE, COMPRESSOR, 9 EA	3200 HP	0.3 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY AND CATALYTIC CONVERTER.	0	BACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	COMPRESSOR, ENGINES, 2 EA	1200 HP	0.5 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY.	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/1998	06/17/1999	ENGINES, COMPRESSOR, 9 EA	3200 HP	0.3 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY. CATALYTIC CONVERTER.	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/1998	06/17/1999	ENGINES, COMPRESSOR, 2 EA	1200 HP	0.5 G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY.	0	BACT-PSD

Minimum	0.07	G/B-HP-H
Maximum	6.60	G/B-HP-H
Average	1.05	G/B-HP-H
Count	71	

5.4 BACT ANALYSIS FOR NO_X

NO_x emissions from combustion sources consist of two components: oxidation of combustion air atmospheric nitrogen (thermal NO_x and prompt NO_x) and conversion of chemically bound fuel nitrogen (fuel NO_x). Essentially all IC engine NO_x emissions originate as nitric oxide (NO). NO generated by the IC engine combustion process is subsequently further oxidized in the engine exhaust system or in the atmosphere to the more stable NO_2 molecule.

Thermal NO_x results from the oxidation of atmospheric nitrogen under high temperature combustion conditions. The amount of thermal NO_x formed is primarily a function of combustion temperature and residence time, A/F ratio, and, to a lesser extent, combustion pressure. Thermal NO_x increases exponentially with increases in temperature and linearly with increases in residence time as described by the Zeldovich mechanism. Prompt NO_x is formed near the combustion flame front from the oxidation of intermediate combustion products such as hydrogen cyanide (HCN) and nitrogen (N). Prompt NO_x comprises a small portion of total NO_x in conventional near-stoichiometric IC engines but increases under fuel-lean conditions. Prompt NO_x, therefore, may be an important consideration with respect to IC engines that use lean fuel mixtures. Fuel NO_x arises from the oxidation of nonelemental nitrogen contained in the fuel. The conversion of fuel-bound nitrogen (FBN) to NO_x depends on the bound nitrogen content of the fuel. In contrast to thermal NO_x, fuel NO_x formation does not vary appreciably with combustion variables such as temperature or residence time. Presently, there are no combustion processes or fuel treatment technologies available to control fuel NO_x emissions. NO_x emissions from combustion sources fired with fuel oil are higher than those fired with natural gas due to higher combustion flame temperatures and FBN contents. Natural gas may contain molecular nitrogen (N_2); however, the N_2 found in natural gas does not contribute significantly to fuel NO_x formation. Typically, natural gas contains a negligible amount of FBN.

Table 5-5. Proposed CO and VOC BACT Emission Limits

Emission Source	lb/hr	g/hp-hr
Waukesha 16V-AT27GL IC Engine (per engine)		
CO	14.9	1.66
VOC	4.9	0.55

Sources: ECT, 2000.
Waukesha, 1999.

5.4.1 POTENTIAL CONTROL TECHNOLOGIES

Available technologies for controlling NO_x emissions from IC engines include combustion process modifications and postcombustion exhaust gas treatment systems. A listing of available technologies for each of these categories follows:

Combustion Process Modifications:

- A/F ratio adjustments
- Ignition timing retard
- Low-emission combustion

Postcombustion Exhaust Gas Treatment Systems:

- Selective noncatalytic reduction (SNCR).
- NSCR.
- SCR.

A description of each of the listed control technologies is provided in the following sections.

A/F Ratio Adjustments

Maximum NO_x formation in IC engines occurs at A/F ratios that are slightly fuel lean from stoichiometric conditions. For natural gas-fired IC engines, the mass stoichiometric A/F is approximately 16:1. For rich burn IC engines, which operate at substoichiometric A/F ratios, decreasing the A/F ratio further will inhibit NO_x formation due to reduced oxygen availability and lower combustion temperatures. However, incomplete combustion under these fuel-rich combustion conditions will also increase CO and VOC emission rates.

For lean burn engines, increasing the A/F ratio decreases NO_x formation. The increase in air content increases the heat capacity of the combustion gas mixture thereby lowering peak combustion temperatures. An increase in combustion air may require the addition of a turbocharger to a naturally aspirated engine or the modification/replacement of an existing turbocharger for turbocharged engines. For both rich and lean burn engines, an automatic A/F ratio controller may be needed to maintain the desired A/F ratio under varying operating conditions.

Adjustments in A/F ratios will adversely affect engine fuel efficiency and decrease the engine's ability to response to load changes.

Ignition Timing Retard

For both rich and lean burn engines, adjusting the ignition timing in the power cycle affects the operating pressures and temperatures in the combustion chamber. Advancing the timing so that ignition occurs earlier in the power cycle results in peak combustion when the piston is near the top of the cylinder, when the combustion chamber volume is at a minimum. This timing adjustment results in maximum combustion pressures and temperatures and has the potential to increase NO_x emissions. Retarding the ignition timing causes the combustion process to occur later in the power stroke when the piston is in its downward motion and combustion chamber volume is increasing. Ignition timing retard reduces combustion operating pressures, temperatures, and residence time and has the potential to reduce NO_x formation. An electronic ignition and control system is typically required if ignition timing retard is employed to maintain proper engine performance and achieve the desired NO_x reductions.

Ignition timing retard delays the combustion process causing higher exhaust temperatures, decreased engine speed stability, and a potential for engine misfire and decreased power output.

Low-Emission Combustion

Both rich and lean burn engine NO_x emission rates can be reduced by significantly increasing the A/F ratio. To achieve low-emissions, major engine components (i.e., intake manifolds, cylinder heads, pistons, ignition systems, etc.) are specifically designed to accommodate the increase in air flow. The low-emission engine design may also include equipment to provide additional combustion air (e.g., turbochargers). Specific engine designs and NO_x emission reductions vary for each engine manufacturer.

Selective Noncatalytic Reduction

The SNCR process involves the gas phase reaction, in the absence of a catalyst, of NO_x in the exhaust gas stream with injected ammonia or urea to yield nitrogen and water vapor.

Due to reaction temperature considerations, the SNCR injection system must be located at a point in the exhaust duct where temperatures are consistently between 1,600 and 2,000°F.

Nonselective Catalytic Reduction

The NSCR technology, which also reduces CO and VOC in addition to NO_x, was previously described in Section 5.3.1 of this report. In brief, the NSCR process uses a platinum/rhodium catalyst to reduce NO_x to nitrogen and water vapor under fuel-rich (less than 3 percent oxygen) conditions. NSCR technology has been applied to automobiles and rich burn stationary reciprocating engines.

Selective Catalytic Reduction

In contrast to SNCR, SCR reduces NO_x emissions by reacting ammonia with exhaust gas NO_x to yield nitrogen and water vapor in the presence of a catalyst. Ammonia is injected upstream of the catalyst bed where the following primary reactions take place:

$$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O \quad (1)$$

$$4NH_3 + 2NO_2 + O_2 \rightarrow 3N_2 + 6H_2O \quad (2)$$

The catalyst serves to lower the activation energy of these reactions, which allows the NO_x conversions to take place at a lower temperature (i.e., in the range of 600 to 750°F). Typical SCR catalysts include metal oxides (titanium oxide and vanadium), noble metals (combinations of platinum and rhodium), zeolite (alumino-silicates), and ceramics.

Factors affecting SCR performance include space velocity (volume per hour of flue gas divided by the volume of the catalyst bed), ammonia/NO_x molar ratio, and catalyst bed temperature. Space velocity is a function of catalyst bed depth. Decreasing the space velocity (increasing catalyst bed depth) will improve NO_x removal efficiency by increasing residence time, but will also cause an increase in catalyst bed pressure drop. The reaction of NO_x with ammonia theoretically requires a 1:1 molar ratio. Ammonia/NO_x molar ratios greater than 1:1 are necessary to achieve high-NO_x removal efficiencies due to imperfect mixing and other reaction limitations. However, ammonia/NO_x molar ratios are typically maintained at 1:1 or lower to prevent excessive unreacted ammonia (ammonia slip) emissions.

As was the case for SNCR, reaction temperature is critical for proper SCR operation. The optimum temperature range for conventional SCR operation is 600 to 750°F. Below this temperature range, reduction reactions (1) and (2) will not proceed. At temperatures exceeding the optimal range, oxidation of ammonia will take place resulting in an increase in NO_x emissions. Specially formulated high temperature zeolite catalysts have been recently developed that function at exhaust stream temperatures up to a maximum of approximately 1,025°F. NO_x removal efficiencies for SCR systems typically range from 60 to 90 percent.

SCR catalyst is subject to deactivation by a number of mechanisms. Loss of catalyst activity can occur from thermal degradation if the catalyst is exposed to excessive temperatures over a prolonged period of time. Catalyst deactivation can also occur due to chemical poisoning. Principal poisons include arsenic, sulfur, potassium, sodium, and calcium. Due to the potential for chemical poisoning with fuels other than natural gas, application of SCR has been primarily limited to natural gas-fired units.

Technical Feasibility

All of the combustion process modification technologies described (A/F ratio adjustment, ignition timing retard, and low-emission combustion) are feasible for the proposed HFCAWTF IC engine/generator sets.

Of the postcombustion stack gas treatment technologies, SNCR is not feasible because the temperature required for this technology (between 1,600 and 2,000°F) exceeds that found in the IC engine exhaust gas stream (approximately 700°F). NSCR was also determined to be technically infeasible because the process must take place in a fuel-rich (less than 3-percent oxygen) environment. Due to high excess air rates, the oxygen content of the IC exhaust gases is typically 10 percent.

For lean burn IC engines, NO_x reductions of 10 to 40 percent can be achieved using a combination of A/F ratio adjustment and ignition timing retard. The NO_x reductions achievable with low-emission combustion are considerably higher, ranging from 70 to 90 percent depending on engine manufacturer. Therefore, use of low-emission combustion technology will achieve NO_x emission rates lower than those obtainable from the application of A/F ratio adjustment and ignition timing retard technology.

Accordingly, the BACT analysis for NO_x for the proposed HFCAWTF IC engine/generator sets was confined to low-emission combustion and the application of post-combustion SCR control technologies. The following sections provide information regarding energy, environmental, and economic impacts and proposed BACT limits for NO_x.

5.4.2 ENERGY AND ENVIRONMENTAL IMPACTS

There are no significant adverse energy or environmental impacts associated with the use of good combustor designs and operating practices to minimize NO_x emissions.

The installation of SCR technology would cause an increase in back pressure on the IC engines due to the pressure drop across the catalyst bed. Additional energy would be needed for the pumping of aqueous ammonia from storage to the injection nozzles and ammonia vaporization. For lean burn IC engines, the engine backpressure will increase by approximately 2 to 4 inches water column (w.c.) due to the installation of an SCR control system. The increase in BSFC is estimated to be 0.5 percent for a 4 inches w.c. backpressure. This backpressure will decrease the power output by approximately 2 percent.

There are no significant adverse environmental effects due to the use of low-emission combustion technology. In contrast, application of SCR technology would result in the following adverse environmental impact:

Ammonia emissions due to *ammonia slip*; ammonia emissions are estimated to total 2.2 tpy for a SCR design ammonia slippage rate of 10 parts per million by dry volume (ppmvd) for both IC engines. However, ammonia slip can increase significantly during start-ups, upsets or failures of the ammonia injection system, or due to catalyst degradation. In instances where such events have occurred, ammonia exhaust concentrations of 50 ppmv or greater have been measured. Since the odor threshold of ammonia is 20 ppmv, releases of ammonia during upsets or malfunctions have the potential to cause ambient odor problems. Ammonia also acts as an irritant to human tissue. Depending on the concentration and duration of exposure, ammonia can cause eye, skin, and mucous membrane irritation. These effects can vary from minor irritation to severe damage. Contact of the skin or mucosa with liquid ammonia or a high vapor concentration can result in burns or obstructed breathing.

5.4.3 ECONOMIC IMPACTS

An assessment of economic impacts was performed by comparing control costs between a baseline case of low-emission combustion combustor technology and baseline technology with the addition of SCR controls. Baseline technology is expected to achieve a NO_x emission rate of 1.56 g/hp-hr. SCR technology was premised to achieve a NO_x control efficiency of 90 percent equivalent to an outlet NO_x emission rate of 0.156 g/hp-hr. The controlled NO_x emission rate of 0.156 g/hp-hr is approximately equal to the most stringent limit (i.e., a California LAER limit of 0.15 g/hp-hr) contained in the RBLC for natural gas-fired IC engines..

Total installed SCR capital and annualized operating costs for the lean burn IC engines were estimated using the following relationships obtained from the EPA *Alternate Control Techniques Document – NO_x Emissions from Stationary Reciprocating Internal Combustion Engines* (EPA, 1993):

- Total capital costs = \$310,000 + (\$72.7 × horsepower [hp]).
- Total annualized operating costs = \$171,000 + (\$49.7 × hp).

Based on the HFCAWTF Waukesha 16V-AT27GL engine rating of 4,073 hp, the total installed SCR capital and annualized operating costs for both IC engines are calculated to be $1,212,214 and $746,856, respectively. Application of a 90-percent efficient SCR control system for the proposed HFCAWTF IC engine/generator sets will result in a 110.5-tpy decrease in NO_x emissions. This emission decrease yields a project SCR control technology cost effectiveness of $6,759 per ton of NO_x controlled. This control cost is considered economically unreasonable. Table 5-6 summarizes the results of the NO_x BACT analysis.

5.4.4 PROPOSED BACT EMISSION LIMITATIONS

BACT NO_x limits obtained from the RBLC database for natural gas-fired IC engines are provided in Table 5-7.

Use of lean burn, low-emission combustion design is proposed as BACT for NO_x. Table 5-8 summarizes the NO_x BACT emission limits proposed for the new HFCAWTF IC engine/generator sets.

Table 5-6. Summary of SCR BACT Analysis

	Emission Impacts			Economic Impacts			Energy Impacts	Environmental Impacts	
	Emission Rates								
Control Option	lb/hr	tpy	Emission Reduction (tpy)	Installed Capital Cost ($)	Total Annualized Cost ($/yr)	Cost Effectiveness Over Baseline ($/ton)	Increase Over Baseline (MMBtu/yr)	Toxic Impact (Y/N)	Adverse Envir. Impact (Y/N)
SCR	2.8	12.3	110.5	1,212,214	746,856	6,759	2.32	Y	Y
Baseline28.0	122.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Basis: Two Waukesha 16V-AT27GL IC engine/generator sets, 100-percent load for 8,760 hr/yr.

Sources: Waukesha, 1999.
ECT, 2000.

Table 5-7. RBLC NOx Summary for Natural Gas Fired IC Engines

RBLCID	Facility Name	City	Permit Dates Issuance	Permit Dates Update	Process Description	Thruput Rate		Emission Limit		Control System Description	Control Efficiency	Basis
AK-0030	CITY OF UNALASKA	UNALASKA	06/21/1996	12/30/1996	INTERNAL COMBUSTION	7	MW	632.6	TPY	LIMIT OF OPERATION HOURS AND AFTERCOOLERS	0	BACT-PSD
AK-0031	CITY OF ST.PAUL POWER PLANT	ST PAUL	06/27/1996	12/30/1996	INTERNAL COMBUSTION	3	MW	427	TPY	AFTERCOOLERS	0	BACT-PSD
AL-0051	FLORIDA GAS TRANSMISSION CO.	MT. VERNON	02/22/1991	12/07/1993	ENGINE, I.C., RECIP	2,400	BHP	2	G/B-HP-H	LEAN COMBUSTION	0	BACT-PSD
AZ-0007	MOJAVE PIPELINE OPERATING COMPANY	TOPOCK	06/12/1991	03/24/1995	ENGINES, INTERIM BUILD-OUT, 3	13,800	HP	347.82	T/YR	FUEL SPECIFICATION	0	BACT-PSD
AZ-0007	MOJAVE PIPELINE OPERATING COMPANY	TOPOCK	06/12/1991	03/24/1995	ENGINES, RECIPROCATING, 5, FULL BUILD-OUT	17,500	HP	491.7	T/YR	FUEL SPECIFICATION	0	BACT-PSD
AZ-0022	INTEL CORPORATION	CHANDLER	04/10/1994	03/24/1995	GENERATORS, BACKUP, 5	2,220	BHP	0		CYANURIC ACID INJECTION TAILPIPE CONTROL	80	BACT
CA-0416	DE LA GUERRA POWER, INC		11/12/1991	01/31/1992	ENGINE IC & GEN (1 OF 3)	380	HP	6.34	LB/D	NON-SELECTIVE CATALYTIC CONVERTER	90	BACT-PSD
CA-0766	KAISER PERMANENTE MEDICAL CENTER	FRESNO	09/02/1997	03/16/1998	JOHN DEERE MODEL 6076AFN30 IC ENGINE	160	BHP	55	PPMV @ 15% O2	NATURAL GAS FUEL	0	LAER
CA-0791	CITY OF CLOVIS	CLOVIS	11/08/1996	03/16/1998	CATERPILLAR MODEL G3406TA NATURAL GAS, IC ENGINE	0		0.33	G/B-HP-H	NATURAL GAS FUEL, A THREE WAY CATALYTIC CONVERTER AND AN O2 CONTROLLER	0	LAER
CA-0792	TOYS R" US"	CLOVIS	11/27/1996	03/16/1998	NATURAL GAS FIRED EMERGENCY IC ENGINE	0		14.56	G/B-HP-H	NO CONTROL	0	LAER
CA-0829	G.E.N.Y. OPERATIONS COMPANY	BAKERSFIELD	11/03/1997	08/31/1999	IC ENGINE, NAT GAS FIRED, CATERPILLAR MODEL 333	145	BHP	10	G/B-HP-H	NO CONTROL	0	BACT
CA-0852	SABA PETROLEUM, INC. (BELL COMPRESSOR PLANT)	SANTA MARIA	10/12/1998	04/19/1999	IC ENGINE, COMPRESSOR, NATURAL GAS-FIRED	747	BHP	0.15	G/B-HP-H	3-WAY CATALYTIC CONVERTER.WITH ELECTRONIC AIR/FUEL RATIO CONTROLLER	0	BACT-OTHER
CO-0022	SNYDER OIL CORP. / ENTERPRISE STATION		11/13/1992	03/24/1995	ENGINES, RECIPROCATING (6)	2,500	HP (EACH)	563.8	LBS/MILLION SCF	LEAN COMBUSTION & FUEL SPEC: FIRING RESIDUE QUALITY NAT. GAS	0	BACT-OTHER
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0		2.7	LB/H.	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0028	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESV.	04/01/1997	03/30/1999	IC ENGINE, WAUKESHA L5790-GSI, 2	1,215	HP	2.7	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0029	VASTAR RESOUCRES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	05/03/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0		2.7	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-1	738	HP	1.6	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	90	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-2	738	HP	1.6	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0032	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/06/1999	COMPRESSOR ENGINE, GAS-FIRED, TS4-3	1,215	HP	2.7	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-1	421	HP	0.9	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-4	738	HP	1.6	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0033	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	04/01/1999	COMPRESSOR ENGINE, GAS-FIRED, TS5-3	1,215	HP	2.7	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 1	1,478	HP	4.9	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0034	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, 2	0		2.7	LB/H 2 EACH	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-5, 1	421	HP	0.9	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0035	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIBE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINE, GAS-FIRED, TS7-6, 1	1,215	HP	2.7	LB/H	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
CO-0036	VASTAR RESOURCES, INC.	SO. UTE INDIAN TRIVE RESERV.	07/31/1997	03/30/1999	COMPRESSOR ENGINES, GAS-FIRED, 3	0		1.6	LB/H 3 EACH	ACCUNOX AIR TO FUEL RATIO CONTROL SYSTEM AND A 3 WAY NSCR CONVERTER.	0	BACT-PSD
FL-0046	FLORIDA GAS & TRANSMISSION COMPANY	PERRY	05/09/1991	05/14/1993	COMPRESSOR, 1 EACH	4,000	BHP	2	G/B-HP-H	COMBUSTION CONTROL	0	BACT-PSD
FL-0051	FLORIDA GAS TRANSMISSION COMPANY	MAITLAND	05/10/1991	05/14/1993	COMPRESSOR, 1 EACH	2,400	BHP	2	G/B-HP-H	COMBUSTION CONTROL	0	BACT-PSD
FL-0075	FLORIDA GAS TRANSMISSION	FT. PIERCE	09/27/1993	04/11/1994	ENGINE, RECIPROCATING, GAS	4,000	BHP/H	2	G/B-HP-H	LEAN BURN ENGINE	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINE, COMPRESSOR	4,000	HP	1.8	G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
IA-0023	NORTHERN NATURAL GAS COMPANY		09/05/1990	06/29/1991	ENGINES, COMPRESSOR, 2	2,000	HP EACH	1.8	G/B-HP-H	GOOD COMBUSTION PRACTICES	0	BACT-PSD
IL-0043	NATURALGAS PIPELINE CO	GENESEO	03/01/1989	06/10/1993	ENGINE, MLV-10, 4 EA	4,000	HP	9	G/B-HP-H	DESIGN & OPERATING PRACTICES	0	BACT-PSD
LA-0077	FLORIDA GAS TRANSMISSION COMPANY	FRANKLINTON	04/17/1991	05/28/1991	ENGINE, RECIP, NATURAL GAS COMPRESSOR	2,400	HP	3.5	G/B-HP-H	LEAN BURN	68	BACT-PSD
MA-0022	BERKSHIRE POWER DEVELOPMENT, INC.	AGAWAM	09/22/1997	04/19/1999	ENGINES, CHILLER, NATURAL GAS-FIRED, TWO	23	MMBTU/H	0.7	LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.	0	BACT-PSD
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 2 CYCLE	6,000	HP	0		LEAN COMBUSTION	83	BACT-PSD
MI-0221	BLUE LAKE GAS STORAGE CO.		05/07/1992	03/24/1995	ENGINES, RECIPROCATING, 4 CYCLE	1,076	HP	0		LEAN COMBUSTION	83	BACT-PSD
MN-0018	GREAT LAKES GAS TRANSMISSION LIMITED PARTNERSHIP	CLOQUET	07/09/1992	03/24/1995	COMPRESSION/TRANSMISSION OF NATURAL GAS	0		160	PPMV @ 15% O2, DRY	ENGINE DESIGN AND FUEL SPEC: NATURAL GAS	0	BACT-PSD
MO-0009	MARSHALL MUNICIPAL UTILITIES (BD. OF PUBLIC WORKS)	MARSHALL	04/06/1993	10/06/1997	ENGINE, I.C. (RECIPROCATING)	8,500	HP	2	G/B-HP-H	INCREASED A/F RATIO, REDUCTION IN AIR INTAKE MANIFOLD TEMP	0	BACT-PSD
MO-0019	MARSHALL MUNICIPAL UTILITIES (BOARD OF PUBLIC WORK	MARSHALL	04/06/1993	10/06/1997	NEW COOPER-BESSEMER INTERNAL COMBUSTION ENGINE	6	MW	2	G/B-HP-H	INCREASED A/F RATIO, REDUCTION IN AIR INTAKE MANIFOLD TEMP	0	BACT-PSD
MS-0021	FLORIDA GAS TRANSMISSION CO.		05/14/1991	05/31/1992	ENGINE, 412 KVSR DRESSER	2,400	HP	2	G/B-HP-H	LEAN COMBUSTION	0	BACT-PSD
NM-0019	MERIDIAN OIL GATHERING INC	BLANCO	10/11/1990	01/14/1994	COMPRESSOR, IC, NATURAL GAS FIRED	2,650	HP, 8 EACH	1.5	G/B-HP-H	CLEAN BURN ENGINE DESIGN	0	BACT-PSD
NM-0021	WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSOR	BLANCO	10/29/1993	03/02/1994	ENGINE, GAS-FIRED, RECIPROCATING	1,000	HP	1.4	G/B-HP-H	CLEAN/LEAN BURN TECHNOLOGY	0	BACT-PSD
NM-0025	MERIDIAN OIL, INC. - FRANCIS MESA STA.	FARMINGTON	06/15/1995	09/01/1995	COMPRESSOR ENGINES (8) & GLYCOL DEHYDRATOR	2,650	HP (EACH)	1.5	G/B-HP-H	COMPRESSOR ENGINE, CLEAN BURN ENGINE	0	BACT-PSD
NM-0026	MERIDIAN OIL, INC./VALVERDE GAS PROCESSING FAC.	FARMINGTON	10/27/1995	02/27/1996	RECIPROCATING ENGINE, NATURAL GAS (4)	0		0.7	G/B-HP-H	CLEAN BURN ENGINE MODEL #: 3612 TA/SW66 MANUFACTURER: CATERPILLAR	0	BACT-PSD
NM-0030	WILLIAMS FIELD SERVICES--MIDDLE MESA CDP	ARCHULETA	12/03/1997	05/31/1997	NATURAL GAS COMPRESSOR STATION, 14 ENGINES	1,478	HP, EACH	4.51	LB/HR EACH ENGINE	CLEAN/LEAN BURN COMBUSTION	0	BACT-PSD
NY-0047	PASNY/HOLTSVILLE COMBINED CYCLE PLANT	HOLTSVILLE	09/01/1992	09/13/1994	GENERATOR, EMERGENCY (NATURAL GAS)	2	MMBTU/HR	1.3	LB/MMBTU	LEAN BURN ENGINE	0	BACT-OTHER
OH-0220	NORTH STAR RECYCLING CO.	TOLEDO	06/09/1993	08/15/1994	RECIPROCATING ENGINES (NATURAL GAS) (3)	1,700	HP (EACH)	1.95	G/B-HP-H	3-WAY CATALYST	85	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	2,400	HP	2.5	G/B-HP-H	LEAN BURN COMBUSTION	78	BACT-OTHER
OK-0024	NGPL		11/01/1990	12/07/1993	ENGINE	1,600	HP	2.5	G/B-HP-H	LEAN BURN COMBUSTION	78	BACT-OTHER
OK-0026	SWIFT ENERGY		09/05/1991	12/07/1993	ENGINES, I.C.	1,132	HP EACH	23.8	T/YR	CATALYTIC CONVERTER	78	OTHER
PA-0077	NATIONAL FUEL GAS SUPPLY	ALLEGANY TOWNSHIP	10/01/1990	03/24/1995	ENGINES, NAT GAS FIRED, RECIP (2)	1,300	HP EACH	2	G/B-HP-H	CLEAN BURN TECHNOLOGY	0	BACT-PSD
PA-0085	CNG TRANSMISSION CORPORATION	FINNEFROCK STATION	09/24/1991	03/24/1995	ENGINE, I.C., RECIP., GAS-FIRED, 2 CYCLE	4,200	HP	2	G/B-HP-H	CLEAN BURN TECHNOLOGY	0	BACT-OTHER
PA-0087	CNG TRANSMISSION CORP.	PITTSBURGH	03/13/1992	03/24/1995	ENGINES, RECIP I.C., 4, NAT. GAS	3,200	HP	2	G/B-HP-H	LEAN BURN TECHNOLOGY	0	BACT-PSD
PA-0095	TEMPLE UNIVERSITY	PHILADELPHIA	10/02/1992	03/24/1995	ELECTRIC GENERATOR (NATURAL GAS)	2	MW	2	G/B-HP-H	LEAN BURN GAS ENGINE	0	BACT-OTHER
PA-0096	PHILADELPHIA SOUTHWEST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (2) (NATURAL GAS)	443	KW (EACH)	2	G/B-HP-H	LEAN BURN ENGINE	0	BACT-OTHER
PA-0097	PHILADELPHIA NORTHEAST WATER TREATMENT PLANT	PHILADELPHIA	10/15/1992	03/24/1995	ENGINES (3) (NATURAL GAS)	443	KW (EACH)	2	G/B-HP-H	LEAN BURN ENGINE	0	BACT-OTHER
PA-0118	TRANSCONTINENTAL GAS PIPELINE CORP.	FRAZER	06/05/1995	11/27/1995	I.C. ENGINES, NATURAL GAS, UNITS 1-6	2,050	HP	18.1	LB/HR	LOW EMISSION COMBUSTION (LEC) TECHNOLOGY	80	RACT
PA-0118	TRANSCONTINENTAL GAS PIPELINE CORP.	FRAZER	06/05/1995	11/27/1995	I.C. ENGINES, NATURAL GAS, UNITS 7-9, 13	2,100	HP	18.54	LB/HR	LOW EMISSION COMBUSTION (LEC) TECHNOLOGY	52	RACT
PA-0118	TRANSCONTINENTAL GAS PIPELINE CORP.	FRAZER	06/05/1995	11/27/1995	I.C. ENGINES, NATURAL GAS, UNITS 10-11	3,400	HP	30	LB/HR	LOW EMISSION COMBUSTION (LEC) TECHNOLOGY	56	RACT
PA-0118	TRANSCONTINENTAL GAS PIPELINE CORP.	FRAZER	06/05/1995	11/27/1995	I.C. ENGINES, NATURAL GAS, UNIT 12	5,500	HP	48.56	LB/HR	LOW EMISSION COMBUSTION (LEC) TECHNOLOGY	67	RACT
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	3,400	HP	4	G/B-HP-H	INSTALL L-E4 TECHNOLOGY& OPERATE W/A LEANER A/F MIXTURE	75	RACT
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	2,000	HP	4	G/B-HP-H	INSTALL L-E4 TECHNOLOGY& OPERATE W/A LEANER A/F MIXTURE	75	RACT
PA-0146	CNG TRANSMISSION CORPORATION-LEIDY	RENOVO	02/29/1996	10/08/1996	NATURAL GAS FIRED ENGINE	1,000	HP	7	G/B-HP-H	INSTALLATION OF L-E-7 TECHNOLOGY	59	RACT
RI-0006	THE WORCESTER CO.	CENTERDALE	09/27/1989	05/18/1990	ENGINE, I.C., 3 EA	2,000	BHP	1.5	G/B-HP-H	LEAN BURN	0	BACT-PSD
TN-0043	TENNECO GAS	PORTLAND		06/30/1994	IC ENGINE, NATURAL GAS	5,500	HP	160	TPY	CLEAN BURN RETROFIT	0	RACT
TN-0046	TENNECO GAS	PORTLAND		06/30/1994	IC ENGINE, NATURAL GAS	408	HP	2	G/B-HP-H	NON-SELECTIVE CATALYTIC REDUCTION (NSCR)	0	OTHER
TN-0046	TENNECO GAS	PORTLAND		06/30/1994	IC ENGINE, NATURAL GAS	408	HP	2	G/B-HP-H	PRE-STRATIFIED CHARGE	0	OTHER
TN-0046	TENNECO GAS	PORTLAND		06/30/1994	IC ENGINES, NATURAL GAS (2)	3,400	HP	946	TPY	PARAMETRIC CONTROL	0	OTHER
TN-0047	MIDWESTERN GAS	PORTLAND		06/30/1994	IC ENGINE, NATURAL GAS	2,000	HP	58	TPY	CLEAN BURN RETROFIT	0	OTHER
TN-0047	MIDWESTERN GAS	PORTLAND		06/30/1994	IC ENGINE, NATURAL GAS	2,700	HP	79	TPY	CLEAN BURN RETROFIT	0	OTHER
UT-0036	LEHT COGENERATION ASSOCIATES		10/22/1987	04/30/1990	ENGINE, GAS FIRED, 3 EA	16,950	KW	249.87	T/YR	SEE NOTES	0	BACT-PSD
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	ENGINE, NATURAL GAS COMPRESSOR	6,060	HP	2	G/B-HP-H	LEAN BURN COMBUSTION	0	BACT-OTHER
WV-0011	CNG TRANSMISSION CORPORATION		05/03/1993	03/02/1994	GENERATOR, AUXILARY	814	HP	2	G/B-HP-H		0	BACT-OTHER
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	2 GAS-FIRED GENERATOR ENGINES	385	HORSEPOWER	1.7	LBS/HR	RETROFIT W/AN AIR TO FUEL RATIO CONTROL W/ NSCR	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	NATURAL GAS-FIRED COMPRESSOR ENGINE	520	HORSEPOWER	2.3	LBS/HR	RETROFIT W/AN AIR TO FUEL RATIO CONTROL W/ NSCR	0	BACT
WY-0020	SNYDER OIL CORPORATION-RIVERTON DOME GAS PLANT	THE WIND RIVER INDIAN	07/05/1994	10/18/1994	1 GAS-FIRED GENERATOR ENGINE	577	HORSEPOWER	2.5	LBS/HR	RETROFIT W/AN AIR TO FUEL RATIO CONTROL W/ NSCR	0	BACT
WY-0033	WESTERN GAS RESOURCES, INC. HILIGHT GAS PLANT	GILLETTE	03/31/1997	02/01/1999	COMPRESSOR ENGINES, NATURAL GAS FIRED, E ACH	1,500	HP	2	G/B-HP-H	CATALYTIC CONVERTER	0	BACT-PSD
WY-0040	CHEVRON USA - PAINTER CENTRAL STATION	8 MILES NE OF EVANSTON	04/19/1993	03/10/1999	ENGINES, COMPRESSOR, 2 EACH	2,650	BHP, EACH	1.5	G/B-HP-H	CLEAN BURN" TECHNOLOGY"	0	BACT-PSD
WY-0049	WESTERN GAS RESOURCES - HILIGHT GAS PLANT	GILLETTE	10/14/1998	06/08/1999	ENGINES, COMPRESSOR, 2 EA	1,650	HP	1	G/B-HP-H	3 - WAY CATALYST SYSTEM AND AIR/FUEL RATIO CONTRO-LLER.	0	BACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	ENGINE, COMPRESSOR, 9 EA	3,200	HP	0.5	G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY	0	BACT-PSD
WY-0051	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 MILE N OF ROCK SPRINGS	05/18/1998	06/08/1999	COMPRESSOR, ENGINES, 2 EA	1,200	HP	0.9	G/B-HP-H	ULTRA LOW NOX LEAN BURNTECHNOLOGY.	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/1998	06/17/1999	ENGINES, COMPRESSOR, 2 EA	1,200	HP	0.9	G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY	0	BACT-PSD
WY-0052	UNION PACIFIC RESOURCES - PATRICK DRAW GAS PLANT	36 M EAST OF ROCK SPRINGS	05/18/1998	06/17/1999	ENGINES, COMPRESSOR, 9 EA	3,200	HP	0.9	G/B-HP-H	ULTRA LOW NOX LEAN BURN TECHNOLOGY.	0	BACT-PSD

Minimum	0.15	G/B-HP-H
Maximum	14.56	G/B-HP-H
Average	2.59	G/B-HP-H
Count	84	

Table 5-8. Proposed NO_x BACT Emission Limits

Emission Source	lb/hr	g/hp-hr
Waukesha 16V-AT27GL IC Engine (per engine)		
NO_x	14.0	1.56

Sources: ECT, 2000.
Waukesha, 1999.

6.0 AMBIENT IMPACT ANALYSIS METHODOLOGY

6.1 GENERAL APPROACH

The approach used to analyze the potential impacts of the proposed facility, as described in detail in the following sections, was developed in accordance with accepted practice. Guidance contained in EPA manuals and user's guides was sought and followed.

6.2 POLLUTANTS EVALUATED

A comparison of estimated potential annual emission rates for the HFCAWTF IC engine/generator modification project and the PSD significant emission rate thresholds was previously provided in Table 3-2. As shown in that table, potential emissions of NO_X, CO, and ozone/VOC are each projected to exceed the applicable PSD significant emission rate level. These pollutants are, therefore, subject to the PSD NSR air quality impact analysis requirements of Rule 62-212.400(5)(d), F.A.C. No modeling analysis was performed for ozone/VOCs since ozone is a regional problem typically addressed by regional dispersion models. All Florida counties, including Hillsborough County, are presently classified attainment for ozone. Pollutants evaluated for ambient air quality impacts for the HFCAWTF IC engine/generator modification project therefore consisted of NO_X (annual averaging period) and CO (1- and 8-hour averaging periods).

6.3 MODEL SELECTION AND USE

The most recent regulatory version of the Industrial Source Complex (ISC3) models (EPA, 1999) is recommended and was used in this analysis. The ISC3 models are steady-state Gaussian plume models that can be used to assess air quality impacts over simple terrain from a wide variety of sources. The ISC3 models are capable of calculating concentrations for averaging times ranging from 1 hour to annual. For this study, the Industrial Source Complex short-term (ISCST3) (Version 99155) model was used to calculate short-term ambient impacts with averaging times between 1 and 24 hours as well as long-term annual averages.

Procedures applicable to the ISCST3 dispersion model specified in EPA's GAQM were followed in conducting this dispersion modeling analysis. The GAQM is codified in Appendix W of 40 CFR 51. In particular, the ISCST3 model control pathway MODELOPT keyword parameters DFAULT, CONC, RURAL, and NOCMPL were selected. Selection of the parameter DFAULT, which specifies use of the regulatory default options, is recommended by the GAQM. The CONC, RURAL, and NOCMPL parameters specify calculation of concentrations, use of rural dispersion, and suppression of complex terrain calculations, respectively. As previously mentioned, the ISCST3 model was also used to determine annual average impact predictions, in addition to short-term averages, by using the PERIOD parameter for the AVERTIME keyword. Conservatively, no consideration was given to pollutant exponential decay.

For annual NO_2 impacts, the tiered screening approach described in the GAQM, Section 6.2.3 was used. Tier 1 of this screening procedure assumes complete conversion of NO_x to NO_2. Tier 2 applies an empirically derived NO_2/NO_x ratio of 0.75 to the Tier 1 results.

6.4 DISPERSION OPTION SELECTION

Area characteristics in the vicinity of proposed emission sources are important in determining model selection and use. One important consideration is whether the area is rural or urban since dispersion rates differ between these two classifications. In general, urban areas cause greater rates of dispersion because of increased turbulent mixing and buoyancy-induced mixing. This is due to the combination of greater surface roughness caused by more buildings and structures and greater amount of heat released from concrete and similar surfaces. EPA guidance provides two procedures to determine whether the character of an area is predominantly urban or rural. One procedure is based on land use typing, and the other is based on population density. The land use typing method uses the work of Auer (Auer, 1978) and is preferred by EPA and FDEP because it is meteorologically oriented. In other words, the land use factors employed in making a rural/urban designation are also factors that have a direct effect on atmospheric dispersion. These factors include building types, extent of vegetated surface area and water surface area, types of industry and commerce, etc. Auer recommends these land use factors be considered within 3 km of the source to be modeled to determine urban or rural classifications. The Auer land use typing method was used for the ambient impact analysis.

The Auer technique recognizes four primary land use types: industrial (I), commercial (C), residential (R), and agricultural (A). Practically all industrial and commercial areas come under the heading of urban, while the agricultural areas are considered rural. However, those portions of generally industrial and commercial areas that are heavily vegetated can be considered rural in character. In the case of residential areas, the delineation between urban and rural is not as clear. For residential areas, Auer subdivides this land use type into four groupings based on building structures and associated vegetation. Accurate classification of the residential areas into proper groupings is important to determine the most appropriate land use classification for the study area.

USGS 7.5-minute series topographic maps for the area were used to identify the land use types within a 3-km radius area of the proposed site. Based on this analysis, more than 50 percent of the land use surrounding the plant was determined to be rural under the Auer land use classification technique. Therefore, rural dispersion coefficients and mixing heights were used for the ambient impact analysis.

6.5 TERRAIN CONSIDERATION

The GAQM defines *flat terrain* as terrain equal to the elevation of the stack base, *simple terrain* as terrain lower than the height of the stack top, and *complex terrain* as terrain above the height of the plume center line (for screening modeling, complex terrain is terrain above the height of the stack top). Terrain above the height of the stack top but below the height of the plume center line is defined as *intermediate terrain.*

USGS 7.5-minute series topographic maps were examined for terrain features in the vicinity of the HFCAWTF (i.e., within an approximate 10-km radius). Review of the USGS topographic maps indicates nearby terrain would be classified as ranging from flat to simple terrain. Due to the minimal amount of terrain elevation differences in the vicinity, assignment of receptor terrain elevations was not conducted (i.e., all receptors were assumed to be at the same elevation as the IC engine stack bases for modeling purposes).

6.6 GOOD ENGINEERING PRACTICE (GEP) STACK HEIGHT/BUILDING WAKE EFFECTS

According to EPA regulations (40 CFR 51), GEP stack height is defined as the highest of 65 meters or a height established by applying the formula:

$$Hg = H + 1.5\,L$$

where: Hg = GEP stack height.

H = height of the structure or nearby structure.

L = lesser dimension (height or projected width) of the nearby structure.

Nearby is defined as a distance up to five times the lesser of the height or width dimension of a structure or terrain feature, but not greater than 800 meters. While the GEP stack height regulations require that stack heights used in modeling for determining compliance with NAAQS and PSD increments not exceed GEP stack heights, the actual stack height may be greater. Guidelines for determining GEP stack height have been issued by EPA (1985).

The stack height proposed for the proposed engines (35 feet [ft]) is less than the *de minimis* GEP height of 65 meters (213 ft), and, therefore, complies with the EPA promulgated final stack height regulations (40 CFR 51).

While the GEP stack height rules address the maximum stack height that can be employed in a dispersion model analysis, stacks having heights lower than GEP stack height can potentially result in higher downwind concentrations due to building downwash effects. The ISC3 dispersion models contain two algorithms that assess the effect of building downwash; these algorithms are referred to as the Huber-Snyder and Schulman-Scire methods. The following steps are employed in determining the effects of building downwash:

- A determination is made as to whether a particular stack is located in the area of influence of a building (i.e., within five times the lesser of the building's height or projected width). If the stack is not within this area, it will not be subject to downwash from that building.

- If a stack is within a building's area of influence, a determination is made as to whether it will be subject to downwash based on the heights of the stack and building. If the stack height to building height ratio is equal to or greater than 2.5, the stack will not be subject to downwash from that building.
- If both conditions in the previous two items are satisfied (i.e., a stack is within the area of influence of a building and has a stack height to building height ratio of less than 2.5), the stack will be subject to building downwash. The determination is then made as to whether the Huber-Snyder or Schulman-Scire downwash method applies. If the stack height is less than or equal to the building height plus one-half the lesser of the building height or width, the Schulman-Scire method is used. Conversely, if the stack height is greater than this criterion, the Huber-Snyder method is employed.
- The ISCST3 downwash input data consists of an array of 36 wind direction-specific building heights and projected widths for each stack. LB is defined as the lesser of the height and projected width of the building. For directionally dependent building downwash, wake effects are assumed to occur if a stack is situated within a rectangle composed of two lines perpendicular to the wind direction, one line at 5 LB downwind of the building and the other at 2 LB upwind of the building, and by two lines parallel to the wind, each at 0.5 LB away from the side of the building.

Table 6-1 provides dimensions of the buildings evaluated for wake effects; the locations of these buildings were previously provided on Figure 2-2. The buildings presented in Table 6-1 were included in the modeling analysis as sources of downwash to the proposed engines.

6.7 RECEPTOR GRIDS

Receptors were placed at locations considered to be *ambient air*, which is defined as "that portion of the atmosphere, external to buildings, to which the general public has access." Section 2.0 provided a plot plan showing the site fence lines (see Figure 2-2). As shown in Figure 2-2, the entire perimeter of the plant site is fenced. Therefore, the nearest locations of general public access are at the facility fence lines.

Table 6-1. Building Dimensions.

Building	Dimensions (meters)		
	Width	Length	Height
Sludge heat drying building	31.4	49.1	11.0
Sludge dewatering building	17.1	78.9	8.9
Proposed engine building	15.2	22.9	7.9

Sources: TEC, 2000.
ECT, 2000.

Consistent with GAQM recommendations, the ambient impact analysis used the following receptor grids:

- Fence Line Cartesian Receptors—Discrete receptors placed on the site fence line at approximately 50-meter intervals.
- Nearfield Cartesian Receptors—Discrete receptors placed at 100-meter intervals from the site fence line to the first polar receptor ring.
- Nearfield Polar Receptors—Polar receptors consisting of 11 rings of 36 receptors each (36 radials at 10-degree [°] radial spacings) at 100-meter intervals beginning 1,000 meters from the receptor grid origin to a distance of 2,000 meters.
- Mid-Field Polar Receptors—Polar receptors consisting of 8 rings of 36 receptors each (36 radials at 10° radial spacings) at 250-meter intervals beginning 2,250 meters from the receptor grid origin to a distance of 4,000 meters.
- Farfield Polar Receptors—Polar receptors consisting of 12 rings of 36 receptors each (36 radials at 10° radial spacings) at 500-meter intervals beginning 4,500 meters from the receptor grid origin to a distance of 10,000 meters.

To improve the spatial distribution of the polar receptors, each polar ring was offset by 5°. Figure 6-1 illustrates a graphical representation of the receptor grids (out to a distance of 1,000 meters). A depiction of the receptor grids (from 1,000 meters to 10 km) is shown in Figure 6-2.

6.8 METEOROLOGICAL DATA

Detailed meteorological data are needed for modeling with the ISC3 dispersion models. The ISCST3 model requires a preprocessed data file compiled from hourly surface observations and concurrent twice-daily rawinsonde soundings (i.e., mixing height data).

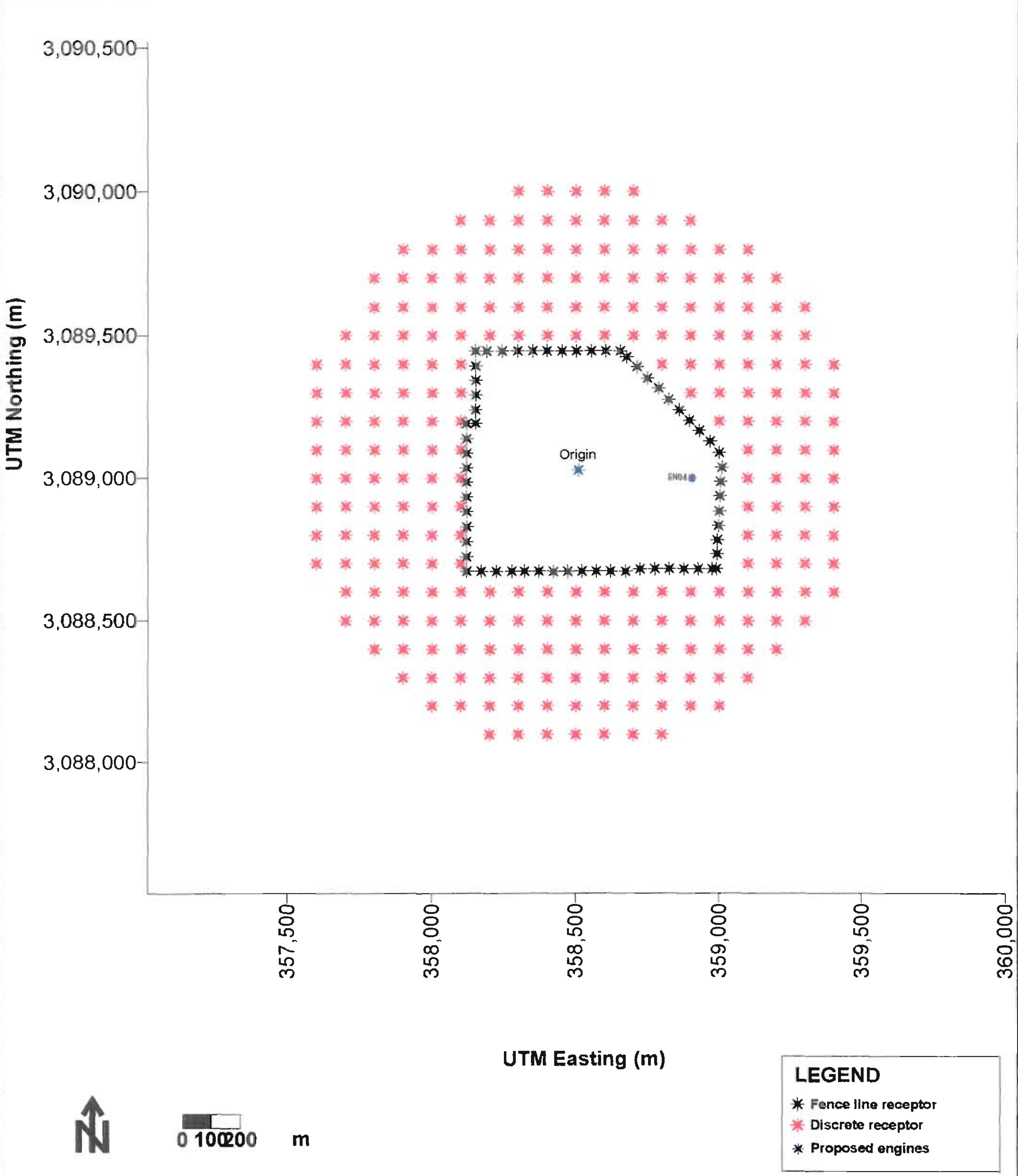

FIGURE 6-1.
RECEPTOR LOCATIONS (WITHIN 1,000 m)

ECT
Environmental Consulting & Technology, Inc.

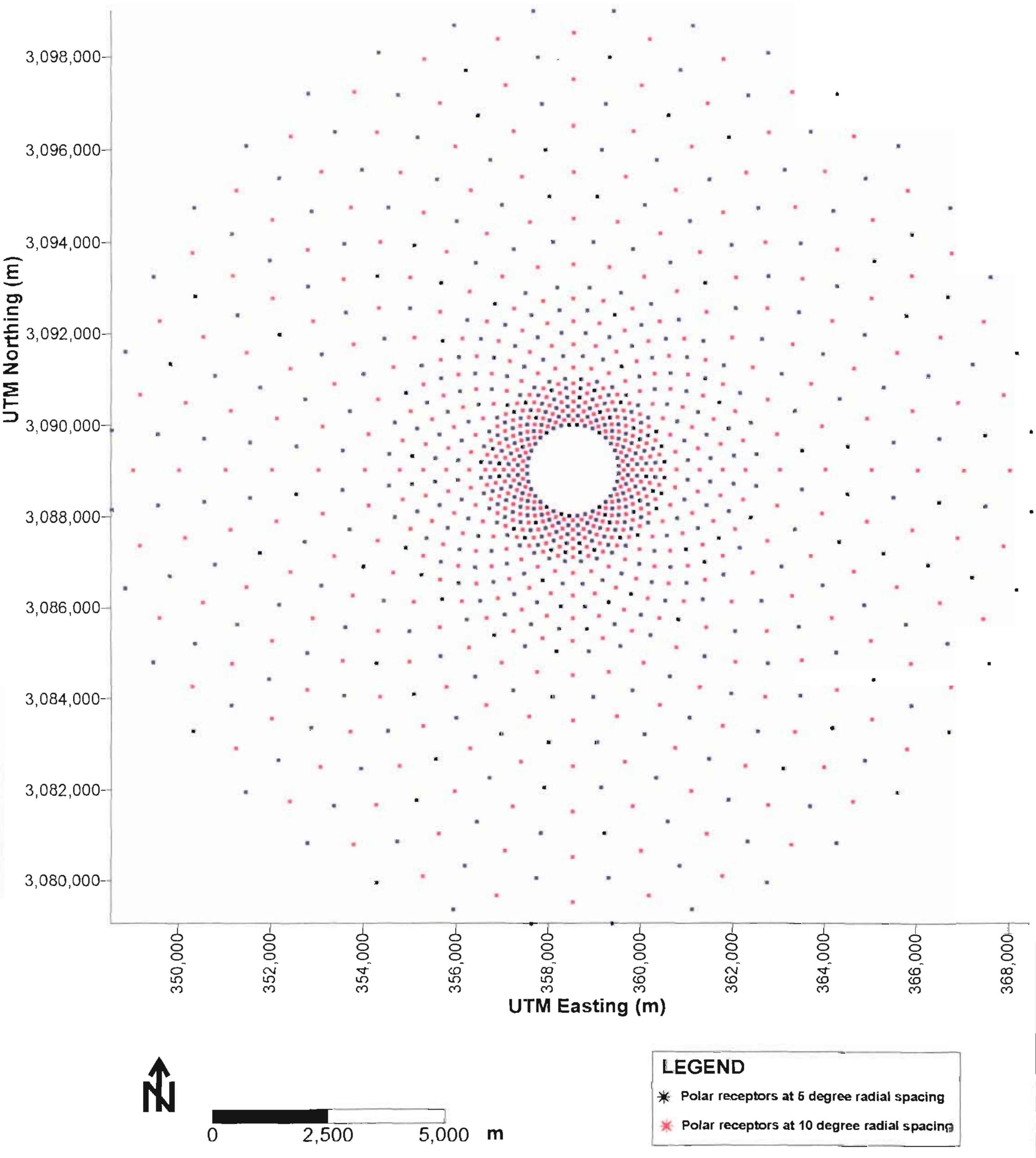

FIGURE 6-2.
RECEPTOR LOCATIONS (From 1,000 to 10 km)

ECT
Environmental Consulting & Technology, Inc.

Consistent with the GAQM and FDEP guidance, modeling should be conducted using the most recent, readily available, 5 years of meteorological data collected at a nearby observation station. In accordance with this guidance, the selected meteorological dataset consisted of St. Petersburg/Clearwater International Airport (SPG), Station ID 72211, surface data and Ruskin (RUS), Station ID 12842, upper air data. These data were obtained from the National Climatic Data Center (NCDC) for the 1992 through 1996 5-year period.

The surface and mixing height data for each of the 5 years were processed using EPA's PCRAMMET meteorological preprocessing program to generate the meteorological data files in the format required by the ISCST3 dispersion model.

6.9 MODELED EMISSION INVENTORY

The modeled on-property emission source consisted of the proposed engines. As will be discussed in Section 7.0, Ambient Impact Analysis Results, emissions from the proposed engines resulted in air quality impacts below the significance impact levels (reference Table 4-2) for all pollutants and all averaging periods with the exception of NO_2. Accordingly, additional, multisource interactive dispersion modeling was only required for NO_2.

The area of influence (AOI) for NO_2 impacts for the HFCAWTF IC engine/generator set modification project was determined to be 1.7 km. An inventory of NO_x emission sources within approximately 55 km of the HFCAWTF was obtained from FDEP. The FDEP off-site NO_x emission source data is provided Table 1, Appendix E. The "20D" screening procedure was used to eliminate emission sources that would not have a significant impact within the AOI. Specifically, emission sources with annual NO_x emissions (tpy) less than 20 times the distance (km) from the nearest edge of the AOI were removed from the modeling emissions inventory. Table 2 in Appendix E provides an evaluation of the FDEP emissions inventory with respect to the "20D" screening procedure and indicates which emission sources were included in the NO_2 air quality impact analysis.

Emission rates and stack parameters for the proposed engines were previously presented in Tables 2-1 and 2-3.

DISKETTES

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TECO AWTP Air Quality Analysis electronic files:

DISKETTE 1

a. Meteorological Data Files (5 Files): **SPG_MET.ZIP**

SPGYY.ASC	YY = 92, 93, 94, 95, and 96

b. GEP/BPIP Files (5 Files): **TECO_GEP.ZIP**

TECOAWTP.SUM	BPIP summary output file
TECOAWTP.OUT	BPIP output file
TECOAWTP.GEP	BPIP
TECOAWTP.GPI	BPIP
TECOAWTP.PIP	BPIP

c. FDEP Emission Inventory (1 File): **TECO_EI.ZIP**

IM0324.XLS	NO_2 Emission Inventory

d. TECO Emission Source Impacts (10 Files): **TECO_NO2.ZIP**

AWTPXX.INP	NO_2 ISCST3 input files Annual Average; XX = 92 - 96
AWTPXX.OUT	NO_2 ISCST3 output files Annual Average; XX = 92 – 96

DISKETTE 2

a. NAAQS Annual Analysis (10 Files): **ISC_NAQ.ZIP**

NAAQSXX.INP	NO_2 NAAQS ISCST3 input files XX = 92 - 96
ANNXX.OUT	NO_2 NAAQS ISCST3 output files XX = 92 – 96

b. PSD Annual Analysis (10 Files): **ISC_PSD.ZIP**

PSDXX.INP	NO_2 PSD ISCST3 input files XX = 92 - 96
PSDXX.OUT	NO_2 PSD ISCST3 output files XX = 92 – 96

7.0 AMBIENT IMPACT ANALYSIS RESULTS

7.1 MAXIMUM FACILITY IMPACTS AND SIGNIFICANT IMPACT AREAS

ISCST3 model results for each year of meteorology evaluated (1992 through 1996) are summarized on Table 7-1 (annual NO_2 impacts), Table 7-2 (1-hour CO impacts), and Table 7-3 (8-hour CO impacts). Significant impacts are highlighted in boldface type.

Table 7-1 show that the HFCAWTF project impacts will exceed the PSD significance level for NO_2 annual average for all years. For all other pollutants and averaging times evaluated, model impacts are below the PSD significance impact level. Accordingly, multi-source interactive modeling was conducted for NO_2 with respect to the annual average PSD Class II and NAAQS increments.

Significant impact areas are shown more clearly with the aid of Tables 7-4 through 7-8 and Figures 7-1 through 7-5. For example, Table 7-4 identifies the specific receptors that had maximum impacts above the 1.0-microgram-per-cubic-meter ($\mu g/m^3$) significance level during evaluation with 1992 meteorology. Correspondingly, Figure 7-1 shows the locations of these receptors relative to the plant site. The remaining tables and figures present similar information for the remaining years of meteorology, i.e. 1993-1996.

7.2 PSD CLASS II INCREMENT ANALYSIS

An assessment of HFCAWTF project impacts, together with other sources within 55 km, was performed for comparison to the annual average NO_2 PSD Class II increments. Conservatively, the modeled PSD increment consuming emissions inventory included the HFCAWTF sources along with all other sources contained in the FDEP NO_2 emission inventory, with the exception of the Tampa Bay Shipbuilding and Repair Company. This approach will result in an over-estimation of PSD Class II increment consumption because many of the modeled emission sources are part of the PSD baseline concentration; i.e. were constructed prior to March 28, 1988.

Table 7-9 provides the results. All maximum annual average NO_2 impacts were well below the PSD Class II increment.

7.3 NAAQS ANALYSIS

An assessment of HFCAWTF project impacts, together with other sources within 55 km, was also performed for comparison to the annual average NO_2 NAAQS. The modeled emissions inventory included the HFCAWTF sources along with all other sources contained in the FDEP NO_2 emission inventory. Only those individual receptors with significant impacts were modeled.

Table 7-10 summarizes the results of the NAAQS analysis. Even with a conservative background NO_2 level added in, all maximum annual average NO_2 impacts were well below the NAAQS.

7.4 CONCLUSION

Dispersion modeling using the ISCST3 model demonstrates that the proposed engines will result in ambient air quality impacts that are:

- Below PSD significant impact levels for CO during all averaging periods.
- Below PSD *de minimis* ambient impact levels for NO_2 and CO during all averaging periods.

The dispersion modeling analysis also demonstrates that maximum air quality impacts due to HFCAWTF sources, together with all other emission sources within 55 km, will:

- Not exceed the PSD Class II increments for NO_2.
- Not exceed the NAAQS for NO_2, including background.

In conclusion, the HFCAWTF project will not cause nor contribute to an exceedance of any PSD Class II increment or NAAQS.

Table 7-1. ISCST3 Model Results - Maximum Annual Average NO_2 Impacts; City of Tampa/TECO IC Engine Project.

Maximum Annual Impacts	1992	1993	1994	1995	1996
Unadjusted ISCST3 Impact ($\mu g/m^3$)[1]	2.49	1.81	3.06	2.76	3.64
Emission Rate Scaling Factor[2]	1.76	1.76	1.76	1.76	1.76
Tier 1 Impact ($\mu g/m^3$)[3]	4.39	3.18	5.38	4.87	6.41
Tier 2 Impact ($\mu g/m^3$)[4]	3.29 OK	2.38 OK	4.03 OK	3.65 OK	4.80 OK
PSD Significant Impact ($\mu g/m^3$)	1.0	1.0	1.0	1.0	1.0
Exceed PSD Significant Impact (Y/N)	Y	Y	Y	Y	Y
Percent of PSD Significant Impact (%)	438.9	318.0	537.9	486.6	640.6
PSD *de minimis* Ambient Impact Threshold ($\mu g/m^3$)	14.0	14.0	14.0	14.0	14.0
Exceed PSD *de minimis* Ambient Impact (Y/N)	N	N	N	N	N
Receptor UTM Easting (m)	359,047.6	359,010.5	359,079.1	359,079.1	359,079.1
Receptor UTM Northing (m)	3,089,454.5	3,089,491.5	3,089,414.5	3,089,414.5	3,089,414.5
Distance From Grid Origin (m)	471	445	495	495	495
Direction From Grid Origin (Vector °)	78	72	83	83	83

[1] Based on modeled emission rate of 1.0 g/s per engine.
[2] Ratio of maximum emission rate (g/s) per engine to modeled 1.0 g/s emission rate.
[3] Unadjusted ISCST3 impact times emission rate factor (Assumed complete conversion of NO_x to NO_2; I.e., NO_2/NO_x ratio of 1.0).
[4] Tier 1 impact times USEPA national default NO_2/NO_x ratio of 0.75.

Source: ECT, 2000.

Table 7-2. ISCST3 Model Results - Maximum 1-Hour Average CO Impacts; City of Tampa/TECO IC Engine Project.

Maximum 1-Hour Impacts	1992	1993	1994	1995	1996
Unadjusted ISCST3 Impact (μg/m³)[1]	347.23	347.14	339.38	354.17	354.90
Emission Rate[2]	1.88	1.88	1.88	1.88	1.88
Adjusted Impact (μg/m³)[3]	652.80	652.62	638.04	665.85	667.22
PSD Significant Impact (μg/m³)	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0
Exceed PSD Significant Impact (Y/N)	N	N	N	N	N
Percent of PSD Significant Impact (%)	32.6	32.6	31.9	33.3	33.4
Receptor UTM Easting (m)	359,088.8	359,088.8	359,088.8	359,088.8	359,088.8
Receptor UTM Northing (m)	3,089,361.3	3,089,361.3	3,089,361.3	3,089,361.3	3,089,361.3
Distance From Grid Origin (m)	501	501	501	501	501
Direction From Grid Origin (Vector °)	89	89	89	89	89
Date of Maximum Impact	7/21/92	2/7/93	3/9/94	6/12/95	4/23/96
Julian Date of Maximum Impact	203	38	68	163	114
Ending Hour of Maximum Impact	1700	1500	1500	2100	1800

[1] Based on modeled emission rate of 1.0 g/s per engine.
[2] Emission rate (g/s) per engine.
[3] Unadjusted ISCST3 impact times emission rate.

Source: ECT, 2000.

Table 7-3. ISCST3 Model Results - Maximum 8-Hour Average CO Impacts; City of Tampa/TECO IC Engine Project.

Maximum 8-Hour Impacts	1992	1993	1994	1995	1996
Unadjusted ISCST3 Impact ($\mu g/m^3$)[1]	153.90	140.06	135.05	161.96	125.49
Emission Rate[2]	1.88	1.88	1.88	1.88	1.88
Adjusted Impact ($\mu g/m^3$) [3]	289.34	263.32	253.90	304.48	235.93
PSD Significant Impact ($\mu g/m^3$)	500.0	500.0	500.0	500.0	500.0
Exceed PSD Significant Impact (Y/N)	N	N	N	N	N
Percent of PSD Significant Impact (%)	57.9	52.7	50.8	60.9	47.2
PSD *de minimis* Ambient Impact Threshold (μg/n	575.0	575.0	575.0	575.0	575.0
Exceed PSD *de minimis* Ambient Impact (Y/N)	N	N	N	N	N
Percent of PSD *de minimis* Ambient Impact (%)	50.3	45.8	44.2	53.0	41.0
Receptor UTM Easting (m)	359,088.8	359,087.6	359,079.1	359,047.6	359,010.5
Receptor UTM Northing (m)	359,088.8	3,089,454.5	3,089,414.5	3,089,454.5	3,089,491.5
Distance From Grid Origin (m)	2,730,266	510	495	471	445
Direction From Grid Origin (Vector °)	180	79	83	78	72
Date of Maximum Impact	5/26/92	5/13/93	10/3/94	4/24/95	3/6/96
Julian Date of Maximum Impact	147	133	276	114	66
Ending Hour of Maximum Impact	1600	1600	0800	1600	1600

[1] Based on modeled emission rate of 1.0 g/s per engine.
[2] Emission rate (g/s) per engine.
[3] Unadjusted ISCST3 impact times emission rate.

Source: ECT, 2000.

Table 7-4. Significant Impact Receptor Locations, 1992 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact ($\mu g/m^3$)	Emission Rate Factor	Tier 1 Impact ($\mu g/m^3$)	Tier 2 Impact ($\mu g/m^3$)	Distance from Origin (km)	Direction from Origin (°)
1	359047.6	3089454.5	2.49	1.76	4.38	3.29	0.47	78
2	359010.5	3089491.5	2.31	1.76	4.07	3.05	0.44	72
3	359079.1	3089414.5	2.31	1.76	4.07	3.05	0.50	83
4	359088.8	3089361.3	2.18	1.76	3.84	2.88	0.50	89
5	359087.6	3089454.5	1.53	1.76	2.69	2.02	0.51	79
6	358501.6	3088996.8	1.43	1.76	2.52	1.89	0.37	194
7	358551.9	3088996.8	1.42	1.76	2.50	1.87	0.36	186
8	358451.3	3088996.8	1.42	1.76	2.50	1.87	0.38	201
9	358401.9	3088996.8	1.38	1.76	2.43	1.82	0.40	207
10	358601.8	3088996.8	1.37	1.76	2.41	1.81	0.36	178
11	358487.6	3088954.5	1.35	1.76	2.38	1.78	0.41	194
12	358356.2	3088996.8	1.33	1.76	2.34	1.76	0.43	213
13	358387.6	3088954.5	1.33	1.76	2.34	1.76	0.45	207
14	358651.6	3088996.8	1.32	1.76	2.32	1.74	0.36	170
15	358587.6	3088954.5	1.30	1.76	2.29	1.72	0.40	180
16	358303.2	3088996.8	1.28	1.76	2.25	1.69	0.46	218
17	358701.9	3088996.8	1.27	1.76	2.24	1.68	0.38	162
18	358687.6	3088954.5	1.24	1.76	2.18	1.64	0.41	166
19	358287.6	3088954.5	1.24	1.76	2.18	1.64	0.50	217
20	358250.2	3088996.8	1.22	1.76	2.15	1.61	0.49	223
21	358753.1	3088996.8	1.18	1.76	2.08	1.56	0.39	155
22	358387.6	3088854.5	1.18	1.76	2.08	1.56	0.54	202
23	358199.9	3089048.0	1.18	1.76	2.08	1.56	0.49	232
24	358487.6	3088854.5	1.17	1.76	2.06	1.54	0.51	191
25	358198.9	3088996.8	1.16	1.76	2.04	1.53	0.53	227
26	358187.6	3089054.5	1.16	1.76	2.04	1.53	0.50	233
27	358587.6	3088854.5	1.16	1.76	2.04	1.53	0.50	180
28	358199.9	3089100.3	1.16	1.76	2.04	1.53	0.46	237
29	358287.6	3088854.5	1.15	1.76	2.02	1.52	0.58	211
30	359081.9	3089261.8	1.15	1.76	2.02	1.52	0.50	101
31	358187.6	3088954.5	1.14	1.76	2.01	1.50	0.57	225
32	358199.9	3089153.3	1.10	1.76	1.94	1.45	0.44	243
33	358187.6	3088854.5	1.09	1.76	1.92	1.44	0.64	219
34	359387.6	3088954.5	1.09	1.76	1.92	1.44	0.89	117
35	358187.6	3089154.5	1.08	1.76	1.90	1.43	0.45	243
36	358199.9	3089257.3	1.07	1.76	1.88	1.41	0.40	256
37	358687.6	3088854.5	1.06	1.76	1.87	1.40	0.51	169
38	358187.6	3089254.5	1.06	1.76	1.87	1.40	0.41	256
39	358199.9	3089205.8	1.06	1.76	1.87	1.40	0.42	249
40	359540.2	3088804.5	1.06	1.76	1.87	1.40	1.10	120
41	358087.6	3089054.5	1.05	1.76	1.85	1.39	0.58	239
42	358087.6	3088954.5	1.04	1.76	1.83	1.37	0.64	231
43	359493.9	3088931.8	1.04	1.76	1.83	1.37	1.00	115
44	358487.6	3088754.5	1.04	1.76	1.83	1.37	0.61	189
45	358805.2	3089004.8	1.04	1.76	1.83	1.37	0.41	148
46	359387.6	3088854.5	1.04	1.76	1.83	1.37	0.94	122
47	359487.6	3088954.5	1.04	1.76	1.83	1.37	0.98	114
48	358387.6	3088754.5	1.04	1.76	1.83	1.37	0.63	198
49	358287.6	3088754.5	1.02	1.76	1.80	1.35	0.67	207
50	358787.6	3088954.5	1.02	1.76	1.80	1.35	0.45	153
51	358199.9	3089309.8	1.02	1.76	1.80	1.35	0.39	263
52	358587.6	3088754.5	1.01	1.76	1.78	1.33	0.60	180
53	358087.6	3088854.5	1.01	1.76	1.78	1.33	0.71	225
54	358187.6	3088754.5	0.99	1.76	1.74	1.31	0.72	214
55	358087.6	3089254.5	0.99	1.76	1.74	1.31	0.51	259
56	359387.6	3089054.5	0.99	1.76	1.74	1.31	0.85	111

Table 7-4. Significant Impact Receptor Locations, 1992 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact (µg/m³)	Emission Rate Factor	Tier 1 Impact (µg/m³)	Tier 2 Impact (µg/m³)	Distance from Origin (km)	Direction from Origin (°)
57	358087.6	3089154.5	0.98	1.76	1.72	1.29	0.54	248
58	359487.6	3089054.5	0.97	1.76	1.71	1.28	0.95	108
59	359621.2	3088978.3	0.96	1.76	1.69	1.27	1.10	110
60	359087.6	3089554.5	0.96	1.76	1.69	1.27	0.54	68
61	359570.6	3088666.0	0.96	1.76	1.69	1.27	1.20	125
62	357987.6	3088954.5	0.95	1.76	1.67	1.25	0.72	236
63	358087.6	3088754.5	0.95	1.76	1.67	1.25	0.78	220
64	357987.6	3089054.5	0.95	1.76	1.67	1.25	0.67	243
65	359675.1	3088847.3	0.94	1.76	1.65	1.24	1.20	115
66	359406.7	3088780.8	0.94	1.76	1.65	1.24	1.00	125
67	359287.6	3088954.5	0.93	1.76	1.64	1.23	0.81	120
68	357987.6	3089254.5	0.92	1.76	1.62	1.21	0.61	261
69	357987.6	3088854.5	0.92	1.76	1.62	1.21	0.78	230
70	358487.6	3088654.5	0.92	1.76	1.62	1.21	0.71	188
71	359287.6	3089054.5	0.92	1.76	1.62	1.21	0.76	113
72	358387.6	3088654.5	0.92	1.76	1.62	1.21	0.73	196
73	358687.6	3088754.5	0.91	1.76	1.60	1.20	0.61	171
74	358287.6	3088654.5	0.91	1.76	1.60	1.20	0.76	203
75	359713.4	3088704.5	0.90	1.76	1.58	1.19	1.30	120
76	358187.6	3089354.5	0.90	1.76	1.58	1.19	0.40	270
77	357987.6	3088754.5	0.89	1.76	1.57	1.17	0.85	225
78	357987.6	3089154.5	0.89	1.76	1.57	1.17	0.63	252
79	358187.6	3088654.5	0.89	1.76	1.57	1.17	0.81	210
80	358199.9	3089360.0	0.88	1.76	1.55	1.16	0.39	271
81	357887.6	3088954.5	0.88	1.76	1.55	1.16	0.81	240
82	359734.4	3088551.5	0.86	1.76	1.51	1.14	1.40	125
83	358087.6	3089354.5	0.86	1.76	1.51	1.14	0.50	270
84	358087.6	3088654.5	0.86	1.76	1.51	1.14	0.86	216
85	358587.6	3088654.5	0.86	1.76	1.51	1.14	0.70	180
86	357887.6	3089254.5	0.86	1.76	1.51	1.14	0.71	262
87	359079.1	3089207.5	0.86	1.76	1.51	1.14	0.51	107
88	357887.6	3088854.5	0.85	1.76	1.50	1.12	0.86	234
89	357887.6	3089054.5	0.85	1.76	1.50	1.12	0.76	247
90	359809.2	3088909.8	0.85	1.76	1.50	1.12	1.30	110
91	357987.6	3088654.5	0.83	1.76	1.46	1.10	0.92	221
92	358787.6	3088854.5	0.83	1.76	1.46	1.10	0.54	158
93	358387.6	3088554.5	0.83	1.76	1.46	1.10	0.82	194
94	357887.6	3088754.5	0.83	1.76	1.46	1.10	0.92	229
95	359087.6	3089754.5	0.83	1.76	1.46	1.10	0.64	51
96	359856.4	3088762.8	0.82	1.76	1.44	1.08	1.40	115
97	357987.6	3089354.5	0.82	1.76	1.44	1.08	0.60	270
98	357887.6	3089154.5	0.82	1.76	1.44	1.08	0.73	254
99	358287.6	3088554.5	0.81	1.76	1.43	1.07	0.85	201
100	357787.6	3088954.5	0.80	1.76	1.41	1.06	0.89	243

Radius of Impact = 1.50 km

Note: Total of 118 significant receptors, the first 100 ranked impact receptors are shown.
Radius of Impact based on Tier II Impact.

Source: ECT, 2000.

Table 7-5. Significant Impact Receptor Locations, 1993 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
1	359010.5	3089491.5	1.81	1.76	3.19	2.39	0.44	72
2	359088.8	3089361.3	1.68	1.76	2.96	2.22	0.50	89
3	359047.6	3089454.5	1.54	1.76	2.71	2.03	0.47	78
4	359079.1	3089414.5	1.36	1.76	2.39	1.80	0.50	83
5	359387.6	3088854.5	1.18	1.76	2.08	1.56	0.94	122
6	359406.7	3088780.8	1.17	1.76	2.06	1.54	1.00	125
7	359079.1	3089207.5	1.14	1.76	2.01	1.50	0.51	107
8	358753.1	3088996.8	1.12	1.76	1.97	1.48	0.39	155
9	358687.6	3088954.5	1.10	1.76	1.94	1.45	0.41	166
10	359287.6	3088954.5	1.10	1.76	1.94	1.45	0.81	120
11	358701.9	3088996.8	1.09	1.76	1.92	1.44	0.38	162
12	359570.6	3088666.0	1.08	1.76	1.90	1.43	1.20	125
13	358805.2	3089004.8	1.05	1.76	1.85	1.39	0.41	148
14	358687.6	3088854.5	1.05	1.76	1.85	1.39	0.51	169
15	358787.6	3088954.5	1.03	1.76	1.81	1.36	0.45	153
16	358199.9	3089309.8	1.03	1.76	1.81	1.36	0.39	263
17	359087.6	3089454.5	1.02	1.76	1.80	1.35	0.51	79
18	358199.9	3089257.3	1.02	1.76	1.80	1.35	0.40	256
19	358187.6	3089254.5	1.01	1.76	1.78	1.33	0.41	256
20	359583.4	3088518.8	1.01	1.76	1.78	1.33	1.30	130
21	358587.6	3088854.5	1.01	1.76	1.78	1.33	0.50	180
22	358199.9	3089153.3	1.01	1.76	1.78	1.33	0.44	243
23	358199.9	3089205.8	1.00	1.76	1.76	1.32	0.42	249
24	358187.6	3089154.5	1.00	1.76	1.76	1.32	0.45	243
25	358187.6	3089354.5	0.99	1.76	1.74	1.31	0.40	270
26	358651.6	3088996.8	0.99	1.76	1.74	1.31	0.36	170
27	358199.9	3089360.0	0.99	1.76	1.74	1.31	0.39	271
28	359430.2	3088647.3	0.97	1.76	1.71	1.28	1.10	130
29	359387.6	3088954.5	0.96	1.76	1.69	1.27	0.89	117
30	359540.2	3088804.5	0.96	1.76	1.69	1.27	1.10	120
31	358199.9	3089100.3	0.96	1.76	1.69	1.27	0.46	237
32	358087.6	3089354.5	0.96	1.76	1.69	1.27	0.50	270
33	358087.6	3089254.5	0.96	1.76	1.69	1.27	0.51	259
34	358587.6	3088754.5	0.95	1.76	1.67	1.25	0.60	180
35	358199.9	3089411.5	0.92	1.76	1.62	1.21	0.39	278
36	358587.6	3088954.5	0.92	1.76	1.62	1.21	0.40	180
37	358087.6	3089154.5	0.92	1.76	1.62	1.21	0.54	248
38	358687.6	3088754.5	0.92	1.76	1.62	1.21	0.61	171
39	357987.6	3089354.5	0.91	1.76	1.60	1.20	0.60	270
40	359287.6	3088854.5	0.91	1.76	1.60	1.20	0.86	126
41	359736.6	3088390.3	0.91	1.76	1.60	1.20	1.50	130
42	357987.6	3089254.5	0.90	1.76	1.58	1.19	0.61	261
43	358601.8	3088996.8	0.89	1.76	1.57	1.17	0.36	178
44	358487.6	3088754.5	0.89	1.76	1.57	1.17	0.61	189
45	358187.6	3089454.5	0.89	1.76	1.57	1.17	0.41	284
46	358199.9	3089464.3	0.88	1.76	1.55	1.16	0.40	286
47	359734.4	3088551.5	0.88	1.76	1.55	1.16	1.40	125
48	358187.6	3089054.5	0.87	1.76	1.53	1.15	0.50	233
49	358087.6	3089454.5	0.87	1.76	1.53	1.15	0.51	281
50	358199.9	3089048.0	0.86	1.76	1.51	1.14	0.49	232
51	359493.9	3088931.8	0.86	1.76	1.51	1.14	1.00	115
52	358587.6	3088654.5	0.86	1.76	1.51	1.14	0.70	180

Table 7-5. Significant Impact Receptor Locations, 1993 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact ($\mu g/m^3$)	Emission Rate Factor	Tier 1 Impact ($\mu g/m^3$)	Tier 2 Impact ($\mu g/m^3$)	Distance from Origin (km)	Direction from Origin (°)
53	357887.6	3089354.5	0.85	1.76	1.50	1.12	0.70	270
54	357987.6	3089154.5	0.85	1.76	1.50	1.12	0.63	252
55	358087.6	3089054.5	0.85	1.76	1.50	1.12	0.58	239
56	358551.9	3088996.8	0.85	1.76	1.50	1.12	0.36	186
57	358487.6	3088854.5	0.84	1.76	1.48	1.11	0.51	191
58	358487.6	3088654.5	0.84	1.76	1.48	1.11	0.71	188
59	357887.6	3089254.5	0.84	1.76	1.48	1.11	0.71	262
60	359487.6	3088954.5	0.84	1.76	1.48	1.11	0.98	114
61	358199.9	3089515.5	0.84	1.76	1.48	1.11	0.42	293
62	357987.6	3089454.5	0.83	1.76	1.46	1.10	0.61	279
63	358501.6	3088996.8	0.83	1.76	1.46	1.10	0.37	194
64	358231.9	3089517.3	0.83	1.76	1.46	1.10	0.39	295
65	358451.3	3088996.8	0.82	1.76	1.44	1.08	0.38	201
66	358401.9	3088996.8	0.81	1.76	1.43	1.07	0.40	207
67	358787.6	3088854.5	0.81	1.76	1.43	1.07	0.54	158
68	357987.6	3089054.5	0.81	1.76	1.43	1.07	0.67	243
69	358356.2	3088996.8	0.81	1.76	1.43	1.07	0.43	213
70	358487.6	3088954.5	0.80	1.76	1.41	1.06	0.41	194
71	358303.2	3088996.8	0.80	1.76	1.41	1.06	0.46	218
72	357787.6	3089354.5	0.80	1.76	1.41	1.06	0.80	270
73	359287.6	3089054.5	0.80	1.76	1.41	1.06	0.76	113
74	359713.4	3088704.5	0.80	1.76	1.41	1.06	1.30	120
75	358250.2	3088996.8	0.79	1.76	1.39	1.04	0.49	223
76	357887.6	3089454.5	0.79	1.76	1.39	1.04	0.71	278
77	359889.8	3088261.8	0.79	1.76	1.39	1.04	1.70	130
78	358087.6	3089554.5	0.79	1.76	1.39	1.04	0.54	292
79	357887.6	3089154.5	0.79	1.76	1.39	1.04	0.73	254
80	358198.9	3088996.8	0.78	1.76	1.37	1.03	0.53	227
81	357787.6	3089254.5	0.78	1.76	1.37	1.03	0.81	263
82	358387.6	3088654.5	0.78	1.76	1.37	1.03	0.73	196
83	359577.5	3088364.5	0.78	1.76	1.37	1.03	1.40	135
84	357987.6	3089554.5	0.77	1.76	1.36	1.02	0.63	288
85	358187.6	3089554.5	0.77	1.76	1.36	1.02	0.45	297
86	358387.6	3088954.5	0.77	1.76	1.36	1.02	0.45	207
87	358487.6	3088554.5	0.77	1.76	1.36	1.02	0.81	187
88	357887.6	3089054.5	0.76	1.76	1.34	1.00	0.76	247
89	359187.6	3089054.5	0.76	1.76	1.34	1.00	0.67	117
90	359675.1	3088847.3	0.76	1.76	1.34	1.00	1.20	115
91	359718.9	3088223.0	0.76	1.76	1.34	1.00	1.60	135
					Radius of Impact =		**1.70**	**km**

Note: Radius of Impact based on Tier II Impact.

Source: ECT, 1999.

Table 7-6. Significant Impact Receptor Locations, 1994 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
1	359079.1	3089414.5	3.06	1.76	5.39	4.04	0.50	83
2	359010.5	3089491.5	2.54	1.76	4.47	3.35	0.44	72
3	359047.6	3089454.5	2.36	1.76	4.15	3.12	0.47	78
4	359087.6	3089454.5	2.27	1.76	4.00	3.00	0.51	79
5	359088.8	3089361.3	1.92	1.76	3.38	2.53	0.50	89
6	358601.8	3088996.8	1.43	1.76	2.52	1.89	0.36	178
7	358551.9	3088996.8	1.41	1.76	2.48	1.86	0.36	186
8	358651.6	3088996.8	1.41	1.76	2.48	1.86	0.36	170
9	358701.9	3088996.8	1.40	1.76	2.46	1.85	0.38	162
10	358501.6	3088996.8	1.39	1.76	2.45	1.83	0.37	194
11	358451.3	3088996.8	1.36	1.76	2.39	1.80	0.38	201
12	358587.6	3088954.5	1.35	1.76	2.38	1.78	0.40	180
13	358487.6	3088954.5	1.33	1.76	2.34	1.76	0.41	194
14	358687.6	3088954.5	1.33	1.76	2.34	1.76	0.41	166
15	358401.9	3088996.8	1.31	1.76	2.31	1.73	0.40	207
16	358387.6	3088954.5	1.27	1.76	2.24	1.68	0.45	207
17	358356.2	3088996.8	1.26	1.76	2.22	1.66	0.43	213
18	358587.6	3088854.5	1.22	1.76	2.15	1.61	0.50	180
19	358303.2	3088996.8	1.20	1.76	2.11	1.58	0.46	218
20	358753.1	3088996.8	1.19	1.76	2.09	1.57	0.39	155
21	358487.6	3088854.5	1.18	1.76	2.08	1.56	0.51	191
22	358287.6	3088954.5	1.18	1.76	2.08	1.56	0.50	217
23	358199.9	3089360.0	1.16	1.76	2.04	1.53	0.39	271
24	358187.6	3089354.5	1.16	1.76	2.04	1.53	0.40	270
25	358387.6	3088854.5	1.15	1.76	2.02	1.52	0.54	202
26	358199.9	3089309.8	1.14	1.76	2.01	1.50	0.39	263
27	358250.2	3088996.8	1.14	1.76	2.01	1.50	0.49	223
28	358199.9	3089411.5	1.13	1.76	1.99	1.49	0.39	278
29	358087.6	3089354.5	1.11	1.76	1.95	1.47	0.50	270
30	358287.6	3088854.5	1.11	1.76	1.95	1.47	0.58	211
31	358198.9	3088996.8	1.08	1.76	1.90	1.43	0.53	227
32	358199.9	3089048.0	1.08	1.76	1.90	1.43	0.49	232
33	358187.6	3088954.5	1.07	1.76	1.88	1.41	0.57	225
34	358187.6	3089454.5	1.07	1.76	1.88	1.41	0.41	284
35	358487.6	3088754.5	1.06	1.76	1.87	1.40	0.61	189
36	358187.6	3089054.5	1.06	1.76	1.87	1.40	0.50	233
37	358199.9	3089100.3	1.06	1.76	1.87	1.40	0.46	237
38	357987.6	3089354.5	1.05	1.76	1.85	1.39	0.60	270
39	358199.9	3089257.3	1.05	1.76	1.85	1.39	0.40	256
40	358187.6	3088854.5	1.05	1.76	1.85	1.39	0.64	219
41	358199.9	3089464.3	1.05	1.76	1.85	1.39	0.40	286
42	358087.6	3089454.5	1.05	1.76	1.85	1.39	0.51	281
43	358187.6	3089254.5	1.05	1.76	1.85	1.39	0.41	256
44	358199.9	3089153.3	1.03	1.76	1.81	1.36	0.44	243
45	358387.6	3088754.5	1.02	1.76	1.80	1.35	0.63	198
46	358187.6	3089154.5	1.02	1.76	1.80	1.35	0.45	243
47	357987.6	3089454.5	1.01	1.76	1.78	1.33	0.61	279
48	358199.9	3089205.8	1.01	1.76	1.78	1.33	0.42	249
49	358087.6	3089254.5	1.00	1.76	1.76	1.32	0.51	259
50	358287.6	3088754.5	0.99	1.76	1.74	1.31	0.67	207
51	357887.6	3089354.5	0.99	1.76	1.74	1.31	0.70	270
52	358587.6	3088754.5	0.99	1.76	1.74	1.31	0.60	180
53	358199.9	3089515.5	0.98	1.76	1.72	1.29	0.42	293

Table 7-6. Significant Impact Receptor Locations, 1994 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact ($\mu g/m^3$)	Emission Rate Factor	Tier 1 Impact ($\mu g/m^3$)	Tier 2 Impact ($\mu g/m^3$)	Distance from Origin (km)	Direction from Origin (°)
54	358231.9	3089517.3	0.98	1.76	1.72	1.29	0.39	295
55	358087.6	3088954.5	0.97	1.76	1.71	1.28	0.64	231
56	358687.6	3088854.5	0.97	1.76	1.71	1.28	0.51	169
57	358087.6	3089054.5	0.96	1.76	1.69	1.27	0.58	239
58	358087.6	3088854.5	0.96	1.76	1.69	1.27	0.71	225
59	357887.6	3089454.5	0.96	1.76	1.69	1.27	0.71	278
60	358187.6	3088754.5	0.96	1.76	1.69	1.27	0.72	214
61	357987.6	3089254.5	0.96	1.76	1.69	1.27	0.61	261
62	358187.6	3089554.5	0.94	1.76	1.65	1.24	0.45	297
63	359087.6	3089554.5	0.94	1.76	1.65	1.24	0.54	68
64	358087.6	3089554.5	0.93	1.76	1.64	1.23	0.54	292
65	358087.6	3089154.5	0.93	1.76	1.64	1.23	0.54	248
66	358231.9	3089564.8	0.93	1.76	1.64	1.23	0.41	301
67	358387.6	3088654.5	0.92	1.76	1.62	1.21	0.73	196
68	357787.6	3089354.5	0.92	1.76	1.62	1.21	0.80	270
69	358487.6	3088654.5	0.92	1.76	1.62	1.21	0.71	188
70	358087.6	3088754.5	0.92	1.76	1.62	1.21	0.78	220
71	359087.6	3089754.5	0.91	1.76	1.60	1.20	0.64	51
72	357787.6	3089454.5	0.91	1.76	1.60	1.20	0.81	277
73	357987.6	3089554.5	0.91	1.76	1.60	1.20	0.63	288
74	357887.6	3089254.5	0.90	1.76	1.58	1.19	0.71	262
75	358287.6	3088654.5	0.89	1.76	1.57	1.17	0.76	203
76	357987.6	3088954.5	0.88	1.76	1.55	1.16	0.72	236
77	357987.6	3089054.5	0.88	1.76	1.55	1.16	0.67	243
78	357987.6	3088854.5	0.87	1.76	1.53	1.15	0.78	230
79	357887.6	3089554.5	0.87	1.76	1.53	1.15	0.73	286
80	357987.6	3088754.5	0.87	1.76	1.53	1.15	0.85	225
81	357687.6	3089354.5	0.86	1.76	1.51	1.14	0.90	270
82	359087.6	3089854.5	0.86	1.76	1.51	1.14	0.71	45
83	358187.6	3088654.5	0.86	1.76	1.51	1.14	0.81	210
84	357987.6	3089154.5	0.86	1.76	1.51	1.14	0.63	252
85	357687.6	3089454.5	0.86	1.76	1.51	1.14	0.91	276
86	358805.2	3089004.8	0.86	1.76	1.51	1.14	0.41	148
87	358231.9	3089616.8	0.86	1.76	1.51	1.14	0.44	306
88	359187.6	3089554.5	0.85	1.76	1.50	1.12	0.63	72
89	358087.6	3089654.5	0.85	1.76	1.50	1.12	0.58	301
90	357787.6	3089254.5	0.85	1.76	1.50	1.12	0.81	263
91	357987.6	3089654.5	0.84	1.76	1.48	1.11	0.67	297
92	358787.6	3088954.5	0.84	1.76	1.48	1.11	0.45	153
93	357787.6	3089554.5	0.83	1.76	1.46	1.10	0.82	284
94	358087.6	3088654.5	0.83	1.76	1.46	1.10	0.86	216
95	358387.6	3088554.5	0.83	1.76	1.46	1.10	0.82	194
96	358187.6	3089654.5	0.82	1.76	1.44	1.08	0.50	307
97	357591.4	3089441.5	0.82	1.76	1.44	1.08	1.00	275
98	359087.6	3089654.5	0.82	1.76	1.44	1.08	0.58	59
99	357887.6	3089654.5	0.81	1.76	1.43	1.07	0.76	293
100	358287.6	3088554.5	0.81	1.76	1.43	1.07	0.85	201
101	357987.6	3088654.5	0.80	1.76	1.41	1.06	0.92	221
102	357887.6	3088954.5	0.80	1.76	1.41	1.06	0.81	240
103	357887.6	3089054.5	0.80	1.76	1.41	1.06	0.76	247
104	359387.6	3088854.5	0.80	1.76	1.41	1.06	0.94	122
105	357887.6	3089154.5	0.80	1.76	1.41	1.06	0.73	254
106	357687.6	3089254.5	0.80	1.76	1.41	1.06	0.91	264

Table 7-6. Significant Impact Receptor Locations, 1994 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
107	357887.6	3088754.5	0.80	1.76	1.41	1.06	0.92	229
108	357687.6	3089554.5	0.80	1.76	1.41	1.06	0.92	283
109	357887.6	3088854.5	0.80	1.76	1.41	1.06	0.86	234
110	359287.6	3089654.5	0.79	1.76	1.39	1.04	0.76	67
111	359406.7	3088780.8	0.78	1.76	1.37	1.03	1.00	125
112	358231.9	3089667.5	0.78	1.76	1.37	1.03	0.47	311
113	358687.6	3088754.5	0.78	1.76	1.37	1.03	0.61	171
114	357787.6	3089654.5	0.78	1.76	1.37	1.03	0.85	291
115	358187.6	3088554.5	0.77	1.76	1.36	1.02	0.89	207
116	358587.6	3088654.5	0.77	1.76	1.36	1.02	0.70	180
117	357880.5	3088647.3	0.77	1.76	1.36	1.02	1.00	225
118	359087.6	3089954.5	0.77	1.76	1.36	1.02	0.78	40
119	357591.4	3089267.3	0.76	1.76	1.34	1.00	1.00	265
120	357487.6	3089354.5	0.76	1.76	1.34	1.00	1.10	270

Tier I Radius of Impact = 1.10 km

Radius of Impact = 1.10 km

Note: Total of 120 significant receptors, the first 100 ranked impact receptors are shown.
Radius of Impact based on Tier II Impact.

Source: ECT, 2000.

Table 7-7. Significant Impact Receptor Locations, 1995 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact (μg/m^3)	Emission Rate Factor	Tier 1 Impact (μg/m^3)	Tier 2 Impact (μg/m^3)	Distance from Origin (km)	Direction from Origin (°)
1	359079.1	3089414.5	2.76	1.76	4.86	3.64	0.50	83
2	359047.6	3089454.5	2.36	1.76	4.15	3.12	0.47	78
3	359088.8	3089361.3	2.36	1.76	4.15	3.12	0.50	89
4	359087.6	3089454.5	2.09	1.76	3.68	2.76	0.51	79
5	359010.5	3089491.5	1.57	1.76	2.76	2.07	0.44	72
6	358451.3	3088996.8	1.48	1.76	2.60	1.95	0.38	201
7	358501.6	3088996.8	1.46	1.76	2.57	1.93	0.37	194
8	358401.9	3088996.8	1.45	1.76	2.55	1.91	0.40	207
9	358387.6	3088954.5	1.41	1.76	2.48	1.86	0.45	207
10	358356.2	3088996.8	1.40	1.76	2.46	1.85	0.43	213
11	358551.9	3088996.8	1.39	1.76	2.45	1.83	0.36	186
12	358303.2	3088996.8	1.35	1.76	2.38	1.78	0.46	218
13	358487.6	3088954.5	1.35	1.76	2.38	1.78	0.41	194
14	358287.6	3088954.5	1.33	1.76	2.34	1.76	0.50	217
15	358601.8	3088996.8	1.30	1.76	2.29	1.72	0.36	178
16	358250.2	3088996.8	1.30	1.76	2.29	1.72	0.49	223
17	358199.9	3089048.0	1.25	1.76	2.20	1.65	0.49	232
18	358198.9	3088996.8	1.25	1.76	2.20	1.65	0.53	227
19	358587.6	3088954.5	1.25	1.76	2.20	1.65	0.40	180
20	358651.6	3088996.8	1.25	1.76	2.20	1.65	0.36	170
21	358187.6	3089054.5	1.24	1.76	2.18	1.64	0.50	233
22	358287.6	3088854.5	1.23	1.76	2.16	1.62	0.58	211
23	358187.6	3088954.5	1.23	1.76	2.16	1.62	0.57	225
24	358199.9	3089100.3	1.21	1.76	2.13	1.60	0.46	237
25	358701.9	3088996.8	1.20	1.76	2.11	1.58	0.38	162
26	358187.6	3088854.5	1.19	1.76	2.09	1.57	0.64	219
27	358687.6	3088954.5	1.18	1.76	2.08	1.56	0.41	166
28	358387.6	3088854.5	1.18	1.76	2.08	1.56	0.54	202
29	358487.6	3088854.5	1.16	1.76	2.04	1.53	0.51	191
30	358587.6	3088854.5	1.15	1.76	2.02	1.52	0.50	180
31	358087.6	3088954.5	1.13	1.76	1.99	1.49	0.64	231
32	359187.6	3089454.5	1.12	1.76	1.97	1.48	0.61	81
33	358087.6	3088854.5	1.11	1.76	1.95	1.47	0.71	225
34	358087.6	3089054.5	1.11	1.76	1.95	1.47	0.58	239
35	358199.9	3089153.3	1.11	1.76	1.95	1.47	0.44	243
36	358187.6	3089154.5	1.09	1.76	1.92	1.44	0.45	243
37	358753.1	3088996.8	1.07	1.76	1.88	1.41	0.39	155
38	358487.6	3088754.5	1.06	1.76	1.87	1.40	0.61	189
39	358187.6	3088754.5	1.05	1.76	1.85	1.39	0.72	214
40	358087.6	3088754.5	1.05	1.76	1.85	1.39	0.78	220
41	358387.6	3088754.5	1.04	1.76	1.83	1.37	0.63	198
42	357987.6	3088954.5	1.03	1.76	1.81	1.36	0.72	236
43	358287.6	3088754.5	1.03	1.76	1.81	1.36	0.67	207
44	357987.6	3088854.5	1.02	1.76	1.80	1.35	0.78	230
45	358687.6	3088854.5	1.02	1.76	1.80	1.35	0.51	169
46	357987.6	3088754.5	1.00	1.76	1.76	1.32	0.85	225
47	358587.6	3088754.5	0.99	1.76	1.74	1.31	0.60	180
48	358199.9	3089205.8	0.99	1.76	1.74	1.31	0.42	249
49	357987.6	3089054.5	0.99	1.76	1.74	1.31	0.67	243
50	358087.6	3089154.5	0.97	1.76	1.71	1.28	0.54	248
51	358387.6	3088654.5	0.96	1.76	1.69	1.27	0.73	196
52	357887.6	3088854.5	0.94	1.76	1.65	1.24	0.86	234
53	357887.6	3088954.5	0.94	1.76	1.65	1.24	0.81	240
54	359087.6	3089554.5	0.94	1.76	1.65	1.24	0.54	68
55	358287.6	3088654.5	0.93	1.76	1.64	1.23	0.76	203
56	358787.6	3088954.5	0.93	1.76	1.64	1.23	0.45	153
57	358687.6	3088754.5	0.93	1.76	1.64	1.23	0.61	171

Table 7-7. Significant Impact Receptor Locations, 1995 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
58	358487.6	3088654.5	0.93	1.76	1.64	1.23	0.71	188
59	357887.6	3088754.5	0.93	1.76	1.64	1.23	0.92	229
60	357987.6	3088654.5	0.92	1.76	1.62	1.21	0.92	221
61	358787.6	3088854.5	0.92	1.76	1.62	1.21	0.54	158
62	358199.9	3089257.3	0.91	1.76	1.60	1.20	0.40	256
63	358187.6	3089254.5	0.91	1.76	1.60	1.20	0.41	256
64	358087.6	3088654.5	0.91	1.76	1.60	1.20	0.86	216
65	358187.6	3088654.5	0.90	1.76	1.58	1.19	0.81	210
66	358805.2	3089004.8	0.90	1.76	1.58	1.19	0.41	148
67	357880.5	3088647.3	0.89	1.76	1.57	1.17	1.00	225
68	358787.6	3088754.5	0.89	1.76	1.57	1.17	0.63	162
69	358587.6	3088654.5	0.88	1.76	1.55	1.16	0.70	180
70	357887.6	3089054.5	0.88	1.76	1.55	1.16	0.76	247
71	357787.6	3088854.5	0.86	1.76	1.51	1.14	0.94	238
72	357987.6	3089154.5	0.86	1.76	1.51	1.14	0.63	252
73	358687.6	3088654.5	0.86	1.76	1.51	1.14	0.71	172
74	358287.6	3088554.5	0.86	1.76	1.51	1.14	0.85	201
75	358199.9	3089309.8	0.86	1.76	1.51	1.14	0.39	263
76	357787.6	3088954.5	0.85	1.76	1.50	1.12	0.89	243
77	358387.6	3088554.5	0.85	1.76	1.50	1.12	0.82	194
78	357768.4	3088780.8	0.85	1.76	1.50	1.12	1.00	235
79	358087.6	3089254.5	0.84	1.76	1.48	1.11	0.51	259
80	359406.7	3088780.8	0.84	1.76	1.48	1.11	1.00	125
81	358187.6	3088554.5	0.83	1.76	1.46	1.10	0.89	207
82	359387.6	3088854.5	0.82	1.76	1.44	1.08	0.94	122
83	357744.9	3088647.3	0.82	1.76	1.44	1.08	1.10	230
84	358487.6	3088554.5	0.81	1.76	1.43	1.07	0.81	187
85	358587.6	3088554.5	0.81	1.76	1.43	1.07	0.80	180
86	358787.6	3088654.5	0.81	1.76	1.43	1.07	0.73	164
87	358687.6	3088554.5	0.80	1.76	1.41	1.06	0.81	173
88	358856.4	3089004.8	0.80	1.76	1.41	1.06	0.44	142
89	358087.6	3088554.5	0.80	1.76	1.41	1.06	0.94	212
90	358187.6	3089354.5	0.80	1.76	1.41	1.06	0.40	270
91	358199.9	3089360.0	0.79	1.76	1.39	1.04	0.39	271
92	357787.6	3089054.5	0.79	1.76	1.39	1.04	0.85	249
93	359287.6	3088854.5	0.78	1.76	1.37	1.03	0.86	126
94	359430.2	3088647.3	0.78	1.76	1.37	1.03	1.10	130
95	357681.3	3088931.8	0.78	1.76	1.37	1.03	1.00	245
96	357987.6	3089254.5	0.77	1.76	1.36	1.02	0.61	261
97	357887.6	3089154.5	0.77	1.76	1.36	1.02	0.73	254
98	357687.6	3088954.5	0.77	1.76	1.36	1.02	0.98	246
99	358014.0	3088535.3	0.77	1.76	1.36	1.02	1.00	215
100	358187.6	3088454.5	0.77	1.76	1.36	1.02	0.98	204
101	358287.6	3088454.5	0.77	1.76	1.36	1.02	0.95	198
102	359287.6	3088954.5	0.76	1.76	1.34	1.00	0.81	120
103	357634.9	3088804.5	0.76	1.76	1.34	1.00	1.10	240
104	358087.6	3089354.5	0.76	1.76	1.34	1.00	0.50	270
105	358164.9	3088448.0	0.76	1.76	1.34	1.00	1.00	205
106	359387.6	3089554.5	0.76	1.76	1.34	1.00	0.82	76
107	357880.5	3088511.8	0.76	1.76	1.34	1.00	1.10	220
						Radius of Impact =	**1.10**	**km**

Note: Total of 107 significant receptors, the first 100 ranked impact receptors are shown.
Radius of Impact based on Tier II Impact.

Source: ECT, 2000.

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Table 7-8. Significant Impact Receptor Locations, 1996 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
1	359079.1	3089414.5	3.64	1.76	6.41	4.80	0.50	83
2	359047.6	3089454.5	2.56	1.76	4.51	3.38	0.47	78
3	359010.5	3089491.5	2.52	1.76	4.44	3.33	0.44	72
4	359087.6	3089454.5	2.28	1.76	4.01	3.01	0.51	79
5	359088.8	3089361.3	2.18	1.76	3.84	2.88	0.50	89
6	358250.2	3088996.8	1.41	1.76	2.48	1.86	0.49	223
7	358199.9	3089048.0	1.41	1.76	2.48	1.86	0.49	232
8	358303.2	3088996.8	1.40	1.76	2.46	1.85	0.46	218
9	358198.9	3088996.8	1.39	1.76	2.45	1.83	0.53	227
10	358187.6	3089054.5	1.38	1.76	2.43	1.82	0.50	233
11	358356.2	3088996.8	1.36	1.76	2.39	1.80	0.43	213
12	358401.9	3088996.8	1.31	1.76	2.31	1.73	0.40	207
13	358199.9	3089100.3	1.30	1.76	2.29	1.72	0.46	237
14	358551.9	3088996.8	1.29	1.76	2.27	1.70	0.36	186
15	358451.3	3088996.8	1.29	1.76	2.27	1.70	0.38	201
16	358601.8	3088996.8	1.28	1.76	2.25	1.69	0.36	178
17	358501.6	3088996.8	1.28	1.76	2.25	1.69	0.37	194
18	358187.6	3088954.5	1.28	1.76	2.25	1.69	0.57	225
19	358651.6	3088996.8	1.26	1.76	2.22	1.66	0.36	170
20	358701.9	3088996.8	1.25	1.76	2.20	1.65	0.38	162
21	358087.6	3088954.5	1.24	1.76	2.18	1.64	0.64	231
22	358287.6	3088954.5	1.24	1.76	2.18	1.64	0.50	217
23	358587.6	3088954.5	1.23	1.76	2.16	1.62	0.40	180
24	358753.1	3088996.8	1.22	1.76	2.15	1.61	0.39	155
25	358687.6	3088954.5	1.22	1.76	2.15	1.61	0.41	166
26	358487.6	3088954.5	1.22	1.76	2.15	1.61	0.41	194
27	358387.6	3088954.5	1.20	1.76	2.11	1.58	0.45	207
28	358087.6	3089054.5	1.19	1.76	2.09	1.57	0.58	239
29	357987.6	3088954.5	1.14	1.76	2.01	1.50	0.72	236
30	358199.9	3089153.3	1.13	1.76	1.99	1.49	0.44	243
31	358587.6	3088854.5	1.12	1.76	1.97	1.48	0.50	180
32	358187.6	3089154.5	1.11	1.76	1.95	1.47	0.45	243
33	358805.2	3089004.8	1.11	1.76	1.95	1.47	0.41	148
34	358487.6	3088854.5	1.09	1.76	1.92	1.44	0.51	191
35	358687.6	3088854.5	1.09	1.76	1.92	1.44	0.51	169
36	358787.6	3088954.5	1.09	1.76	1.92	1.44	0.45	153
37	358387.6	3088854.5	1.06	1.76	1.87	1.40	0.54	202
38	359087.6	3089554.5	1.05	1.76	1.85	1.39	0.54	68
39	357987.6	3088854.5	1.02	1.76	1.80	1.35	0.78	230
40	358199.9	3089205.8	1.02	1.76	1.80	1.35	0.42	249
41	357887.6	3088954.5	1.02	1.76	1.80	1.35	0.81	240
42	358287.6	3088854.5	1.02	1.76	1.80	1.35	0.58	211
43	357987.6	3089054.5	1.02	1.76	1.80	1.35	0.67	243
44	358087.6	3088854.5	1.01	1.76	1.78	1.33	0.71	225
45	358856.4	3089004.8	1.01	1.76	1.78	1.33	0.44	142
46	357887.6	3088854.5	1.00	1.76	1.76	1.32	0.86	234
47	358587.6	3088754.5	1.00	1.76	1.76	1.32	0.60	180
48	358187.6	3088854.5	0.99	1.76	1.74	1.31	0.64	219
49	358787.6	3088854.5	0.99	1.76	1.74	1.31	0.54	158
50	358487.6	3088754.5	0.99	1.76	1.74	1.31	0.61	189
51	358087.6	3089154.5	0.96	1.76	1.69	1.27	0.54	248
52	359187.6	3089454.5	0.96	1.76	1.69	1.27	0.61	81

Table 7-8. Significant Impact Receptor Locations, 1996 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	Location UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
53	358199.9	3089257.3	0.96	1.76	1.69	1.27	0.40	256
54	358387.6	3088754.5	0.96	1.76	1.69	1.27	0.63	198
55	358187.6	3089254.5	0.96	1.76	1.69	1.27	0.41	256
56	358687.6	3088754.5	0.94	1.76	1.65	1.24	0.61	171
57	357787.6	3088854.5	0.94	1.76	1.65	1.24	0.94	238
58	358287.6	3088754.5	0.92	1.76	1.62	1.21	0.67	207
59	358199.9	3089309.8	0.91	1.76	1.60	1.20	0.39	263
60	359079.1	3089207.5	0.90	1.76	1.58	1.19	0.51	107
61	357787.6	3088954.5	0.90	1.76	1.58	1.19	0.89	243
62	358787.6	3088754.5	0.89	1.76	1.57	1.17	0.63	162
63	358487.6	3088654.5	0.89	1.76	1.57	1.17	0.71	188
64	359287.6	3088754.5	0.89	1.76	1.57	1.17	0.92	131
65	358087.6	3089254.5	0.88	1.76	1.55	1.16	0.51	259
66	357887.6	3089054.5	0.88	1.76	1.55	1.16	0.76	247
67	358187.6	3088754.5	0.88	1.76	1.55	1.16	0.72	214
68	359087.6	3089754.5	0.87	1.76	1.53	1.15	0.64	51
69	358387.6	3088654.5	0.87	1.76	1.53	1.15	0.73	196
70	357768.4	3088780.8	0.87	1.76	1.53	1.15	1.00	235
71	358587.6	3088654.5	0.87	1.76	1.53	1.15	0.70	180
72	359087.6	3089854.5	0.86	1.76	1.51	1.14	0.71	45
73	359077.3	3089156.0	0.86	1.76	1.51	1.14	0.53	112
74	357987.6	3089154.5	0.85	1.76	1.50	1.12	0.63	252
75	359287.6	3089554.5	0.85	1.76	1.50	1.12	0.73	74
76	358187.6	3089354.5	0.85	1.76	1.50	1.12	0.40	270
77	358199.9	3089360.0	0.85	1.76	1.50	1.12	0.39	271
78	359287.6	3088854.5	0.85	1.76	1.50	1.12	0.86	126
79	358087.6	3088754.5	0.84	1.76	1.48	1.11	0.78	220
80	358287.6	3088654.5	0.84	1.76	1.48	1.11	0.76	203
81	358687.6	3088654.5	0.84	1.76	1.48	1.11	0.71	172
82	357887.6	3088754.5	0.83	1.76	1.46	1.10	0.92	229
83	359387.6	3089654.5	0.83	1.76	1.46	1.10	0.85	69
84	359187.6	3089554.5	0.83	1.76	1.46	1.10	0.63	72
85	357634.9	3088804.5	0.83	1.76	1.46	1.10	1.10	240
86	359187.6	3088954.5	0.83	1.76	1.46	1.10	0.72	124
87	359087.6	3089654.5	0.83	1.76	1.46	1.10	0.58	59
88	357987.6	3088754.5	0.82	1.76	1.44	1.08	0.85	225
89	358887.6	3088954.5	0.82	1.76	1.44	1.08	0.50	143
90	359087.6	3089954.5	0.81	1.76	1.43	1.07	0.78	40
91	357681.3	3088931.8	0.81	1.76	1.43	1.07	1.00	245
92	357987.6	3089254.5	0.81	1.76	1.43	1.07	0.61	261
93	358087.6	3089354.5	0.81	1.76	1.43	1.07	0.50	270
94	358187.6	3088654.5	0.80	1.76	1.41	1.06	0.81	210
95	359287.6	3089654.5	0.79	1.76	1.39	1.04	0.76	67
96	357687.6	3088954.5	0.79	1.76	1.39	1.04	0.98	246
97	358387.6	3088554.5	0.79	1.76	1.39	1.04	0.82	194
98	359294.7	3088647.3	0.79	1.76	1.39	1.04	1.00	135
99	358487.6	3088554.5	0.78	1.76	1.37	1.03	0.81	187
100	359187.6	3088854.5	0.77	1.76	1.36	1.02	0.78	130
101	358904.9	3089004.8	0.77	1.76	1.36	1.02	0.47	138
102	359387.6	3088854.5	0.77	1.76	1.36	1.02	0.94	122
103	358287.6	3088554.5	0.77	1.76	1.36	1.02	0.85	201
104	358199.9	3089411.5	0.77	1.76	1.36	1.02	0.39	278

Table 7-8. Significant Impact Receptor Locations, 1996 Annual Impact - NO_2, NAAQS Analysis.

Receptor Rank	Location UTM East (m)	UTM North (m)	Unadjusted ISCST3 Impact (μg/m³)	Emission Rate Factor	Tier 1 Impact (μg/m³)	Tier 2 Impact (μg/m³)	Distance from Origin (km)	Direction from Origin (°)
105	357787.6	3089054.5	0.77	1.76	1.36	1.02	0.85	249
106	357887.6	3089154.5	0.77	1.76	1.36	1.02	0.73	254
107	358587.6	3088554.5	0.76	1.76	1.34	1.00	0.80	180
108	357987.6	3089354.5	0.76	1.76	1.34	1.00	0.60	270
109	358087.6	3088654.5	0.76	1.76	1.34	1.00	0.86	216
110	358687.6	3088554.5	0.76	1.76	1.34	1.00	0.81	173
111	359430.2	3088647.3	0.76	1.76	1.34	1.00	1.10	130
					Radius of Impact =		**1.10**	**km**

Note: Total of 111 significant receptors, the first 100 ranked impact receptors are shown.
Radius of Impact based on Tier II Impact.

Source: ECT, 2000.

Table 7-9. ISCST3 Model Results - Highest Annual Average NO_2 Impacts, PSD Class II Increment Analysis, City of Tampa/ TECO IC Engine Project

Maximum Annual Impacts	1992	1993	1994	1995	1996
ISCST3 Impact ($\mu g/m^3$)	16.407	17.201	18.078	16.925	17.996
PSD Class II Increment ($\mu g/m^3$)	25.0	25.0	25.0	25.0	25.0
Exceed PSD Class II Increment (Y/N)	N	N	N	N	N
Percent of PSD Class II Increment (%)	65.6	68.8	72.3	67.7	72.0
Receptor UTM Easting (m)	352,479.6	363,749.8	354,358.9	355,146.1	354,344.9
Receptor UTM Northing (m)	3,087,131.3	3,081,982.0	3,087,815.3	3,084,439.5	3,085,111.8
Distance From Plant Bench Mark (m)	6,500	9,000	4,500	6,000	6,000
Direction From Plant Bench Mark (Vector °)	250	145	250	215	225

Source: ECT, 2000.

Table 7-10. ISCST3 Model Results - Annual Average NO_2 Impacts; NAAQS Analysis, City of Tampa/TECO IC Engine Project

Maximum Annual Impacts	1992	1993	1994	1995	1996
ISCST3 Impact ($\mu g/m^3$)	54.817	55.678	63.438	36.378	35.426
Tier 1 Impact ($\mu g/m^3$)[1]	54.817	55.678	63.438	36.378	35.426
Tier 2 Impact ($\mu g/m^3$)[2]	41.113	41.759	47.578	27.284	26.569
Background ($\mu g/m^3$)	20.700	20.700	20.700	20.700	20.700
Total Impact ($\mu g/m^3$)	61.813	62.459	68.278	47.984	47.269
NAAQS ($\mu g/m^3$)	100.0	100.0	100.0	100.0	100.0
Exceed NAAQS (Y/N)	N	N	N	N	N
Percent of NAAQS (%)	61.8	62.5	68.3	48.0	47.3
Receptor UTM Easting (m)	357,887.6	357,887.6	357,591.4	357,887.6	357,887.6
Receptor UTM Northing (m)	3,089,254.5	3,089,254.5	3,089,441.5	3,089,154.5	3,089,154.5
Distance From Plant Bench Mark (m)	707	707	1,000	728	728
Direction From Plant Bench Mark (Vector °)	262	262	275	254	254

[1] Unadjusted ISCST3 impact (Assumed complete conversion of NO_x to NO_2; I.e., NO_2/NO_x ratio of 1.0).
[2] Tier 1 impact times USEPA national default NO_2/NO_x ratio of 0.75.

Source: ECT, 2000.

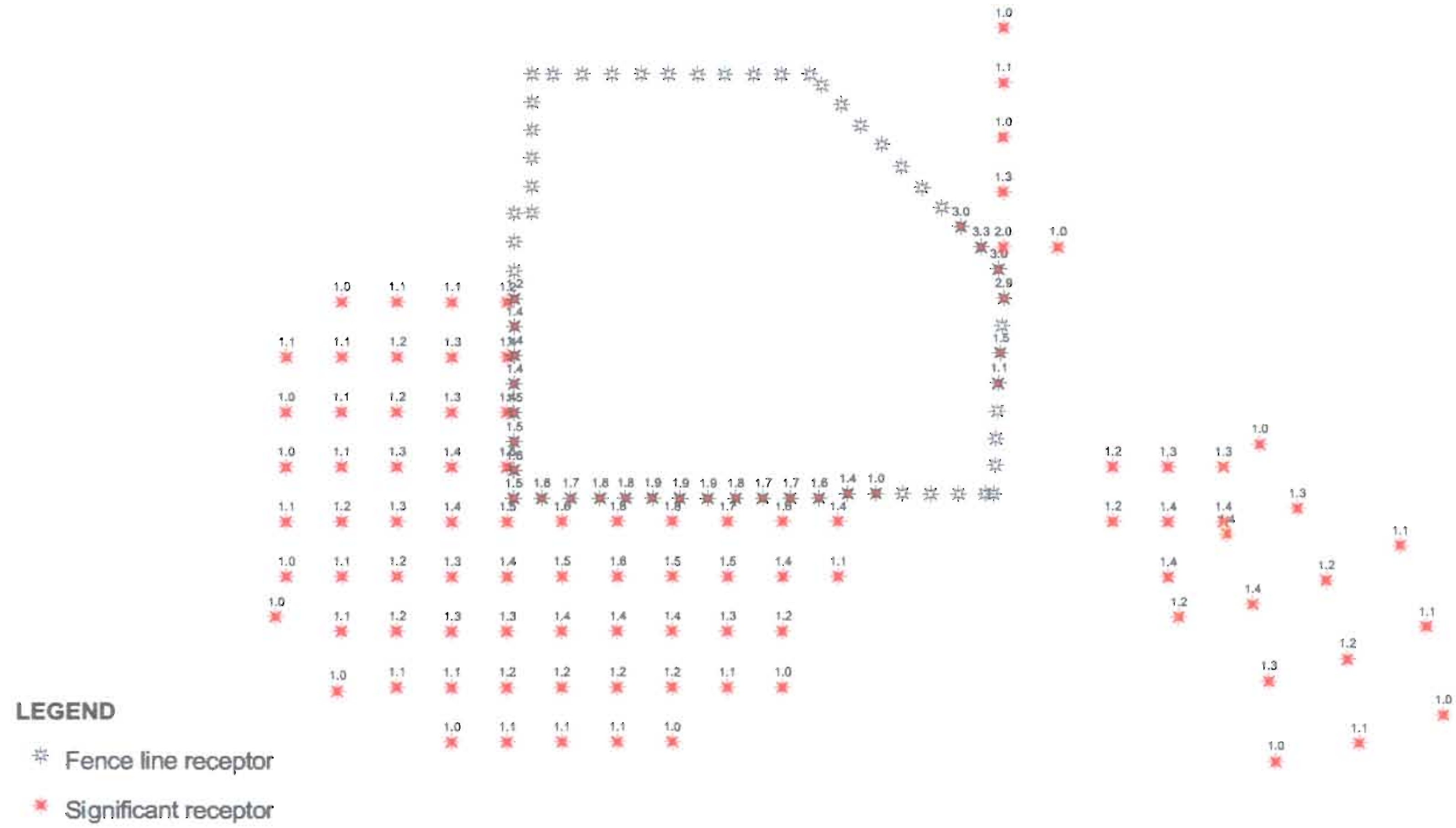

FIGURE 7-1.
NOx: Annual Significant Impacts - 1992 Meteorology.

Source: ECT, 2000.

ECT
Environmental Consulting & Technology, Inc.

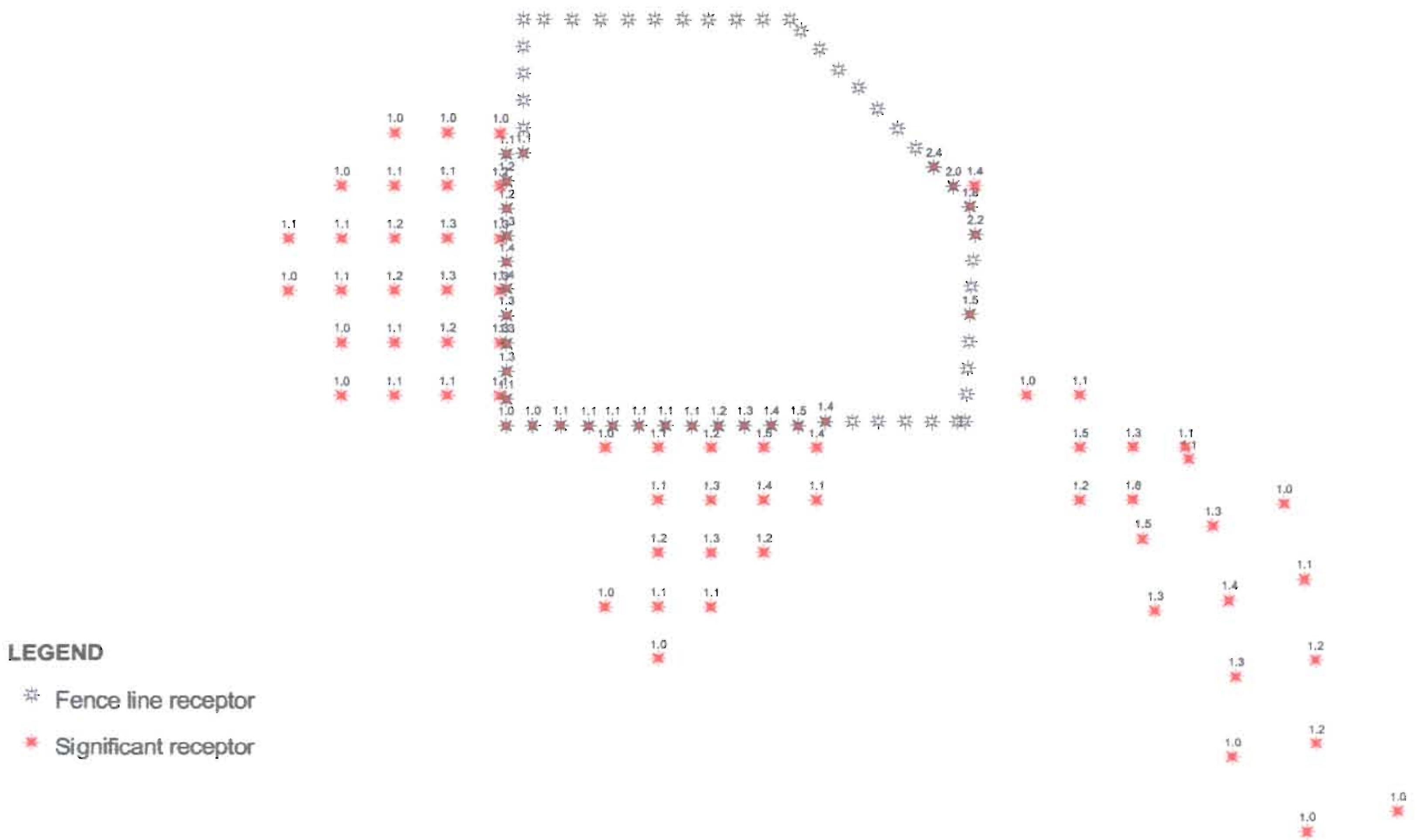

FIGURE 7-2.

NOx: Annual Significant Impacts - 1993 Meteorology.

Source: ECT, 2000.

ECT
Environmental Consulting & Technology, Inc.

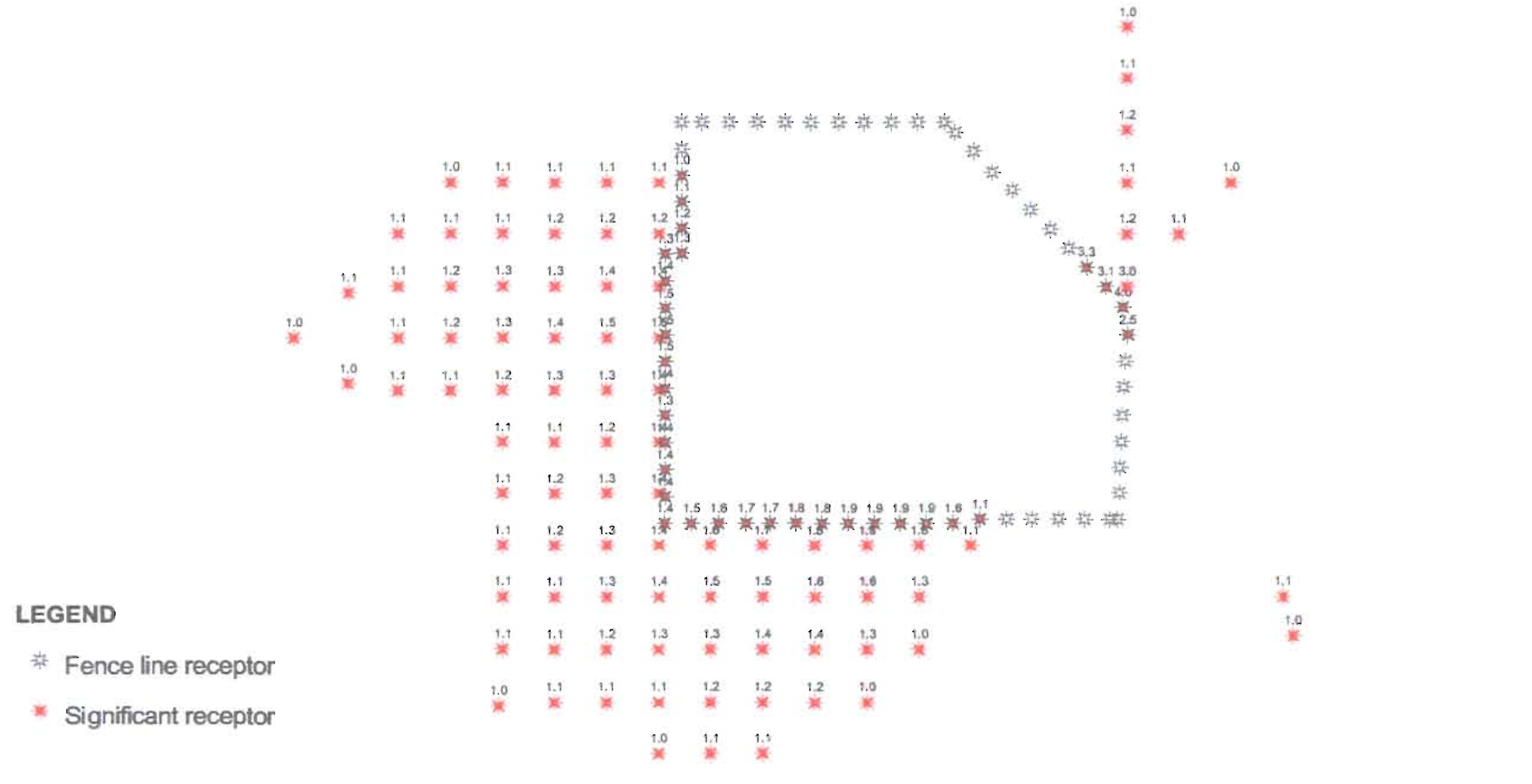

FIGURE 7-3.

NOx: Annual Significant Impacts - 1994 Meteorology.

Source: ECT, 2000.

Environmental Consulting & Technology, Inc.

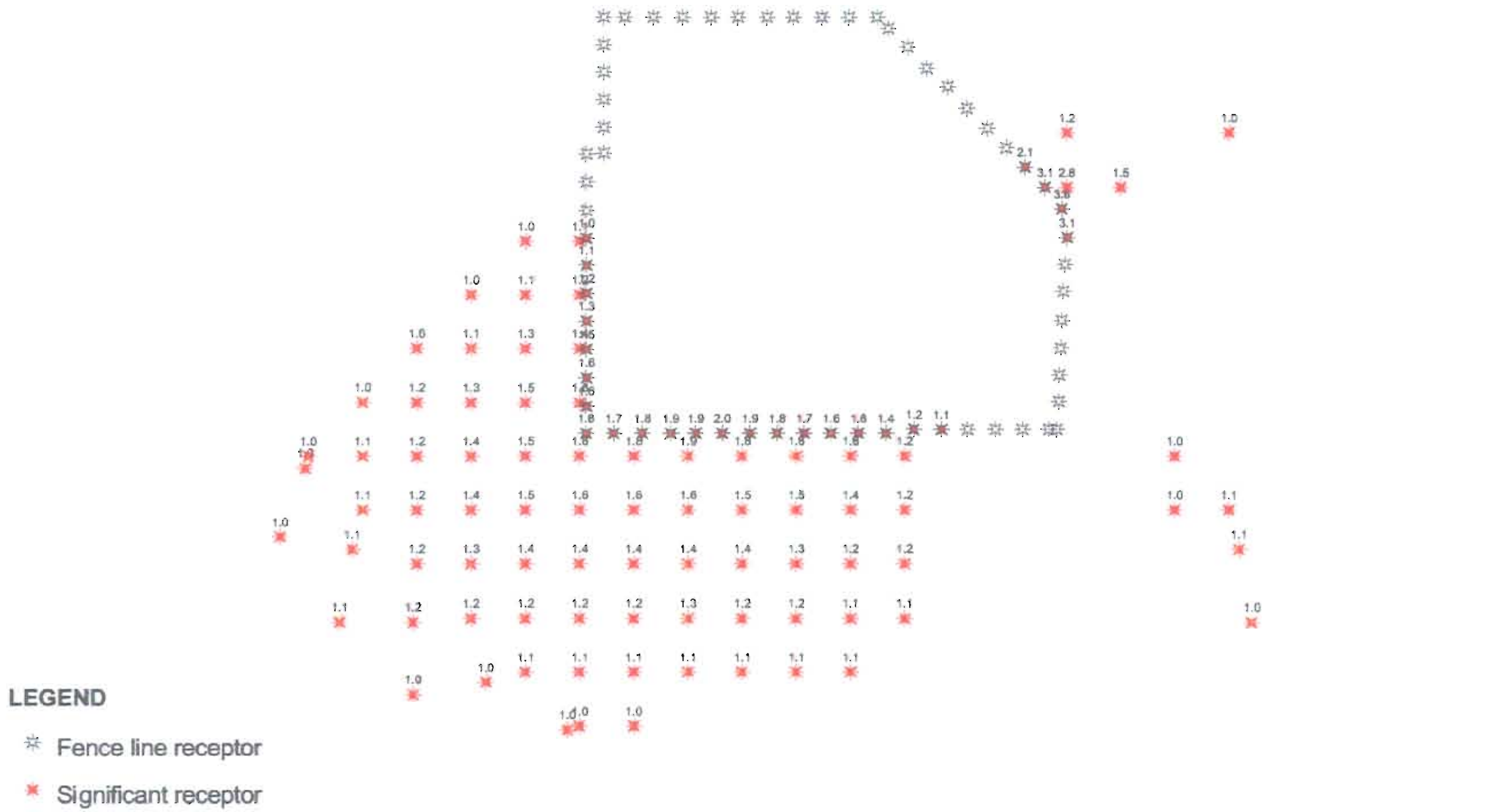

FIGURE 7-4.

NOx: Annual Significant Impacts - 1995 Meteorology.

Source: ECT, 2000.

ECT
Environmental Consulting & Technology, Inc.

8.0 AMBIENT AIR QUALITY MONITORING AND ANALYSIS

8.1 EXISTING AMBIENT AIR QUALITY MONITORING DATA

The nearest FDEP ambient air monitoring station to the HFCAWTF is located at Davis Island, Tampa, Hillsborough County, approximately 1.6 km northwest of the project site. The FDEP monitoring station at Davis Island monitors CO, ozone, PM_{10}, and SO_2. During calendar year 1997, the nearest FDEP monitoring station that monitored PM_{10} was located at Harbor Island in Tampa, Hillsborough County, located approximately 2.3 km northwest of the project site. The nearest FDEP station that monitors NO_x is located on Gandy Boulevard in Tampa, Hillsborough County, approximately 9.3 km southwest of the project site. The nearest FDEP station monitoring for lead is situated on 66th Street in Tampa, Hillsborough County, approximately 5.6 km northeast of the project site. Summaries of 1997 and 1998 ambient air quality data for these FDEP stations are provided in Tables 8-1 and 8-2.

8.2 PRECONSTRUCTION AMBIENT AIR QUALITY MONITORING EXEMPTION APPLICABILITY

FDEP Rule 62-212.400(2)(e), F.A.C., provides an exemption from preconstruction monitoring requirement for sources with *de minimis* air quality impacts. The *de minimis* ambient impact levels were previously presented in Table 4-1. To assess the appropriateness of monitoring exemptions, dispersion modeling analyses were performed to determine the maximum pollutant concentrations caused by emissions from the proposed facility. The results of these analyses are presented in detail in Section 7.2. The following paragraphs summarize the dispersion modeling results as applied to the preconstruction ambient air quality monitoring exemptions.

8.2.1 NO_2

The maximum annual NO_2 impact was predicted to be 6.48 $\mu g/m^3$. This concentration is below the 14-$\mu g/m^3$ *de minimis* ambient impact level. Therefore, a preconstruction monitoring exemption is appropriate for the proposed facility.

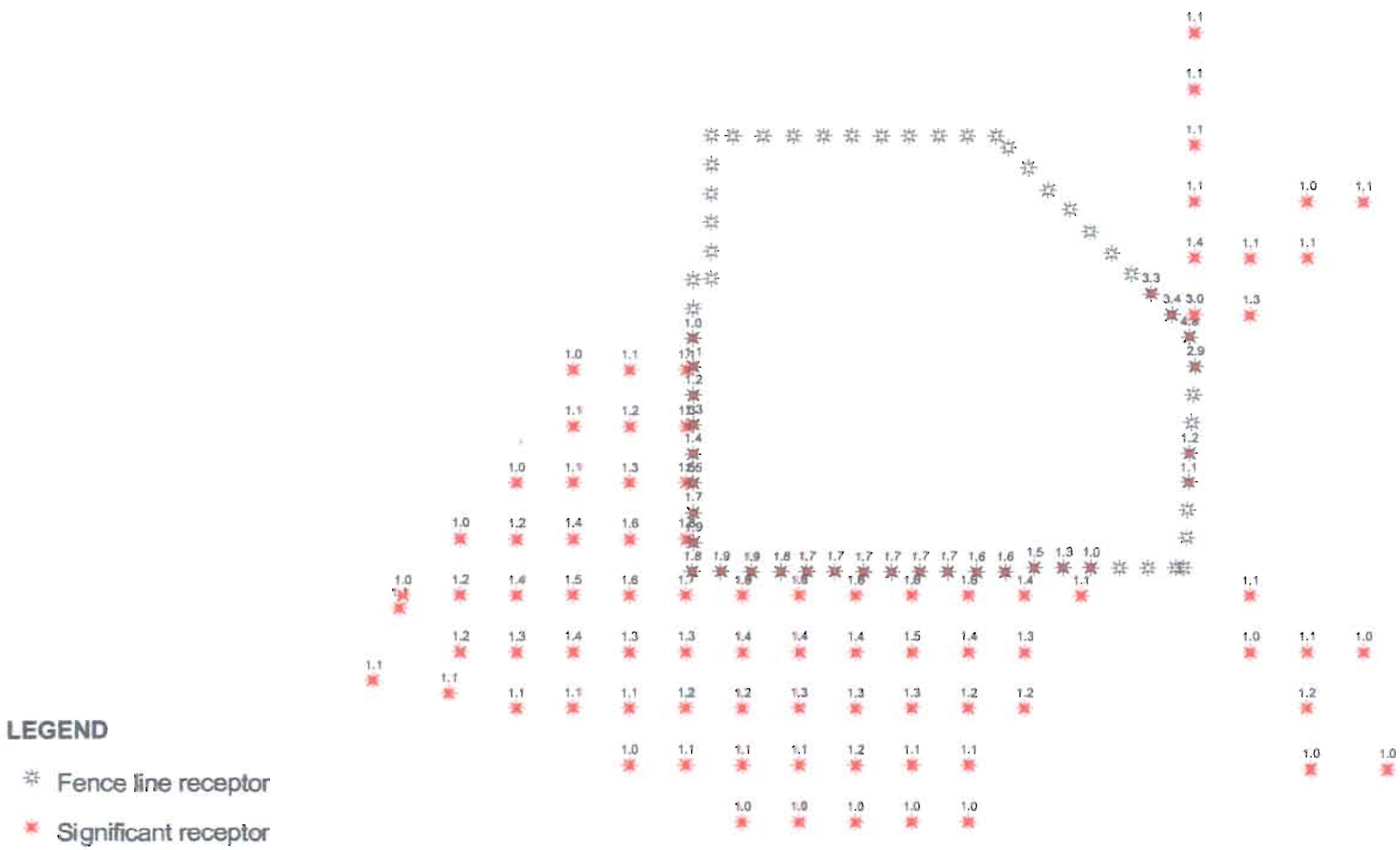

FIGURE 7-5.

NOx: Annual Significant Impacts - 1996 Meteorology.

Source: ECT, 2000.

ECT
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Table 8-1. Summary of 1997 FDEP Ambient Air Quality Data

Pollutant	Site Location		Site No.	Relative to Project Site (km)	Averaging Period	Sampling Period	Number of Observations	Ambient Concentration (μg/m³)				
	County	City						1st High	2nd High	99th Percentile	Arithmeti c Mean	Standard
PM_{10}	Hillsborough	Tampa	4360-069-G02	2.3 NW	24-Hr	Jan-Dec	60	67	47	67		150*
					Annual						28	50†
SO_2	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	8,696	548	540			
					3-Hr			348	285			1,300**
					24-Hr			104	93			260**
					Annual						21	60†
NO_2	Hillsborough	Tampa	4360-065-G01	9.3 SW	1-Hr	Jan-Dec	8,087	111	111			
					Annual						18	100†
CO	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	8,716	4,581	4,581			40,000**
					8-Hr			2,290	2,290			10,000**
O_3	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	8,700	225.8	219.9			235‡
Lead	Hillsborough	Tampa	4360-066-G02	5.6 NE	24-Hr	Jan-Mar	15				0.6	1.5†
						Apr-Jun	14				0.4	
						Jul-Sep	15				0.4	
						Oct-Dec	16					

*99th percentile.
†Arithmetic mean.
**2nd high.
‡4th highest day with hourly value exceeding standard over a 3-year period.

Sources: FDEP, 2000.
ECT, 2000.

Table 8-2. Summary of 1998 FDEP Ambient Air Quality Data

Pollutant	Site Location		Site No.	Relative to Project Site (km)	Averaging Period	Sampling Period	Number of Observations	Ambient Concentration (µg/m³)				
	County	City						1st High	2nd High	99th Percentile	Arithmetic Mean	Standard
PM_{10}	Hillsborough	Tampa	4360-035-G02	1.6 NW	24-Hr	Jan-Dec	352	108	105	108		150*
					Annual						27	50†
SO_2	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	8,663	536.6	348.1			
					3-Hr			369.1	293.2			1,300**
					24-Hr			89.0	86.4			260**
					Annual						20.9	60†
NO_2	Hillsborough	Tampa	4360-065-G01	9.3 SW	1-Hr	Jan-Dec	8,634	116.6	112.9			
					Annual						20.7	100†
CO	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	8,691	3,779.1	3,321.1			40,000**
					8-Hr			2,633.9	2,175.9			10,000**
O_3	Hillsborough	Tampa	4360-035-G02	1.6 NW	1-Hr	Jan-Dec	363	239.5	219.9			235‡
Lead	Hillsborough	Tampa			24-Hr	Jan-Mar						
			4360-066-G02	5.6 NE		Apr-Jun	59				0.41	1.5†
						Jul-Sep					0.51	
						Oct-Dec					0.27	
											0.37	

*99th percentile.
†Arithmetic mean.
**2nd high.
‡4th highest day with hourly value exceeding standard over a 3-year period.

Sources: FDEP, 2000.
ECT, 2000.

8.2.2 CO

The maximum 8-hour CO impact was predicted to be 398.1 μg/m^3. This concentration is below the 575-μg/m^3 *de minimis* ambient impact level. Therefore, a preconstruction monitoring exemption for CO is appropriate for the proposed facility.

9.0 ADDITIONAL IMPACT ANALYSES

The additional impacts analysis, required for projects subject to PSD review, evaluates project impacts pertaining to associated growth; soils, vegetation, and wildlife; and visibility impairment. Each of these topics is discussed in the following sections.

9.1 GROWTH IMPACT ANALYSIS

The purpose of the growth impact analysis is to quantify growth resulting from the construction and operation of the proposed project and assess air quality impacts that would result from that growth.

Impacts associated with construction of the HFCAWTF IC engine/generator modification project will be minor. While not readily quantifiable, the temporary increase in vehicle miles traveled in the area would be insignificant, as would any temporary increase in vehicular emissions.

The new, IC engine/generators are being constructed to provide standby power for the HFCAWTF and to meet general area electric power demands; therefore, no significant secondary growth effects due to operation of the project are anticipated. The increase in natural gas demand due to operation of the new IC engines will have no major impact on local fuel markets. No significant air quality impacts due to associated industrial/commercial growth are expected.

9.2 IMPACTS ON SOILS, VEGETATION, AND WILDLIFE

Maximum air quality impacts in the vicinity of the HFCAWTF due to operation of the proposed IC engine/generator sets are well below applicable AAQS. Accordingly, no significant, adverse impacts on soils, vegetation, and wildlife in the vicinity of the HFCAWTF are anticipated. The following sections discuss potential impacts on the nearest Class I area; the Chassahowitzka NWR.

9.2.1 IMPACTS ON SOILS

The U.S. Department of Agriculture (USDA) (1991a and 1991b) lists the primary soil type in Chassahowitzka NWR as Weekiwachee-Durbin muck. This soil type is characterized by high levels of sulfur and organic content. Sulfur levels may approach 4 percent in the upper soil layer. Daily flooding by high tides causes the pH to vary between 6.1 and 7.8.

Typically, SO_2 represents the greatest threat to soil since this pollutant causes increased sulfur content and decreased pH. However, for this project, given the extremely low levels of SO_2 emitted, the distance from the source, the naturally high sulfur content of the Class I area soils, and the pH variability caused by tidal influences, no impacts to soils are expected.

9.2.2 IMPACTS ON VEGETATION

The Chassahowitzka NWR is a complex ecosystem of vegetation assemblages that depend on the subtle interplay of slight changes in elevation, salinity, hydroperiod, and edaphic factors for distribution, extent, and species composition. The mosaic of plant communities at the Chassahowitzka NWR is represented by pine woods and hammock forests within areas of higher ground, various fresh water forested and nonforested wetlands situated within lowland depressions that are inundated/saturated with fresh water for at least part of the year (mixed swamp, marsh, etc.) and brackish to salt water wetlands such as salt marsh and mangrove swamp distributed at lower elevations on land normally inundated by tidal action and freshwater pulses from upland surface water runoff. The predominant flora associated with these associations is typically common to the central Florida region and characterized by a high diversity of terrestrial, wetland, and aquatic species. Common vascular taxa within the Chassahowitzka NWR would include slash pine, laurel oak, live oak, cabbage palm, sweet gum, red maple, saw palmetto, and gallberry in the inland areas and needlerush, red mangrove, cordgrass, and saltgrass in the brackish to marine reaches.

The literature was reviewed as to potential effects of air pollutants on vegetation. Maximum impacts projected to occur in the immediate vicinity of the HFCAWTF due to operation of the new IC engines will be well below thresholds shown to cause damage to vegetation. Maximum air pollutant impacts at Chassahowitzka NWR due to emissions from the new IC engines will be far less. The potential for damage at the Chassahowitzka NWR could be negligible given the absence of any plant species at Chassahowitzka NWR that would be especially sensitive to the very low predicted pollutant concentrations.

9.2.3 IMPACTS ON WILDLIFE

Wildlife resources in the 30,500-acre Chassahowitzka NWR are fairly typical of central Florida's Gulf Coast. The eastern portions of the site are fringed by hardwood swamp habitats, but the primary habitats are the estuarine and brackish marshes along with the saltwater bays containing many mangrove-covered islands. These habitats support large numbers of resident and migratory waterfowl, water birds, and shorebirds. Wading birds are also quite common. Deer, raccoons, black bears, otters, and bobcats are the notable mammals. Alligators are numerous. Bald eagles and the West Indian manatee are the primary endangered/threatened species utilizing the area.

Air pollution impacts to wildlife have been reported in the literature, although many of the incidents involved acute exposures to pollutants usually caused by unusual or highly concentrated releases or unique weather conditions.

Based on a review of the limited literature on air pollutant effects on wildlife, it is unlikely the low concentrations of pollutants resulting from the IC engine modification project will cause any injury to wildlife.

Bioaccumulation, particularly of mercury, has been a concern in Florida. There is increasing evidence that mercury may be naturally evolved in Florida and that, combined with manmade sources, is becoming bioaccumulated in certain fish and wildlife. It is unknown what naturally occurring levels may be present in onsite fish and wildlife. However, the likelihood that the small amount attributable to this Project would all be methylated, end up in the food chain, and then consumed by predators is considered negligible.

The acid rain effects on wildlife in Florida are primarily those related to aquatic animals. Acidified water may prevent fish egg hatching, damage larvae, and lower immunity factors in adult fish (Barker, 1983). Acid rain can also result in release of metals (especially aluminum) from lake sediments; this can cause a biochemical deterioration of fish gills leading to death by suffocation. However, the sensitivity of Florida lakes to acid rain is in question. Florida lakes have a wide natural range of pH (from 4 to 8.8 pH units). Most well-buffered lakes are in central and south Florida, and rainfall is in the pH range of 4.8 to 5.1. According to Barker (1983) and Charles (1991), no evidence is currently available to clearly show that degradation of aquatic systems have occurred as a direct result of acid precipitation in Florida. The air emissions from the HFCAWTF IC engine/generator sets that could contribute to the formation of atmospheric acids are not predicted to significantly increase acid precipitation and are predicted to have no impact on wildlife at Chassahowitzka NWR.

In conclusion, it is unlikely the projected air emission levels from the HFCAWTF IC engine/generator modification project will have any measurable direct or indirect effects on wildlife utilizing the Chassahowitzka NWR.

9.3 VISIBILITY IMPAIRMENT POTENTIAL

No visibility impairment at the local level is expected due to the types and quantities of emissions projected for the IC engine/generators. Opacity of the natural gas-fired IC engine exhausts will be 10 percent or less. Emissions of primary particulates and sulfur oxides from the IC engines will be low due to the exclusive use of pipeline quality natural gas. The new IC engines will comply with all applicable FDEP requirements pertaining to visible emissions.

Due to the exclusive use of natural gas as a fuel source, relatively minor project emissions, and the distance from the project site to the Chassahowitzka NWR Class I area (i.e., approximately 80 km), it can be concluded that the proposed IC engine/generator emissions will not cause impairment of visibility at this Class I area.

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APPENDIX A

APPLICATION FOR AIR PERMIT—TITLE V SOURCE

Department of Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: **City of Tampa, Department of Sanitary Sewers**	
2. Site Name: **Howard F. Curren Advanced Wastewater Treatment Facility**	
3. Facility Identification Number: **0570373**	[ ] Unknown
4. Facility Location: **Hookers Point, Between East McKay Bay and Hillsborough Bay** Street Address or Other Locator: **2700 Maritime Boulevard** City: **Tampa** County: **Hillsborough** Zip Code: **33605-6744**	
5. Relocatable Facility? [ ] Yes [✔] No	6. Existing Permitted Facility? [✔] Yes [ ] No

Application Contact

1. Name and Title of Application Contact: **Shannon K. Todd** **Engineer – Air Programs, Environmental Planning**
2. Application Contact Mailing Address: Organization/Firm: **Tampa Electric Company** Street Address: **6499 U.S. Highway 41 North** City: **Apollo Beach** State: **FL** Zip Code: **3572-9200**
3. Application Contact Telephone Numbers: Telephone: **(813)641 – 5125** Fax: **(813) 641-5081**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	4-26-00
2. Permit Number:	0570373-009-AC
3. PSD Number (if applicable):	PSD-FL-291
4. Siting Number (if applicable):	

<u>Purpose of Application</u>

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:______________________________

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number:______________________________

Operation permit number to be revised:______________________________

[✔] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:______________________

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:______________________________

Reason for revision:______________________________________

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[✔] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Ralph L. Metcalf, II., P.E., Director

2. Application Contact Mailing Address:
   Organization/Firm: **City of Tampa, Department of Sanitary Sewers**
   Street Address: **City Hall Plaza, 6th Floor**
   City: **Tampa** State: **FL** Zip Code: **33602**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(813) 641-5016** Fax: **(813) 641-5081**

4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative(check here [ ], if so) or the responsible official (check here [✔], if so) of the Title V source addressed in this application, whichever is applicable. 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. 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 any permitted emissions unit.*

   Signature: [signature] Date: 4/20/00

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: **Thomas W. Davis**
   Registration Number: **36777**

2. Professional Engineer Mailing Address:
   Organization/Firm: **Environmental Consulting & Technology, Inc.**
   Street Address: **3701 Northwest 98th Street**
   City: **Gainesville** State: **FL** Zip Code: **32606**

3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 332-0444** Fax: **(352) 332-6722**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(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

(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.

If the purpose of this application is to obtain a Title V source air operation permit (check here [✔], 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 schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [✔], 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.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], 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.

Signature: [signature] — Date: 4/19/00

(seal)

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
	IC Engine/Generator Set No. 7	AC1A	$7,500
	IC Engine/Generator Set No. 8	AC1A	N/A

Application Processing Fee

Check one: [✔] Attached - Amount: $ 7,500 [ ] Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations: **Project consists of the addition of two nominal 2.9-MW Waukesha 16V-AT27GL natural gas-fired internal combustion (IC) engine/generator sets. The IC engine/generator sets will serve as a source of standby power for the Howard F. Curren Advanced Wastewater Treatment Facility (HFCAWTF) as well as generating supplemental grid power for TEC. Heat contained in the exhausts of the new IC engines will also be used to provide most of the energy necessary for the HFCAWTF's existing sludge drying process.**
2. Projected or Actual Date of Commencement of Construction: **Upon authorization**
3. Projected Date of Completion of Construction: **Within 30 days of construction start**

Application Comment

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17**	East (km): **364.0**	North (km): **3,089.5**	
2. Facility Latitude/Longitude: Latitude (DD/MM/SS):		Longitude (DD/MM/SS):	
3. Governmental Facility Code: **4**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s):
7. Facility Comment (limit to 500 characters):			

Facility Contact

1. Name and Title of Facility Contact: **John E. Drapp,**			
2. Facility Contact Mailing Address: Organization/Firm: **City of Tampa, Department of Sanitary Sewers** Street Address: **2700 Maritime Boulevard**			
City: **Tampa**	State: **FL**	Zip Code: **33605-6744**	
3. Facility Contact Telephone Numbers: Telephone: **(813) 247-3451**	Fax: **(813) 248-5269**		

Facility Regulatory Classifications

Check all that apply:

1. [ ] Small Business Stationary Source?	[ ] Unknown
2. [✔] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?	
4. [ ] Major Source of Hazardous Air Pollutants (HAPs)?	
5. [✔] Synthetic Minor Source of HAPs?	
6. [ ] One or More Emissions Units Subject to NSPS?	
7. [✔] One or More Emission Units Subject to NESHAP?	
8. [ ] Title V Source by EPA Designation?	
9. Facility Regulatory Classifications Comment (limit to 200 characters):	

List of Applicable Regulations

See Title V permit application	

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap lb/hour	tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
NOX	**A**	**N/A**	**N/A**	**N/A**	
CO	**A**	**N/A**	**N/A**	**N/A**	

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [ ] Attached, Document ID: [ ] Not Applicable [✔] Waiver Requested
2. Facility Plot Plan: [ ] Attached, Document ID: [ ] Not Applicable [✔] Waiver Requested
3. Process Flow Diagram(s): [✔] Attached, Document ID: **Fig. 2-3** [ ] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID: [ ] Not Applicable [✔] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID:________ [ ] Not Applicable [✔] Waiver Requested
6. Supplemental Information for Construction Permit Application: [✔] Attached, Document ID: **PSD App.** [ ] Not Applicable
7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities: [ ] Attached, Document ID:________ [ ] Not Applicable
9. List of Equipment/Activities Regulated under Title VI: [ ] Attached, Document ID:________ [ ] Equipment/Activities On site but Not Required to be Individually Listed [ ] Not Applicable
10. Alternative Methods of Operation: [ ] Attached, Document ID:________ [ ] Not Applicable
11. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID:________ [ ] Not Applicable
12. Identification of Additional Applicable Requirements: [ ] Attached, Document ID:________ [ ] Not Applicable
13. Risk Management Plan Verification: [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:________) or previously submitted to DEP (Date and DEP Office:________________________) [ ] Plan to be submitted to CEPPO (Date required:________________________) [ ] Not Applicable
14. Compliance Report and Plan: [ ] Attached, Document ID:________ [ ] Not Applicable
15. Compliance Certification (Hard-copy Required): [ ] Attached, Document ID:________ [ ] Not Applicable

Items 8. through 15. above previously submitted – see Title V permit application.

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[✔] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[✔] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
Emission unit consists of one Waukesha Model 16V-AT27GL IC engine/generator set having a nominal rating of 2.9 megawatts (MW). The IC engine will be fired exclusively with pipeline quality natural gas.

4. Emissions Unit Identification Number: [✔] No ID
ID: **IC Engine/Generator No. 7** [ ] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		49	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method): **Lean burn, low-emission combustion**
2. Control Device or Method Code(s): **024**

Emissions Unit Details

1. Package Unit: Manufacturer: **Waukesha Engine**		Model Number: **16V-AT27GL**
2. Generator Nameplate Rating: **2.9** MW		
3. Incinerator Information: Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:		 °F seconds °F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	**25.2 (LHV)** mmBtu/hr			
2. Maximum Incineration Rate:	lb/hr		tons/day	
3. Maximum Process or Throughput Rate:				
4. Maximum Production Rate:				
5. Requested Maximum Operating Schedule:				
	24	hours/day	**7**	days/week
	52	weeks/year	**8,760**	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters): **Maximum heat input is lower heating value (LHV) at 100 percent load**				

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Section 5.2 of PSD application	

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **ENG 7**	2. Emission Point Type Code: **1**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):

N/A

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:

N/A

5. Discharge Type Code: **V**	6. Stack Height: **35** feet	7. Exit Diameter: **2.3** feet
8. Exit Temperature: **731** °F	9. Actual Volumetric Flow Rate: **22,574** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet

13. Emission Point UTM Coordinates:

Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **IC engine fired with pipeline quality natural gas.**		
3. Source Classification Code (SCC): **20100202**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.0265**	5. Maximum Annual Rate: **232.03**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **950**
10. Segment Comment (limit to 200 characters): **Fuel heat content (Field 9) represents lower heating value (LHV).**		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
3. Maximum Hourly Rate:	4. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
6. Maximum % Sulfur:	7. Maximum % Ash:	8. Million Btu per SCC Unit:
9. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 – NOX	**024**		**EL**
2 – CO	**024**		**EL**
3 – VOC	**024**		**EL**

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **14.0** lb/hour **61.4** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **1.56 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **1.56 g/hp-hr**	4. Equivalent Allowable Emissions: **14.0** lb/hour **61.4** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Method 7E**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **14.9** lb/hour **65.3** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **1.66 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
4. Requested Allowable Emissions and Units: **1.66 g/hp-hr**	4. Equivalent Allowable Emissions: **14.9** lb/hour **65.3** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Method 10**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **4.9** lb/hour **21.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **0.55 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
5. Requested Allowable Emissions and Units: **0.55 g/hp-hr**	4. Equivalent Allowable Emissions: **4.9** lb/hour **21.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Methods 18, 25, or 25A.**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [ ] Rule [✔] Other
3. Requested Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
5. Method of Compliance: **EPA Reference Method 9**	
6. Visible Emissions Comment (limit to 200 characters): **Rule 62-212.400(5)(c), F.A.C. (BACT)**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

2. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [✔] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **60** min/hour	
7. Method of Compliance: **EPA Reference Method 9**	
8. Visible Emissions Comment (limit to 200 characters): **Excess emissions resulting from startup, shutdown, or malfunction not-to-exceed 2 hours in any 24 hour period unless authorized by FDEP for a longer duration. Rule 62-210.700(1), F.A.C.**	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor —— of ——

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
6. Continuous Monitor Comment (limit to 200 characters):	

Continuous Monitoring System: Continuous Monitor —— of ——

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [✔] Attached, Document ID: **Fig. 2-3** [ ] Not Applicable [ ] Waiver Requested	
2. Fuel Analysis or Specification [ ] Attached, Document ID: _______ [ ] Not Applicable [✔] Waiver Requested	
3. Detailed Description of Control Equipment [✔] Attached, Document ID: **Sect. 5.0** [ ] Not Applicable [ ] Waiver Requested	
4. Description of Stack Sampling Facilities **To be provided** [ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested	
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:________________ [ ] Not Applicable	
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [✔] Not Applicable [ ] Waiver Requested	
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [✔] Not Applicable [ ] Waiver Requested	
8. Supplemental Information for Construction Permit Application **See PSD application** [ ] Attached, Document ID:________ [ ] Not Applicable	
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [✔] Not Applicable	
10. Supplemental Requirements Comment:	

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [ ] Attached, Document ID:________ [ ] Not Applicable
12. Alternative Modes of Operation (Emissions Trading) [ ] Attached, Document ID:________ [ ] Not Applicable
13. Identification of Additional Applicable Requirements [ ] Attached, Document ID:________ [ ] Not Applicable
14. Compliance Assurance Monitoring Plan [ ] Attached, Document ID:________ [ ] Not Applicable
15. Acid Rain Part Application (Hard-copy Required) [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID:________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID:________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID:________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID:________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID:________ [ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID:________ [ ] Not Applicable

Above items previously submitted, see Title V permit application.

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[✔] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[✔] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

10. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
Emission unit consists of one Waukesha Model 16V-AT27GL IC engine/generator set having a nominal rating of 2.9 megawatts (MW). The IC engine will be fired exclusively with pipeline quality natural gas.

4. Emissions Unit Identification Number: [✔] No ID
ID: **IC Engine/Generator No. 8** [ ] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		**49**	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

Emissions Unit Control Equipment

8. Control Equipment/Method Description (Limit to 200 characters per device or method): **Lean burn, low-emission combustion**
2. Control Device or Method Code(s): **024**

Emissions Unit Details

1. Package Unit: Manufacturer: **Waukesha Engine**	Model Number: **16V-AT27GL**
2. Generator Nameplate Rating: **2.9** MW	
3. Incinerator Information: Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:	 °F seconds °F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	**25.2 (LHV)** mmBtu/hr			
2. Maximum Incineration Rate:	lb/hr		tons/day	
3. Maximum Process or Throughput Rate:				
4. Maximum Production Rate:				
5. Requested Maximum Operating Schedule:				
	24	hours/day	**7**	days/week
	52	weeks/year	**8,760**	hours/year
7. Operating Capacity/Schedule Comment (limit to 200 characters): **Maximum heat input is lower heating value (LHV) at 100 percent load**				

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Section 5.2 of PSD application	

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **ENG 8**	9. Emission Point Type Code: **1**

10. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **N/A**
11. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**

12. Discharge Type Code: **V**	6. Stack Height: **35** feet	7. Exit Diameter: **2.3** feet
8. Exit Temperature: **731** °F	9. Actual Volumetric Flow Rate: **22,574** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet

13. Emission Point UTM Coordinates:		
Zone:	East (km):	North (km):

14. Emission Point Comment (limit to 200 characters):

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **IC engine fired with pipeline quality natural gas.**		
11. Source Classification Code (SCC): **20100202**	3. SCC Units: **Million Cubic Feet Burned**	
12. Maximum Hourly Rate: **0.0265**	13. Maximum Annual Rate: **232.03**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	10. Million Btu per SCC Unit: **950**
10. Segment Comment (limit to 200 characters): **Fuel heat content (Field 9) represents lower heating value (LHV).**		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
9. Source Classification Code (SCC):	3. SCC Units:	
10. Maximum Hourly Rate:	11. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
14. Maximum % Sulfur:	15. Maximum % Ash:	16. Million Btu per SCC Unit:
17. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 – NOX	**024**		**EL**
2 – CO	**024**		**EL**
3 – VOC	**024**		**EL**

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **14.0** lb/hour **61.4** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **1.56 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
6. Requested Allowable Emissions and Units: **1.56 g/hp-hr**	4. Equivalent Allowable Emissions: **14.0** lb/hour **61.4** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Method 7E**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **14.9** lb/hour **65.3** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **1.66 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
7. Requested Allowable Emissions and Units: **1.66 g/hp-hr**	4. Equivalent Allowable Emissions: **14.9** lb/hour **65.3** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Method 10**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **4.9** lb/hour **21.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: **0.55 g/hp-hr** Reference: **Waukesha data**	7. Emissions Method Code: **5**
8. Calculation of Emissions (limit to 600 characters): **See Attachment C**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **Other**	2. Future Effective Date of Allowable Emissions:
8. Requested Allowable Emissions and Units: **0.55 g/hp-hr**	4. Equivalent Allowable Emissions: **4.9** lb/hour **21.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Reference Methods 18, 25, or 25A.**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **FDEP Rule 62-212.400(5)(c), F.A.C. (BACT)**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

3. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [ ] Rule [✔] Other
3. Requested Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
12. Method of Compliance: **EPA Reference Method 9**	
13. Visible Emissions Comment (limit to 200 characters): **Rule 62-212.400(5)(c), F.A.C. (BACT)**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

4. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [✔] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **60** min/hour	
14. Method of Compliance: **EPA Reference Method 9**	
15. Visible Emissions Comment (limit to 200 characters): **Excess emissions resulting from startup, shutdown, or malfunction not-to-exceed 2 hours in any 24 hour period unless authorized by FDEP for a longer duration. Rule 62-210.700(1), F.A.C.**	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
13. Continuous Monitor Comment (limit to 200 characters):	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
14. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [✓] Attached, Document ID: **Fig. 2-3** [ ] Not Applicable [ ] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID: _______ [ ] Not Applicable [✓] Waiver Requested
3. Detailed Description of Control Equipment [✓] Attached, Document ID: **Sect. 5.0** [ ] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities **To be provided** [ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:_______________ [ ] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [✓] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [✓] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application **See PSD application** [ ] Attached, Document ID:________ [ ] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [✓] Not Applicable
10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [ ] Attached, Document ID:________ [ ] Not Applicable	
12. Alternative Modes of Operation (Emissions Trading) [ ] Attached, Document ID:________ [ ] Not Applicable	
13. Identification of Additional Applicable Requirements [ ] Attached, Document ID:________ [ ] Not Applicable	
14. Compliance Assurance Monitoring Plan [ ] Attached, Document ID:________ [ ] Not Applicable	
15. Acid Rain Part Application (Hard-copy Required) [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID:________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID:________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID:________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID:________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID:________ [ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID:________ [ ] Not Applicable	

Above items previously submitted, see Title V permit application.

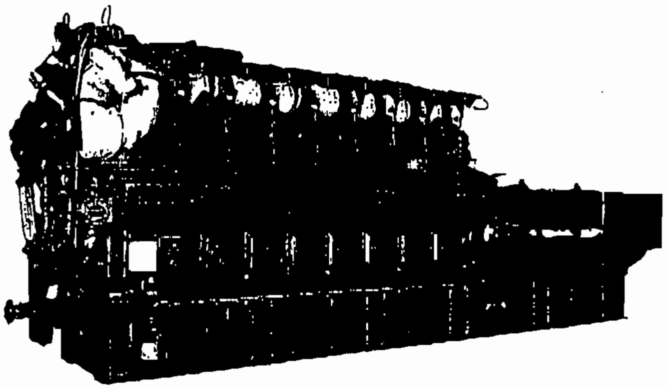
APPENDIX B

IC ENGINE/GENERATOR TECHNICAL SPECIFICATIONS AND EMISSION RATES

Waukesha

16V - AT27GL

GAS ENGINATOR® GENERATING SYSTEM
2910 - 3250 kW



Model 16V-AT27GL Gas Enginator®

SPECIFICATIONS

ENGINE

Waukesha 16V-AT27GL, Four Cycle, Overhead Valve

Cylinders	V16
Piston Displacement	17398 cu. in. (285 L)
Bore & Stroke	10.83" x 11.81" (275 x 300 mm)
Compression Ratio	9:1
Jacket Water Capacity	130 gal. (492 L)
Auxiliary Water Capacity	26 gal. (98 L)
Lube Oil Capacity	313 gal. (1188 L)
Starting System, Air/Gas	150 psig (10.3 bar)
Fuel Pressure Range	45 - 60 psig (3.1 - 4.1 bar)

GENERATOR

Power Factor for Ratings	0.8
Insulation Material	NEMA Class F
Temperature Rise	within NEMA (105° C)
Voltage	4160/2400, 3 phase, 4 wire Wye, 60 Hz* 3300/1905, 3 phase, 4 wire Wye, 50 Hz*
TIF and Deviation Factor	within NEMA, MG 1.22

*Additional voltages available

ENGINE COMPONENTS

CAMSHAFT – Consists of individual segments, one per cylinder, bolted together.

CONNECTING RODS – Low alloy, forged, fully machined.

CRANKCASE – Single piece, stress relieved, gray iron casting. Main bearing caps are retained with vertical studs and lateral tie bolts.

CRANKSHAFT – Low alloy, forged, fully machined, counterweighted with nine main bearing journals. The crankshaft is flanged for full power transmission from each end. Bearings are heavy duty, replaceable, precision aluminum type.

CYLINDER HEAD – Sixteen interchangeable, bore–cooled with two hard-faced intake and two hard-faced exhaust valves per head. Includes stainless steel intake and exhaust valve seats and prechamber fuel control valves.

CYLINDER LINER – Removable wet type with intermediate jacket water guide.

ENGINE INSTRUMENT CONNECTIONS – Thermocouples, K–type, for jacket water temperature, lube oil temperature, individual cylinder exhaust temperatures and pre and post turbocharger temperatures wired to a common junction box. Pressure taps piped to a common bulkhead for intake manifold pressure, lube oil pressure, prechamber fuel pressure, main chamber fuel pressure and jacket water pressure. Instruments and panel are by others. Recommend optional Model 4000 Remote Engine Instrument Panel (reference WPS Engomatic® controls.).

ENGINE PROTECTION SHUTDOWN CONTACTS - For high water temperature, low oil pressure, high intake manifold temperature (standard engine mounted thermocouple with one thermocouple relay - shipped loose), overspeed (electronic speed switch - shipped loose), and engine detonation sensing, alarm and shutdown, (see separate description of Detonation Sensing Module). Two engine mounted emergency shutdown/starter lockout palm buttons are supplied, one on either side of the engine. Use all of the above in conjunction with a DC control panel for unit shutdown, (reference WPS Engomatic® controls).

FLYWHEEL – With 291 tooth ring gear. Machined for direct connected, generator shaft or plate type coupling.

INTERCOOLER – Air–to–water.

PISTON – Single piece, aluminum alloy with integrally cast cooling passage. Four piston rings with the top two compression rings housed in a Ni–resist ring carrier. 9:1 compression ratio.

TURBOCHARGER – Two exhaust driven, with Turbocharger Control Module (TCM), electronic controlled wastegate and air bypass. 24V DC required.

VIBRATION DAMPER – Enclosed, viscous type.

ENGINE SYSTEMS

AIR INLET SYSTEM

Air Inlet Connection – Two 14.17" (360 mm) round.

Air Cleaner – Two dry panel type for remote mounting (shipped loose).

EXHAUST SYSTEM

Exhaust Manifold – Dry type with removable blankets.

Exhaust Outlet – Two 14" (356 mm) flanged vertical outlets.

FUEL SYSTEM – Carburetor with precombustion circuit. Single fuel inlet connection, mounted main and prechamber gas supply regulators. Pressure required: 45 - 60 psig (3.1 - 4.1 bar). Shipped loose 24V DC pilot operated main fuel valve. Mounted 24V DC pilot operated prechamber fuel valve. Includes adjustable speed switch for control of prechamber solenoid valve during start cycle.

Waukesha Engine ISO 9001 CERTIFIED

IGNITION SYSTEM – Waukesha Custom Engine Control® Ignition Module with flange mounted coils. Ignition system meets Canadian Standards Association Class 1, Group D, Division 2 hazardous location requirements. Includes fuses for protection against reverse polarity. 24V DC power required.

LUBRICATION SYSTEM – Gear driven, externally mounted gear type pump with pressure regulator and bypass circuit. Discharge side has flange for connection to remote oil cooler. Includes shell and tube type lube oil cooler sized for connection in series with intercooler. Not mounted. Includes full flow, 45 gallon (170 litre) capacity oil filter. Not mounted. Includes 175° F (79° C) lube oil temperature control valve, mounted on shipped loose oil cooler. Includes full flow filter strainer. Requires single customer lube oil inlet connection. Includes electric motor driven pre/post lube pump, 5 hp 230V AC/3ph/50 - 60 Hz, with motor starter (other voltages can be specified). Not mounted.

STARTING SYSTEM – Two turbine type pneumatic starters with 24V DC starting valves and strainers. Requires 150 psig (10.3 bar) air/gas supply. Crank termination switch is shipped loose.

WATER CIRCULATION SYSTEM

Auxiliary Circuit – Includes gear driven water pump with discharge piped to intercooler. Suction side has single flange for customer connection. Requires single customer outlet connection. Includes 130° F (54° C) auxiliary water temperature control valve, not mounted.

Engine Jacket – Includes gear driven water pump with discharge to engine inlet. Suction side has single flange for customer outlet connection. Requires single customer outlet connection. Includes 180° F (82° C) jacket water temperature control valve, not mounted.

ENGINE ACCESSORIES

BARRING DEVICE – Manual.

CRANKCASE PRESSURE RELIEF DOORS – Twelve mounted on side of crankcase..

CRANKCASE VENT CONNECTION – Single 3" (76.2 mm) round tube.

GOVERNOR – Woodward UG Actuator, mounted, with 701A speed control for single stand alone unit, shipped loose. Does not include optional generator load sharing control or portable programmer for 701A speed control.

JUNCTION BOXES - Separate AC, DC, and instrument/thermocouple junction boxes for engine wiring and external connections.

WAUKESHA CUSTOM ENGINE CONTROL® DETONATION SENSING MODULE (DSM) – Includes individual cylinder sensors, Detonation Sensing Module, and filter. Device is compatible with Waukesha CEC Ignition Module only. Sensors are mounted and wired to DSM Filter. Detonation Sensing Module and filter are mounted. 24V DC power is required. The DSM meets Canadian Standards Association Class 1, Group D, Division 2, hazardous location requirements.

WAUKESHA CUSTOM ENGINE CONTROL® AIR/FUEL MODULE (AFM)– Electronic air/fuel ratio control. Includes Air/Fuel Module, main fuel gas regulator actuator, intake manifold pressure transducer, exhaust O_2 sensor assembly, junction box, and wiring harness. The Air/Fuel Module is shipped loose for customer installation. Wiring harness allows connection of the Air/Fuel Module to junction box. The module must be mounted off engine. 24V DC power is required. The AFM meets Canadian Standards Association Class 1, Group D, Division 2, hazardous location requirements.

GENERATOR AND BASE

GENERATOR - Waukesha, open dripproof, direct connected, fan cooled, 2/3 pitch, A.C. revolving field type, anti-friction grease lubricated bearing(s), with brushless PMG type exciter and damper windings. TIF and deviation factor within NEMA MG1.22. Voltage 4160/2400, 3 phase, 6-wire, WYE, 60 WYE, 60 Hz or 3300/1905, 3 phase, 6-wire WYE 50 Hz. Other voltages are available, consult factory. Insulation material NEMA Class F. Temperature rise within NEMA (105° C) for continuous power duty. All generators are rated at 0.8 power factor. Includes terminal standoff assembly.

VOLTAGE REGULATOR - SCR static automatic type, providing 1% regulation from no load to full load with automatic subsynchronous speed protection. Single phase sensing. Includes voltage adjustment rheostat. All items are shipped loose.

BASE - Engine and generator are mounted and aligned on a structural steel fabricated base designed for mounting on an isolated concrete pad and suitable for lifting. Base must be fully grouted in place according to Waukesha recommendations.

FLYWHEEL GUARD - Fabricated steel guard for protection of the rotating components is mounted to the engine-generator base.

TESTING - Standard Enginator testing.

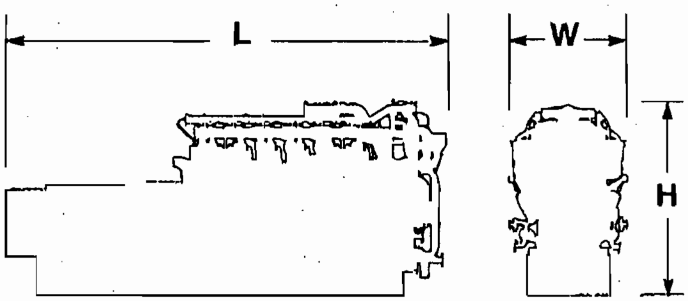
PAINT/PRESERVATION - Oil field orange paint. Internal preservation treatment for short-term storage up to one year.

PERFORMANCE DATA

WATER CONNECTION COOLING Intercooler Water 130° F (54°C)	CONTINUOUS POWER*	
	900 rpm	1000 rpm
	60 Hz	60 Hz
kWe Rating	2910	3250
Fuel Consumption x 1000 Btu/h (kW)	25830 (7570)	29085 (8518)
Jacket Water x 1000 Btu/h (kW)	3225 (945)	3380 (991)
Intercooler x 1000 Btu/h (kW)	1985 (582)	2325 (681)
Lube Oil x 1000 Btu/h (kW)	1020 (299)	1100 (322)
Heat Radiated x 1000 Btu/h (kW)	1626 (477)	1656 (485)
Exhaust Heat** x 1000 Btu/h (kW)	8045 (2358)	9515 (2789)
Exhaust Flow lb/h (kg/h)	45765 (20759)	48860 (22163)
Exhaust Temperature °F (° C)	703 (373)	768 (409)
Induction Air Flow scfm (m³/min)	10135 (287)	10805 (306)

Typical heat balance data is shown. Consult factory for guaranteed data.
***Continuous Power Rating:** The highest electrical power output of the Enginator® available for an unlimited number of hours per year, less maintenance.
Rating Standard: The Waukesha Enginator® power rating descriptions are in accordance to ISO 8528, DIN6271 and BS5514. It is also valid for ISO 3046/1-1986 with an engine mechanical efficiency of 90% and Tcra (clause 10.0) is limited to ±10° F (5° C).
**Heat rejection based on cooling exhaust gas to 85° F (29° C).

Cooling Equipment	L in. (mm)	W in. (mm)	H in. (mm)	Avg. Wt. lb. (Kg)
W.C.	396 (10,060)	102 (2590)	132 (3350)	108,000 (49,000)



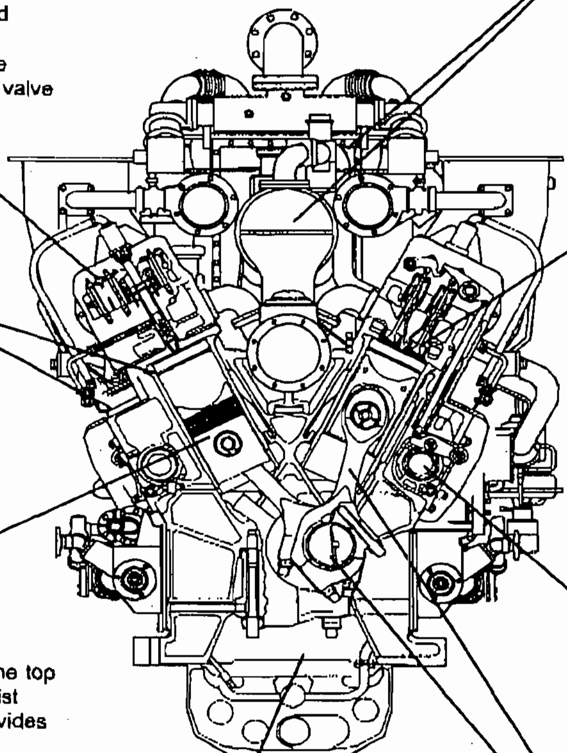
WAUKESHA AT SERIES LEAN COMBUSTION GAS ENGINE

CYLINDER HEADS
In each of the individual bore-cooled cylinder heads jacket water is directed around the centrally located prechamber, the four valve guides and valve seats. This means lower overall temperatures and provides reduced deformation of the cylinder head flame deck. This feature results in extended spark plug, valve, valve guide and valve seat life.

CYLINDER LINERS AND WATER GUIDE ASSEMBLIES
An intermediate jacket water guide separates the bath-nitrided gray iron cylinder liners from the crankcase deck. This allows a high volume of coolant to flow around the combustion chamber and also reduces liner bore distortion due to preloading of the cylinder head studs. These features mean lower piston ring temperatures and longer ring life.

ISTONS
One piece aluminum alloy pistons. The top two rings are housed within a Ni-Resist insert, cast into the piston, which provides piston ring groove wear resistance.

Lubrication oil for cooling is supplied under pressure to a cooling passage cast into the piston crown. This feature provides for lower piston and piston ring operating temperatures. This design means longer piston and piston ring operating life.



INTERCOOLER, CARBURETOR AND INTAKE MANIFOLD
A single intercooler, carburetor and intake manifold provide for a constant air/fuel ratio and uniform air/fuel distribution to each cylinder. This means improved fuel efficiency, lower exhaust emissions and simplified operation and maintenance.

VALVES AND VALVE TRAIN
The intake and exhaust valves (two each per cylinder) are made of a high silicon alloy material. The valve stems are chrome plated. The valve heads are hard faced and the valve seats are hardened stainless steel. These features provide for high strength and wear resistance. The hardened valve guides and valve seats are water cooled to minimize high temperature distortion and corrosion. These features mean long valve, seat and guide life.

CAMSHAFT
The camshaft consists of individual cylinder segments bolted together. This feature allows for simplified removal and replacement if necessary. The camshaft lobe design minimizes valve overlap which reduces gas flow between the intake and exhaust ports. This assures fuel efficiency and low exhaust emissions.

CRANKCASE
The crankcase is a single piece gray iron casting which is stress relieved before final machining. The main bearing caps are retained with vertical studs and lateral tie bolts. These features assure structural rigidity and lower stress levels. This means a durable crankcase assembly and long main bearing life.

CRANKSHAFT AND CONNECTING RODS
Underslung crankshaft and connecting rods are fully machined from low alloy, high tensile strength forged steel. The crankshaft also features flanged construction on each end. This allows full power transmission from either the front or rear end of the engine for greater application flexibility.

Connecting rods have a high angle diagonal split at the rod cap. This permits the largest possible bearing diameter, for low unit loading, while allowing removal of the piston and rod assembly from the top of the engine. These features add up to high strength, application flexibility and long bearing life.

WAUKESHA ENGINE
A Halliburton Company
1000 West St. Paul Avenue
Waukesha, WI 53188-4999
Phone: (414) 547-3311 Fax: (414) 549-2795
http://www.waukeshaengine.com

WAUKESHA ENGINE DIVISION
Dresser Industrial Products, b.v.
Farmsumerweg 43, Postbus 330
9900 AH Appingedam, The Netherlands
Phone: (31) 596-652269 Fax: (31)596-624217

SPECIAL APPLICATION APPROVAL

INFORMATION LISTED BELOW IS REQUESTED DATA - SEE PAGE 3 of 3 FOR APPROVAL

C-# ____________

Project Name: City of Tampa WWTP

End User: City of Tampa

Consultant: Tampa Electric Co.

Application: Power Generation

Engine Model: 16V-AT27GL Qty: 2 Compression Ratio: 9:1

Duty: Continuous Y Intermittent N Standby N Hours/Year: 8760

Is this a Waukesha Power Systems Enginator®? Y If Yes, State:

Model: 16V-AT27GL Price Code: EJG908 Gen Synch/Ind.: S

Site Conditions:

4073 (3037) HP(KW_b)(Driven Equip) If Gen Set 2910 KWe 95.8 % Eff

____________ HP(KW_b)(Cooling Fan)

____________ HP(KW_b)(Misc.)

4073 (3037) HP(KW_b)(Total) @ 900 RPM = BMEP 206.0 (14.21) psi(bar)

______ % Overload (O.L.) ______ Hours per ______

____________ HP(KW_b)(O.L.) @ ______ RPM = BMEP ____________ psi(bar)

Location: Tampa, FL Elevation: ASL 500 (152) FT(M)

Jacket Water System Type (Solid Water/Ebullient): Solid Water

Jacket Water Outlet Temp.: 180 (82) °F(°C)

Intercooler Water Inlet Temp. *(Tcra)*: 130 (54) °F(°C)

Max. Combustion Air Inlet Temperature: 100 (38) °F(°C)

Fuel Types: Primary: Natural Gas Secondary: ____________

If G or GSI then Requested Carburetor Setting: ____________

Additional Information:

DRESSER

CERTIFICATION OF ENGINEERING APPROVAL

Are Special Codes or Equipment Required for this Approval? N

List:

Engineering Approval:

Ignition Timing 22 °BTDC Carb Setting (Lambda or MAFR) 10.85

When operating per the site conditions listed and when using a commercial quality natural gas consisting of a minimum of 93% Methane by volume, WKI(TM)=91, and 900 Btu/ft3 SLHV, WED approves a maximum continuous rating of 4073 BHP @900 RPM with no overload allowed.

For the site conditions listed and per the above stated fuel with the engine operating at 4073 BHP @900 RPM, the following heat rejection and emissions are guaranteed:

BSFC:(Btu/bhp-hr)	6178-0/+5% (per ISO 3046/1 -1995)
Induction Air(scfm):	9887
Exhaust Flow(lb/hr):	44399
Exhaust Temp(±75°F):	731°F
Heat To:(Btu/hr x1000)	
Jacket:	3272±5%
Lube Oil:	1028±5%
Intercooler:	1759±5%
Radiation:	1670±25%

Exhaust Emissions Not To Exceed:

NOx:	1.56 g/bhp-hr
CO:	1.66 g/bhp-hr
NMHC:	0.55 g/bhp-hr

Fuel must conform to WED "Gaseous Fuel Specification" S7884-6.

Signed: Mark Schreiner Date: 01/20/2000

Signed: Steve Kuehl Date: 01/20/2000

APPENDIX C

EMISSION RATE CALCULATIONS

POTENTIAL EMISSION INVENTORY WORKSHEET

City of Tampa, Howard F. Curren AWT Plant

ENG-7

EMISSION SOURCE TYPE

HEAVY DUTY NATURAL GAS-FIRED ENGINES - CRITERIA POLLUTANTS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	4-Cycle Lean Burn Engine
Emission Control Method(s)/ID No.(s):	None
Emission Point Description:	2.9 MW Engine/Generator Set No. 7, Waukesha 16V-AT27GL

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = Engine Power Output (hp) x Pollutant Emission Factor (lb/hp-hr)

Emission (ton/yr) = Engine Power Output (hp) x Pollutant Emission Factor (lb/hp-hr) x Operating Period (hrs/yr) x (1 ton/ 2,000 lb)

Source: ECT, 2000.

INPUT DATA AND EMISSIONS CALCULATIONS

Operating Hours:	24	Hrs/Day	7	Days/Wk	52	Wks/Yr
Operating Hours:	8,760	Hrs/Yr				
Engine Heat Input:	25.2	10^6 Btu/hr (LHV)	Power Output:	2,910	kW	
Engine Power Output:	4,073	HP	Typical Natural Gas Sulfur Content:		0.00064	weight %
Gas Heat Content:	950	Btu/ft^3 (LHV)	Heat Rate:	6,178	Btu/hp-hr	
Number of Engines:	1	Gas Consumed:	0.0265	10^6 ft^3/hr	232.03	10^6 ft^3/yr

Criteria Pollutant	Pollutant Emission Factors		Potential Emission Rates	
	(g/hp-hr)	(lb/hp-hr)	(lb/hr)	(tpy)
NO_x	1.56	0.0034	14.0	61.4
CO	1.66	0.0037	14.9	65.3
NMHC	0.55	0.00121	4.9	21.6
SO_2	2.92E-03	6.45E-06	0.026	0.12
PM/PM_{10}	0.10	0.00022	0.90	3.9

SOURCES OF INPUT DATA

Parameter	Data Source
Operating Hours	TEC, 2000.
Engine Power Output	Waukesha, 1999.
Typical Natural Gas Sulfur Content	Calculated based on gas sulfur content of 2,000 grains per 10^6 cubic feet, ECT, 1999.
Emission Factors (except SO_2)	Waukesha, 2000.
Emission Factor, SO_2	Table 3.4-1, AP-42, EPA, October 1996.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	T.Davis	Date:	Apr-00
Data Entered by:	T.Davis	Date:	Apr-00
Reviewed by:	S. Todd	Date:	Apr-00

POTENTIAL EMISSION INVENTORY WORKSHEET

City of Tampa, Howard F. Curren AWT Plant

ENG-8

EMISSION SOURCE TYPE

HEAVY DUTY NATURAL GAS-FIRED ENGINES - CRITERIA POLLUTANTS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	4-Cycle Lean Burn Engine
Emission Control Method(s)/ID No.(s):	None
Emission Point Description:	2.9 MW Engine/Generator Set No. 8, Waukesha 16V-AT27GL

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = Engine Power Output (hp) x Pollutant Emission Factor (lb/hp-hr)

Emission (ton/yr) = Engine Power Output (hp) x Pollutant Emission Factor (lb/hp-hr) x Operating Period (hrs/yr) x (1 ton/ 2,000 lb)

Source: ECT, 2000.

INPUT DATA AND EMISSIONS CALCULATIONS

Operating Hours:	24	Hrs/Day	7	Days/Wk	52	Wks/Yr
Operating Hours:	8,760	Hrs/Yr				
Engine Heat Input:	25.2	10^6 Btu/hr (LHV)	Power Output:	2,910	kW	
Engine Power Output:	4,073	HP	Typical Natural Gas Sulfur Content:		0.00064	weight %
Gas Heat Content:	950	Btu/ft^3 (LHV)	Heat Rate:	6,178	Btu/hp-hr	
Number of Engines:	1	Gas Consumed:	0.0265	10^6 ft^3/hr	232.03	10^6 ft^3/yr

Criteria Pollutant	Pollutant Emission Factors		Potential Emission Rates	
	(g/hp-hr)	(lb/hp-hr)	(lb/hr)	(tpy)
NO_x	1.56	0.0034	14.0	61.4
CO	1.66	0.0037	14.9	65.3
NMHC	0.55	0.00121	4.9	21.6
SO_2	2.92E-03	6.45E-06	0.026	0.12
PM/PM_{10}	0.10	0.00022	0.90	3.9

SOURCES OF INPUT DATA

Parameter	Data Source
Operating Hours	TEC, 2000.
Engine Power Output	Waukesha, 1999.
Typical Natural Gas Sulfur Content	Calculated based on gas sulfur content of 2,000 grains per 10^6 cubic feet, ECT, 1999.
Emission Factors (except SO_2)	Waukesha, 2000.
Emission Factor, SO_2	Table 3.4-1, AP-42, EPA, October 1996.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	T.Davis	Date:	Apr-00
Data Entered by:	T.Davis	Date:	Apr-00
Reviewed by:	S. Todd	Date:	Apr-00

APPENDIX D

DISPERSION MODELING FILES

APPENDIX E

OFFSITE NOx EMISSIONS INVENTORIES

Table 1. FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
0490015	HARDEE POWER PARTNERS,LTD	1	404.8	3,057.4	56.1	215.90	27.20	945.60	90.0	14.5	236.0	77.5
0490015	HARDEE POWER PARTNERS,LTD	1	404.8	3,057.4	56.1	383.80	48.36	1,681.00	90.0	14.5	236.0	77.5
0490015	HARDEE POWER PARTNERS,LTD	2	404.8	3,057.4	56.1	215.90	27.20	945.60	90.0	14.5	245.0	75.8
0490015	HARDEE POWER PARTNERS,LTD	2	404.8	3,057.4	56.1	383.80	48.36	1,681.00	90.0	14.5	245.0	75.8
0490015	HARDEE POWER PARTNERS,LTD	3	404.8	3,057.4	56.1	215.90	27.20	945.60	75.0	17.9	986.0	94.3
0490015	HARDEE POWER PARTNERS,LTD	3	404.8	3,057.4	56.1	383.80	48.36	1,681.00	75.0	17.9	986.0	94.3
0490015	HARDEE POWER PARTNERS,LTD	5	404.8	3,057.4	56.1	32.00	4.03	140.16	85.0	14.8	999.0	142.0
0490015	HARDEE POWER PARTNERS,LTD	5	404.8	3,057.4	56.1	167.00	21.04	73.15	85.0	14.8	999.0	142.0
0490043	IPS AVON PARK CORPORATION	1	408.8	3,044.5	67.1	351.00	44.23	252.00				
0490043	IPS AVON PARK CORPORATION	1	408.8	3,044.5	67.1	64.10	8.08	252.00				
0490043	IPS AVON PARK CORPORATION	2	408.8	3,044.5	67.1	351.00	44.23	252.00				
0490043	IPS AVON PARK CORPORATION	2	408.8	3,044.5	67.1	64.10	8.08	252.00				
0490043	IPS AVON PARK CORPORATION	3	408.8	3,044.5	67.1	351.00	44.23	252.00				
0490043	IPS AVON PARK CORPORATION	3	408.8	3,044.5	67.1	64.10	8.08	252.00				
0490043	IPS AVON PARK CORPORATION	4	408.8	3,044.5	67.1	351.00	44.23	252.00				
0490043	IPS AVON PARK CORPORATION	4	408.8	3,044.5	67.1	64.10	8.08	252.00				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	2	359.9	3,102.5	13.5				35.0	3.0	95.0	31.0
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	5	359.9	3,102.5	13.5				35.0	0.8	125.0	69.0
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	17	359.9	3,102.5	13.5				36.0	2.3	90.0	29.0
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	22	359.9	3,102.5	13.5				35.0	2.7	85.0	43.0
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	36	359.9	3,102.5	13.5				35.0	1.0		
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	37	359.9	3,102.5	13.5			1.99				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	38	359.9	3,102.5	13.5			1.10				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	41	359.9	3,102.5	13.5			0.10	40.0	0.4	600.0	15.9
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	44	359.9	3,102.5	13.5			1.10				
0570003	CF INDUSTRIES, INC.	1	362.8	3,098.4	10.3			12.70	25.0	2.5	500.0	28.0
0570003	CF INDUSTRIES, INC.	2	362.8	3,098.4	10.3							
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	1	388.0	3,116.0	40.0	0.47	0.06	694.00	25.0	3.5	550.0	58.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	7	388.0	3,116.0	40.0				199.0	8.0	175.0	53.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	8	388.0	3,116.0	40.0				199.0	8.0	148.0	31.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	10	388.0	3,116.0	40.0				94.0	10.0	128.0	26.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	11	388.0	3,116.0	40.0				180.0	9.2	137.0	43.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	12	388.0	3,116.0	40.0				180.0	9.2	105.0	26.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	13	388.0	3,116.0	40.0				180.0	9.2		
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	25	388.0	3,116.0	40.0				20.0	3.5	110.0	62.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	28	388.0	3,116.0	40.0				119.0	1.0	120.0	
0570006	YUENGLING BREWING CO.	1	362.0	3,103.2	14.6	5.60	0.71	50.08	90.0	6.5	275.0	7.0
0570008	CARGILL FERTILIZER, INC.	4	362.9	3,082.5	7.9				150.0	7.5	153.0	44.0
0570008	CARGILL FERTILIZER, INC.	5	362.9	3,082.5	7.9				150.0	8.0	152.0	34.0
0570008	CARGILL FERTILIZER, INC.	6	362.9	3,082.5	7.9				150.0	9.0	170.0	41.6
0570008	CARGILL FERTILIZER, INC.	7	362.9	3,082.5	7.9				126.0	8.0	132.0	37.0
0570008	CARGILL FERTILIZER, INC.	22	362.9	3,082.5	7.9				133.0	7.3	120.0	48.0
0570008	CARGILL FERTILIZER, INC.	23	362.9	3,082.5	7.9				133.0	7.0	120.0	52.0
0570008	CARGILL FERTILIZER, INC.	41	362.9	3,082.5	7.9				40.0	1.7	120.0	39.7
0570008	CARGILL FERTILIZER, INC.	43	362.9	3,082.5	7.9	50.90	6.41	223.00	20.0	4.0	420.0	52.0
0570008	CARGILL FERTILIZER, INC.	55	362.9	3,082.5	7.9	20.00	2.52	87.60	133.0	7.0	108.0	50.0
0570008	CARGILL FERTILIZER, INC.	64	362.9	3,082.5	7.9							
0570008	CARGILL FERTILIZER, INC.	66	362.9	3,082.5	7.9							
0570008	CARGILL FERTILIZER, INC.	67	362.9	3,082.5	7.9							
0570008	CARGILL FERTILIZER, INC.	68	362.9	3,082.5	7.9							
0570008	CARGILL FERTILIZER, INC.	73	362.9	3,082.5	7.9				70.0	4.8	100.0	50.0
0570008	CARGILL FERTILIZER, INC.	78	362.9	3,082.5	7.9	6.50	0.82	28.42	125.0	6.0		
0570008	CARGILL FERTILIZER, INC.	100	362.9	3,082.5	7.9	3.71	0.47	15.96	70.0	2.5	170.0	64.5
0570008	CARGILL FERTILIZER, INC.	101	362.9	3,082.5	7.9	3.71	0.47	15.96	70.0	2.5	170.0	64.5
0570008	CARGILL FERTILIZER, INC.	103	362.9	3,082.5	7.9	6.50	0.82	28.42				
0570008	CARGILL FERTILIZER, INC.	106	362.9	3,082.5	7.9				70.0	3.0	165.0	47.2
0570010	CITY OF TAMPA WATER DEPARTMENT	1	365.9	3,110.6	22.8				55.0	0.8	77.0	16.0

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
0570010	CITY OF TAMPA WATER DEPARTMENT	2	365.9	3,110.6	22.8				41.0	1.0	77.0	10.0
0570018	LAFARGE FLORIDA,INC.	18	357.9	3,090.7	1.8				16.0	2.4	77.0	55.0
0570018	LAFARGE FLORIDA,INC.	20	357.9	3,090.7	1.8				57.0	2.2	77.0	56.0
0570018	LAFARGE FLORIDA,INC.	21	357.9	3,090.7	1.8				30.0	2.4	77.0	55.0
0570018	LAFARGE FLORIDA,INC.	32	357.9	3,090.7	1.8				73.0	1.9	77.0	76.0
0570018	LAFARGE FLORIDA,INC.	54	357.9	3,090.7	1.8							
0570021	INTERNATIONAL SHIP REPAIR & MARINE SERV.	1	358.0	3,092.8	3.8			89.00			77.0	
0570022	MARATHON ASHLAND PETROLEUM LLC	3	362.2	3,087.2	4.1				75.0	3.6	550.0	4.0
0570022	MARATHON ASHLAND PETROLEUM LLC	5	362.2	3,087.2	4.1			2.60	10.0	1.5	580.0	21.2
0570024	IMC-AGRICO CO.(PORT SUTTON TERMINAL)	1	361.5	3,087.5	3.3				65.0	8.0	150.0	41.0
0570025	TRADEMARK NITROGEN CORP	1	367.3	3,092.6	9.5				50.0	1.7	350.0	108.0
0570028	NATIONAL GYPSUM COMPANY	21	348.8	3,082.7	11.8	0.84	0.11	3.67	42.0	1.1	350.0	59.0
0570028	NATIONAL GYPSUM COMPANY	22	348.8	3,082.7	11.6	0.84	0.11	3.67	42.0	1.1	350.0	62.0
0570028	NATIONAL GYPSUM COMPANY	23	348.8	3,082.7	11.6				42.0	1.1	350.0	50.0
0570028	NATIONAL GYPSUM COMPANY	24	348.8	3,082.7	11.6	0.84	0.11	3.67	42.0	1.1	350.0	61.0
0570028	NATIONAL GYPSUM COMPANY	28	348.8	3,082.7	11.8	2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	29	348.8	3,082.7	11.6	2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	30	348.8	3,082.7	11.6	2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	31	348.8	3,082.7	11.6	2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	34	348.8	3,082.7	11.6	11.90	1.50	5.00	47.0	2.5	309.0	67.0
0570028	NATIONAL GYPSUM COMPANY	36	348.8	3,082.7	11.6	2.18	0.27	9.55	64.0	3.5	185.0	40.0
0570028	NATIONAL GYPSUM COMPANY	47	348.8	3,082.7	11.6	7.50	0.95	31.50	35.0	2.8	300.0	64.0
0570028	NATIONAL GYPSUM COMPANY	100	348.8	3,082.7	11.6				42.0	1.1	350.0	71.9
0570028	NATIONAL GYPSUM COMPANY	101	348.8	3,082.7	11.6				42.0	1.1	350.0	71.9
0570028	NATIONAL GYPSUM COMPANY	102	348.8	3,082.7	11.6	2.08	0.26	9.11	90.0	3.9	200.0	44.7
0570028	NATIONAL GYPSUM COMPANY	103	348.8	3,082.7	11.6	2.08	0.26	9.11	90.0	3.0	200.0	75.5
0570028	NATIONAL GYPSUM COMPANY	104	348.8	3,082.7	11.6	2.08	0.26	9.11	90.0	3.0	200.0	75.5
0570029	NITRAM, INC.	3	362.5	3,089.0	4.0				90.0	4.5	260.0	35.0
0570029	NITRAM, INC.	4	362.5	3,089.0	4.0				30.0	4.5	450.0	35.0
0570029	NITRAM, INC.	7	362.5	3,089.0	4.0	103.10	12.99	294.00	55.0	2.5	250.0	121.0
0570029	NITRAM, INC.	13	362.5	3,089.0	4.0	1.74	0.22	7.61	9.0	1.7	260.0	24.0
0570029	NITRAM, INC.	100	362.5	3,089.0	4.0							
0570038	TAMPA ELECTRIC COMPANY	1	358.0	3,091.0	2.0	121.00	15.25	530.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	2	358.0	3,091.0	2.0	121.00	15.25	530.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	3	358.0	3,091.0	2.0	167.00	21.04	731.00	280.0	12.0	341.0	62.7
0570038	TAMPA ELECTRIC COMPANY	4	358.0	3,091.0	2.0	167.00	21.04	731.00	280.0	12.0	341.0	62.7
0570038	TAMPA ELECTRIC COMPANY	5	358.0	3,091.0	2.0	243.00	30.62	1,064.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	6	358.0	3,091.0	2.0	222.00	27.97	972.00	280.0	9.4	329.0	75.2
0570039	TAMPA ELECTRIC COMPANY	1	361.9	3,075.0	14.4	6,171.00	777.55	27,029.00	490.0	24.0	294.0	115.9
0570039	TAMPA ELECTRIC COMPANY	2	361.9	3,075.0	14.4	6,191.00	780.07	27,118.00	490.0	24.0	125.0	87.6
0570039	TAMPA ELECTRIC COMPANY	3	361.9	3,075.0	14.4	2,881.00	363.01	12,619.00	499.0	24.0	279.0	47.0
0570039	TAMPA ELECTRIC COMPANY	4	361.9	3,075.0	14.4	2,598.00	327.35	11,379.00	499.0	24.0	156.0	59.0
0570039	TAMPA ELECTRIC COMPANY	5	361.9	3,075.0	14.4	447.00	56.32	1,958.00	75.0	14.0	928.0	61.0
0570039	TAMPA ELECTRIC COMPANY	6	361.9	3,075.0	14.4	447.50	56.39	1,960.00	75.0	14.0	928.0	61.0
0570039	TAMPA ELECTRIC COMPANY	7	361.9	3,075.0	14.4	128.00	16.13	561.00	35.0	11.0	1,010.0	91.9
0570040	TAMPA ELECTRIC COMPANY	1	360.0	3,087.5	2.1	1,839.00	231.71	8,055.00	315.0	10.0	289.0	94.0
0570040	TAMPA ELECTRIC COMPANY	2	360.0	3,087.5	2.1	1,898.00	239.15	8,314.00	315.0	10.0	298.0	101.0
0570040	TAMPA ELECTRIC COMPANY	3	360.0	3,087.5	2.1	2,401.00	302.53	10,518.00	315.0	10.6	296.0	126.0
0570040	TAMPA ELECTRIC COMPANY	4	360.0	3,087.5	2.1	2,638.00	332.39	11,555.00	315.0	10.0	309.0	75.0
0570040	TAMPA ELECTRIC COMPANY	5	360.0	3,087.5	2.1	3,454.00	435.20	15,128.00	315.0	14.6	303.0	76.0
0570040	TAMPA ELECTRIC COMPANY	6	360.0	3,087.5	2.1	5,698.00	717.95	24,957.00	315.0	17.6	320.0	81.0
0570040	TAMPA ELECTRIC COMPANY	7	360.0	3,087.5	2.1	128.00	16.13	561.00	35.0	11.0	1,010.0	92.6
0570040	TAMPA ELECTRIC COMPANY	8	360.0	3,087.5	2.1						77.0	
0570041	FLORIDA HEALTH SCIENCES CTR, INC	2	356.4	3,091.0	2.9				90.0	6.0	80.0	
0570054	SCRAP-ALL, INC.	2	359.4	3,093.1	4.2	0.74	0.09	30.00	38.0	0.7	435.0	51.0
0570054	SCRAP-ALL, INC.	5	359.4	3,093.1	4.2				28.0	2.0	1,497.0	12.0
0570055	CHEVRON PRODUCTS COMPANY	5	348.2	3,082.5	12.2				25.0	6.0		

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0570056	BUILDING MATERIALS MANUFACTURING CORP	4	362.2	3,087.2	4.1				33.0	2.3	800.0	28.0
0570056	BUILDING MATERIALS MANUFACTURING CORP	5	362.2	3,087.2	4.1				38.0	1.6	375.0	61.0
0570056	BUILDING MATERIALS MANUFACTURING CORP	8	362.2	3,087.2	4.1				45.0	2.0	77.0	4.0
0570056	BUILDING MATERIALS MANUFACTURING CORP	9	362.2	3,087.2	4.1							
0570057	GULF COAST RECYCLING, INC.	1	364.0	3,093.5	7.1	1.67	0.21		150.0	3.0	160.0	54.8
0570057	GULF COAST RECYCLING, INC.	2	364.0	3,093.5	7.1				25.0	2.0	87.0	76.9
0570057	GULF COAST RECYCLING, INC.	6	364.0	3,093.5	7.1				65.0	2.0	98.0	48.0
0570061	TAMPA ARMATURE WORKS	1	365.6	3,091.7	7.8			11.38	20.0	2.1	1,200.0	
0570061	TAMPA ARMATURE WORKS	2	365.6	3,091.7	7.6	1.28	0.16	2.00	18.0	0.8	400.0	33.0
0570061	TAMPA ARMATURE WORKS	6	365.6	3,091.7	7.6	0.31	0.04	1.36	27.0	1.7	1,400.0	19.4
0570065	SOUTHDOWN,INC.	2	349.5	3,102.0	15.8				60.0	2.0	78.0	10.0
0570069	INDUSTRIAL GALVANIZERS AMERICA, INC.	1	368.5	3,094.5	11.4				11.0	1.5	150.0	330.0
0570069	INDUSTRIAL GALVANIZERS AMERICA, INC.	2	368.5	3,094.5	11.4				28.0	2.0	94.0	53.1
0570072	BALL METAL BEVERAGE CONTAINER CORP.	1	360.5	3,103.0	14.1				40.0	0.5	350.0	106.0
0570072	BALL METAL BEVERAGE CONTAINER CORP.	2	360.5	3,103.0	14.1				40.0	1.2	80.0	17.0
0570072	BALL METAL BEVERAGE CONTAINER CORP.	3	360.5	3,103.0	14.1				40.0	1.0	190.0	38.0
0570072	BALL METAL BEVERAGE CONTAINER CORP.	6	360.5	3,103.0	14.1				35.0	4.3	300.0	61.6
0570075	CORONET INDUSTRIES, INC.	1	393.8	3,096.3	36.0	5.50	0.69	23.44	100.0	4.5	149.0	39.0
0570075	CORONET INDUSTRIES, INC.	3	393.8	3,096.3	36.0	5.28	0.67		152.0	5.8	81.0	31.0
0570075	CORONET INDUSTRIES, INC.	5	393.8	3,096.3	36.0	46.80	5.90	65.70	150.0	5.8	104.0	60.0
0570075	CORONET INDUSTRIES, INC.	8	393.8	3,096.3	36.0				100.0	3.0	115.0	28.0
0570075	CORONET INDUSTRIES, INC.	18	393.8	3,096.3	36.0				45.0	1.8	170.0	46.0
0570075	CORONET INDUSTRIES, INC.	19	393.8	3,096.3	36.0				25.0	1.3	450.0	50.0
0570075	CORONET INDUSTRIES, INC.	20	393.8	3,096.3	36.0	1.00	0.13		20.0	1.2	630.0	66.0
0570075	CORONET INDUSTRIES, INC.	21	393.8	3,096.3	36.0				80.0	4.5	95.0	259.0
0570075	CORONET INDUSTRIES, INC.	22	393.8	3,096.3	36.0	23.40	2.95	83.00	152.0	5.8	80.0	39.0
0570075	CORONET INDUSTRIES, INC.	23	393.8	3,096.3	36.0				32.0	1.5	73.0	35.0
0570075	CORONET INDUSTRIES, INC.	24	393.8	3,096.3	36.0	6.22	0.78		152.0	5.8	72.0	36.0
0570075	CORONET INDUSTRIES, INC.	27	393.8	3,096.3	36.0				10.0	0.8	150.0	59.0
0570078	DELTA ASPHALT	1	372.1	3,105.4	21.3	54.00	6.80	154.00	28.0	3.8	300.0	80.0
0570076	DELTA ASPHALT	100	372.1	3,105.4	21.3	18.75	2.36	37.50				
0570076	DELTA ASPHALT	101	372.1	3,105.4	21.3			0.86				
0570076	DELTA ASPHALT	103	372.1	3,105.4	21.3							
0570077	VERLITE COMPANY	1	360.2	3,093.0	4.3	0.76	0.10	3.00	50.0	2.0	230.0	28.0
0570080	MARATHON ASHLAND PETROLEUM LLC	1	359.5	3,091.7	2.8				50.0	2.0	78.0	15.0
0570082	FREEPORT-MCMORAN SULPHUR LLC	3	358.0	3,090.0	1.1							
0570082	FREEPORT-MCMORAN SULPHUR LLC	4	358.0	3,090.0	1.1				50.0	0.8		
0570083	AMOCO PETROLEUM PRODUCTS	10	357.8	3,092.0	3.1				20.0	0.8	28.0	1.3
0570085	GATX TERMINALS CORP	4	358.0	3,089.0	0.5							
0570087	CORESLAB STRUCTURES(TAMPA),INC.	1	363.2	3,098.4	10.5				15.0	1.5	75.0	5.0
0570087	CORESLAB STRUCTURES(TAMPA),INC.	2	363.2	3,098.4	10.5				60.0	0.8	78.0	99.0
0570087	CORESLAB STRUCTURES(TAMPA),INC.	3	363.2	3,098.4	10.5							
0570088	HALEY, JAMES A. VETERAN'S HOSPITAL TAMPA	2	359.6	3,104.1	15.1				64.0	2.0		
0570089	ST JOSEPHS HOSPITAL	2	353.3	3,095.9	8.6				40.0	1.7	135.0	45.7
0570089	ST JOSEPHS HOSPITAL	3	353.3	3,095.9	8.6	7.30	0.92	31.90	30.0	1.0	375.0	42.0
0570089	ST JOSEPHS HOSPITAL	5	353.3	3,095.9	8.6				35.0	2.0	350.0	23.9
0570089	ST JOSEPHS HOSPITAL	6	353.3	3,095.9	8.6				35.0	2.0	350.0	23.9
0570089	ST JOSEPHS HOSPITAL	7	353.3	3,095.9	8.6				35.0	2.0	350.0	23.9
0570090	SOUTHEASTERN WIRE	1	368.2	3,094.6	11.2				14.0	3.5	116.0	31.0
0570091	TERRA ASGROW	1	388.6	3,104.6	33.9	0.45	0.06		28.0	1.5	1,800.0	23.0
0570097	W R BONSAL CO	1	363.6	3,098.1	10.4				17.0	2.3	300.0	57.0
0570097	W R BONSAL CO	3	363.6	3,098.1	10.4				55.0	2.2	77.0	2.0
0570100	FREEPORT-MCMORAN SULPHUR LLC	1	361.1	3,086.9	3.4				20.0	1.7	380.0	11.0
0570100	FREEPORT-MCMORAN SULPHUR LLC	2	361.1	3,086.9	3.4				6.0	5.1		
0570100	FREEPORT-MCMORAN SULPHUR LLC	3	361.1	3,086.9	3.4				6.0	5.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	4	361.1	3,086.9	3.4				0.0	0.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	5	361.1	3,086.9	3.4				0.0			

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0570100	FREEPORT-MCMORAN SULPHUR LLC	6	361.1	3,086.9	3.4				0.0	0.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	7	361.1	3,086.9	3.4				0.0	0.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	8	361.1	3,086.9	3.4				0.0	0.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	9	361.1	3,086.9	3.4				0.0	0.0		
0570100	FREEPORT-MCMORAN SULPHUR LLC	10	361.1	3,086.9	3.4							
0570119	GULF COAST METALS	3	364.7	3,093.6	7.7				28.0	1.5	1,900.0	22.0
0570119	GULF COAST METALS	4	364.7	3,093.6	7.7				25.0	0.7	1,841.0	
0570119	GULF COAST METALS	5	364.7	3,093.6	7.7			12.74				
0570127	CITY OF TAMPA	1	360.2	3,092.2	3.6	75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	2	360.2	3,092.2	3.6	75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	3	360.2	3,092.2	3.6	75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	4	360.2	3,092.2	3.6	75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	103	360.2	3,092.2	3.6	42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	104	360.2	3,092.2	3.6	42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	105	360.2	3,092.2	3.6	42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	106	360.2	3,092.2	3.6	42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570136	VERLITE CO	3	363.0	3,098.1	10.1				40.0	1.0	171.0	41.0
0570136	VERLITE CO	4	363.0	3,098.1	10.1				40.0	1.0	272.0	46.0
0570141	US AIR FORCE (MACDILL AFB)	2	353.5	3,081.5	9.0			5.30	35.0	2.0	450.0	15.0
0570141	US AIR FORCE (MACDILL AFB)	4	353.5	3,081.5	9.0			5.30	35.0	2.0		
0570141	US AIR FORCE (MACDILL AFB)	5	353.5	3,081.5	9.0			5.30	35.0	2.0		
0570141	US AIR FORCE (MACDILL AFB)	11	353.5	3,081.5	9.0			48.00				
0570150	DRAVO LIME, INC.	1	362.9	3,084.7	6.2				560.0	2.0	77.0	6.0
0570160	BALL METAL BEVERAGE CONTAINER CORP.	1	362.0	3,103.2	14.6				43.0	1.7	224.0	29.4
0570160	BALL METAL BEVERAGE CONTAINER CORP.	2	362.0	3,103.2	14.6				51.0	0.1	360.0	67.0
0570160	BALL METAL BEVERAGE CONTAINER CORP.	4	362.0	3,103.2	14.6				40.0	0.5	78.0	
0570160	BALL METAL BEVERAGE CONTAINER CORP.	5	362.0	3,103.2	14.6				40.0	0.7	150.0	
0570163	GRIFFIN INDUSTRIES	1	364.1	3,096.4	9.3	6.84	0.86	30.00	50.0	2.8	450.0	22.0
0570163	GRIFFIN INDUSTRIES	2	364.1	3,096.4	9.3	6.84	0.86	30.00	48.0	0.3	450.0	414.0
0570163	GRIFFIN INDUSTRIES	3	364.1	3,096.4	9.3				40.0	2.2	90.0	43.0
0570165	BAG-MOR	2	362.8	3,097.4	9.4							
0570171	SPEEDLING, INC.	1	354.1	3,062.2	27.2				25.0	1.8	325.0	63.0
0570171	SPEEDLING, INC.	2	354.1	3,062.2	27.2	1.79	0.23	7.84	25.0	1.7	350.0	85.0
0570180	FECP/CAST CRETE DIVISION	3	371.9	3,099.2	16.8				20.0	1.0	240.0	31.0
0570185	RINKER MATERIALS CORPORATION	2	363.2	3,098.1	10.2							
0570198	HILLSBOROUGH CREMATORY	1	350.8	3,096.0	10.4				20.0	1.6	1,400.0	10.0
0570216	SOUTH BAY HOSPITAL	1	365.3	3,065.1	24.9				16.0	1.0	400.0	21.0
0570224	REED MINERALS DIVISION	1	362.2	3,085.5	5.1				30.0	3.9	132.0	32.0
0570224	REED MINERALS DIVISION	2	362.2	3,085.5	5.1				30.0	5.5	92.0	32.0
0570236	WESTSHORE GLASS CORP	1	349.2	3,098.5	13.3			2.00	28.0	1.5	1,800.0	23.0
0570249	ALCOA EXTRUSIONS	2	385.6	3,097.0	28.2	1.09	0.14	3.42	29.0	2.7	325.0	32.0
0570249	ALCOA EXTRUSIONS	3	385.6	3,097.0	28.2	0.35	0.04	1.10	14.0	1.5	375.0	14.0
0570249	ALCOA EXTRUSIONS	4	385.6	3,097.0	28.2	0.92	0.12	2.86	29.0	2.7	325.0	26.0
0570249	ALCOA EXTRUSIONS	5	385.6	3,097.0	28.2	0.35	0.04	1.07	14.0	1.5	375.0	14.0
0570249	ALCOA EXTRUSIONS	6	385.6	3,097.0	28.2	0.25	0.03	0.80	14.0	1.7	375.0	8.0
0570249	ALCOA EXTRUSIONS	7	385.6	3,097.0	28.2			2.00	16.0	1.3	400.0	22.0
0570249	ALCOA EXTRUSIONS	8	385.6	3,097.0	28.2	2.39	0.30	10.16	30.0	3.0	850.0	63.0
0570249	ALCOA EXTRUSIONS	9	385.6	3,097.0	28.2	0.89	0.11	3.78	30.0	3.0	500.0	11.0
0570249	ALCOA EXTRUSIONS	10	385.6	3,097.0	28.2	0.70	0.09	0.26	16.0	1.5	350.0	5.0
0570249	ALCOA EXTRUSIONS	11	385.6	3,097.0	28.2	2.66	0.34	4.49	15.0	1.0	120.0	212.0
0570249	ALCOA EXTRUSIONS	14	385.6	3,097.0	28.2				60.0	6.5	900.0	22.0
0570249	ALCOA EXTRUSIONS	15	385.6	3,097.0	28.2				6.0	1.3	1,100.0	101.0
0570249	ALCOA EXTRUSIONS	17	385.6	3,097.0	28.2	0.37	0.05	1.63	30.0	1.9	660.0	32.0
0570249	ALCOA EXTRUSIONS	18	385.6	3,097.0	28.2	0.33	0.04	1.46	30.0	1.4	350.0	80.0
0570249	ALCOA EXTRUSIONS	19	385.6	3,097.0	28.2	0.33	0.04	1.46	30.0	1.4	350.0	80.0
0570254	TREASURE CHEST ADVERTISING	1	350.3	3,086.4	8.6				35.0	3.2	650.0	80.0
0570254	TREASURE CHEST ADVERTISING	5	350.3	3,086.4	8.6				35.0	3.2	650.0	101.3

Tab[illegible] FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
0570260	GAYLORD CONTAINER CORPORATION	4	366.3	3,092.3	8.5							
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	1	368.2	3,092.7	10.4	117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	1	368.2	3,092.7	10.4	58.63	7.39	256.00	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	2	368.2	3,092.7	10.4	117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	2	368.2	3,092.7	10.4	58.63	7.39	256.00	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	3	368.2	3,092.7	10.4	117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	3	368.2	3,092.7	10.4	58.63	7.39	256.00	220.0	5.1	290.0	72.5
0570262	CHROMALLOY CASTINGS TAMPA, CORPORATION	3	349.0	3,100.0	14.5				30.0	2.0	1,300.0	2.0
0570286	TAMPA BAY SHIPBUILDING & REPAIR CO.	5	358.0	3,089.0	0.5			188.00	10.0	0.5		148.5
0570287	COL. MET., INC.	1	350.5	3,102.2	15.4				35.0	3.5	800.0	19.0
0570290	E.A. MARIANI ASPHALT CO.	1	358.2	3,092.0	3.0				27.0	1.3	435.0	18.0
0570290	E.A. MARIANI ASPHALT CO.	2	358.2	3,092.0	3.0				26.0	2.5	500.0	4.0
0570295	ASHLAND CHEMICAL COMPANY	2	348.0	3,082.7	12.3							
0570296	INTERNATIONAL PETROLEUM CORP	1	389.0	3,098.0	31.8				21.0	2.0	600.0	48.0
0570296	INTERNATIONAL PETROLEUM CORP	2	389.0	3,098.0	31.8				35.0	1.0	750.0	314.0
0570296	INTERNATIONAL PETROLEUM CORP	3	389.0	3,098.0	31.8				20.0	1.3	900.0	42.0
0570317	JANET & CHARLIES WOOD RECYCLING FACILITY	1	363.1	3,085.3	5.9			199.68	14.0	12.0	1,600.0	
0570320	DART CONTAINER CORPORATION OF FLORIDA	1	384.9	3,098.2	27.9				28.0	1.8	350.0	20.0
0570320	DART CONTAINER CORPORATION OF FLORIDA	2	384.9	3,098.2	27.9				28.0	1.8	350.0	20.0
0570320	DART CONTAINER CORPORATION OF FLORIDA	3	384.9	3,098.2	27.9				28.0	2.0	350.0	34.0
0570320	DART CONTAINER CORPORATION OF FLORIDA	4	384.9	3,098.2	27.9				15.0	0.5	100.0	76.0
0570320	DART CONTAINER CORPORATION OF FLORIDA	6	384.9	3,098.2	27.9	3.53	0.44	15.45	28.0	2.0	350.0	24.0
0570321	MANTUA MANUFACTURING CO.	2	364.7	3,092.5	7.1	2.92	0.37		20.0	0.8	1,400.0	13.2
0570342	ZIPPERER'S AGAPE MORTUARY SERVICE	1	363.0	3,064.7	24.7				20.0	1.3	588.0	26.0
0570370	PARADISE, INC.	1	388.5	3,099.0	31.6				33.0	2.8	450.0	19.0
0570370	PARADISE, INC.	2	388.5	3,099.0	31.6				33.0	2.8	450.0	19.0
0570370	PARADISE, INC.	3	388.5	3,099.0	31.6				32.0	2.1	450.0	41.0
0570370	PARADISE, INC.	4	388.5	3,099.0	31.6	0.80	0.10	3.49	37.0	1.3	450.0	40.2
0570370	PARADISE, INC.	5	388.5	3,099.0	31.6				43.0	3.7	80.0	48.5
0570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	1	364.0	3,089.5	5.5				75.0	3.0	216.0	82.8
0570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	2	364.0	3,089.5	5.5				75.0	5.0	216.0	29.0
0570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	3	364.0	3,089.5	5.5				34.0	5.0	78.0	41.0
0570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	4	364.0	3,089.5	5.5				34.0	5.0	78.0	41.0
0570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	12	364.0	3,089.5	5.5							
0570378	HILLSBOROUGH RESOURCE RECOVERY, INC	1	362.8	3,088.3	4.3							
0570378	HILLSBOROUGH RESOURCE RECOVERY, INC	2	362.8	3,088.3	4.3							
0570408	PRODICA LLC	1	358.4	3,088.4	0.6				25.0	0.7	70.0	21.0
0570408	PRODICA LLC	2	358.4	3,088.4	0.6				17.0	3.7	150.0	27.0
0570409	CONIGLIO CONSTRUCTION AND DEMOLITION DEB	1	368.9	3,104.2	18.4	40.00	5.04	48.64				
0570412	VULCAN/ICA COMPANY	1	359.1	3,086.9	2.2							
0570412	VULCAN/ICA COMPANY	2	359.1	3,086.9	2.2							
0570412	VULCAN/ICA COMPANY	3	359.1	3,086.9	2.2							
0570412	VULCAN/ICA COMPANY	4	359.1	3,086.9	2.2							
0570417	INTERNATIONAL PAPER, OFFICE 8-213	2	391.7	3,099.3	34.7			0.13				
0570417	INTERNATIONAL PAPER, OFFICE 8-213	5	391.7	3,099.3	34.7							
0570417	INTERNATIONAL PAPER, OFFICE 8-213	6	391.7	3,099.3	34.7	0.13	0.02	0.56				
0570431	FLORIDA MORTUARY	1	357.3	3,098.1	9.2							
0570434	TRANSFER-ONE, INC	1	362.4	3,093.2	5.7						77.0	
0570436	BAY CITY SAND, INC.	1	362.8	3,096.1	8.3							
0570437	NEWSPAPER PRINTING COMPANY	2	350.5	3,085.5	8.8				33.0	1.5		
0570438	FLORIDA GAS TRANSMISSION COMPANY	1	391.9	3,106.6	37.7			14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	1	391.9	3,106.6	37.7			14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	2	391.9	3,106.6	37.7			14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	3	391.9	3,106.6	37.7	3.95	0.50	17.30	20.0	2.0	837.0	147.0
0570442	GULF MARINE REPAIR CORPORATION	3	360.3	3,091.9	3.4			127.00				
0570455	PASCO TERMINALS, INC.	1	359.1	3,087.0	2.1							
0570459	BAUSCH&LOMB PHARMACEUTICALS	2	366.4	3,105.7	18.5			17.97	37.0			

Table 1. FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	(g/s)	(tpy)	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Velocity (ft/sec)
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	4	387.1	3,089.5	28.6	2.97	0.37	12.50	30.0	2.0		
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	12	387.1	3,089.5	28.6							
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	15	387.1	3,089.5	28.6							
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	16	387.1	3,089.5	28.6							
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	17	387.1	3,089.5	28.6							
0570460	JAMES HARDIE BUILDING PRODUCTS INC,	18	387.1	3,089.5	28.6							
0570461	BLACKLIDGE EMULSIONS INCORPORATED	3	359.5	3,093.2	4.3			3.69	20.0		320.0	
0570461	BLACKLIDGE EMULSIONS INCORPORATED	4	359.5	3,093.2	4.3			0.11				
0570480	UNIVERSITY OF SOUTH FLORIDA (USF)	1	360.8	3,104.8	15.9				65.0	4.7		
0570480	UNIVERSITY OF SOUTH FLORIDA (USF)	2	360.8	3,104.8	15.9				65.0	4.7		
0570480	UNIVERSITY OF SOUTH FLORIDA (USF)	3	360.8	3,104.8	15.9				65.0	4.7		
0570480	UNIVERSITY OF SOUTH FLORIDA (USF)	5	360.8	3,104.8	15.9							
0570854	HILLSBOROUGH COUNTY SOLID WASTE MGT. DE.	2	383.0	3,073.0	29.3							
0571029	WILLAMETTE INDUSTRIES INC	2	391.2	3,095.9	33.4							
0571118	UNIVERSITY COMMUNITY HOSPITAL	1	360.3	3,105.4	16.4							
0571118	UNIVERSITY COMMUNITY HOSPITAL	2	360.3	3,105.4	16.4							
0571118	UNIVERSITY COMMUNITY HOSPITAL	3	360.3	3,105.4	16.4							
0571118	UNIVERSITY COMMUNITY HOSPITAL	5	360.3	3,105.4	16.4							
0571118	UNIVERSITY COMMUNITY HOSPITAL	8	360.3	3,105.4	16.4							
0571128	SOUTH FLORIDA BAPTIST HOSPITAL	1	388.0	3,099.3	31.2							
0571130	BRANDON REGIONAL MEDICAL CENTER	1	374.5	3,090.5	16.1				29.0	2.0	500.0	
0571147	SMITHFIELD FOODS, INC.	1	389.6	3,099.4	32.8				21.0	2.5	400.0	22.1
0571147	SMITHFIELD FOODS, INC.	2	389.6	3,099.4	32.8				21.0	1.5	400.0	40.6
0571147	SMITHFIELD FOODS, INC.	3	389.6	3,099.4	32.8							
0571151	WEYERHAEUSER COMPANY	2	362.8	3,098.3	10.2			12.50	34.0	2.0		
0571205	STOROPACK, INC.	1	363.4	3,093.2	6.4							
0571209	APAC-FLORIDA, INC.	2	359.9	3,088.1	1.6							
0571217	SEA 3 OF FLORIDA, INC.	3	360.1	3,087.1	2.5			20.55				
0571242	NATIONAL GYPSUM	1	364.7	3,075.6	14.8			9.60	98.0	3.8	350.0	28.2
0571242	NATIONAL GYPSUM	2	364.7	3,075.6	14.8				98.0	3.8	350.0	28.2
0571242	NATIONAL GYPSUM	3	364.7	3,075.6	14.8				98.0	3.8	350.0	28.2
0571242	NATIONAL GYPSUM	4	364.7	3,075.6	14.8				98.0	3.8	350.0	28.2
0571242	NATIONAL GYPSUM	5	364.7	3,075.6	14.8							
0810001	COASTAL FUELS MARKETING, INC.	1	348.0	3,057.7	33.0	4.62	0.58	20.24	25.0	1.8	375.0	28.0
0810001	COASTAL FUELS MARKETING, INC.	2	348.0	3,057.7	33.0	4.62	0.58	20.24	25.0	1.8	375.0	28.0
0810001	COASTAL FUELS MARKETING, INC.	3	348.0	3,057.7	33.0	0.34	0.04	1.49	22.0	1.0	510.0	56.0
0810001	COASTAL FUELS MARKETING, INC.	4	348.0	3,057.7	33.0	0.34	0.04	1.49	22.0	1.0	510.0	56.0
0810001	COASTAL FUELS MARKETING, INC.	5	348.0	3,057.7	33.0	0.34	0.04	1.49	22.0	1.0	510.0	56.7
0810002	PINEY POINT PHOSPHATES, INC.	1	349.7	3,057.3	32.9	10.00	1.26	43.80	200.0	7.8	147.0	33.5
0810002	PINEY POINT PHOSPHATES, INC.	6	349.7	3,057.3	32.9				200.0	7.0	97.0	52.0
0810002	PINEY POINT PHOSPHATES, INC.	14	349.7	3,057.3	32.9							
0810003	GATOR ASPHALT PAVING INC	1	348.7	3,037.5	52.5				29.0	1.9	185.0	177.0
0810007	TROPICANA PRODUCTS, INC.	1	348.1	3,041.0	49.2				95.0	3.0	140.0	70.0
0810007	TROPICANA PRODUCTS, INC.	2	348.1	3,041.0	49.2				95.0	3.0	140.0	70.0
0810007	TROPICANA PRODUCTS, INC.	3	348.1	3,041.0	49.2				95.0	3.2	140.0	62.0
0810007	TROPICANA PRODUCTS, INC.	11	348.1	3,041.0	49.2	32.00	4.03	138.00	71.0	6.3	441.0	25.0
0810007	TROPICANA PRODUCTS, INC.	12	348.1	3,041.0	49.2	96.70	12.18	423.60	71.0	6.3	536.0	39.0
0810007	TROPICANA PRODUCTS, INC.	14	348.1	3,041.0	49.2	91.00	11.47	391.00	103.0	6.3	489.0	22.0
0810007	TROPICANA PRODUCTS, INC.	15	348.1	3,041.0	49.2	31.40	3.96	80.20	80.0	7.0	540.0	24.0
0810007	TROPICANA PRODUCTS, INC.	15	348.1	3,041.0	49.2	15.70	1.98	68.90	80.0	7.0	540.0	24.0
0810007	TROPICANA PRODUCTS, INC.	16	348.1	3,041.0	49.2	73.00	9.20	314.50	80.0	12.0	268.0	54.0
0810007	TROPICANA PRODUCTS, INC.	21	348.1	3,041.0	49.2	1.13	0.14	4.29	40.0	1.7	300.0	16.0
0810007	TROPICANA PRODUCTS, INC.	22	348.1	3,041.0	49.2	2.42	0.30	1.06	35.0	5.0	1,000.0	15.0
0810007	TROPICANA PRODUCTS, INC.	23	348.1	3,041.0	49.2	2.51	0.32	11.00	27.0	2.0	475.0	31.7
0810010	FLORIDA POWER & LIGHT COMPANY	1	367.3	3,054.2	36.0	2,595.00	326.97	11,366.10	499.0	26.2	325.0	82.5
0810010	FLORIDA POWER & LIGHT COMPANY	2	367.3	3,054.2	36.0	2,595.00	328.97	11,366.10	499.0	26.2	325.0	82.5
0810010	FLORIDA POWER & LIGHT COMPANY	3	367.3	3,054.2	36.0				16.0	1.2	710.0	158.7

Table [illegible] FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	(g/s)	(tpy)	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Velocity (ft/sec)
0810018	BISHOP ANIMAL SHELTER SPCA	2	340.1	3,040.7	51.7				10.0	1.5	750.0	12.0
0810024	FLORIDA POWER & LIGHT COMPANY	1	347.5	3,056.6	34.2	5.43	0.68	16.74	20.0	3.3	650.0	8.9
0810024	FLORIDA POWER & LIGHT COMPANY	2	347.5	3,056.6	34.2	5.43	0.68	16.74	20.0	3.3	650.0	8.9
0810039	TOALE BROTHERS FUNERAL HOME	1	348.2	3,036.9	53.2				16.0	1.3	700.0	25.0
0810045	MANATEE COUNTY ANIMAL CONTROL	2	341.8	3,046.2	46.0	0.21	0.03	0.33	20.0	1.5	850.0	8.0
0810063	AJAX PAVING INDUSTRIES, INC.	1	347.9	3,056.3	34.4				34.0	2.3	300.0	332.9
0810063	AJAX PAVING INDUSTRIES, INC.	2	347.9	3,056.3	34.4							
0810067	ATLAS-TRANSOIL, INC.	1	349.7	3,058.0	32.3				35.0	5.0	1,500.0	42.1
0810069	PALMETTO FUNERAL HOME AND CREMATORY	1	345.4	3,044.7	46.2			0.20	20.0	1.5	1,000.0	32.0
0810079	BENZ RESEARCH & DEVELOPMENT CORP.	1	348.4	3,034.4	55.6			0.51				
0810085	BELSPUR OAKS PET CREMATORY	1	348.7	3,034.8	55.1	0.05	0.01	0.08	24.0	1.0	797.0	30.0
0810085	BELSPUR OAKS PET CREMATORY	2	348.7	3,034.8	55.1	0.17	0.02	0.74				
0810087	GRIFFITH-CLINE FUNERAL HOME- MANASOTA CH	1	346.5	3,036.8	53.6							
0810164	FLOWERS BAKING COMPANY OF BRADENTON INC.	1	350.1	3,034.6	55.1	0.66	0.08	2.89	37.0	1.5	270.0	20.8
0810164	FLOWERS BAKING COMPANY OF BRADENTON INC.	2	350.1	3,034.6	55.1	0.55	0.07	2.41	30.0	0.8	340.0	63.0
0810174	JEFFERSON SMURFIT CORP/BRADENTON CONTAIN	1	348.0	3,040.9	49.3				30.0	2.5	470.0	19.4
0810180	FAMILY CREST MANAGEMENT SERVICES INC	1	354.2	3,040.9	48.3							
1010002	PASCO BEVERAGE COMPANY	5	383.5	3,139.2	56.1	22.80	2.87	89.40	53.0	4.0	350.0	2.0
1010002	PASCO BEVERAGE COMPANY	6	383.5	3,139.2	56.1	12.00	1.51	52.56	53.0	4.4	350.0	1.0
1010002	PASCO BEVERAGE COMPANY	7	383.5	3,139.2	56.1	32.40	4.08	89.40	56.0	5.9	400.0	1.0
1010002	PASCO BEVERAGE COMPANY	26	383.5	3,139.2	56.1	0.13	0.02	0.58	54.0	1.5	450.0	47.0
1010002	PASCO BEVERAGE COMPANY	34	383.5	3,139.2	56.1	0.13	0.02	0.58	54.0	1.3	450.0	95.0
1010017	FLORIDA POWER CORP.	1	324.4	3,118.7	45.2				499.0	24.0	320.0	62.0
1010017	FLORIDA POWER CORP.	2	324.4	3,118.7	45.2				499.0	24.0	320.0	62.0
1010026	HCA NEW PORT RICHEY HOSPITAL	1	333.4	3,133.0	50.6	0.06	0.01		36.0	1.0	520.0	12.0
1010026	HCA NEW PORT RICHEY HOSPITAL	2	333.4	3,133.0	50.6	0.06	0.01		36.0	1.0	520.0	12.0
1010027	R.E. PURCELL CONST. CO., INC.	4	340.6	3,119.2	35.1				32.0	4.0	320.0	96.8
1010027	R.E. PURCELL CONST. CO., INC.	5	340.6	3,119.2	35.1							
1010027	R.E. PURCELL CONST. CO., INC.	6	340.6	3,119.2	35.1							
1010028	OVERSTREET PAVING CO	1	355.9	3,143.7	54.7	18.75	2.36	37.50	30.0	4.3	275.0	58.5
1010028	OVERSTREET PAVING CO	2	355.9	3,143.7	54.7	0.14	0.02	0.61				
1010041	APAC - FLORIDA, INC. -TAMPA DIVISIONON	1	340.7	3,119.5	35.3				35.0	4.2	300.0	87.0
1010042	SCI FUNERAL SERVICES OF FLORIDA	2	335.0	3,136.5	53.0	1.19	0.15	8.83	24.0	1.6	1,099.0	21.0
1010043	OAKCREST PET CEMETARY	1	359.4	3,119.7	30.7				15.0	1.7	600.0	18.0
1010045	FUNERAL SERVICES ACQUISITION GROUP, INC.	1	383.3	3,133.6	51.0				15.0	1.7	600.0	18.0
1010051	PASCO COUNTY ANIMAL CONTROL	1	353.7	3,122.1	33.4							
1010056	PASCO COUNTY (OWNER)	1	348.8	3,138.8	50.7	90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	2	348.8	3,138.8	50.7	90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	3	348.8	3,138.8	50.7	90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	5	348.8	3,138.8	50.7	0.30	0.04	1.32	50.0	1.3	330.0	37.0
1010064	SUNBELT PUBLISHING CO.	1	333.3	3,133.0	50.7							
1010070	CHAMPEAU STORAGE & RECYCLING	1	343.5	3,118.3	32.9				167.0	33.3	1,700.0	
1010071	PASCO COGEN LIMITED	1	385.1	3,139.0	56.6	42.75	5.39	202.25	275.0	4.8	310.0	
1010071	PASCO COGEN LIMITED	2	385.1	3,139.0	56.6	42.50	5.36	202.35	275.0	4.8	299.0	
1010327	COASTAL LANDFILL DISPOSAL, INC.	1	341.5	3,143.2	56.8							
1010360	M.K.G. CARE, INC.	1	331.7	3,123.1	43.4				15.0	1.5	600.0	12.7
1010364	B & T REBUILDERS	1	333.9	3,129.9	47.7				17.0	0.7	1,400.0	26.0
1010365	TRINITY MEMORIAL CEMETARY INC	1	340.7	3,119.1	34.9				15.0	1.5	600.0	15.1
1010373	IPS AVON PARK CORP.	1	347.0	3,139.0	51.3	351.00	44.23	252.00				
1010373	IPS AVON PARK CORP.	1	347.0	3,139.0	51.3	64.10	8.08	252.00				
1010373	IPS AVON PARK CORP.	2	347.0	3,139.0	51.3	351.00	44.23	252.00				
1010373	IPS AVON PARK CORP.	2	347.0	3,139.0	51.3	64.10	8.08	252.00				
1010373	IPS AVON PARK CORP.	3	347.0	3,139.0	51.3	351.00	44.23	252.00				
1010373	IPS AVON PARK CORP.	3	347.0	3,139.0	51.3	64.10	8.08	252.00				
1030004	APAC - FLORIDA, INC. -TAMPA DIVISION	1	334.3	3,085.6	24.4				40.0	4.0	290.0	
1030011	FLORIDA POWER CORPORATION	1	342.4	3,082.6	17.3	329.90	41.57	1,444.80	300.0	9.0	312.0	119.0
1030011	FLORIDA POWER CORPORATION	2	342.4	3,082.6	17.3	368.70	46.46	1,614.80	300.0	9.0	305.0	102.0

Tab[illegible] FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
1030011	FLORIDA POWER CORPORATION	3	342.4	3,082.6	17.3	619.20	78.02	4,818.00	300.0	11.0	275.0	113.0
1030011	FLORIDA POWER CORPORATION	4	342.4	3,082.6	17.3	2.20	0.28	9.64	30.0	3.0	515.0	17.0
1030011	FLORIDA POWER CORPORATION	5	342.4	3,082.6	17.3				45.0	17.3	930.0	73.0
1030011	FLORIDA POWER CORPORATION	6	342.4	3,082.6	17.3				45.0	17.3	930.0	73.0
1030011	FLORIDA POWER CORPORATION	7	342.4	3,082.6	17.3				45.0	17.3	930.0	73.0
1030011	FLORIDA POWER CORPORATION	8	342.4	3,082.6	17.3				45.0	17.3	930.0	73.0
1030012	FLORIDA POWER CORPORATION	1	336.5	3,098.4	23.9	383.70	48.35	1,680.00	174.0	12.5	312.0	27.0
1030012	FLORIDA POWER CORPORATION	2	336.5	3,098.4	23.9	366.00	46.12	1,603.20	174.0	12.5	310.0	27.0
1030012	FLORIDA POWER CORPORATION	3	336.5	3,098.4	23.9	383.70	48.35	1,680.00	174.0	12.5	301.0	24.0
1030012	FLORIDA POWER CORPORATION	4	336.5	3,098.4	23.9	273.37	34.44	1,197.36	55.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	5	336.5	3,098.4	23.9	273.37	34.44	1,197.36	56.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	6	336.5	3,098.4	23.9	304.69	38.39	1,334.56	55.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	7	336.5	3,098.4	23.9	304.69	38.39	1,334.56	55.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	8	336.5	3,098.4	23.9							
1030012	FLORIDA POWER CORPORATION	9	336.5	3,098.4	23.9							
1030012	FLORIDA POWER CORPORATION	11	336.5	3,098.4	23.9							
1030013	FLORIDA POWER CORPORATION	1	338.8	3,071.3	26.5	225.08	28.36		40.0	22.9	900.0	21.0
1030013	FLORIDA POWER CORPORATION	2	338.8	3,071.3	26.5	231.46	29.16		40.0	22.9	900.0	21.0
1030013	FLORIDA POWER CORPORATION	3	338.8	3,071.3	26.5	213.56	26.91		40.0	22.9	900.0	21.0
1030013	FLORIDA POWER CORPORATION	4	338.8	3,071.3	26.5	206.11	25.97		40.0	22.9	900.0	21.0
1030017	CEMETERY MANAGEMENT, INC.	4	331.3	3,086.3	27.3				20.0	2.0	900.0	10.0
1030017	CEMETERY MANAGEMENT, INC.	5	331.3	3,086.3	27.3				15.0	1.5	600.0	15.1
1030018	PINELLAS COUNTY ANIMAL SERVICES	2	321.8	3,085.9	36.8				18.0	1.5	1,000.0	34.0
1030020	SPCA OF PINELLAS COUNTY	1	326.3	3,086.2	32.3	0.35	0.04	0.16	30.0	1.0	1,200.0	63.0
1030026	OVERSTREET PAVING COMPANY, INC.	1	326.2	3,086.9	32.4	18.95	2.39	38.38	30.0	10.0	275.0	16.6
1030026	OVERSTREET PAVING COMPANY, INC.	2	326.2	3,086.9	32.4	0.20	0.03	0.88				
1030035	DIRECTORS SERVICES, INC.	1	337.3	3,077.3	24.2				30.0	1.6	700.0	8.0
1030035	DIRECTORS SERVICES, INC.	2	337.3	3,077.3	24.2				20.0	1.5	900.0	24.0
1030037	EWELL INDUSTRIES, INC.	1	337.6	3,102.7	25.0				70.0	2.0	78.0	15.0
1030044	SUNCOAST PAVING, INC.	1	326.0	3,116.7	42.7				30.0	3.0	147.0	45.0
1030045	EWELL INDUSTRIES, INC.	1	330.7	3,087.4	27.9				40.0	1.0	87.0	63.0
1030045	EWELL INDUSTRIES, INC.	2	330.7	3,087.4	27.9				40.0	1.0	77.0	16.0
1030045	EWELL INDUSTRIES, INC.	3	330.7	3,087.4	27.9				70.0	1.0	77.0	18.0
1030045	EWELL INDUSTRIES, INC.	4	330.7	3,087.4	27.9				20.0	2.0	78.0	35.8
1030045	EWELL INDUSTRIES, INC.	5	330.7	3,087.4	27.9				15.0	1.0	77.0	
1030047	NATIONAL CREMATION SOCIETY	2	329.1	3,088.9	29.4	0.34	0.04	1.47	18.0	1.7	800.0	30.0
1030054	THE MINUTE MAID COMPANY	1	324.3	3,100.7	36.1				50.0	1.0	160.0	15.9
1030054	THE MINUTE MAID COMPANY	4	324.3	3,100.7	36.1	0.46	0.06	6.00	150.0	11.0	230.0	
1030054	THE MINUTE MAID COMPANY	5	324.3	3,100.7	36.1				32.0	2.0	350.0	13.0
1030060	LARGO WASTEWATER TREATMENT PLANT	1	332.4	3,087.9	26.1				65.0	3.1	275.0	44.8
1030061	ACRE IRON & METAL	3	329.7	3,082.1	29.6				40.0	5.0	77.0	38.0
1030070	MORTON PLANT MEASE HEALTH CARE	2	324.7	3,099.7	35.5	1.44	0.18	6.31			350.0	
1030075	ON CALL CREMATORY	4	331.0	3,081.1	28.6			0.74	16.0	1.7	1,136.0	15.8
1030078	FLORIDA ROCK INDUSTRIES	1	335.5	3,102.6	26.7				25.0	1.0	78.0	175.0
1030091	MORTON PLANT MEASE HEALTH CARE	5	322.6	3,093.1	36.1	1.64	0.21	5.97	20.0	2.0	350.0	41.0
1030091	MORTON PLANT MEASE HEALTH CARE	6	322.6	3,093.1	36.1	1.64	0.21	5.97	20.0	2.0	350.0	41.0
1030091	MORTON PLANT MEASE HEALTH CARE	7	322.6	3,093.1	36.1	20.20	2.54	22.12				
1030095	BAYFRONT MEDICAL CENTER	2	338.1	3,071.8	26.7				35.0	2.0	140.0	135.0
1030098	ESSILOR OF AMERICA, INC.	1	327.5	3,077.8	33.0				21.0	1.2	80.0	33.7
1030112	R P SCHERER NORTH AMERICA	6	335.3	3,087.7	23.2				15.0	1.0	350.0	
1030112	R P SCHERER NORTH AMERICA	7	335.3	3,087.7	23.2				20.0	1.0	320.0	
1030113	DAVIS CONCRETE, INC.	1	324.2	3,100.4	36.1				42.0	2.6	77.0	13.0
1030113	DAVIS CONCRETE, INC.	2	324.2	3,100.4	36.1				42.0	2.6	77.0	13.0
1030114	METAL INDUSTRIES, INC.	1	336.7	3,101.0	24.9			12.12	35.0	4.9	800.0	1.0
1030117	PINELLAS CO. BOARD OF CO. COMMISSIONERS	1	335.2	3,084.1	23.8				161.0	7.8	449.0	88.0
1030117	PINELLAS CO. BOARD OF CO. COMMISSIONERS	2	335.2	3,084.1	23.8				161.0	7.6	449.0	88.0
1030117	PINELLAS CO. BOARD OF CO. COMMISSIONERS	3	335.2	3,084.1	23.8	205.30	25.87	899.20	165.0	9.0	450.0	90.0

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	(g/s)	(tpy)	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Velocity (ft/sec)
1030118	SCHNELLER INC., FLORIDA DIVISION	3	332.5	3,079.2	27.8				25.0	2.8	749.0	30.9
1030119	FILM TECHNOLOGIES INT, INC	1	335.6	3,071.9	28.6				34.0	2.0	255.0	57.0
1030119	FILM TECHNOLOGIES INT, INC	2	335.6	3,071.9	28.6				34.0	2.0	255.0	57.0
1030127	METAL CULVERTS	1	329.1	3,089.1	29.4				20.0	1.0	325.0	63.0
1030129	PINELLAS MEMORIAL PET CEMETERY	1	329.9	3,081.6	29.6	0.60	0.08	0.54	15.0	1.5	1,800.0	16.5
1030129	PINELLAS MEMORIAL PET CEMETERY	2	329.9	3,081.6	29.6	0.31	0.04	0.32	15.0	1.5	950.0	16.5
1030131	E JAMES REECE FUNERAL HOME	1	322.9	3,080.3	36.7				18.0	1.5	1,000.0	27.0
1030132	COOPER COIL COATING, INC.	1	334.0	3,086.9	24.6	2.10	0.26	9.20	41.0	3.6	800.0	17.0
1030132	COOPER COIL COATING, INC.	2	334.0	3,086.9	24.6	1.96	0.25	8.58	40.0	3.0	818.0	31.5
1030136	REFLECTION PET FUNERAL HOME	1	335.3	3,079.1	25.2				17.0	1.1	900.0	27.0
1030140	METAL INDUSTRIES INC.	6	328.8	3,116.4	40.4				28.0	3.0	77.0	41.3
1030147	SONNY GLASBRENNER, INC.	1	334.3	3,085.6	24.4							
1030147	SONNY GLASBRENNER, INC.	2	334.3	3,085.6	24.4							
1030147	SONNY GLASBRENNER, INC.	3	334.3	3,085.6	24.4	27.40	3.45	42.80	15.0	0.7		248.9
1030148	SUN N FUN PRINTING CO.,INC.	2	332.7	3,085.2	26.1				12.0	25.7	650.0	0.1
1030148	SUN N FUN PRINTING CO.,INC.	3	332.7	3,085.2	26.1				35.0	5.3		
1030153	HOWCO ENVIRONMENTAL SERVICES, INC.	3	333.1	3,071.5	30.9				25.0	0.3	190.0	
1030157	HEATH AND COMPANY, L.L.C.	5	336.9	3,102.3	25.4				30.0	1.0	160.0	6.4
1030165	JACOBSEN MANUFACTURING, INC.	1	332.9	3,097.3	26.9							
1030166	IRWIN YACHT & MARINE CORP.	1	332.6	3,086.0	26.1							
1030172	WATKINS YACHT, INC.	1	332.6	3,085.6	26.1							
1030175	GAGNE WALLCOVERINGS	1	327.6	3,096.8	31.9						85.0	
1030180	INTERPRINT, INC.	1	335.0	3,085.0	23.8				25.0	2.0	650.0	8.3
1030192	R.R. DONNELLEY & SONS COMPANY	1	329.9	3,071.1	33.8				30.0	1.6	350.0	38.0
1030210	MEDICO ENVIRONMENTAL SERVICES, INC.	1	331.3	3,086.3	27.3				40.0	3.0	130.0	38.6
1030214	LIFE-LIKE PRODUCTS INC	2	330.3	3,084.8	28.5			8.65				
1030217	ABC CREMATORY (PREV PARKLAWN MEM GARDEN)	1	328.2	3,101.4	32.7	0.38	0.05	1.66	16.0	1.7	689.0	24.0
1030218	M C GRAPHICS, INC., MODERN GRAPHIC ARTS	3	337.2	3,083.2	22.1				40.0	2.0	75.0	1.6
1030227	CITY OF CLEARWATER	1	332.3	3,101.2	28.9							
1030228	CITY OF CLEARWATER	1	324.0	3,096.2	35.2							
1030229	CITY OF CLEARWATER	1	332.4	3,101.7	29.0							
1030230	CITY OF DUNEDIN	1	324.2	3,100.9	36.3							
1030231	CITY OF LARGO	1	332.3	3,087.9	26.2							
1030232	PINELLAS COUNTY GOVERNMENT	1	317.8	3,084.8	40.9							
1030233	PINELLAS COUNTY GOVERNMENT	1	326.9	3,114.1	40.3							
1030234	PINELLAS COUNTY GOVERNMENT	1	328.4	3,078.8	31.8							
1030235	CITY OF ST. PETERSBURG	1	339.6	3,071.8	25.6							
1030236	CITY OF ST. PETERSBURG	1	340.5	3,079.0	20.6							
1030237	CITY OF ST. PETERSBURG	1	328.4	3,075.4	33.0							
1030238	CITY OF ST. PETERSBURG	1	333.7	3,066.9	33.2							
1030240	VAL-PAK DIRECT MARKETING SYSTEMS, INC.	1	326.4	3,084.2	32.5				40.0	1.2	500.0	33.0
1030248	NEW YORK DRY CLEANERS & TAILORS	1	327.1	3,115.0	40.8							
1030282	ANDERSON-MCQUEEN COMPANY	1	327.9	3,076.8	33.0							
1030288	BAYCARE SERVICES INC	1	333.1	3,084.4	25.8	1.64	0.21	7.17				
1030288	BAYCARE SERVICES INC	2	333.1	3,084.4	25.8	1.64	0.21	7.17				
1030443	LORAD CHEMICAL CORPORATION	2	336.5	3,074.2	26.5			2.41	25.0	0.7	100.0	
1050003	LAKELAND ELECTRIC & WATER UTILITIES	3	408.9	3,102.5	52.2	154.00	19.40	674.00	165.0	10.0	340.0	21.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	4	408.9	3,102.5	52.2	331.00	41.71	1,448.00	165.0	10.0	340.0	22.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	5	408.9	3,102.5	52.2	145.90	18.38	639.00	31.0	11.8	800.0	101.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	6	408.9	3,102.5	52.2	145.90	18.38	639.00	31.0	11.8	800.0	101.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	8	408.9	3,102.5	52.2	176.00	22.18	425.00	155.0	16.0	481.0	85.7
1050003	LAKELAND ELECTRIC & WATER UTILITIES	8	408.9	3,102.5	52.2	176.00	22.18	244.00	155.0	16.0	481.0	85.7
1050003	LAKELAND ELECTRIC & WATER UTILITIES	9	408.9	3,102.5	52.2							
1050003	LAKELAND ELECTRIC & WATER UTILITIES	10	408.9	3,102.5	52.2							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	1	409.0	3,106.2	53.3	529.00	66.65	2,317.00	150.0	9.0	277.0	81.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	2	409.0	3,106.2	53.3	86.80	10.94	380.18	20.0	2.6	715.0	77.0
1050004	LAKELAND ELECTRIC & WATER UTILITIES	3	409.0	3,106.2	53.3	86.80	10.94	380.18	20.0	2.6	715.0	77.0

Table 1. FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	(g/s)	(tpy)	Stack Parameters Height (ft)	Diameter (ft)	Temperature (°F)	Velocity (ft/sec)
1050004	LAKELAND ELECTRIC & WATER UTILITIES	4	409.0	3,106.2	53.3	223.36	28.14	978.32	35.0	13.5	900.0	79.5
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5	409.0	3,106.2	53.3	236.90	29.85	1,037.60	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5	409.0	3,106.2	53.3	334.50	42.15	1,465.10	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5	409.0	3,106.2	53.3	334.50	42.15	1,465.10	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6	409.0	3,106.2	53.3	728.00	91.73	3,188.60	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6	409.0	3,106.2	53.3	2,548.00	321.05	11,160.20	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6	409.0	3,106.2	53.3	1,092.00	137.59	4,782.96	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	8	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	9	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	10	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	11	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	12	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	13	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	20	409.0	3,106.2	53.3							
1050004	LAKELAND ELECTRIC & WATER UTILITIES	28	409.0	3,106.2	53.3	237.00	29.86	1,038.00	85.0	28.0	1,095.0	82.7
1050004	LAKELAND ELECTRIC & WATER UTILITIES	28	409.0	3,106.2	53.3	413.00	52.04	1,809.00	85.0	28.0	1,095.0	82.7
1050004	LAKELAND ELECTRIC & WATER UTILITIES		409.0	3,106.2	53.3	529.00	66.65	2,317.00	150.0	9.0	277.0	
1050009	FLORIDA TILE INDUSTRIES, INC.	2	405.4	3,102.4	48.8	0.12	0.02	0.53	30.0	2.0	160.0	
1050009	FLORIDA TILE INDUSTRIES, INC.	10	405.4	3,102.4	48.8	0.10	0.01	0.40	40.0	2.0	150.0	1.0
1050009	FLORIDA TILE INDUSTRIES, INC.	18	405.4	3,102.4	48.8				20.0	0.4	70.0	321.0
1050009	FLORIDA TILE INDUSTRIES, INC.	19	405.4	3,102.4	48.8				88.0	3.4	176.0	90.0
1050009	FLORIDA TILE INDUSTRIES, INC.	25	405.4	3,102.4	48.8				20.0	0.4	70.0	2.0
1050009	FLORIDA TILE INDUSTRIES, INC.	26	405.4	3,102.4	48.8				38.0	2.7	482.0	
1050009	FLORIDA TILE INDUSTRIES, INC.	33	405.4	3,102.4	48.8				30.0	0.5	150.0	2.0
1050009	FLORIDA TILE INDUSTRIES, INC.	34	405.4	3,102.4	48.8				30.0	0.5	150.0	2.0
1050009	FLORIDA TILE INDUSTRIES, INC.	40	405.4	3,102.4	48.8	0.27	0.03	1.18	30.0	1.6	482.0	13.0
1050009	FLORIDA TILE INDUSTRIES, INC.	43	405.4	3,102.4	48.8				26.0	1.5	220.0	41.7
1050009	FLORIDA TILE INDUSTRIES, INC.	44	405.4	3,102.4	48.8				39.0	2.0	513.0	48.9
1050009	FLORIDA TILE INDUSTRIES, INC.	46	405.4	3,102.4	48.8				33.0	1.0	120.0	59.4
1050009	FLORIDA TILE INDUSTRIES, INC.	47	405.4	3,102.4	48.8				33.0	1.0	120.0	59.4
1050009	FLORIDA TILE INDUSTRIES, INC.	51	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	52	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	53	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	54	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	55	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	56	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	57	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	58	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	59	405.4	3,102.4	48.8							
1050009	FLORIDA TILE INDUSTRIES, INC.	60	405.4	3,102.4	48.8							
1050015	FLORIDA JUICE PARTNERS, LTD.	1	399.0	3,101.8	42.5	7.47	0.94		90.0	3.0	140.0	24.0
1050015	FLORIDA JUICE PARTNERS, LTD.	2	399.0	3,101.8	42.5	2.38	0.30		33.0	2.0	345.0	17.0
1050015	FLORIDA JUICE PARTNERS, LTD.	3	399.0	3,101.8	42.5	2.38	0.30		34.0	3.0	345.0	30.0
1050021	ASHLAND SPECIALTY CHEMICAL COMPANY	1	411.1	3,085.9	52.7	0.18	0.02		8.0	1.3	600.0	3.0
1050021	ASHLAND SPECIALTY CHEMICAL COMPANY	6	411.1	3,085.9	52.7				30.0	2.0		
1050032	NORTH LAKELAND RECYCLING, INC.	1	404.4	3,112.5	51.5				25.0	1.1	450.0	8.0
1050034	IMC-AGRICO CO. (CFMO)	2	398.2	3,075.7	41.9				60.0	2.5	110.0	64.0
1050034	IMC-AGRICO CO. (CFMO)	3	398.2	3,075.7	41.9				58.0	1.9	100.0	49.0
1050034	IMC-AGRICO CO. (CFMO)	4	398.2	3,075.7	41.9				70.0	7.0	165.0	47.0
1050034	IMC-AGRICO CO. (CFMO)	8	398.2	3,075.7	41.9				28.0	1.0	400.0	23.5
1050034	IMC-AGRICO CO. (CFMO)	11	398.2	3,075.7	41.9				76.0	6.5	250.0	56.8
1050034	IMC-AGRICO CO. (CFMO)	12	398.2	3,075.7	41.9				55.0	9.3	155.0	29.0
1050046	CARGILL FERTILIZER, INC.	1	409.8	3,086.6	51.3				99.0	7.5	135.0	53.0
1050046	CARGILL FERTILIZER, INC.	12	409.8	3,086.6	51.3	13.00	1.64	57.00	200.0	6.8	180.0	61.0
1050046	CARGILL FERTILIZER, INC.	21	409.8	3,086.6	51.3				140.0	10.9	132.0	53.0
1050046	CARGILL FERTILIZER, INC.	32	409.8	3,086.6	51.3	13.00	1.64	57.00	200.0	6.8	180.0	61.0
1050046	CARGILL FERTILIZER, INC.	33	409.8	3,086.6	51.3	13.00	1.64	57.00	200.0	6.8	180.0	61.0

Ta[illegible] FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
1050046	CARGILL FERTILIZER, INC.	45	409.8	3,086.6	51.3				20.0	1.0	200.0	57.0
1050046	CARGILL FERTILIZER, INC.	46	409.8	3,086.6	51.3				34.0	1.0	200.0	
1050046	CARGILL FERTILIZER, INC.	47	409.8	3,086.6	51.3				31.0	2.0	200.0	
1050046	CARGILL FERTILIZER, INC.	50	409.8	3,086.6	51.3				40.0	1.0		57.0
1050046	CARGILL FERTILIZER, INC.	51	409.8	3,086.6	51.3				31.0	3.5	410.0	20.0
1050046	CARGILL FERTILIZER, INC.	53	409.8	3,086.6	51.3							
1050047	AGRIFOS, L.L.C.	1	398.7	3,085.3	40.4	35.80	4.51	156.80	80.0	7.5	160.0	41.0
1050047	AGRIFOS, L.L.C.	2	398.7	3,085.3	40.4	35.20	4.44	154.20	80.0	7.5	160.0	41.0
1050047	AGRIFOS, L.L.C.	15	398.7	3,085.3	40.4							
1050048	MULBERRY PHOSPHATES, INC.	2	406.8	3,085.1	48.5				200.0	7.0	200.0	32.0
1050048	MULBERRY PHOSPHATES, INC.	5	406.8	3,085.1	48.5	11.00	1.39	18.40	102.0	8.8	110.0	26.0
1050048	MULBERRY PHOSPHATES, INC.	9	406.8	3,085.1	48.5	23.93	3.02	104.81	45.0	3.7	80.0	8.0
1050048	MULBERRY PHOSPHATES, INC.	24	406.8	3,085.1	48.5							
1050048	MULBERRY PHOSPHATES, INC.	38	406.8	3,085.1	48.5							
1050050	U S AGRI-CHEMICALS CORP.	38	413.2	3,086.3	54.8				131.0	7.0	130.0	79.0
1050050	U S AGRI-CHEMICALS CORP.	40	413.2	3,086.3	54.8							
1050052	CF INDUSTRIES, INC.	6	408.3	3,082.5	50.2				206.0	7.0	140.0	21.0
1050052	CF INDUSTRIES, INC.	21	408.3	3,082.5	50.2				36.0	2.5	600.0	44.0
1050052	CF INDUSTRIES, INC.	36	408.3	3,082.5	50.2							
1050053	FARMLAND HYDRO, L.P.	3	410.3	3,079.7	52.6				100.0	7.5	170.0	28.0
1050053	FARMLAND HYDRO, L.P.	4	410.3	3,079.7	52.6				100.0	7.5	180.0	34.7
1050053	FARMLAND HYDRO, L.P.	5	410.3	3,079.7	52.6	11.90	1.50	52.20	150.0	8.0	180.0	37.8
1050053	FARMLAND HYDRO, L.P.	7	410.3	3,079.7	52.6				129.0	7.5	129.0	40.0
1050053	FARMLAND HYDRO, L.P.	9	410.3	3,079.7	52.6	29.10	3.67	64.80	65.0	1.0	120.0	14.0
1050053	FARMLAND HYDRO, L.P.	14	410.3	3,079.7	52.6				60.0	0.8	61.0	1.0
1050053	FARMLAND HYDRO, L.P.	15	410.3	3,079.7	52.6				60.0	1.3	80.0	2.0
1050053	FARMLAND HYDRO, L.P.	16	410.3	3,079.7	52.6				100.0	3.5	98.0	51.0
1050053	FARMLAND HYDRO, L.P.	17	410.3	3,079.7	52.6				100.0	3.5	105.0	51.0
1050053	FARMLAND HYDRO, L.P.	28	410.3	3,079.7	52.6	11.00	1.39		95.0	5.5	630.0	11.0
1050053	FARMLAND HYDRO, L.P.	29	410.3	3,079.7	52.6	7.20	0.91	31.30	129.0	7.5	108.0	43.0
1050053	FARMLAND HYDRO, L.P.	30	410.3	3,079.7	52.6				40.0	2.0	200.0	
1050053	FARMLAND HYDRO, L.P.	31	410.3	3,079.7	52.6				40.0	2.0	200.0	
1050053	FARMLAND HYDRO, L.P.	32	410.3	3,079.7	52.6				40.0	2.0	200.0	
1050053	FARMLAND HYDRO, L.P.	33	410.3	3,079.7	52.6				40.0	0.7	200.0	1.0
1050053	FARMLAND HYDRO, L.P.	34	410.3	3,079.7	52.6				10.0	0.8	200.0	54.0
1050053	FARMLAND HYDRO, L.P.	35	410.3	3,079.7	52.6				40.0	2.0	200.0	
1050053	FARMLAND HYDRO, L.P.	36	410.3	3,079.7	52.6				10.0	0.5	200.0	1.0
1050053	FARMLAND HYDRO, L.P.	38	410.3	3,079.7	52.6	13.80	1.74	60.00	150.0	9.0	180.0	34.8
1050055	IMC-AGRICO CO.(SO. PIERCE)	1	407.5	3,071.4	52.1	17.64	2.22		35.0	4.8	430.0	51.0
1050055	IMC-AGRICO CO.(SO. PIERCE)	3	407.5	3,071.4	52.1				88.0	3.0	94.0	30.0
1050055	IMC-AGRICO CO.(SO. PIERCE)	4	407.5	3,071.4	52.1	15.00	1.89	65.70	144.0	9.0	170.0	41.1
1050055	IMC-AGRICO CO.(SO. PIERCE)	5	407.5	3,071.4	52.1	15.00	1.89	65.70	144.0	9.0	170.0	41.1
1050055	IMC-AGRICO CO.(SO. PIERCE)	23	407.5	3,071.4	52.1				140.0	9.0	110.0	36.0
1050055	IMC-AGRICO CO.(SO. PIERCE)	30	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	31	407.5	3,071.4	52.1				24.0	1.2	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	32	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	33	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	34	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	35	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	36	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	37	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	38	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	39	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	40	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	41	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	42	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	43	407.5	3,071.4	52.1				24.0	1.0	200.0	

Ta[illegible]. FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
1050055	IMC-AGRICO CO.(SO. PIERCE)	44	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050055	IMC-AGRICO CO.(SO. PIERCE)	45	407.5	3,071.4	52.1				24.0	1.0	200.0	
1050056	IMC-AGRICO CO.(PRAIRIE)	4	402.9	3,087.0	44.4	14.03	1.77	61.47	70.0	4.4	184.0	51.0
1050057	IMC-AGRICO CO.(NICHOLS)	2	398.4	3,084.2	40.2				52.0	2.5	120.0	66.0
1050057	IMC-AGRICO CO.(NICHOLS)	3	398.4	3,084.2	40.2				80.0	3.5	130.0	78.0
1050057	IMC-AGRICO CO.(NICHOLS)	5	398.4	3,084.2	40.2	12.50	1.58	54.80	150.0	7.5	170.0	33.0
1050057	IMC-AGRICO CO.(NICHOLS)	12	398.4	3,084.2	40.2				81.0	7.5	130.0	12.0
1050057	IMC-AGRICO CO.(NICHOLS)	15	398.4	3,084.2	40.2				27.0	2.0	500.0	45.0
1050057	IMC-AGRICO CO.(NICHOLS)	16	398.4	3,084.2	40.2				39.0	3.2	500.0	29.0
1050057	IMC-AGRICO CO.(NICHOLS)	20	398.4	3,084.2	40.2				25.0	0.2	90.0	
1050057	IMC-AGRICO CO.(NICHOLS)	21	398.4	3,084.2	40.2				6.0	0.8		
1050057	IMC-AGRICO CO.(NICHOLS)	22	398.4	3,084.2	40.2				6.0	0.8		
1050057	IMC-AGRICO CO.(NICHOLS)	23	398.4	3,084.2	40.2				6.0	0.8		
1050059	IMC-AGRICO CO.(NEW WALES)	2	396.7	3,079.4	39.4	14.50	1.83	63.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	3	396.7	3,079.4	39.4	14.50	1.83	63.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	4	396.7	3,079.4	39.4	14.50	1.83	63.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	9	396.7	3,079.4	39.4	11.70	1.47		133.0	7.0	105.0	49.0
1050059	IMC-AGRICO CO.(NEW WALES)	10	396.7	3,079.4	39.4	15.90	2.00		133.0	6.0	125.0	83.1
1050059	IMC-AGRICO CO.(NEW WALES)	13	396.7	3,079.4	39.4	27.60	3.48	120.80	85.0	3.0	555.0	193.3
1050059	IMC-AGRICO CO.(NEW WALES)	27	396.7	3,079.4	39.4				172.0	8.0	130.0	66.3
1050059	IMC-AGRICO CO.(NEW WALES)	32	396.7	3,079.4	39.4				86.0	1.5	220.0	258.0
1050059	IMC-AGRICO CO.(NEW WALES)	33	396.7	3,079.4	39.4				86.0	1.5	274.0	225.0
1050059	IMC-AGRICO CO.(NEW WALES)	36	396.7	3,079.4	39.4				172.0	4.5	105.0	52.0
1050059	IMC-AGRICO CO.(NEW WALES)	42	396.7	3,079.4	39.4	14.50	1.83	63.50	199.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	44	396.7	3,079.4	39.4	14.50	1.83	63.50	199.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	45	396.7	3,079.4	39.4	12.60	1.59	55.20	171.0	6.0	110.0	58.0
1050059	IMC-AGRICO CO.(NEW WALES)	46	396.7	3,079.4	39.4	12.60	1.59	55.20	171.0	6.0	110.0	58.0
1050059	IMC-AGRICO CO.(NEW WALES)	50	396.7	3,079.4	39.4				100.0	1.8	102.0	37.0
1050059	IMC-AGRICO CO.(NEW WALES)	62	396.7	3,079.4	39.4				40.0	2.0	240.0	
1050059	IMC-AGRICO CO.(NEW WALES)	63	396.7	3,079.4	39.4				40.0	2.0	240.0	
1050059	IMC-AGRICO CO.(NEW WALES)	64	396.7	3,079.4	39.4				40.0	2.0	240.0	
1050059	IMC-AGRICO CO.(NEW WALES)	65	396.7	3,079.4	39.4				40.0	2.0	240.0	
1050059	IMC-AGRICO CO.(NEW WALES)	66	396.7	3,079.4	39.4				40.0	2.0	240.0	
1050059	IMC-AGRICO CO.(NEW WALES)	67	396.7	3,079.4	39.4							
1050059	IMC-AGRICO CO.(NEW WALES)	68	396.7	3,079.4	39.4				25.0	0.1	90.0	
1050059	IMC-AGRICO CO.(NEW WALES)	69	396.7	3,079.4	39.4				25.0	0.1	90.0	
1050059	IMC-AGRICO CO.(NEW WALES)	74	396.7	3,079.4	39.4				172.0	4.5	105.0	70.2
1050081	QUIKRETE OF FLORIDA, INC.(PRE-MIX INDUS)	6	412.8	3,099.0	55.2				18.0	1.8	230.0	249.5
1050095	LAKELAND REGIONAL MEDICAL CENTER	2	406.4	3,104.3	50.3				120.0	1.1	220.0	88.9
1050097	CUSTOM CHEMICALS CORPORATION	1	408.0	3,085.5	49.6	0.36	0.05		35.0	0.7	100.0	732.0
1050097	CUSTOM CHEMICALS CORPORATION	2	408.0	3,085.5	49.6				20.0	1.2	350.0	278.0
1050097	CUSTOM CHEMICALS CORPORATION	3	408.0	3,085.5	49.6				15.0	1.2	350.0	279.0
1050099	AOC, L.L.C.	1	401.0	3,108.5	46.7				10.0	2.0	1,600.0	12.0
1050099	AOC, L.L.C.	2	401.0	3,108.5	46.7			39.45	40.0	4.9	160.0	45.1
1050099	AOC, L.L.C.	3	401.0	3,108.5	46.7			7.02				
1050100	SHELL EPOXY RESINS LLC	1	410.7	3,098.9	53.1	28.19	3.55		25.0	2.0	350.0	600.0
1050100	SHELL EPOXY RESINS LLC	2	410.7	3,098.9	53.1	28.19	3.55		30.0	2.0	350.0	374.0
1050100	SHELL EPOXY RESINS LLC	5	410.7	3,098.9	53.1	0.21	0.03	0.94	35.0	1.1	900.0	25.0
1050100	SHELL EPOXY RESINS LLC	6	410.7	3,098.9	53.1	28.19	3.55		35.0	1.5	350.0	13.0
1050100	SHELL EPOXY RESINS LLC	7	410.7	3,098.9	53.1	28.19	3.55		35.0	1.5	350.0	16.0
1050100	SHELL EPOXY RESINS LLC	8	410.7	3,098.9	53.1				21.0	2.0	800.0	27.0
1050127	JUICE BOWL PRODUCTS	1	409.4	3,099.9	52.0	24.95	3.14		45.0	4.0	350.0	3.0
1050134	HEATH FUNERAL CHAPEL	1	407.1	3,101.9	50.3	0.30	0.04	0.55	15.0	1.7	1,175.0	8.0
1050139	MAXPAK CORPORATION	3	402.0	3,102.0	45.4				50.0	2.0	78.0	4.0
1050146	PAVEX CORPORATION	1	413.0	3,086.2	54.6	19.28	2.43	24.10	40.0	4.0		56.4
1050148	ABB SERVICE, INC.	1	404.9	3,084.1	46.7	0.42	0.05		28.0	1.3	1,400.0	33.0
1050151	CENTRAL FLORIDA HOT-MIX, INC.	2	412.5	3,097.7	54.7				25.0	2.1	250.0	216.0

Ta[illegible] FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project Site (km)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
1050151	CENTRAL FLORIDA HOT-MIX, INC.	3	412.5	3,097.7	54.7				32.0	2.4	214.0	94.8
1050174	PEPPERIDGE FARM, INC	9	403.3	3,104.8	47.5	1.23	0.15	5.40				
1050174	PEPPERIDGE FARM, INC	10	403.3	3,104.8	47.5			5.40				
1050174	PEPPERIDGE FARM, INC	11	403.3	3,104.8	47.5			5.40				
1050174	PEPPERIDGE FARM, INC	12	403.3	3,104.8	47.5			5.40				
1050174	PEPPERIDGE FARM, INC	13	403.3	3,104.8	47.5			3.83				
1050174	PEPPERIDGE FARM, INC	14	403.3	3,104.8	47.5			3.83				
1050182	GEOLOGIC RECOVERY SYSTEMS	1	401.8	3,085.8	43.4	25.90	3.26	69.80	26.0	2.7	1,500.0	98.0
1050192	CARPENTER CO., INSULATION DIVISION	1	412.5	3,098.4	54.8				31.0	3.6	120.0	31.0
1050194	WOOD WASTE RECYCLING, INC.	1	399.0	3,101.5	42.4							
1050196	O. K. WEST & SON	1	411.5	3,098.2	53.8				23.0	1.0	800.0	32.0
1050200	J. H. HULL, INC.	1	399.1	3,070.6	44.6				35.0	2.0		
1050210	AMERICOAT CORPORATION	3	411.4	3,096.7	53.4							
1050210	AMERICOAT CORPORATION	21	411.4	3,096.7	53.4							
1050212	FLORIDA GAS TRANSMISSION COMPANY	1	412.2	3,086.1	53.8				11.0	1.5	837.0	262.0
1050215	WOOD MULCH PRODUCTS, INC.	1	413.0	3,099.0	55.4							
1050220	MACLAN CORPORATION	1	410.9	3,099.6	53.4				13.0	1.0	72.0	16.0
1050227	CENTRAL FLORIDA CREMATORY OF POLK CO.	1	405.0	3,106.5	49.7				24.0	1.7	1,100.0	18.0
1050228	SADLER DRUM COMPANY	2	396.2	3,089.3	37.7							
1050233	TAMPA ELECTRIC COMPANY	1	402.5	3,067.4	49.0	311.00	39.19	2,908.30	150.0	19.0	340.0	75.8
1050233	TAMPA ELECTRIC COMPANY	1	402.5	3,067.4	49.0	664.20	83.69	2,908.30	150.0	19.0	340.0	75.8
1050233	TAMPA ELECTRIC COMPANY											

Ta[illegible] Modeled FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	Modeled (Y/N)	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project AOI (km)	20D Rule (tpy)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
0490015	HARDEE POWER PARTNERS,LTD	1		404.8	3,057.4	54.4		215.90	27.20	945.80	90.0	14.5	236.0	77.5
0490015	HARDEE POWER PARTNERS,LTD	1		404.8	3,057.4	54.4		383.80	48.36	1,681.00	90.0	14.5	236.0	77.5
0490015	HARDEE POWER PARTNERS,LTD	2		404.8	3,057.4	54.4		215.90	27.20	945.60	90.0	14.5	245.0	75.8
0490015	HARDEE POWER PARTNERS,LTD	2		404.8	3,057.4	54.4		383.80	48.36	1,681.00	90.0	14.5	245.0	75.8
0490015	HARDEE POWER PARTNERS,LTD	3		404.8	3,057.4	54.4		215.90	27.20	945.60	75.0	17.9	988.0	94.3
0490015	HARDEE POWER PARTNERS,LTD	3		404.8	3,057.4	54.4		383.80	48.36	1,681.00	75.0	17.9	986.0	94.3
0490015	HARDEE POWER PARTNERS,LTD	5		404.8	3,057.4	54.4		32.00	4.03	140.18	85.0	14.8	999.0	142.0
0490015	HARDEE POWER PARTNERS,LTD	5		404.8	3,057.4	54.4		167.00	21.04	73.15	85.0	14.8	999.0	142.0
	TOTALS		Y				1,087.31			8,093.11				
0490043	IPS AVON PARK CORPORATION	1		408.8	3,044.5	65.4		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	1		408.8	3,044.5	65.4		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	2		408.8	3,044.5	65.4		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	2		408.8	3,044.5	65.4		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	3		408.8	3,044.5	65.4		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	3		408.8	3,044.5	65.4		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	4		408.8	3,044.5	65.4		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
0490043	IPS AVON PARK CORPORATION	4		408.8	3,044.5	65.4		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
	TOTALS		Y				1,308.69			2,016.00				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	37		359.9	3,102.5	11.8				1.99				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	38		359.9	3,102.5	11.8				1.10				
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	41		359.9	3,102.5	11.8				0.10	40.0	0.4	800.0	15.9
0570001	JOHNSON CONTROLS BATTERY GROUP, INC	44		359.9	3,102.5	11.8				1.10				
	TOTALS		N				236.85			4.29				
0570003	CF INDUSTRIES, INC.	1	N	362.8	3,098.4	8.6	172.14			12.70	25.0	2.5	500.0	28.0
0570005	CF INDUSTRIES, INC., PLANT CITY PHOSP	1	N	388.0	3,118.0	38.3	785.30	0.47	0.06	694.00	25.0	3.5	550.0	58.0
0570006	YUENGLING BREWING CO.	1	N	362.0	3,103.2	12.9	257.90	5.80	0.71	50.08	90.0	6.5	275.0	7.0
0570008	CARGILL FERTILIZER, INC.	43		362.9	3,082.5	6.2		50.90	6.41	223.00	20.0	4.0	420.0	52.0
0570008	CARGILL FERTILIZER, INC.	55		362.9	3,082.5	6.2		20.00	2.52	87.60	133.0	7.0	108.0	50.0
0570008	CARGILL FERTILIZER, INC.	78		362.9	3,082.5	6.2		6.50	0.82	26.42	125.0	6.0	108.0	50.0
0570008	CARGILL FERTILIZER, INC.	100		362.9	3,082.5	6.2		3.71	0.47	15.96	70.0	2.5	170.0	64.5
0570008	CARGILL FERTILIZER, INC.	101		362.9	3,082.5	6.2		3.71	0.47	15.96	70.0	2.5	170.0	64.5
0570008	CARGILL FERTILIZER, INC.	103		362.9	3,082.5	6.2		8.50	0.82	28.42	70.0	2.5	170.0	64.5
	TOTALS		Y				123.37			399.36				
0570021	INTERNATIONAL SHIP REPAIR & MARINE SERV.	1	Y	358.0	3,092.8	2.1	41.03			89.00			77.0	
0570022	MARATHON ASHLAND PETROLEUM LLC	5	N	362.2	3,087.2	2.4	48.40			2.80	10.0	1.5	580.0	21.2
0570028	NATIONAL GYPSUM COMPANY	21		348.8	3,082.7	9.9		0.84	0.11	3.87	42.0	1.1	350.0	59.0
0570028	NATIONAL GYPSUM COMPANY	22		348.8	3,082.7	9.9		0.84	0.11	3.67	42.0	1.1	350.0	62.0
0570028	NATIONAL GYPSUM COMPANY	24		348.8	3,082.7	9.9		0.84	0.11	3.87	42.0	1.1	350.0	61.0
0570028	NATIONAL GYPSUM COMPANY	28		348.8	3,082.7	9.9		2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	29		348.8	3,082.7	9.9		2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	30		348.8	3,082.7	9.9		2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	31		348.8	3,082.7	9.9		2.10	0.26	9.00	42.0	1.1	350.0	71.0
0570028	NATIONAL GYPSUM COMPANY	34		348.8	3,082.7	9.9		11.90	1.50	5.00	47.0	2.5	309.0	67.0
0570028	NATIONAL GYPSUM COMPANY	36		348.8	3,082.7	9.9		2.18	0.27	9.55	64.0	3.5	185.0	40.0
0570028	NATIONAL GYPSUM COMPANY	47		348.8	3,082.7	9.9		7.50	0.95	31.50	35.0	2.8	300.0	64.0
0570028	NATIONAL GYPSUM COMPANY	102		348.8	3,082.7	9.9		2.08	0.26	9.11	90.0	3.9	200.0	44.7
0570026	NATIONAL GYPSUM COMPANY	103		348.8	3,082.7	9.9		2.08	0.26	9.11	90.0	3.0	200.0	75.5
0570028	NATIONAL GYPSUM COMPANY	104		348.8	3,082.7	9.9		2.08	0.28	9.11	90.0	3.0	200.0	75.5
	TOTALS		N				197.39			120.39				
0570029	NITRAM, INC.	7		362.5	3,089.0	2.3		103.10	12.99	294.00	55.0	2.5	250.0	121.0
0570029	NITRAM, INC.	13		362.5	3,089.0	2.3		1.74	0.22	7.81	9.0	1.7	260.0	24.0
	TOTALS		Y				45.84			301.61				
0570038	TAMPA ELECTRIC COMPANY	1		358.0	3,091.0	0.3		121.00	15.25	530.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	2		358.0	3,091.0	0.3		121.00	15.25	530.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	3		358.0	3,091.0	0.3		167.00	21.04	731.00	280.0	12.0	341.0	62.7
0570038	TAMPA ELECTRIC COMPANY	4		358.0	3,091.0	0.3		167.00	21.04	731.00	280.0	12.0	341.0	62.7

Facility ID	Company Name	EU ID	Modeled (Y/N)	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project AOI (km)	20D Rule (tpy)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
0570038	TAMPA ELECTRIC COMPANY	5		358.0	3,091.0	0.3		243.00	30.62	1,064.00	280.0	11.3	356.0	82.0
0570038	TAMPA ELECTRIC COMPANY	6		358.0	3,091.0	0.3		222.00	27.97	972.00	280.0	9.4	329.0	75.2
	TOTALS		Y				6.71			4,658.00				
0570039	TAMPA ELECTRIC COMPANY	1		361.9	3,075.0	12.7		6,171.00	777.55	27,029.00	490.0	24.0	294.0	115.9
0570039	TAMPA ELECTRIC COMPANY	2		361.9	3,075.0	12.7		6,191.00	780.07	27,118.00	490.0	24.0	125.0	87.6
0570039	TAMPA ELECTRIC COMPANY	3		361.9	3,075.0	12.7		2,881.00	363.01	12,619.00	499.0	24.0	279.0	47.0
0570039	TAMPA ELECTRIC COMPANY	4		361.9	3,075.0	12.7		2,598.00	327.35	11,379.00	499.0	24.0	156.0	59.0
0570039	TAMPA ELECTRIC COMPANY	5		361.9	3,075.0	12.7		447.00	56.32	1,958.00	75.0	14.0	928.0	61.0
0570039	TAMPA ELECTRIC COMPANY	6		361.9	3,075.0	12.7		447.50	56.39	1,960.00	75.0	14.0	928.0	61.0
0570039	TAMPA ELECTRIC COMPANY	7		361.9	3,075.0	12.7		128.00	16.13	561.00	35.0	11.0	1,010.0	91.9
	TOTALS		Y				254.86			82,624.00				
0570040	TAMPA ELECTRIC COMPANY	1		360.0	3,087.5	0.4		1,839.00	231.71	8,055.00	315.0	10.0	289.0	94.0
0570040	TAMPA ELECTRIC COMPANY	2		360.0	3,087.5	0.4		1,898.00	239.15	8,314.00	315.0	10.0	298.0	101.0
0570040	TAMPA ELECTRIC COMPANY	3		360.0	3,087.5	0.4		2,401.00	302.53	10,518.00	315.0	10.6	296.0	126.0
0570040	TAMPA ELECTRIC COMPANY	4		360.0	3,087.5	0.4		2,638.00	332.39	11,555.00	315.0	10.0	309.0	75.0
0570040	TAMPA ELECTRIC COMPANY	5		360.0	3,087.5	0.4		3,454.00	435.20	15,128.00	315.0	14.6	303.0	76.0
0570040	TAMPA ELECTRIC COMPANY	6		360.0	3,087.5	0.4		5,698.00	717.95	24,957.00	315.0	17.6	320.0	81.0
0570040	TAMPA ELECTRIC COMPANY	7		360.0	3,087.5	0.4		128.00	16.13	561.00	35.0	11.0	1,010.0	92.6
	TOTALS		Y				8.72			79,088.00				
0570054	SCRAP-ALL, INC.	2	N	359.4	3,093.1	2.5	49.35	0.74	0.09	30.00	38.0	0.7	435.0	51.0
0570061	TAMPA ARMATURE WORKS	1		365.6	3,091.7	5.9				11.36	20.0	2.1	1,200.0	
0570061	TAMPA ARMATURE WORKS	2		365.6	3,091.7	5.9		1.28	0.16	2.00	18.0	0.8	400.0	33.0
0570061	TAMPA ARMATURE WORKS	6		365.6	3,091.7	5.9		0.31	0.04	1.38	27.0	1.7	1,400.0	19.4
	TOTALS		N				117.56			14.74				
0570075	CORONET INDUSTRIES, INC.	1		393.8	3,096.3	34.3		5.50	0.69	23.44	100.0	4.5	149.0	39.0
0570075	CORONET INDUSTRIES, INC.	5		393.8	3,096.3	34.3		46.80	5.90	65.70	150.0	5.6	104.0	60.0
0570075	CORONET INDUSTRIES, INC.	22		393.8	3,096.3	34.3		23.40	2.95	83.00	152.0	5.8	80.0	39.0
	TOTALS		N				686.66			172.14				
0570076	DELTA ASPHALT	1		372.1	3,105.4	19.6		54.00	6.80	154.00	28.0	3.8	300.0	60.0
0570076	DELTA ASPHALT	100		372.1	3,105.4	19.6		18.75	2.36	37.50				
0570076	DELTA ASPHALT	101		372.1	3,105.4	19.6				0.86				
	TOTALS		N				391.56			192.36				
0570077	VERLITE COMPANY	1	N	360.2	3,093.0	2.6	52.33	0.76	0.10	3.00	50.0	2.0	230.0	28.0
0570089	ST JOSEPHS HOSPITAL	3	N	353.3	3,095.9	6.9	138.44	7.30	0.92	31.90	30.0	1.0	375.0	42.0
0570119	GULF COAST METALS	5	N	364.7	3,093.6	6.0	119.92			12.74				
0570127	CITY OF TAMPA	1		360.2	3,092.2	1.9		75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	2		360.2	3,092.2	1.9		75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	3		360.2	3,092.2	1.9		75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	4		360.2	3,092.2	1.9		75.00	9.45	329.00	160.0	5.7	450.0	41.0
0570127	CITY OF TAMPA	103		360.2	3,092.2	1.9		42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	104		360.2	3,092.2	1.9		42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	105		360.2	3,092.2	1.9		42.50	5.36	186.15	201.0	4.2	289.0	73.3
0570127	CITY OF TAMPA	106		360.2	3,092.2	1.9		42.50	5.36	186.15	201.0	4.2	289.0	73.3
	TOTALS		Y				38.06			2,060.60				
0570141	US AIR FORCE (MACDILL AFB)	2		353.5	3,081.5	7.3				5.30	35.0	2.0	450.0	15.0
0570141	US AIR FORCE (MACDILL AFB)	4		353.5	3,081.5	7.3				5.30	35.0	2.0		
0570141	US AIR FORCE (MACDILL AFB)	5		353.5	3,081.5	7.3				5.30	35.0	2.0		
0570141	US AIR FORCE (MACDILL AFB)	11		353.5	3,081.5	7.3				48.00				
	TOTALS		N				146.85			63.90				
0570163	GRIFFIN INDUSTRIES	1		364.1	3,096.4	7.6		6.84	0.86	30.00	50.0	2.6	450.0	22.0
0570163	GRIFFIN INDUSTRIES	2		364.1	3,096.4	7.6		6.84	0.86	30.00	48.0	0.3	450.0	414.0
	TOTALS		N				151.04			60.00				
0570171	SPEEDLING, INC.	2	N	354.1	3,062.2	25.5	509.78	1.79	0.23	7.84	25.0	1.7	350.0	85.0
0570236	WESTSHORE GLASS CORP	1	N	349.2	3,098.5	11.6	231.59			2.00	28.0	1.5	1,800.0	23.0
0570249	ALCOA EXTRUSIONS	2		385.6	3,097.0	26.5		1.09	0.14	3.42	29.0	2.7	325.0	32.0
0570249	ALCOA EXTRUSIONS	3		385.6	3,097.0	26.5		0.35	0.04	1.10	14.0	1.5	375.0	14.0

Ta[illegible] Modeled FDEP Off-Site NO_x Emission Inventory

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0570249	ALCOA EXTRUSIONS	4		385.6	3,097.0	26.5		0.92	0.12	2.86	29.0	2.7	325.0	26.0
0570249	ALCOA EXTRUSIONS	5		385.6	3,097.0	26.5		0.35	0.04	1.07	14.0	1.5	375.0	14.0
0570249	ALCOA EXTRUSIONS	6		385.6	3,097.0	26.5		0.25	0.03	0.60	14.0	1.7	375.0	8.0
0570249	ALCOA EXTRUSIONS	7		385.6	3,097.0	26.5				2.00	16.0	1.3	400.0	22.0
0570249	ALCOA EXTRUSIONS	8		385.6	3,097.0	26.5		2.39	0.30	10.16	30.0	3.0	850.0	63.0
0570249	ALCOA EXTRUSIONS	9		385.6	3,097.0	26.5		0.89	0.11	3.76	30.0	3.0	500.0	11.0
0570249	ALCOA EXTRUSIONS	10		385.6	3,097.0	26.5		0.70	0.09	0.26	16.0	1.5	350.0	5.0
0570249	ALCOA EXTRUSIONS	11		385.6	3,097.0	26.5		2.66	0.34	4.49	15.0	1.0	120.0	212.0
0570249	ALCOA EXTRUSIONS	17		385.6	3,097.0	26.5		0.37	0.05	1.63	30.0	1.9	680.0	32.0
0570249	ALCOA EXTRUSIONS	18		385.6	3,097.0	26.5		0.33	0.04	1.46	30.0	1.4	350.0	80.0
0570249	ALCOA EXTRUSIONS	19		385.6	3,097.0	26.5		0.33	0.04	1.46	30.0	1.4	350.0	80.0
	TOTALS		N				530.80			34.49				
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	1		368.2	3,092.7	8.7		117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	1		368.2	3,092.7	8.7		58.63	7.39	256.00	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	2		368.2	3,092.7	8.7		117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	2		368.2	3,092.7	8.7		58.63	7.39	256.00	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	3		368.2	3,092.7	8.7		117.33	14.78	513.91	220.0	5.1	290.0	72.5
0570261	HILLSBOROUGH CTY. RESOURCE RECOVERY FAC.	3		368.2	3,092.7	8.7		58.63	7.39	256.00	220.0	5.1	290.0	72.5
	TOTALS		Y				173.27			2,309.73				
0570286	TAMPA BAY SHIPBUILDING & REPAIR CO.	5	Y	358.0	3,089.0	-1.2	-23.82			188.00	10.0	0.5	350.0	148.5
0570317	JANET & CHARLIES WOOD RECYCLING FACILITY	1	Y	363.1	3,085.3	4.2	84.30			199.68	14.0	12.0	1,600.0	60.0
0570320	DART CONTAINER CORPORATION OF FLORIDA	6	N	384.9	3,098.2	26.2	524.79	3.53	0.44	15.45	28.0	2.0	350.0	24.0
0570370	PARADISE, INC.	4	N	388.5	3,099.0	29.9	598.11	0.80	0.10	3.49	37.0	1.3	450.0	40.2
0570409	CONIGLIO CONSTRUCTION AND DEMOLITION DEB	1	N	368.9	3,104.2	16.7	333.78	40.00	5.04	48.64				
0570417	INTERNATIONAL PAPER, OFFICE 8-213	2		391.7	3,099.3	33.0				0.13				
0570417	INTERNATIONAL PAPER, OFFICE 8-213	6		391.7	3,099.3	33.0		0.13	0.02	0.56				
	TOTALS		N				660.89			0.69				
0570438	FLORIDA GAS TRANSMISSION COMPANY	1		391.9	3,106.6	36.0				14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	1		391.9	3,106.6	36.0				14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	2		391.9	3,106.6	36.0				14.40	14.0	2.0	837.0	147.0
0570438	FLORIDA GAS TRANSMISSION COMPANY	3		391.9	3,106.6	36.0		3.95	0.50	17.30	20.0	2.0	837.0	147.0
	TOTALS		N				720.65			60.60				
0570442	GULF MARINE REPAIR CORPORATION	3	Y	360.3	3,091.9	1.7	33.68			127.00				
0570459	BAUSCH&LOMB PHARMACEUTICALS	2	N	366.4	3,105.7	16.8	335.44			17.97	37.0			
0570460	JAMES HARDIE BUILDING PRODUCTS INC.	4	N	387.1	3,089.5	28.9	537.12	2.97	0.37	12.50	30.0	2.0		
0570461	BLACKLIDGE EMULSIONS INCORPORATED	3		359.5	3,093.2	2.6				3.69	20.0		320.0	
0570461	BLACKLIDGE EMULSIONS INCORPORATED	4		359.5	3,093.2	2.6				0.11				
	TOTALS		N				51.75			3.80				
0571151	WEYERHAEUSER COMPANY	2	N	382.8	3,098.3	8.5	170.32			12.50	34.0	2.0		
0571217	SEA 3 OF FLORIDA, INC.	3	Y	360.1	3,087.1	0.8	16.02			20.55				
0571242	NATIONAL GYPSUM	1	N	364.7	3,075.6	13.1	261.21			9.60	98.0	3.8	350.0	28.2
0810001	COASTAL FUELS MARKETING, INC.	1		348.0	3,057.7	31.3		4.62	0.58	20.24	25.0	1.8	375.0	28.0
0810001	COASTAL FUELS MARKETING, INC.	2		348.0	3,057.7	31.3		4.62	0.58	20.24	25.0	1.8	375.0	28.0
0810001	COASTAL FUELS MARKETING, INC.	3		348.0	3,057.7	31.3		0.34	0.04	1.49	22.0	1.0	510.0	56.0
0810001	COASTAL FUELS MARKETING, INC.	4		348.0	3,057.7	31.3		0.34	0.04	1.49	22.0	1.0	510.0	56.0
0810001	COASTAL FUELS MARKETING, INC.	5		348.0	3,057.7	31.3		0.34	0.04	1.49	22.0	1.0	510.0	56.7
	TOTALS		N				626.51			44.95				
0810002	PINEY POINT PHOSPHATES, INC.	1	N	349.7	3,057.3	31.2	824.08	10.00	1.26	43.80	200.0	7.8	147.0	33.5
0810007	TROPICANA PRODUCTS, INC.	11		348.1	3,041.0	47.5		32.00	4.03	136.00	71.0	6.3	441.0	25.0
0810007	TROPICANA PRODUCTS, INC.	12		348.1	3,041.0	47.5		96.70	12.18	423.60	71.0	6.3	536.0	39.0
0810007	TROPICANA PRODUCTS, INC.	14		348.1	3,041.0	47.5		91.00	11.47	391.00	103.0	6.3	489.0	22.0
0810007	TROPICANA PRODUCTS, INC.	15		348.1	3,041.0	47.5		31.40	3.96	80.20	80.0	7.0	540.0	24.0
0810007	TROPICANA PRODUCTS, INC.	15		348.1	3,041.0	47.5		15.70	1.98	68.90	80.0	7.0	540.0	24.0
0810007	TROPICANA PRODUCTS, INC.	16		348.1	3,041.0	47.5		73.00	9.20	314.50	80.0	12.0	288.0	54.0
0810007	TROPICANA PRODUCTS, INC.	21		348.1	3,041.0	47.5		1.13	0.14	4.29	40.0	1.7	300.0	16.0
0810007	TROPICANA PRODUCTS, INC.	22		348.1	3,041.0	47.5		2.42	0.30	1.06	35.0	5.0	1,000.0	15.0

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0810007	TROPICANA PRODUCTS, INC.	23		348.1	3,041.0	47.5		2.51	0.32	11.00	27.0	2.0	475.0	31.7
	TOTALS		Y				949.67			1,432.65				
0810010	FLORIDA POWER & LIGHT COMPANY	1		367.3	3,054.2	34.3		2,595.00	326.97	11,366.10	499.0	26.2	325.0	82.5
0810010	FLORIDA POWER & LIGHT COMPANY	2		367.3	3,054.2	34.3		2,595.00	326.97	11,366.10	499.0	26.2	325.0	82.5
0810024	FLORIDA POWER & LIGHT COMPANY	1		347.5	3,056.6	32.5		5.43	0.68	16.74	20.0	3.3	650.0	8.9
0810024	FLORIDA POWER & LIGHT COMPANY	2		347.5	3,056.6	32.5		5.43	0.68	16.74	20.0	3.3	650.0	8.9
	TOTALS		Y				685.16			22,765.68				
0810045	MANATEE COUNTY ANIMAL CONTROL	2	N	341.8	3,046.2	44.3	885.45	0.21	0.03	0.33	20.0	1.5	850.0	8.0
0810069	PALMETTO FUNERAL HOME AND CREMATORY	1	N	345.4	3,044.7	44.5	890.53			0.20	20.0	1.5	1,000.0	32.0
0810079	BENZ RESEARCH & DEVELOPMENT CORP.	1	N	348.4	3,034.4	53.9	1,077.13			0.51				
0810085	BELSPUR OAKS PET CREMATORY	1		348.7	3,034.8	53.4		0.05	0.01	0.08	24.0	1.0	797.0	30.0
0810085	BELSPUR OAKS PET CREMATORY	2		348.7	3,034.8	53.4		0.17	0.02	0.74				
	TOTALS		N				1,068.18			0.82				
0810164	FLOWERS BAKING COMPANY OF BRADENTON INC.	1		350.1	3,034.6	53.4		0.66	0.08	2.89	37.0	1.5	270.0	20.8
0810164	FLOWERS BAKING COMPANY OF BRADENTON INC.	2		350.1	3,034.6	53.4		0.55	0.07	2.41	30.0	0.8	340.0	63.0
	TOTALS		N				1,067.60			5.30				
1010002	PASCO BEVERAGE COMPANY	5		383.5	3,139.2	54.4		22.80	2.87	89.40	53.0	4.0	350.0	2.0
1010002	PASCO BEVERAGE COMPANY	6		383.5	3,139.2	54.4		12.00	1.51	52.56	53.0	4.4	350.0	1.0
1010002	PASCO BEVERAGE COMPANY	7		383.5	3,139.2	54.4		32.40	4.08	89.40	56.0	5.9	400.0	1.0
1010002	PASCO BEVERAGE COMPANY	26		383.5	3,139.2	54.4		0.13	0.02	0.58	54.0	1.5	450.0	47.0
1010002	PASCO BEVERAGE COMPANY	34		383.5	3,139.2	54.4		0.13	0.02	0.58	54.0	1.3	450.0	95.0
	TOTALS		N				1,087.02			232.53				
1010028	OVERSTREET PAVING CO	1		355.9	3,143.7	53.0		18.75	2.36	37.50	30.0	4.3	275.0	58.5
1010028	OVERSTREET PAVING CO	2		355.9	3,143.7	53.0		0.14	0.02	0.61				
	TOTALS		N				1,060.88			38.11				
1010042	SCI FUNERAL SERVICES OF FLORIDA	2	N	335.0	3,136.5	51.3	1,025.82	1.19	0.15	8.83	24.0	1.6	1,099.0	21.0
1010056	PASCO COUNTY (OWNER)	1		348.8	3,138.8	49.0		90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	2		348.8	3,138.8	49.0		90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	3		348.8	3,138.8	49.0		90.00	11.34	394.20	275.0	10.0	250.0	51.0
1010056	PASCO COUNTY (OWNER)	5		348.8	3,138.8	49.0		0.30	0.04	1.32	50.0	1.3	330.0	37.0
	TOTALS		Y				979.55			1,183.92				
1010071	PASCO COGEN LIMITED	1		385.1	3,139.0	54.9		42.75	5.39	202.25	275.0	4.8	310.0	
1010071	PASCO COGEN LIMITED	2		385.1	3,139.0	54.9		42.50	5.36	202.35	275.0	4.8	299.0	
	TOTALS		N				1,097.74			404.60				
1010373	IPS AVON PARK CORP.	1		347.0	3,139.0	49.6		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
1010373	IPS AVON PARK CORP.	1		347.0	3,139.0	49.6		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
1010373	IPS AVON PARK CORP.	2		347.0	3,139.0	49.6		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
1010373	IPS AVON PARK CORP.	2		347.0	3,139.0	49.6		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
1010373	IPS AVON PARK CORP.	3		347.0	3,139.0	49.6		351.00	44.23	252.00	60.0	22.0	1,113.0	116.0
1010373	IPS AVON PARK CORP.	3		347.0	3,139.0	49.6		64.10	8.08	252.00	60.0	22.0	1,113.0	116.0
	TOTALS		Y				991.56			1,512.00				
1030011	FLORIDA POWER CORPORATION	1		342.4	3,082.6	15.6		329.90	41.57	1,444.80	300.0	9.0	312.0	119.0
1030011	FLORIDA POWER CORPORATION	2		342.4	3,082.6	15.6		368.70	46.46	1,614.80	300.0	9.0	305.0	102.0
1030011	FLORIDA POWER CORPORATION	3		342.4	3,082.6	15.6		619.20	78.02	4,818.00	300.0	11.0	275.0	113.0
1030011	FLORIDA POWER CORPORATION	4		342.4	3,082.6	15.6		2.20	0.28	9.64	30.0	3.0	515.0	17.0
	TOTALS		Y				312.88			7,887.24				
1030012	FLORIDA POWER CORPORATION	1		336.5	3,098.4	22.2		383.70	48.35	1,680.00	174.0	12.5	312.0	27.0
1030012	FLORIDA POWER CORPORATION	2		336.5	3,098.4	22.2		366.00	46.12	1,603.20	174.0	12.5	310.0	27.0
1030012	FLORIDA POWER CORPORATION	3		336.5	3,098.4	22.2		383.70	48.35	1,680.00	174.0	12.5	301.0	24.0
1030012	FLORIDA POWER CORPORATION	4		336.5	3,098.4	22.2		273.37	34.44	1,197.36	55.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	5		336.5	3,098.4	22.2		273.37	34.44	1,197.36	56.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	6		336.5	3,098.4	22.2		304.69	38.39	1,334.56	55.0	15.1	850.0	93.1
1030012	FLORIDA POWER CORPORATION	7		336.5	3,098.4	22.2		304.69	38.39	1,334.56	55.0	15.1	850.0	93.1
	TOTALS		Y				444.41			10,027.04				
1030020	SPCA OF PINELLAS COUNTY	1	N	326.3	3,086.2	30.6	612.65	0.35	0.04	0.16	30.0	1.0	1,200.0	63.0

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1030026	OVERSTREET PAVING COMPANY, INC.	1		326.2	3,086.9	30.7		18.95	2.39	38.38	30.0	10.0	275.0	16.6
1030026	OVERSTREET PAVING COMPANY, INC.	2		326.2	3,086.9	30.7		0.20	0.03	0.88				
	TOTALS		N				613.57			39.26				
1030047	NATIONAL CREMATION SOCIETY	2	N	329.1	3,088.9	27.7	554.17	0.34	0.04	1.47	18.0	1.7	800.0	30.0
1030054	THE MINUTE MAID COMPANY	4	N	324.3	3,100.7	34.4	888.89	0.46	0.06	6.00	150.0	11.0	230.0	
1030070	MORTON PLANT MEASE HEALTH CARE	2	N	324.7	3,099.7	33.8	675.05	1.44	0.18	6.31			350.0	
1030075	ON CALL CREMATORY	4	N	331.0	3,081.1	26.9	538.56			0.74	16.0	1.7	1,138.0	15.8
1030091	MORTON PLANT MEASE HEALTH CARE	5		322.6	3,093.1	34.4		1.64	0.21	5.97	20.0	2.0	350.0	41.0
1030091	MORTON PLANT MEASE HEALTH CARE	6		322.6	3,093.1	34.4		1.64	0.21	5.97	20.0	2.0	350.0	41.0
1030091	MORTON PLANT MEASE HEALTH CARE	7		322.6	3,093.1	34.4		20.20	2.54	22.12				
	TOTALS		N				688.77			34.05				
1030114	METAL INDUSTRIES, INC.	1	N	336.7	3,101.0	23.2	463.56			12.12	35.0	4.9	800.0	1.0
1030117	PINELLAS CO. BOARD OF CO. COMMISSIONERS	3	Y	335.2	3,064.1	22.1	442.46	205.30	25.87	899.20	165.0	9.0	450.0	90.0
1030129	PINELLAS MEMORIAL PET CEMETERY	1		329.9	3,081.6	27.9		0.60	0.08	0.54	15.0	1.5	1,800.0	16.5
1030129	PINELLAS MEMORIAL PET CEMETERY	2		329.9	3,081.6	27.9		0.31	0.04	0.32	15.0	1.5	950.0	16.5
	TOTALS		N				557.14			0.86				
1030132	COOPER COIL COATING, INC.	1		334.0	3,086.9	22.9		2.10	0.26	9.20	41.0	3.6	800.0	17.0
1030132	COOPER COIL COATING, INC.	2		334.0	3,086.9	22.9		1.96	0.25	8.58	40.0	3.0	818.0	31.5
	TOTALS		N				458.25			17.78				
1030147	SONNY GLASBRENNER, INC.	3	N	334.3	3,085.6	22.7	455.00	27.40	3.45	42.80	15.0	0.7		248.9
1030214	LIFE-LIKE PRODUCTS INC	2	N	330.3	3,084.8	26.8	536.47			8.65				
1030217	ABC CREMATORY (PREV PARKLAWN MEM GARDEN)	1	N	328.2	3,101.4	31.0	620.72	0.38	0.05	1.66	16.0	1.7	889.0	24.0
1030288	BAYCARE SERVICES INC	1		333.1	3,084.4	24.1		1.64	0.21	7.17				
1030288	BAYCARE SERVICES INC	2		333.1	3,084.4	24.1		1.64	0.21	7.17				
	TOTALS		N				482.53			14.34				
1030443	LORAD CHEMICAL CORPORATION	2	N	336.5	3,074.2	24.8	496.76			2.41	25.0	0.7	100.0	
1050003	LAKELAND ELECTRIC & WATER UTILITIES	3		408.9	3,102.5	50.5		154.00	19.40	674.00	165.0	10.0	340.0	21.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	4		408.9	3,102.5	50.5		331.00	41.71	1,448.00	165.0	10.0	340.0	22.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	5		408.9	3,102.5	50.5		145.90	18.38	639.00	31.0	11.8	800.0	101.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	6		408.9	3,102.5	50.5		145.90	18.38	639.00	31.0	11.8	800.0	101.0
1050003	LAKELAND ELECTRIC & WATER UTILITIES	8		408.9	3,102.5	50.5		176.00	22.18	425.00	155.0	16.0	481.0	85.7
1050003	LAKELAND ELECTRIC & WATER UTILITIES	8		408.9	3,102.5	50.5		176.00	22.18	244.00	155.0	16.0	481.0	85.7
	TOTALS		Y				1,009.22			4,069.00				
1050004	LAKELAND ELECTRIC & WATER UTILITIES	1		409.0	3,106.2	51.6		529.00	66.65	2,317.00	150.0	9.0	277.0	81.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	2		409.0	3,106.2	51.6		86.80	10.94	380.18	20.0	2.6	715.0	77.0
1050004	LAKELAND ELECTRIC & WATER UTILITIES	3		409.0	3,106.2	51.6		86.80	10.94	380.18	20.0	2.6	715.0	77.0
1050004	LAKELAND ELECTRIC & WATER UTILITIES	4		409.0	3,106.2	51.6		223.38	28.14	978.32	35.0	13.5	900.0	79.5
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5		409.0	3,106.2	51.6		236.90	29.85	1,037.60	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5		409.0	3,106.2	51.6		334.50	42.15	1,465.10	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	5		409.0	3,106.2	51.6		334.50	42.15	1,465.10	157.0	10.5	277.0	73.2
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6		409.0	3,106.2	51.6		728.00	91.73	3,188.60	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6		409.0	3,106.2	51.6		2,548.00	321.05	11,160.20	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	6		409.0	3,106.2	51.6		1,092.00	137.59	4,782.96	250.0	18.0	167.0	82.6
1050004	LAKELAND ELECTRIC & WATER UTILITIES	28		409.0	3,106.2	51.6		237.00	29.86	1,038.00	85.0	28.0	1,095.0	82.7
1050004	LAKELAND ELECTRIC & WATER UTILITIES	28		409.0	3,106.2	51.6		413.00	52.04	1,809.00	85.0	28.0	1,095.0	82.7
1050004	LAKELAND ELECTRIC & WATER UTILITIES	1		409.0	3,106.2	51.6		529.00	66.65	2,317.00	150.0	9.0	277.0	81.2
	TOTALS		Y				1,032.63			32,319.24				
1050009	FLORIDA TILE INDUSTRIES, INC.	2		405.4	3,102.4	47.1		0.12	0.02	0.53	30.0	2.0	160.0	
1050009	FLORIDA TILE INDUSTRIES, INC.	10		405.4	3,102.4	47.1		0.10	0.01	0.40	40.0	2.0	150.0	1.0
1050009	FLORIDA TILE INDUSTRIES, INC.	40		405.4	3,102.4	47.1		0.27	0.03	1.18	30.0	1.6	482.0	13.0
	TOTALS		N				941.22			2.11				
1050046	CARGILL FERTILIZER, INC.	12		409.8	3,086.6	49.8		13.00	1.64	57.00	200.0	6.8	180.0	61.0
1050046	CARGILL FERTILIZER, INC.	32		409.8	3,086.6	49.6		13.00	1.64	57.00	200.0	6.6	180.0	61.0
1050046	CARGILL FERTILIZER, INC.	33		409.6	3,086.6	49.6		13.00	1.64	57.00	200.0	6.8	180.0	61.0
	TOTALS		N				992.98			171.00				

Ta[illegible] Modeled FDEP Off-Site NO_x Emission Inventory

Facility ID	Company Name	EU ID	Modeled (Y/N)	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Distance from Project AOI (km)	20D Rule (tpy)	Allowable NO_x Emission Rates (lb/hr)	Allowable NO_x Emission Rates (g/s)	Allowable NO_x Emission Rates (tpy)	Stack Parameters Height (ft)	Stack Parameters Diameter (ft)	Stack Parameters Temperature (°F)	Stack Parameters Velocity (ft/sec)
1050047	AGRIFOS, L.L.C.	1		398.7	3,085.3	38.7		35.80	4.51	156.80	80.0	7.5	160.0	41.0
1050047	AGRIFOS, L.L.C.	2		398.7	3,085.3	38.7		35.20	4.44	154.20	80.0	7.5	160.0	41.0
	TOTALS		N				773.29			311.00				
1050048	MULBERRY PHOSPHATES, INC.	5		406.8	3,085.1	46.8		11.00	1.39	18.40	102.0	8.8	110.0	26.0
1050048	MULBERRY PHOSPHATES, INC.	9		406.8	3,085.1	46.8		23.93	3.02	104.81	45.0	3.7	80.0	8.0
	TOTALS		N				935.03			123.21				
1050053	FARMLAND HYDRO, L.P.	5		410.3	3,079.7	50.9		11.90	1.50	52.20	150.0	8.0	180.0	37.8
1050053	FARMLAND HYDRO, L.P.	9		410.3	3,079.7	50.9		29.10	3.67	84.80	65.0	1.0	120.0	14.0
1050053	FARMLAND HYDRO, L.P.	29		410.3	3,079.7	50.9		7.20	0.91	31.30	129.0	7.5	106.0	43.0
1050053	FARMLAND HYDRO, L.P.	36		410.3	3,079.7	50.9		13.80	1.74	80.00	150.0	9.0	180.0	34.8
	TOTALS		N				1,018.60			208.30				
1050055	IMC-AGRICO CO.(SO. PIERCE)	4		407.5	3,071.4	50.4		15.00	1.89	65.70	144.0	9.0	170.0	41.1
1050055	IMC-AGRICO CO.(SO. PIERCE)	5		407.5	3,071.4	50.4		15.00	1.89	65.70	144.0	9.0	170.0	41.1
	TOTALS		N				1,007.34			131.40				
1050056	IMC-AGRICO CO.(PRAIRIE)	4	N	402.9	3,087.0	42.7	854.78	14.03	1.77	61.47	70.0	4.4	184.0	51.0
1050057	IMC-AGRICO CO.(NICHOLS)	5	N	398.4	3,084.2	38.5	789.66	12.50	1.56	54.80	150.0	7.5	170.0	33.0
1050059	IMC-AGRICO CO.(NEW WALES)	2		396.7	3,079.4	37.7		14.50	1.83	63.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	3		396.7	3,079.4	37.7		14.50	1.83	83.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	4		396.7	3,079.4	37.7		14.50	1.83	63.50	200.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	13		396.7	3,079.4	37.7		27.60	3.46	120.80	85.0	3.0	555.0	193.3
1050059	IMC-AGRICO CO.(NEW WALES)	42		396.7	3,079.4	37.7		14.50	1.83	83.50	199.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	44		396.7	3,079.4	37.7		14.50	1.83	83.50	199.0	8.5	170.0	50.0
1050059	IMC-AGRICO CO.(NEW WALES)	45		396.7	3,079.4	37.7		12.60	1.59	55.20	171.0	6.0	110.0	58.0
1050059	IMC-AGRICO CO.(NEW WALES)	46		396.7	3,079.4	37.7		12.60	1.59	55.20	171.0	6.0	110.0	58.0
	TOTALS		N				753.74			548.70				
1050099	AOC, L.L.C.	2		401.0	3,108.5	45.0				39.45	40.0	4.9	160.0	45.1
1050099	AOC, L.L.C.	3		401.0	3,108.5	45.0				7.02				
	TOTALS		N				900.81			46.47				
1050100	SHELL EPOXY RESINS LLC	5	N	410.7	3,098.9	51.4	1,028.34	0.21	0.03	0.94	35.0	1.1	900.0	25.0
1050134	HEATH FUNERAL CHAPEL	1	N	407.1	3,101.9	46.6	971.35	0.30	0.04	0.55	15.0	1.7	1,175.0	8.0
1050146	PAVEX CORPORATION	1	N	413.0	3,086.2	52.9	1,057.30	19.28	2.43	24.10	40.0	4.0		56.4
1050174	PEPPERIDGE FARM, INC	9		403.3	3,104.8	45.8		1.23	0.15	5.40				
1050174	PEPPERIDGE FARM, INC	10		403.3	3,104.8	45.8				5.40				
1050174	PEPPERIDGE FARM, INC	11		403.3	3,104.8	45.8				5.40				
1050174	PEPPERIDGE FARM, INC	12		403.3	3,104.8	45.8				5.40				
1050174	PEPPERIDGE FARM, INC	13		403.3	3,104.8	45.8				3.83				
1050174	PEPPERIDGE FARM, INC	14		403.3	3,104.8	45.8				3.83				
	TOTALS		N				915.74			29.28				
1050182	GEOLOGIC RECOVERY SYSTEMS	1	N	401.6	3,085.8	41.7	834.24	25.90	3.26	69.80	26.0	2.7	1,500.0	98.0
1050233	TAMPA ELECTRIC COMPANY	1		402.5	3,067.4	47.3		311.00	39.19	2,908.30	150.0	19.0	340.0	75.8
1050233	TAMPA ELECTRIC COMPANY	1		402.5	3,067.4	47.3		664.20	83.69	2,908.30	150.0	19.0	340.0	75.8
1050233	TAMPA ELECTRIC COMPANY	1		402.5	3,067.4	47.3		220.25	27.75	1,032.90	150.0	19.0	340.0	75.8
1050233	TAMPA ELECTRIC COMPANY	3		402.5	3,067.4	47.3		12.00	1.51	18.00	75.0	3.7	375.0	43.0
1050233	TAMPA ELECTRIC COMPANY	9		402.5	3,067.4	47.3		73.50	9.26	270.30	114.0	28.9	1,098.0	62.2
1050233	TAMPA ELECTRIC COMPANY	10		402.5	3,067.4	47.3		73.50	9.26	270.30	114.0	28.9	1,098.0	62.2
	TOTALS		Y				945.97			7,408.10				
1050240	INTERNATIONAL BEVERAGE SYSTEMS, INC.	1	N	398.0	3,097.0	38.6	771.76	1.16	0.15	5.08				
1050257	PANDA-KATHLEEN, L.P.	1		398.7	3,101.5	40.3		53.00	6.88	232.00	150.0	17.5	219.0	47.0
1050257	PANDA-KATHLEEN, L.P.	1		398.7	3,101.5	40.3		188.00	21.17	42.00	150.0	17.5	219.0	47.0
1050257	PANDA-KATHLEEN, L.P.	1		398.7	3,101.5	40.3		53.00	6.66	232.00	150.0	17.5	219.0	47.0
1050257	PANDA-KATHLEEN, L.P.	1		398.7	3,101.5	40.3		171.00	21.55	43.00	150.0	17.5	219.0	47.0
	TOTALS		N				805.39			549.00				
1050319	CLARK ENVIRONMENTAL INC	1	N	401.2	3,086.6	41.1	821.21	5.20	0.66	15.10	21.0	3.4	1,300.0	102.2
7770037	APAC - FLORIDA, INC. - TAMPA DIVISION	2	N	392.6	3,097.3	33.4	667.81	0.07	0.01	0.15	8.0	1.0		
7770262	ANGELO'S RECYCLED MATERIALS	2	N	333.9	3,084.8	23.3	465.38	27.40	3.45	42.80	9.0	0.2		

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7771101	WOODRUFF AND SONS INC	2	N	364.3	3,093.2	5.5	109.00	5.44	0.66	5.65	10.0	0.5		
7775048	SONNY GLASBRENNER, INC.	2	N	334.3	3,065.6	22.7	455.00			23.70	15.0	1.0	750.0	112.5
7775052	WOODRUFF & SONS, INC.	2		363.8	3,092.3	4.4		5.44	0.68	5.65	10.0	0.5		
7775053	WOODRUFF & SONS, INC.	2		363.6	3,092.3	4.4		5.44	0.68	5.65				
7775054	WOODRUFF & SONS, INC.	2		363.6	3,092.3	4.4		4.83	0.61	3.93				
	TOTALS		N				87.39			15.23				
7775055	WOODRUFF & SONS, INC.	2	N	363.7	3,034.3	53.3	1,066.53	4.83	0.61	3.93				

Source: FDEP, 2000.
ECT, 2000.