INTEROFFICE MEMORANDUM

Date: 14-Jun-2000 02:37pm
From: Joseph Kahn TAL
KAHN_J
Dept: Air Resources Management
Tel No: 850/921-9519

To: Jeff Koerner TAL (KOERNER_J)

Subject: Tampa Curren SCR & NH3

I spoke today with the representative from Johnson-Matthey regarding the applicability of their SCR system to the Tampa Curren AWT project. Based on his rough estimate, that system would cost less than the Miratech system for the same 90% NOx reduction. Both systems use agricultural grade urea solution, avoiding the issues with storage and handling of ammonia. The J-M representative did make a point of specifying that his estimate was based on an allowable ammonia slip of 50 ppm. The Miratech quote does not address slip, but the J-M rep thought that system would be similar. He said the price would rise substantially if the slip needs to be limited to 10 ppm.

Please look over my estimate of annual ammonia emissions at 50 ppm slip:

For each engine, with the MW of NH3 = 17.03:

22,574 ft3/min x (70+460)/(731+460) = 10,046 ft3/min = 17,070 m3/hr

50 ppm NH3 x 17.03 x 10^3 x 1/24.5 = 34,755 ug/m3 = 0.0348 g NH3/m3

So, ammonia emissions from 2 engines are:

17,070 m3/hr x 0.0348 g/m3 x 1 lb/454 g x 6500 hr/yr x 1 ton/2000 lb x 2 =
8.5 TPY.

So, NOx emissions would be reduced by 82 TPY, with an increase in NH3 of 8.5 TPY.

INTEROFFICE MEMORANDUM

Date: 14-Jun-2000 10:36am
From: Joseph Kahn TAL
KAHN_J
Dept: Air Resources Management
Tel No: 850/921-9519

To: Jeff Koerner TAL (KOERNER_J)

Subject:

I spoke with Doug Bruckman (609-633-8244) of the NJ DEP Bureau of Air Quality Engineering regarding the SB Linden, LLC project that is referenced on the CARB BACT web site. (The Sycom Enterprises project also listed is the same project.)

That project involved the installation of three 3,130 bhp Waukesha model 12V-AT27GL lean-burn spark ignition, natural gas-fired internal combustion engines at a pipeline compressor station. The engines are intended for varying load operation. The applicant proposed SCR with ammonia injection for NOx control and oxidation catalyst for control of CO and VOC in order to avoid a major source threshold that would have required offsets and LAER. The catalysts are Siemens Westinghouse. Control efficiency is 70% for NOx, 85% for CO and 80% for VOC. Ammonia reagent is 27% NH3 solution, and ammonia slip is limited to 0.331 lb/hr and 10 ppm @ 15% O2.

Permit limits are:

Pollutant	g/bhp-hr	lb/hr	lb/mmBtu	ppm @ 7% O2
NOx	0.2	1.37	0.06	36
CO	0.254	1.75	0.07	76
VOC	0.11	0.76	0.03	58
PM10	0.044	0.302	0.012	--

Mr. Bruckman is going to fax me stack test results.

New Jersey Dept. Environmental Protection
FAX Transmittal Cover Sheet

TO: Joe Kahn

Company: Florida DEP

City/State:

Date: 06/14/00

Number of Pages with Cover: 12

From: Doug Bruckmann

Telephone: 609 633 8244

FAX Number: 609-984-6369

Additional comments:
As discussed today!

Bob E

Mikolajczyk yk2
Alan Gu...

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

October 21, 1997

MEMORANDUM

TO: Byron Sullivan, Regional Enforcement Officer
Metro Regional Enforcement Office

FROM: Michael A. Klein, MK Supervisor
Consultant Test Program, Bureau of Technical Services

SUBJECT: Sycom Enterprises - Linden Pumping Facility
Stack Emission Test Program
APC Plant ID No. NA 41202
NJ Stack Nos. NA
P/CT Nos. NA
Log Nos. 01-95-5697, 01-95-5698 and 01-95-5699
Engine Nos. 601, 602 and 603

Stack emission tests were conducted at the above referenced facility initially in January, 1997, then repeated in March, 1997. The purpose of the tests was to quantify the emissions of nitrogen oxides, carbon monoxide, total non-methane non-ethane hydrocarbons (VOC) and ammonia being discharged to the atmosphere from three Waukesha, lean burn IC engines burning natural gas and controlled by an oxidation catalyst array (for CO and VOC) and SCR (for NOx). The test results were then compared to the allowables specified by each approved log number. Compliance with the permitted allowables would mean adherence to NOx/VOC RACT standards since the permits were more restrictive.

Daniel Strochak reviewed the submitted stack test report. His review indicated that during the initial test series, each engine exceeded the concentration and mass emission rate limit for VOC. It should be noted that concentrations during these tests were reported as propane whereas the allowable was as methane. Corrected results would be:

VOC (as CH_4)

Engine No.	601	602	603	**Allowable**
ppmvd @ 7% O_2	594	264	200	58

The remaining contaminants tested were within their permitted limits.

During the re-tests in March, 1997, each engine demonstrated compliance. In some cases for VOC, methane and ethane concentrations exceeded the total hydrocarbon measurement. The VOC was reported as <25 ppmvd for these runs. Additionally, Engine 602 exhibited cyclonic flow. To resolve this issue, BTS required a stratification check (to show uniform contaminant concentration across the stack) and allowed lb/hr to be calculated from lb/MMBTU data and heat input (measured and worst case). Although the accuracy of fuel monitoring could be questioned, the worst case values were in compliance.

Production data indicated that during the March, 1997 test series, Engine Nos. 601, 602 and 603 were operating at 83%, 88% and 97% of the permitted power output. Air to fuel ratio was not reported. Ammonia flow rate was not listed in the units of the permit (GPM).

According to the test report, the catalyst array for each engine was "checked and cleaned in the time period between testing events." The conditions of approval required maintenance in accordance with manufacturers recommendations. MRO should investigate whether this was the case prior to the January, 1997 test and if so, these requirements were not stringent enough to maintain compliance.

Based on the reported test, enforcement action for the January tests is left to your discretion based on the ultimate demonstration of compliance. Operating limitations are also left to our discretion, although the three units are identical and Engine 603 was near maximum. Follow-up on catalyst maintenance, as previously stated, is strongly recommended.

c. Chief Held
Chief Mikolajczyk
Dan Strochak

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

October 16, 1997

MEMORANDUM

TO: Michael A. Klein

FROM: Daniel Strochak

SUBJECT: Sycom Enterprises
Linden Pumping Facility
Engine Nos. 601, 602 and 603
Log Nos. 01-95-5697, 01-95-5698 and 01-95-5699

Air Nova, Inc. conducted an emission compliance test program on three internal combustion engines at the above subject facility. The tests were performed for VOC's (non-methane non-ethane hydrocarbons), nitrogen oxides, carbon monoxide and ammonia on January 14, 15, 16 and 22, 1997 and again on March 11, 12 and 13, 1997.

The results of these tests and the applicable NJ DEP permit limits are as follows.

Engine 601 Emission Summary
First Testing Event

	Run 1	Run 2	Run 3	Allowable
Date: 1/14/97				
Contaminant				
NOx (as NO_2)				
ppm	14.1	13.3	13.1	
ppm @ 7% O_2	24.2	22.9	22.5	36
lb/hr	0.74	0.69	0.71	1.37
CO				
ppm	23.9	24.9	27.5	
ppm @ 7% O_2	41.1	42.8	47.2	76
lb/hr	0.77	0.78	0.91	1.75
VOC (as C_3H_8)				
ppm	93	53.8	198	
ppm @ 7% O_2	161	92.5	341	58 *
lb/hr	4.73	2.67	10.3	0.76
Ammonia				
ppm	<0.5	<0.4	<0.3	
ppm @ 15% O_2	<0.4	<0.3	<0.2	10
lb/hr	<0.01	<0.01	<0.01	0.331
Oxygen (%)	12.8	12.8	12.8	
Operating Data				
Load (Hp)	2603	2603	2640	
Heat Rate (Btu/Hp-Hr)	6540	6556	6561	
Stack Temp (°F)	640	642	639	
NH_3 (PSI)	54	55	55	

* As CH_4

Engine 601 Emissions Summary
Second Testing Event

	Run 1	Run 2	Run 3	Allowable
Date: 3/11/97				
Contaminant				
NOx (as NO_2)				
ppm	16.5	19.6	17.2	
ppm @ 7% O_2	28.4	33.7	28.6	36
lb/hr	0.84	0.99	0.83	1.37
CO				
ppm	38.9	42.8	33.0	
ppm @ 7% O_2	67.0	73.6	54.9	76
lb/hr	1.20	1.31	0.97	1.75
VOC (as CH_4)				
ppm	<25.0	<25.0	<25.0	
ppm @ 7% O_2	<43.1	<43.0	<41.6	58
lb/hr	<0.44	<0.44	<0.42	0.76
Ammonia				
ppm	<0.2	<0.2	<0.2	
ppm @ 15% O_2	<0.2	<0.2	<0.2	10
lb/hr	<0.01	<0.01	<0.01	0.331
Oxygen (%)	12.8	12.8	12.5	
Operating Data				
Load (Hp)	2624	2668	2517	
Heat Rate (Btu/Hp-Hr)	6463	6490	6548	
Stack Temp (°F)	643	634	663	
NH_3 (PSI)	52	53	53	

Engine 602 Emissions Summary
First Testing Event

	Run 1	Run 2	Run 3	Allowable
Date: 1/16/97				
Contaminant				
NOx (as NO_2)				
ppm	14.5	14.4	15.4	
ppm @ 7% O_2	22.3	21.9	23.5	36
lb/hr	0.69	0.68	0.72	1.37
CO				
ppm	21.4	21.6	22.0	
ppm @ 7% O_2	32.9	32.9	33.6	76
lb/hr	0.62	0.62	0.63	1.75
VOC (as C_3H_8)				
ppm	59.5	75.1	38.0	
ppm @ 7% O_2	91.5	115	57.9	58 *
lb/hr	2.71	3.39	1.71	0.76
Ammonia				
ppm	<0.4	<0.3	<0.3	
ppm @ 15% O_2	<0.3	<0.2	<0.2	10
lb/hr	<0.01	<0.01	<0.01	0.331
Oxygen (%)	11.9	11.8	11.8	
Operating Data				
Load (Hp)	2699	2784	2811	
Stack Temp (°F)	686	691	691	
NH_3 (PSI)	48	48	48	

As CH_4

Engine 602 Emissions Summary
Second Testing Event

	Run 1	Run 2	Run 3	Allowable
Date: 3/11/97				
Contaminant				
NOx (as NO_2)				
ppm	18.1	18.5	18.6	
ppm @ 7% O_2	26.9	27.7	28.2	36
lb/hr (actual)	0.83	0.85	0.85	1.37
lb/hr (max)	1.02	1.04	1.07	1.37
lb/MMBTU	0.042	0.043	0.044	
CO				
ppm	17.4	17.8	18.3	
ppm @ 7% O_2	25.8	26.6	27.8	76
lb/hr (actual)	0.48	0.50	0.51	1.75
lb/hr (max)	0.59	0.61	0.64	1.75
lb/MMBTU	0.024	0.025	0.026	
VOC (as CH_4)				
ppm	<25.0	16.5	<25.0	
ppm @ 7% O_2	<37.1	24.6	<37.9	58
lb/hr (actual)	<0.40	0.26	<0.40	0.76
lb/hr (max)	<0.49	0.32	<0.50	0.76
lb/MMBTU	<0.020	0.013	<0.021	
Ammonia				
ppm	<0.3	<0.3	<0.3	
ppm @ 7% O_2	<0.2	<0.2	<0.2	10
lb/hr	<0.01	<0.01	<0.01	0.331
lb/MMBTU (actual)	<0.01	<0.01	<0.01	
Oxygen (%)	11.5	11.6	11.7	

table cont...

Operating Data

	Run 1	Run 2	Run 3
Load (Hp)	2740	2755	2745
Heat Rate (Btu/Hp-Hr)	6555	6554	6324
Stack Temp (°F)	706	707	700
NH_3 (PSI)	48	48	48

Engine 603 Emissions Summary
First Testing Event

	Run 1	Run 2	Run 3	Run 4	Allowable
Date	1/15/97	1/16/97	1/22/97	1/22/97	
Contaminant					
NOx (as NO_2)					
ppm	22.9	20.2	23.0	2.17	
ppm @ 7% O_2	33.7	31.0	33.2	32.7	36
lb/hr	1.22	1.11	1.11	1.07	1.37
CO					
ppm	34.4	41.4	28.1	25.1	
ppm @ 7% O_2	50.6	63.4	40.5	37.8	76
lb/hr	1.12	1.38	0.83	0.76	1.75
VOC (as C_3H_8)					
ppm	68.4	40.2	39.9	31.0	
ppm @ 7% O_2	101	61.6	57.6	46.7	58 *
lb/hr	3.50	2.11	1.85	1.47	0.76
Ammonia					
ppm	<0.3	<0.4	<0.3	<0.4	
ppm @ 15% O_2	<0.2	<0.2	<0.2	<0.2	10
lb/hr	<0.01	<0.01	<0.01	<0.01	0.331
Oxygen (%)	11.5	11.8	11.3	11.7	
Operating Data					
Load (Hp)	2970	2930	2920	2783	
Stack Temp (°F)	743	731	753	753	
NH_3 (PSI)	46	46	48	48	

* As CH_4

Engine 603 Emissions Summary
Second Testing Event

	Run 1	Run 2	Run 3	Run 4	Allowable
Date: 3/13/97					
NOx (as NO_2)					
ppm	24.9	21.2	21.1	21.2	
ppm @ 7% O_2	39.0	32.9	32.9	33.1	36
lb/hr	1.38	1.14	1.14	1.11	1.37
CO					
ppm	40	39.3	37.8	37.4	
ppm @ 7% O_2	62.7	61.0	59.0	58.3	76
lb/hr	1.35	1.29	1.25	1.20	1.75
VOC (as CH_4)					
ppm	<25	<25.0	<25.0	<25.0	
ppm @ 7% O_2	<39.2	<38.8	<39.0	<39.0	58
lb/hr	<0.48	<0.47	<0.47	<0.46	0.76
Ammonia					
ppm	<0.2	<0.2	<0.2	<0.2	
ppm @ 15% O_2	<0.1	<0.1	<0.2	<0.1	10
lb/hr	<0.01	<0.01	<0.01	<0.01	0.331
Operating Data					
Load (Hp)	3045	3050	3010	3020	
Heat Rate (Btu/Hp-Hr)	6928	6790	6740	6720	
Stack Temp (°F)	719	719	719	719	
NH_3 (PSI)	47	47	47	47	

Technical Services calculations of the raw data supplied produced substantially the same results. The test results indicated that on the first testing event the VOC emission rates exceeded the permit limits of 58 ppm and 0.76 lb/hr for all test runs conducted on all three engines. However, the nitrogen oxides, carbon monoxide and ammonia emissions were all less than their respective permit limits. The facility had the catalysts for each engine checked and cleaned before having the test consultant perform a second testing program. The second testing event resulted in the emissions of VOC's, nitrogen oxides, carbon monoxide and ammonia being less than their respective permit limits during all of the tests conducted on the three engines.

During the second testing event it was determined that cyclonic flow conditions existed in the engine 602 exhaust flow. The lb/MMBTU and lb/hr emissions have been reported based on the maximum and "actual" heat input rates for each emission parameter. Actual heat input was based on the facility's fuel flow monitoring.

The engines were operating from 80 to 97 percent of the permit rated 3130 BHP during the two test programs.

INTEROFFICE MEMORANDUM

Date: 02-Jun-2000 04:40pm
From: Joseph Kahn TAL
KAHN_J
Dept: Air Resources Management
Tel No: 850/921-9519

To: Chris Carlson TAL (CARLSON_C)

Subject: Tampa Curren Incinerators

I heard back from Steve Pak of HCEPC. Each odor control incinerator has a heat input of 3.78 mmBtu/hr, in addition to the 20 mmBtu/hr for the dryer burner. Shannon Todd told me this afternoon that the emissions used for modeling of the sludge drying operation include both the dryer and incinerator for each of two trains.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 2 6 2000

RECEIVED

JUN 0 1 2000

BUREAU OF AIR REGULATION

4 APT-ARB

A. A. Linero, P.E.
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

SUBJ: PSD Permit Application for Howard F. Curren Advanced Wastewater Treatment Facility (PSD-FL-291) located in Tampa, Florida

Dear Mr. Linero:

Thank you for sending the prevention of significant deterioration (PSD) permit application for the Howard F. Curren (HFC) Advanced Wastewater Treatment (AWT) Facility dated April 26, 2000. The PSD permit application is for the installation of two natural gas fired reciprocating engine-driven generators at the existing HFC AWT Facility. The reciprocating engines proposed for the facility are Waukesha 16V-AT27GL engines rated at 4,073 hp each, coupled to a 2.9 MW generator. As proposed, the engines will be allowed to fire natural gas up to 8,760 hours per year. Total emissions from the proposed project are above the thresholds requiring PSD review for nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC).

Based on our review of the PSD permit application, we have the following comments on topics other than the air quality impact assessment. Air quality impact comments are provided at the end of this letter.

1. The application stated that catalytic oxidation is a technically feasible option for controlling CO emissions; however, no economic analysis was performed. A detailed cost evaluation should be provided explaining why this control option was deemed cost prohibitive.

2. The selective catalytic reduction (SCR) economic analysis relied on the U.S. Environmental Protection Agency's *Alternative Control Techniques Document - NO_x Emissions from Stationary Reciprocating Internal Combustion Engines* published in 1993. The applicant should estimate the cost of this control option using the more recently published *OAQPS Control Cost Manual* (February 1996) and specific vendor quotes for the proposed SCR system. Additionally, the cost estimate included in the application is in the range of NO_x control cost effectiveness values that has previously been considered economically feasible for

other combustion projects. We suggest FDEP carefully consider SCR as an option for controlling NO_x emissions from the reciprocating engines.

In terms of the air quality impact assessment, our review comments on the HFC AWT Facility were discussed with Chris Carlson of the Florida Department of Environmental Protection on May 22 and 23, 2000. Additional information was provided in these discussions that resolved some of our comments and questions. The following are our remaining comments:

1. Worst Case Impacts - The internal combustion engines (ICEs) appear to be modeled at maximum load. If the ICEs will be operated at other load conditions, the associated emission parameters should be modeled to ensure the application presents the maximum ambient impacts. In addition, the worst case impact modeling should consider emission parameters for the ICE operation with and without use of the sludge heat recovery system.

2. Ambient Monitoring - The application addresses pre-construction ambient monitoring for NO_x and CO. VOC emission increases are significant, so the need for ozone monitoring should be addressed in the application.

3. Class I Area Assessment - The Federal Land Manager for the Chassahowitza NWR Class I area should be provided the opportunity to review and comment on this application.

4. Emission Inventory - The following comments are concerned with the NO_x emission sources modeled for NAAQS and PSD increment compliance assessments.

   a. The only HFC emission sources included in the NAAQS and PSD increment assessments were the ICEs. This application is for a major modification to a major emission source, so confirmation is needed that there are no other HFC NO_x emission sources at this facility.

   b. Although International Ship Repair (89 TPY) was identified as a source for inclusion in the emission inventory, it was not included in the ambient impact modeling.

   c. Source #5 for Hardee Power Partners, LTD (HAR5) was modeled with an incorrect emission rate of 4.0 g/s rather than 21.04 g/s as given in Appendix E.

Thank you for the opportunity to comment on the Howard F. Curren Advanced Wastewater Treatment Facility PSD permit application. If you have any questions regarding these comments, please direct them to either Katy Forney at 404-562-9130 or Stan Krivo at 404-562-9123.

Sincerely,

Douglas Neeley

R. Douglas Neeley
Chief
Air and Radiation Technology Branch
Air, Pesticides and Toxics
Management Division

J. Kahn, BAR
CC: R. Metcalf, PE
SWD
NPS
Hillsboro Co
T. Davis, ECT
S. Todd, TEC

CITY OF TAMPA

Department of Sanitary Sewers

Howard F. Curren
Advanced Wastewater Treatment Plant

May 31, 2000

Mr. Joseph Kahn, P.E.
Bureau of Air Regulation
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Re: Request for Additional Information Regarding Howard F. Curren AWTF
DEP File No. 0570373-009-AC (PSD-FL-291)

Dear Mr. Kahn:

The City of Tampa has received your letter dated April 26, 2000 requesting additional information regarding the above referenced project and offers the following responses:

FDEP Request 1:
We understand that the waste heat from the engine exhaust will be used in the existing sludge drying operation, and that this use will offset the use of the existing combustion chamber. Will this project increase the throughput or availability of the existing sludge drying operation, and will there be any impact on hourly and annual emissions as a result of this project, other than the additional emissions from the engines? How has the need to maintain a minimum level of waste heat throughput affected the proposed emissions of NOx and CO from the engines, and what is the level of the emissions from the combustion chamber that are being offset?

City of Tampa Response:
This project is designed to provide waste heat to the existing sludge drying facility at current throughput rates. As such, the availability or throughput of the sludge drying operation will not increase as a result of this project. To achieve optimum sludge drying, the proposed engines have been tuned to provide the required energy through the exhaust. Table 1 defines the emission rates from an AT27GL that has not been tuned for optimal exhaust heat recovery, emission rates from the proposed engines that have been designed to provide optimum heat for sludge drying, and the percent difference between the two.

Mr. Joseph Kahn, P.E.
May 31, 2000

Table 1

	Standard Engines	Proposed Engines	Percent Difference
NOx [g/bhp-hr]	*1.5*	*1.56*	*3.8%*
CO [g/bhp-hr]	*1.7*	*1.66*	*-2.3%*
VOC [g/bhp-hr]	*0.5*	*0.55*	*9%*

By changing emission rates of NO_x, CO or VOC, the heat content of the exhaust will change, and the process will not operate at the designed optimum level. This may result in the need to provide additional heat through the uncontrolled combustion of natural gas in the existing combustion chamber. Current projections indicate that this project is expected to reduce emissions from the combustion chamber by approximately 70 % below current levels. Based on the 1998 AOR report submitted for the facility, this would result in approximately 2.3 tons of NOx and 1.96 tons of CO reduced per year.

FDEP Request 2:

Please provide a control cost effectiveness analysis of an oxidation catalyst for CO and VOC control. This analysis should be based on a vendor quote for the project. Please provide a revised control cost effectiveness analysis for SCR based on a vendor quote for the project. Please include in the analysis details of the assumptions used in the analysis for projected life, interest rate, etc.

City of Tampa Response:

To simplify and expedite the permitting process, the maximum requested operating hours for the proposed new Engines 7 and 8 has been reduced from 8,760 to 6,500 hours per year. The reduction in maximum annual operating hours reduces potential CO and VOC emissions from 130.6 and 43.2 tons per year (tpy), respectively, to 96.9 and 32.1 tpy, respectively. Accordingly, Project potential CO and VOC emissions are now below the Section 62-212.400, Table 212.400-2, F.A.C. Significant Emission Rate thresholds and therefore not subject to PSD review. For this reason, a determination of Best Available Control Technology (BACT), including a cost effectiveness analysis, is no longer required for CO and VOCs.

As requested, a vendor quote was obtained for the installation of a SCR control system for NO_x control. Tables 2 through 4 attached provide summaries of capital cost, annual operating costs, and cost effectiveness for the SCR control system. Enclosed is a copy of the SCR quote received from Miratech Corporation. Cost effectiveness was determined to be $ 3,029 per ton of NO_x controlled. This control system cost exceeds the level of cost effectiveness previously considered to be unreasonable by FDEP for internal combustion (IC) engines; e.g., the Miami-Dade Water and Sewer Department February 1998 IC engine project.

Mr. Joseph Kahn, P.E.
May 31, 2000

FDEP Request 3:
Please confirm that the following equipment will be provided with each engine: air/fuel module, ignition control module, detonation sensing module, and turbocharger control module. Also, please confirm that each engine is equipped with a turbocharger intercooler.

City of Tampa Response:
Please see the enclosed letter from Reagan Equipment (the Florida Waukesha Distributor) confirming that the proposed units will be provided with the above referenced equipment.

FDEP Request 4:
Please provide supporting information for the emission factor for PM_{10} emissions.

City of Tampa Response:
A PM_{10} emission rate range of 0.06 to 0.10 grams per brake horsepower-hour (g/bhp-hr) was provided by the IC engine vendor (Waukesha); see enclosed letter. Conservatively, the top of this range, 0.10 g/hp-hr, was used to estimate PM_{10} emissions for the proposed new IC engines.

DEP Request 5:
The application shows that the emissions units are subject to a NESHAP but there seems to be no NESHAP requirement applicable to the engines. Please address.

City of Tampa Response:
The proposed units are not subject to NESHAP requirements. However, the plant is subject to NESHAP requirements, and therefore, the box was inadvertently checked.

FDEP Request 6:
Please briefly summarize the procedures for startup and shutdown and describe the length of time required for startup and shutdown.

City of Tampa Response:
The enclosed description from Reagan Equipment addresses the above referenced request.

In conversations with Mr. Shannon Todd of Tampa Electric Company, additional air quality impact analysis issues (i.e., dispersion modeling assessment) were discussed. Responses to these issues are as follows:

- As discussed with Mr. Chris Carlson of the Department, the annualized NO_x emission rate for the Hardee Power Partners, LTD emission unit (EU) number 5 has been increased from 4.0 grams per second (g/s) to 5.73 g/s. This is the annualized equivalent of 199.29 tons per year (tpy) of NO_x emissions.
- In addition, all existing emission units at the Howard F. Curren Advanced Wastewater Treatment Facility have been added to the interactive air dispersion modeling analyses.

Mr. Joseph Kahn, P.E.
May 31, 2000

Emission rates for the five digester gas internal combustion engines (EU #'s DG1-DG5), four emergency diesel generator engines (EU #'s 12A-12D), and two sludge dryer units (EU #'s 2 & 3) are provided on the attached Table 5. The City of Tampa requests that an operating hours limit of 8,000 hours a year be placed on digestive gas internal combustion units DG4 and DG5.

- All existing Howard F. Curren Advanced Wastewater Treatment Facility emission units were included in the revised interactive NO_x NAAQS analyses. However, the digester gas internal combustion engines DG1-3 were not included in the NO_x PSD Class II increment analyses. Digester gas internal combustion engines DG1-3 were installed and placed in service during calendar year 1985. Because the major source baseline date for PSD Class II increment consumption is February 8, 1988, digester gas internal combustion engines DG1-3 are part of the PSD baseline and do not consume increment.

The interactive NO_x PSD Class II increment and NAAQS analyses were repeated in accordance with the changes detailed above. Total impacts, at all locations where the proposed Project had a significant impact, were found to be below both the PSD Class II increments and the NAAQS. Revised Tables 7-9 and 7-10 showing the model results are attached. Electronic copies of the revised modeling files are provided on the attached diskette.

The City of Tampa understands that with the submission of this information, processing of the permit application will continue.

If you have any further questions, you may contact John Drapp with the Howard F. Curren Advanced Wastewater Treatment Plant at (813) 247-3451 or Shannon Todd with Tampa Electric Company at (813) 641-5125.

Sincerely,
DEPARTMENT OF SANITARY SEWERS

Ralph L. Metcalf II, P.E., Director

c/enc: Gregg Worley, EPA
John Bunyak, NPS
Bill Thomas, P.E., SWD
Steve Pak, Hillsborough County EPC
Thomas Davis, P.E., ECT
Shannon Todd, TEC
Eric Weiss, DSS Contracts
C. Carlson, BAR
File

Table 2. Economic Analysis for SCR Control System; 1.56 to 0.156 g/hp-hr; 10 ppm NH_3 Slip
City of Tampa/TEC IC Engine Project

Capital Cost Estimate for SCR Control System - Two IC Engines
Waukesha 16V-AT27GL

Direct Costs	($)	OAQPS Factor
Purchased Equipment		
SCR Control System	344,000	Miratech Quote
Required Components	20,000	Miratech Quote
Purchased Equipment Total	364,000	A
Sales Tax	21,840	0.060 * A
Instrumentation	36,400	0.10 * A
Freight	18,200	0.05 * A
Total Purchased Equipment	440,440	B
Installation		
Foundations & Supports	35,235	0.08 * B
Handling & Erection	61,662	0.14 * B
Electrical	17,618	0.04 * B
Piping	8,809	0.02 * B
Insulation For Ductwork	4,404	0.01 * B
Painting	4,404	0.01 * B
Total Installation Cost	132,132	
Total Direct Cost	572,572	TDC
Indirect Costs	**($)**	**OAQPS Factor**
Engineering	44,044	0.10 * B
Construction & Field Expenses	22,022	0.05 * B
Contractor Fees	44,044	0.10 * B
Start-up	8,809	0.02 * B
Performance Test	4,404	0.01 * B
Contingency	13,213	0.03 * B
Total Indirect Cost	136,536	TIC
Total Capital Investment	709,108	TCI

Sources: ECT, 2000.
Miratech, 2000.

Table 3. Economic Analysis for SCR Control System; 1.56 to 0.156 g/hp-hr; 10 ppm NH_3 Slip
City of Tampa/TEC IC Engine Project

Annual Operating Cost Estimate for SCR Control System - Two IC Engines
Waukesha 16V-AT27GL

Direct Costs	($)	OAQPS Factor
Labor & Material Costs		
Operator	17,875	A (1.0 hr/shift @$22/hr)
Supervisor	2,681	0.15 * A
Maintenance		
Labor	8,938	B (0.5 hr/shift @$22/hr)
Material	8,938	1.0 * B
Total Labor & Material Costs	38,431	C
Catalyst Costs		
Replacement (materials)	77,700	$35,000 Per Catalyst Replacement
Replacement (labor)	3,000	Estimated
Disposal	0	
Total Catalyst Cost	80,700	Replacement Every 16,000 Hours
Annualized Catalyst Cost	36,822	7% Interest Rate for 2.5 Yrs.
Urea	14,337	$325/ton
Electricity Costs	0	Negligible
Energy Penalties		
Unforced Outages	0	
Engine Backpressure	37,700	2.5% derate @ $0.040/kW-hr
Total Energy Penalties	37,700	
Total Direct Cost	127,290	TDC
Indirect Costs	**($)**	**OAQPS Factor**
Overhead	23,059	0.60 * C
Administrative Charges	14,182	0.02 * TCI
Property Taxes.	7,091	0.01 * TCI
Insurance	7,091	0.01 * TCI
Capital Recovery	69,325	7% Interest Rate for 15 Yrs.
Total Indirect Cost	120,748	
Total Annual Cost	248,039	

Sources: ECT, 2000.
Miratech, 2000.

Table 4. Cost Effectiveness Analysis for SCR Control System; 1.56 to 0.156 g/hp-hr; 10 ppm NH_3 Slip
City of Tampa/TEC IC Engine Project

Engine No.	No. of Engines	Annual Operation (hrs/yr)	NO_x Emission Rates							Economic Impacts	
			Baseline			SCR Control System			Decrease (tpy)	Annualized Cost[1] ($)	Cost-Effectiveness Over Baseline ($/ton)
			(g/hp-hr)	(lb/hr)	(tpy)	(Eff. - %)	(g/hp-hr)	(lb/hr)	(tpy)		
Eng. 7-8	2	6,500	1.560	28.0	91.0	90.0	0.156	2.8	9.1	81.9	248,039	3,029

[1] Estimated annualized cost for two SCR control systems.

Fax Proposal	SHEET 1 OF 10

MIRATECH Corporation
12345 Jones Road, Suite 287
Houston, TX 77070

Phone: 281-955-5464
Fax: 281-955-5462
Cellular: 281-799-5628

Email: dlambert@miratechcorp.com

DATE: 3/28/2000

To: Tom Davis @ Environmental Consulting & Technology, Inc.	Ph. #: 352-332-6230 ext. 351 Fax #: 352-332-6722
Copy:	

FROM: Don Lambert

Project Reference: **City of Tampa: Curren Wastewater Treatment, Waukesha 16V-AT27 GL emission controls**
MIRATECH Proposal #: **L-2000-3102**
Firm Quote For: **90 days**

Dear Tom:

Thank you for your inquiry regarding emission control equipment for two Waukesha 16V-AT27GL engine-generator packages fueled by pipeline quality natural gas. The attached proposal provides budgetary pricing and descriptions of Selective Catalytic Reduction (SCR) equipment and Oxidation Catalytic Converters.

Each system is sized such that system backpressure will not exceed 12" WC. Both systems are designed for engines fueled by pipeline quality natural gas. Neither system is compatible with engines fueled (entirely or in part) by digester gas, as the engine's exhaust gases will contain poisons that permanently damage catalytic aftertreatment devices.

The SCR system descriptions include a summary of "Required Components" not included in the "System Pricing". A safe estimate for these components is $10,000 per engine.

The control panel and injectors are specified such that the system will operate using urea as a reductant. With modifications at an additional cost, the system can be adjusted to operate on either urea or ammonia.

One option you may want to consider is a **continuous NO gas analyzer to measure the post catalyst emissions**. With a SCR system, the post-catalyst NOx is comprised almost entirely of NO. This analyzer will provide a continuous feedback (4-20 mA) to the SCR. This feedback is proportional to NOx. This feedback could be used to certify compliance – *continuously*. Further, the permit operator could use this feedback tied with a kW feedback from the generator to quantify NOx emissions (lb./hour, tons/year, etc.) which could be used for emission credit trading purposes. This analyzer package is available at $33,000 per engine. CO measurement and oxygen measurement (with 4-20 mA outputs) could each be added to this analyzer at $4,950 each.

The SCR catalyst system is designed to operate within a temperature range of 500 – 970 deg. F. The ideal operating range (which will minimize urea consumption) is 500 – 750 deg. F. The SCR housing in this proposal is insulated.

COMMERCIAL TERMS – SCR

Commissioning Cost:
$800/day plus expenses

Shipment: FOB Switzerland, CIP destination

Delivery: 10 - 12 weeks after drawings are approved . Approval drawings submitted within 2 weeks of receipt of order.

Payment:
30% with order
20% upon release for production
40% upon notification of shipment
10% upon completion of an acceptance test, but not later than (2) months after delivery.

The progress payments are due net 30 days.

Bid Validity: 90 days

Startup & Acceptance:

MIRATECH will provide a startup engineer for startup and acceptance per the attached "Field Service Rate Schedule". Out of pocket expenses are billed separately at cost.

Training in the operation of the SCR system is to ensure trouble-free system operation. Acceptance of the scope of supplies and service shall take place after startup. An acceptance record shall be prepared and signed by both parties to the contract.

Negligible defects in the fulfillment of the contract, which do not impair the guaranteed system values, shall not rule out acceptance but rather shall be noted in the acceptance record and eliminated immediately by MIRATECH.

Terms & Conditions:

See attached standard terms and conditions.

Warranty

MIRATECH guarantees the soundness and suitability of the material, workmanship, services, design and construction of the application.

The warranty period shall commence with acceptance or at the latest three months after date of shipment and shall amount to 24 months for SCR system components. The warranty period for the SCR catalysts (MIRATECH's process guarantee) shall be 16,000 operating hours or 2 years whichever occurs first.

Thank you for the opportunity to provide this proposal. If you have any questions about this equipment or its performance, please feel free to call me at 281-955-5464.

Best regards,

Don Lambert
Regional Sales Manager
MIRATECH Corporation

SCR CATALYST SYSTEM FOR NOX REDUCTION

Basic Component Outline:

SCR housing (carbon steel construction, insulated) including
- 3 - single layer SCR catalyst beds
- 1 - single layer oxidation catalyst bed
- 2 – internal static mixers for mixing pipe

Urea/ammonia control panel including
- 1 - urea/ammonia variable speed/stroke pump
- 1 - air compressor for nozzle atomization / cooling / cleaning
- 1 - urea/ammonia/ air, dual media injection nozzle with 3-way solenoid valve
- 1 - PLC programmable controller w/ 4 - 20mA input proportional to NOx

Required Components (not included in system pricing)

Urea storage tank (cross linked polyethylene; insulated, if required)
Vacuum breaker, mixer, submersion heater, feeder pump for storage tank
Urea storage tank level switch/alarm
Urea day tank(s) level switch/alarm
Plumbing of storage tank to control panel
Plumbing of urea lines and compressed air lines to injection nozzle
Exhaust system modifications
Infrastructure (structure, catwalk, ladder) to support SCR housing
Power source (2000 W) for control panel
Pre/post catalyst temperature signal for control panel
Exhaust backpressure signal for control panel
Engine running/stopped signal for control panel
Generator kW feedback transducer w/ 4 - 20mA output proportional to load.
Electrical connections from panel to injector solenoid valve
System installation

Required Maintenance

The required maintenance includes the following items:
1. Refill urea tank as required
2. Clean catalyst elements every 12 - 18 months
3. Test SCR performance periodically as required by operating permit
4. Replace filters as needed (urea supply, air supply)

Annual Operating Costs

The primary operating cost will be based on the amount of urea required for the NOx reduction. As a rule of thumb 1 lb of urea is required to reduce 1 lb of NOx. However this will vary depending on the actual NO/NO2 ratio of NOx. Urea is available as a 40% wt solution or as pellets which can be mixed as a solution at the plant. Regardless, the average cost of urea is $300 to $350 per ton of urea.

SCR System Pricing

Waukesha 16V-AT27GL @ 4,073 bhp

SCR Dosing Control Panel	Model SE-115
SCR Injector	Model DES-75600
SCR Housing	Model EM-88/4

System Pricing: **$197,000 each system**

SCR EMISSION PERFORMANCE – two engines

Exhaust Gases	Engine Outputs (gm/bhp-hr)	Site Engine Output (tons/year)	Catalyst Performance (% Reduction)	Site Engine Output w/SCR (tons/year)
NO_x	1.56	122.2	90%	12.2
CO	1.66	130.0	90%	13.0
NMHC	0.55	43.1	5%	40.9

REAGAN EQUIPMENT CO., INC.
190 South Bryan Road
Dania, FL 33004
Tel 954.925.6300
Fax 954.925.5808

Mr. John Drapp
Wastewater Facilities Operations Manager
Department of Sanitary Sewers
Howard F. Curren - AWT Plant
2700 Maritime Blvd.
Tampa, Florida 33605

May 3, 2000

Dear Mr. Drapp

This letter is responding to the Florida Department of Environmental Protection's request for additional information regarding the Howard Curren AWT DEP File No. 0570303-009AC (PSD-FL-291). Reagan equipment Co., the distributor of Waukesha Engines, is verifying that both engines ordered for the above referenced project include the following equipment.

REF; FDEP REQUEST 3:

Reagan's answer:

Both engines will have the following equipment:

- Air/Fuel Module
- Ignition Control Module
- Detonation Sensing Module
- Turbocharger Control Module
- Turbocharger Intercooler

If you need further information or have some questions, please contact me at (954) 925-6300.

REAGAN EQUIPMENT CO., INC.

Sincerely Yours,

Robert C. Lopez
Sales Representative

The nature of the business carried on by this Company is such that its ability to carry out its contracts as to quality of materials and times of delivery is dependent upon representations and promises made by manufacturers. Every article sold by us is guaranteed free from defect in material and workmanship, and when shown to be defective will be replaced free of charge. F.O.B. works where manufactured, but all propositions are made with the distinct understanding that we are not to be held for any damages consequent to break-downs due to such defects.

All promises as to date of shipments or completion of erecting are made in good faith, and this Company will use its utmost endeavors to keep such promises by taking every reasonable precaution in the placing of its orders and obligating the manufacturers in every way possible to insure their carrying out their agreements, but since all manufacturers in accepting orders specifically deny any liability for consequential damages this proposal is made with the distinct understanding that we are not to be held liable for damages of any character whatsoever consequential upon delays due to defective materials, delays in shipments or in erecting unless in particular cases where the measure of damages is covered by special agreement, and in such cases delays due to strikes, fires, delays in transportation and other causes beyond our reasonable control must be understood as entitling us to corresponding extensions in time.

The title and right of possession to all machinery and materials furnished by this Company is to remain in this Company until full payment is made therefor in cash.

REAGAN EQUIPMENT CO., INC.
190 South Bryan Road
Dania, FL 33004
Tel 954.925.6300
Fax 954.925.5808

Tampa Electric Company
6944 US Hwy 41 North
Apollo Beach, Florida 33572-1500

May 17, 2000

Attn: Shannon Todd

Ref: Electric Generation and Heat Recovery at the City of Tampa's Biosolids Drying Facility - Waukesha Natural Gas Generator 16V-AT27GL.

Dear Shannon

The requested emission estimates for the 16V-AT27GL are as follows:

A. Particulate Matter (PM total) ..... 0.06 - 0.10 g/bhp-hr

B. Volatile Organic Carbon (VOC) defined as NMHC ..... 0.55 g/bhp-hr

I hope this helps. If you need further information or have some questions, please call me.

REAGAN EQUIPMENT CO., INC.

Sincerely Yours,

Robert C. Lopez
Sales Representative

cc: John J. Kelly

The nature of the business carried on by this Company is such that its ability to carry out its contracts as to quality of materials and times of delivery is dependent upon representations and promises made by manufacturers. Every article sold by us is guaranteed free from defect in material and workmanship, and when shown to be defective will be replaced free of charge. F.O.B. works where manufactured, but all propositions are made with the distinct understanding that we are not to be held for any damages consequent to break-downs due to such defects.

All promises as to date of shipments or completion of erecting are made in good faith, and this Company will use its utmost endeavors to keep such promises by taking every reasonable precaution in the placing of its orders and obligating the manufacturers in every way possible to insure their carrying out their agreements, but since all manufacturers in accepting orders specifically deny any liability for consequential damages this proposal is made with the distinct understanding that we are not to be held liable for damages of any character whatsoever consequential upon delays due to defective materials, delays in shipments or in erecting unless in particular cases where the measure of damages is covered by special agreement, and in such cases delays due to strikes, fires, delays in transportation and other causes beyond our reasonable control must be understood as entitling us to corresponding extensions in time.

The title and right of possession to all machinery and materials furnished by this Company is to remain in this Company until full payment is made therefor in cash.

Engine Operations and Typical Start up and Shut Down Procedures

The engines will be started and stopped based on economic dispatch of the units as designated by Tampa Electric for normal operations. The units will be started by the City of Tampa to meet site load for emergency operations.

Normal Start Procedures

Estimated Time	Procedure	Estimated Duration (Seconds)
0-300	engine prelube	300
301-320	engine to rated speed	20
321-406	0-25% load step	86
407-491	26-50% load step	85
492-576	51-75% load step	85
577-660	76-100% load step	84

Normal Stop Procedures

Estimated Time	Procedure	Estimated Duration (Seconds)
0-119	load dump	119
120-240	engine cool-down cycle	121
241-540	engine post lube	300

Emergency Start Procedures

Estimated Time	Procedure	Estimated Duration (Seconds)
0-20	engine to rated speed	20
20-60	0-80% Load Step	40

Table 5. Modeled Emission Inventory Revisions

FACILITY ID	COMPANY NAME	EU ID	MODELED EMISSION RATES (tpy)	(g/s)
490015	HARDEE POWER PARTNERS,LTD	5	199.29	5.7300
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	2	2.77	0.0798
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	3	2.77	0.0798
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	12A	1.78	0.0511
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	12B	1.78	0.0511
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	12C	1.78	0.0511
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	12D	1.78	0.0511
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	DG1	71.80	2.0654
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	DG2	71.80	2.0654
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	DG3	71.80	2.0654
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	DG4	65.57	1.8863
570373	CITY OF TAMPA-DEPT OF SANITARY SEWERS	DG5	65.57	1.8863

Sources: FDEP, 2000.
ECT, 2000.

Table 7-9. 2nd Revision 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 ($\mu g/m^3$)	21.964	22.332	23.877	21.999	22.491
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 (%)	87.9	89.3	95.5	88.0	90.0
Receptor UTM Easting (m)	357,987.6	357,987.6	357,987.6	357,987.6	357,987.6
Receptor UTM Northing (m)	3,089,254.5	3,089,454.5	3,089,454.5	3,089,254.5	3,089,354.5
Distance From Plant Bench Mark (m)	608	608	608	608	600
Direction From Plant Bench Mark (Vector °)	261	279	279	261	270

Source: ECT, 2000.

Table 7-10. 2nd Revision 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 ($\mu g/m^3$)	78.903	71.145	83.063	58.297	54.119
Tier 1 Impact ($\mu g/m^3$)[1]	78.903	71.145	83.063	58.297	54.119
Tier 2 Impact ($\mu g/m^3$)[2]	59.177	53.358	62.297	43.723	40.589
Background ($\mu g/m^3$)	20.700	20.700	20.700	20.700	20.700
Total Impact ($\mu g/m^3$)	79.877	74.058	82.997	64.423	61.289
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 (%)	79.9	74.1	83.0	64.4	61.3
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.

INTEROFFICE MEMORANDUM

Date: 31-May-2000 11:22am
From: Shannon Todd
sktodd@tecoenergy.com
Dept:
Tel No:

To: Joseph.Kahn (Joseph.Kahn@dep.state.fl.us)

Subject: City of Tampa Response Letter

Joe,

Attached are the response letter to your original request for information as well as the revised modeling files that will be included in the response. Please call me so that we can discuss any additional questions that you may have with this response. Thank you for all of your help and cooperation on this project.

-Shannon

Mr. Joseph Kahn, P.E.
May 31, 2000

DRAFT

May 31, 2000

Mr. Joseph Kahn, P.E.
Bureau of Air Regulation
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Re: Request for Additional Information Regarding Howard F. Curren AWTF
DEP File No. 0570373-009-AC (PSD-FL-291)

Dear Mr. Kahn:

The City of Tampa has received your letter requesting additional information regarding the above referenced project and offers the following responses:

FDEP Request 1:
We understand that the waste heat from the engine exhaust will be used in the existing sludge drying operation, and that this use will offset the use of the existing combustion chamber. Will this project increase the throughput or availability of the existing sludge drying operation, and will there be any impact on hourly and annual emissions as a result of this project, other than the additional emissions from the engines? How has the need to maintain a minimum level of waste heat throughput affected the proposed emissions of NOx and CO from the engines, and what is the level of the emissions from the combustion chamber that are being offset?

City of Tampa Response:
This project is designed to provide waste heat to the existing sludge drying facility at current throughput rates. As such, the availability or throughput of the sludge drying operation will not increase as a result of this project. To achieve optimum sludge drying, the proposed engines have been tuned to provide the required energy through the exhaust. Table I defines the emission rates from an AT27GL that has not been tuned for optimal exhaust heat recovery, emission rates from the proposed engines that have been

designed to provide optimum heat for sludge drying, and the percent difference between the two.

Table I

	Standard Engines	Proposed Engines	Percent Difference
NOx [g/bhp-hr]	*1.5*	*1.56*	*3.8%*
CO [g/bhp-hr]	*1.7*	*1.66*	*-2.3%*
VOC [g/bhp-hr]	*0.5*	*0.55*	*9%*

By changing emission rates of NO_x, CO or VOC, the heat content of the exhaust will change, and the process will not operate at the designed optimum level. This may result in the need to provide additional heat through the uncontrolled combustion of natural gas in the existing combustion chamber. Current projections indicate that this project is expected to reduce emissions from the combustion chamber by approximately 70 % below current levels. Based on the 1998 AOR report submitted for the facility, this would result in approximately 2.3 tons of NOx and 1.96 tons of CO reduced per year.

FDEP Request 2:

Please provide a control cost effectiveness analysis of an oxidation catalyst for CO and VOC control. This analysis should be based on a vendor quote for the project. Please provide a revised control cost effectiveness analysis for SCR based on a vendor quote for the project. Please include in the analysis details of the assumptions used in the analysis for projected life, interest rate, etc.

City of Tampa Response:

To simplify and expedite the permitting process, the maximum requested operating hours for the proposed new Engines 7 and 8 has been reduced from 8,760 to 6,500 hours per year. The reduction in maximum annual operating hours reduces potential CO and VOC emissions from 130.6 and 43.2 tons per year (tpy), respectively, to 96.9 and 32.1 tpy, respectively. Accordingly, Project potential CO and VOC emissions are now below the Section 62-212.400, Table 212.400-2, F.A.C. Significant Emission Rate thresholds and therefore not subject to PSD review. For this reason, a determination of Best Available Control Technology (BACT), including a cost effectiveness analysis, is no longer required for CO and VOCs.

As requested, a vendor quote was obtained for the installation of a SCR control system

for NO_x control. Tables 2 through 4 attached provide summaries of capital cost, annual operating costs, and cost effectiveness for the SCR control system. Enclosed is a copy of the SCR quote received from Miratech Corporation. Cost effectiveness was determined to be $ 3,029 per ton of NO_x controlled. This control system cost exceeds the level of cost effectiveness previously considered to be unreasonable by FDEP for internal combustion (IC) engines; e.g., the Miami-Dade Water and Sewer Department February 1998 IC engine project.

FDEP Request 3:
Please confirm that the following equipment will be provided with each engine: air/fuel module, ignition control module, detonation sensing module, and turbocharger control module. Also, please confirm that each engine is equipped with a turbocharger intercooler.

City of Tampa Response:
Please see the enclosed letter from Reagan Equipment (the Florida Waukesha Distributor) confirming that the proposed units will be provided with the above referenced equipment.

FDEP Request 4:
Please provide supporting information for the emission factor for PM_{10} emissions.

City of Tampa Response:
A PM_{10} emission rate range of 0.06 to 0.10 grams per brake horsepower-hour (g/bhp-hr) was provided by the IC engine vendor (Waukesha); see enclosed letter. Conservatively, the top of this range, 0.10 g/hp-hr, was used to estimate PM_{10} emissions for the proposed new IC engines.

DEP Request 5:
The application shows that the emissions units are subject to a NESHAP but there seems to be no NESHAP requirement applicable to the engines. Please address.

City of Tampa Response:
The proposed units are not subject to NESHAP requirements. However, the plant is subject to NESHAP requirements, and therefore, the box was inadvertently checked.

FDEP Request 6:
Please briefly summarize the procedures for startup and shutdown and describe the length of time required for startup and shutdown.

Mr. Joseph Kahn, P.E.
May 31, 2000

City of Tampa Response:
The enclosed description from Reagan Equipment addresses the above referenced request.

In conversations with Mr. Shannon Todd of Tampa Electric Company, additional air quality impact analysis issues (i.e., dispersion modeling assessment) were discussed. Responses to these issues are as follows:

- As discussed with Mr. Chris Carlson of the Department, the annualized NO_x emission rate for the Hardee Power Partners, LTD emission unit (EU) number 5 has been increased from 4.0 grams per second (g/s) to 5.73 g/s. This is the annualized equivalent of 199.29 tons per year (tpy) of NO_x emissions.
- In addition, all existing emission units at the Howard F. Curren Advanced Wastewater Treatment Facility have been added to the interactive air dispersion modeling analyses. Emission rates for the five digester gas internal combustion engines (EU #'s DG1-DG5), four emergency diesel generator engines (EU #'s 12A-12D), and two sludge dryer units (EU #'s 2 & 3) are provided on the attached Table 5. The City of Tampa requests that an operating hours limit of 8,000 hours a year be placed on digestive gas internal combustion units DG4 and DG5.
- All existing Howard F. Curren Advanced Wastewater Treatment Facility emission units were included in the revised interactive NO_x NAAQS analyses. However, the digester gas internal combustion engines DG1-3 were not included in the NO_x PSD Class II increment analyses. Digester gas internal combustion engines DG1-3 were installed and placed in service during calendar year 1985. Because the major source baseline date for PSD Class II increment consumption is February 8, 1988, digester gas internal combustion engines DG1-3 are part of the PSD baseline and do not consume increment.

The interactive NO_x PSD Class II increment and NAAQS analyses were repeated in accordance with the changes detailed above. Total impacts, at all locations where the proposed Project had a significant impact, were found to be below both the PSD Class II increments and the NAAQS. Revised Tables 7-9 and 7-10 showing the model results are attached. Electronic copies of the revised modeling files are provided on the attached diskette.

The City of Tampa understands that with the submission of this information, processing of the permit application will continue.

Mr. Joseph Kahn, P.E.
May 31, 2000

If you have any further questions, you may contact John Drapp at (813) 247-3451 or Shannon Todd with Tampa Electric Company at (813) 641-5125.

Sincerely,

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

c/enc: Gregg Worley, EPA
John Bunyak, NPS
Bill Thomas, P.E., SWD
Steve Pak, Hillsborough County EPC
Thomas Davis, P.E., ECT
Shannon Todd, TEC

Memorandum

Florida Department of Environmental Protection

To: Chris Carlson

From: Joseph Kahn, P.E.

Date: May 26, 2000

Re: Tampa Curren Other Sources

I spoke with Shannon Todd this afternoon regarding the heat input to the sludge dryers and afterburners. He referred to the draft Title V permit and found that each dryer has a maximum heat input of 20 mmBtu per hour and fires natural gas. Using emission factors of 0.1 lb/mmBtu for NOx and 0.08 lb/mmBtu for CO, annual potential emissions would be: 18 TPY NOx and 14 TPY.

I reviewed the draft permit and found no separate reference to heat input for the afterburners. I did find the permit has the following information in the draft permit about the afterburners:

(i) Manufacturer: Hunting Energy Systems, Inc.
(ii) Model Name and Number: 105
(iii) Design Flow Rate: 35,124 ACFM @ 261° F.
(iv) Overall Efficiency Rating at Design Capacity: 99.64% PM, 90% VOC
(v) Stack Height Above Ground: 75 ft.
(vi) Exit Diameter: 3.1 ft.
(vii) Exit Velocity: 67 f.p.s.
(viii) Water Vapor Content: 15.25%
(ix) Process Controlled by Collection System: Train Nos. 2 and 3
(x) Material Handling Rate: 29.38 TPH per train (Averaged over a period of 24 hours)
(xi) Operation Schedule: 24 hrs./day; 7 days/wk.; 52 wks/yr.

I have left a message with Steve Pak at Hillsborough County EPC to determine if the heat input for the dryers includes the afterburners.

Further, the draft Title V permit does include the limitation on fuel consumption for the diesel engines that is carried over from a construction permit:

D.2. Total fuel usage shall not exceed 115,000 gallons for any consecutive twelve (12) month period.
[Construction Permit 0570373-006-AC]

D.3. The generators shall be fired only on #2 fuel oil with a maximum sulfur content of 0.05% by weight
[Construction Permit 0570373-006-AC]

Shannon also told me that they will be submitting the additional information including the modeling next week.

FAX Cover Sheet

USEPA - Region 4
61 Forsyth St., SW
Atlanta, Georgia 30303

TO: Joe Kahn
FDEP

FAX #: 850-922-6979

RE: Howard F. Curren AWT Fac. H

FROM: Katy Forney
Air Permits Section, Region 4 USEPA

Phone #: 404-562-9130

Date: 5-26-00

# of Pages (including cover): 4

COMMENTS:

If this FAX is poorly received, please call
Katy Forney: 404-562-9130

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 2 6 2000

4 APT-ARB

A. A. Linero, P.E.
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

SUBJ: PSD Permit Application for Howard F. Curren Advanced Wastewater Treatment Facility (PSD-FL-291) located in Tampa, Florida

Dear Mr. Linero:

Thank you for sending the prevention of significant deterioration (PSD) permit application for the Howard F. Curren (HFC) Advanced Wastewater Treatment (AWT) Facility dated April 26, 2000. The PSD permit application is for the installation of two natural gas fired reciprocating engine-driven generators at the existing HFC AWT Facility. The reciprocating engines proposed for the facility are Waukesha 16V-AT27GL engines rated at 4,073 hp each, coupled to a 2.9 MW generator. As proposed, the engines will be allowed to fire natural gas up to 8,760 hours per year. Total emissions from the proposed project are above the thresholds requiring PSD review for nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC).

Based on our review of the PSD permit application, we have the following comments on topics other than the air quality impact assessment. Air quality impact comments are provided at the end of this letter.

1. The application stated that catalytic oxidation is a technically feasible option for controlling CO emissions; however, no economic analysis was performed. A detailed cost evaluation should be provided explaining why this control option was deemed cost prohibitive.

2. The selective catalytic reduction (SCR) economic analysis relied on the U.S. Environmental Protection Agency's *Alternative Control Techniques Document - NO_x Emissions from Stationary Reciprocating Internal Combustion Engines* published in 1993. The applicant should estimate the cost of this control option using the more recently published *OAQPS Control Cost Manual* (February 1996) and specific vendor quotes for the proposed SCR system. Additionally, the cost estimate included in the application is in the range of NO_x control cost effectiveness values that has previously been considered economically feasible for

other combustion projects. We suggest FDEP carefully consider SCR as an option for controlling NO_x emissions from the reciprocating engines.

In terms of the air quality impact assessment, our review comments on the HFC AWT Facility were discussed with Chris Carlson of the Florida Department of Environmental Protection on May 22 and 23, 2000. Additional information was provided in these discussions that resolved some of our comments and questions. The following are our remaining comments:

1. Worst Case Impacts - The internal combustion engines (ICEs) appear to be modeled at maximum load. If the ICEs will be operated at other load conditions, the associated emission parameters should be modeled to ensure the application presents the maximum ambient impacts. In addition, the worst case impact modeling should consider emission parameters for the ICE operation with and without use of the sludge heat recovery system.

2. Ambient Monitoring - The application addresses pre-construction ambient monitoring for NO_x and CO. VOC emission increases are significant, so the need for ozone monitoring should be addressed in the application.

3. Class I Area Assessment - The Federal Land Manager for the Chassahowitza NWR Class I area should be provided the opportunity to review and comment on this application.

4. Emission Inventory - The following comments are concerned with the NO_x emission sources modeled for NAAQS and PSD increment compliance assessments.

   a. The only HFC emission sources included in the NAAQS and PSD increment assessments were the ICEs. This application is for a major modification to a major emission source, so confirmation is needed that there are no other HFC NO_x emission sources at this facility.

   b. Although International Ship Repair (89 TPY) was identified as a source for inclusion in the emission inventory, it was not included in the ambient impact modeling.

   c. Source #5 for Hardee Power Partners, LTD (HAR5) was modeled with an incorrect emission rate of 4.0 g/s rather than 21.04 g/s as given in Appendix E.

Thank you for the opportunity to comment on the Howard F. Curren Advanced Wastewater Treatment Facility PSD permit application. If you have any questions regarding these comments, please direct them to either Katy Forney at 404-562-9130 or Stan Krivo at 404-562-9123.

Sincerely,

Douglas Neeley

R. Douglas Neeley
Chief
Air and Radiation Technology Branch
Air, Pesticides and Toxics
Management Division

INTEROFFICE MEMORANDUM

Date: 24-May-2000 09:21am
From: Chris Carlson TAL 850/921-9537
CARLSON_C@A1
Dept:
Tel No:

To: Joseph Kahn (Joseph.Kahn@dep.state.fl.us)
CC: Alvaro Linero (Alvaro.Linero@dep.state.fl.us)

Subject: Class I Impact for HF Curren AWTF

Joe,

I just wanted to let you know that I got a voice mail message from Ellen Porter of the US Fish and Wildlife Service yesterday. She stated that the Class I Impact analysis for the HF Curren AWTF was fine, and that the Fish and Wildlife Service would not have any concerns with this project.

Chris

TECO
TAMPA ELECTRIC

FACSIMILE TRANSMITTAL SHEET

ENVIRONMENTAL AFFAIRS
813/641-5036
813/641-5081 FAX

DATE: 5/24/00 X **FOR IMMEDIATE DELIVERY**

TO: Joe Kahn

COMPANY: FDEP

NUMBER OF PAGES (Including cover page): 2

FROM: Shannon Todd

COMMENTS:

Joe,

Attached is a summary of emissions from the Waukesha 16V-AT27GL under varying load conditions. As you can see, the emission rates do not vary significantly with load. Please call me if you have any questions at (813) 641-5125.

Thanks,

Shannon.

Waukesha 16V-AT27GL Emissions with Varying Load

	75%	50%	25%	0%
Load (BMEP)	154.5	103	51.5	1
Nox (g/Bhp-hr)	1.22	0.87	0.52	.18
CO (g/Bhp-hr)	1.76	1.86	1.96	2.05
NMHC	0.57	0.73	1.0	1.4

Source: Waukesha

ADMINISTRATIVE OFFICES, LEGAL &
WATER MANAGEMENT DIVISION
1900 - 9TH AVENUE
TAMPA, FLORIDA 33605
TELEPHONE (813) 272-5960
FAX (813) 272-5157

AIR MANAGEMENT DIVISION
TELEPHONE (813) 272-5530

WASTE MANAGEMENT DIVISION
TELEPHONE (813) 272-5788

WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

MEMORANDUM

DATE: May 17, 2000

TO: Mr. Joseph Kahn, P.E.

FROM: Gabriel Castaño G.C THRU: Alice Harman, P.E.

SUBJECT: Request for Additional Information – DEP File No. 0570373-009-AC
(PSD-FL-291)
Project: Howard F. Curren AWTF, Engines 7 and 8

On April 28, 2000 the HEPC received a copy of application to construct two natural gas fired reciprocating engine driven generators at the Howard F. Curren Advanced Wastewater Treatment Facility operated by the City of Tampa. The Department of Environmental Protection sent a request for additional information to Robert L. Metcalf,II, P.E., on April 28, 2000 and May 08, 2000. The EPC is in agreement with the Department of Environment Protection. The application is incomplete and additional information is needed in order to continue processing. The Commission has concerns with this analysis and the request. Your April and May requests included all of our concerns.

Thank you for the opportunity to provide comments on this project.

Cc: Shannon Todd, TECO

INTEROFFICE MEMORANDUM

Date: 23-May-2000 02:17pm
From: Krivo.Stanley
Dept:
Tel No:

To: S&L Model: FL
CC: Reeves.Kathleen

Subject: Howard F. Curren Advance Wastewater Treatment Facility

Chris,

As we discussed yesterday, the following presents my initial review comments on the air quality impact portions of the PSD permit application for the Howard F. Curren Advance Wastewater Treatment Facility (HFC) to be located in Tampa, FL. These are for your use in reviewing the application. Our letter on this application will contain our final review comments.

1. Worst Case Impacts - The internal combustion engines (ICE) were modeled at maximum load. The exit velocity and exit temperature used for each ICE appear to be associated with maximum load conditions. The impact of the operation of the ICE at other loads was not addressed. If the ICE will be operated at other load conditions, the associated emission parameters should be modeled to ensure the maximum ambient impacts are associated with maximum load operation. Also, the worst case impacts should consider emission parameters for operation with and without use of the sludge heat recover system.

2. Ambient Monitoring - The application addresses pre-construction ambient monitoring for NOx and CO. VOC emission increases are significant so the need for ozone monitoring should be addressed in the application.

3. Modeling Assumptions - A number of items in the ambient impact modeling assessment appear incorrect. If the Class I area is the nearest sensitive receptor, the following do not alter the results presented.

   1) Visibility impacts of the Additional Analysis section are concerned with impacts at sensitive receptors in the impact area - not just the nearest Class I area.

   2) Soils and vegetation impacts of the Additional Analysis section are concerned with sensitive receptors in the impact area - not just the nearest Class I area.

4. Class I Area Assessment - The assessment of impacts to the nearest Class I area should be reviewed by the federal land manager (FLM). These impacts included PSD increment consumption, visibility impairment, and regional haze. The FLM for the Chassahowitza NWR Class I area needs to be provided the opportunity to review and comment on this applications. [Note: The CALPUFF modeling performed for the Class I area was not provided for our review.]

5. Emission Inventory - The following comments are concerned with the emission sources modeled for NAAQS and PSD increment compliance assessment.

- For both the NAAQS and PSD assessment, all sources within small significant impact areas (3 km) are normally included in the ambient impact modeling.

- Only the HFC emissions from the ICE were included in the NAAQS and PSD assessment. This is a major modification to a major emission source so confirmation is needed that there are no other HFC NOx sources for these assessments.

- The NAAQS emission inventory has only one additional source that was not included in the PSD emission inventory (Tampa Bay Ship Building). No attempt was made to distinguish PSD sources so all emissions were used in the increment assessment.

- The application identified the following sources as appropriate for inclusion in the PSD modeling but were absent from the ISTST3 model output files reviewed:

International Ship Repair (89 TPY)
Gulf Marine Repair Corporation (127 TPY)

- Source HAR5 was modeled with an emission rate of 4.0 g/s rather than 21.04 g/s.

Please let me know of any questions.
Thanks...sjk

INTEROFFICE MEMORANDUM

Date: 18-May-2000 01:52pm
From: Joseph Kahn TAL
KAHN_J
Dept: Air Resources Management
Tel No: 850/921-9519

To: Shannon Todd (sktodd@tecoenergy.com)

Subject: Re: City of Tampa HFCAWTP Project Response Letter

Shannon,

Thanks for sending your draft response. I have a couple of comments for you to consider before you finalize your letter. Regarding the heat vs. emissions from the engines, I was interested in getting a more quantitative estimate of the magnitude of emissions increase that resulted from the design choice. Did the need for heat increase emissions by 1%, 5%, etc.? I was also looking for an estimate of the emissions offset from the sludge drying operation in terms of a mass unit, say, tons per year.

The Magnolia address will be fine if the letter is sent by courier or Fed-ex. Note that it is Magnolia Drive, not Avenue. However, we do not receive US Mail here, so if you are going to mail it, you should send it to the following address: Mail Station #5505, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.

Please call if you have any questions.

-Joe

INTEROFFICE MEMORANDUM

Date: 17-May-2000 03:30pm
From: Shannon Todd
sktodd@tecoenergy.com
Dept:
Tel No:

To:	Joseph.Kahn	(Joseph.Kahn@dep.state.fl.us)
CC:	ss40	(ss40@ci.tampa.fl.us)
CC:	John Kelly	(jjkelly@tecoenergy.com)
CC:	Patrick Shell	(plshell@tecoenergy.com)

Subject: City of Tampa HFCAWTP Project Response Letter

Joe,

As per our discussion, I have attached a draft response to your letter dated April 26, 2000. Once we receive the requested vendor quotes, we will send a final form of this letter complete with all attachments. Please feel free to call me at (813) 641-5125 if you have any questions.

Sincerely,

Shannon K. Todd
Tampa Electric Company
(813) 641-5125
fax (813) 641-5081

Mr. Joseph Kahn, P.E.
May 17, 2000

DRAFT

May 17, 2000

Mr. Joseph Kahn, P.E.
Bureau of Air Regulation
Florida Department of Environmental Protection
111 South Magnolia Avenue, Suite 4
Tallahassee, FL 32301

Re: Request for Additional Information Regarding Howard F. Curren AWTF
DEP File No. 0570373-009-AC (PSD-FL-291)

Dear Mr. Kahn:

The City of Tampa has received your letter requesting additional information regarding the above referenced project and offers the following responses:

FDEP Request 1:
We understand that the waste heat from the engine exhaust will be used in the existing sludge drying operation, and that this use will offset the use of the existing combustion chamber. Will this project increase the throughput or availability of the existing sludge drying operation, and will there be any impact on hourly and annual emissions as a result of this project, other than the additional emissions from the engines? How has the need to maintain a minimum level of waste heat throughput affected the proposed emissions of NOx and CO from the engines, and what is the level of the emissions from the combustion chamber that are being offset?

City of Tampa Response:
This project is designed to provide waste heat to the existing sludge drying facility at current throughput rates. As such, the availability or throughput of the sludge drying operation will not increase as a result of this project. To achieve optimum sludge drying, the proposed engines have been tuned to provide the required energy through the exhaust. By changing emission rates of NO_x, CO or VOC, the heat content of the exhaust

will change, and the process will not operate at the designed optimum level. This may result in the need to provide additional heat through the uncontrolled combustion of natural gas in the existing combustion chamber. Based on projected use, this project is expected to reduce emissions from the combustion chamber by approximately 70 % below current levels.

FDEP Request 2:
Please provide a control cost effectiveness analysis of an oxidation catalyst for CO and VOC control. This analysis should be based on a vendor quote for the project. Please provide a revised control cost effectiveness analysis for SCR based on a vendor quote for the project. Please include in the analysis details of the assumptions used in the analysis for projected life, interest rate, etc.

City of Tampa Response:
The requested information is enclosed.

FDEP Request 3:
Please confirm that the following equipment will be provided with each engine: air/fuel module, ignition control module, detonation sensing module, and turbocharger control module. Also, please confirm that each engine is equipped with a turbocharger intercooler.

City of Tampa Response:
Please see the enclosed letter from Reagan Equipment (the Florida Waukesha Distributor) confirming that the proposed units will be provided with the above referenced equipment.

FDEP Request 4:
Please provide supporting information for the emission factor for PM_{10} emissions.

City of Tampa Response:
The PM_{10} emission rate is based on a factor provided by Waukesha and is enclosed.

DEP Request 5:
The application shows that the emissions units are subject to a NESHAP but there seems to be no NESHAP requirement applicable to the engines. Please address.

City of Tampa Response:
The proposed units are not subject to NESHAP requirements. However, the plant is

subject to NESHAP requirements, and therefore, the box was inadvertently checked.

FDEP Request 6:
Please briefly summarize the procedures for startup and shutdown and describe the length of time required for startup and shutdown.

City of Tampa Response:
The enclosed letter from Reagan Equipment addresses the above referenced request.

The City of Tampa understands that with the submission of this information, processing of the permit application will continue.

If you have any further questions, you may contact me at (813) 247-3451 or Shannon Todd with Tampa Electric Company at (813) 641-5125.

Sincerely,

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

c/enc: Gregg Worley, EPA
John Bunyak, NPS
Bill Thomas, P.E., SWD
Steve Pak, Hillsborough County EPC
Thomas Davis, P.E., ECT
Shannon Todd, TEC

INTEROFFICE MEMORANDUM

Date: 16-May-2000 11:35am
From: Joseph Kahn TAL
KAHN_J
Dept: Air Resources Management
Tel No: 850/921-9519

To: Ellen_Porter (Ellen_Porter@nps.gov)
CC: Kirsten_King (Kirsten_King@nps.gov)

Subject: Re: Howard Curren AWTF

Ellen and Kirsten,

Thanks for the timely comments on this project. I've reviewed your comments and have some thoughts to add about the applicability of NSCR to this project that may clarify why the applicant rejected the technology. (Kirsten, I called you today to discuss your comments, but you are out of the office, so I thought I'd send this message instead.)

NSCR, also known as a three-way catalyst, is used to decrease emissions of NOx, CO and VOC in fuel-rich engine exhaust. The mode of action is basically that the oxygen from the NOx is used to oxidize the CO and VOC, so the nitrogen in the NOx gets reduced to elemental N2, and the catalyst acts to promote that reaction.

The oxygen content in the engine exhaust under fuel rich conditions is low, say less than 3%, so the oxidation reaction proceeds primarily using the oxygen from the NOx, which allows for the reduction reaction to proceed. As the oxygen content increases in the exhaust, as with lean combustion engines (which operate fuel-lean, or with lots of excess air), the CO and VOC get oxidized as before, but with the elemental oxygen instead of the oxygen from the NOx. In other words, the oxidation reaction proceeds fine, but the reduction reaction for NOx does not proceed. So, CO and VOC are oxidized, but the NOx just goes through. This is exactly the effect of an oxidation catalyst.

The Gill's Onions project in the RBLC data is for six rich-burn engines, so the NSCR technology is applicable for that engine design. Since this project will have a lean-burn design, NSCR is not applicable for NOx control. However, the oxidation catalyst is applicable for CO and VOC control, and I asked the applicant to perform a cost analysis of the oxidation catalyst in my letter of April 26th.

I hope this clarifies the control technology issue somewhat. I'll be sure you get a copy of the applicant's response regarding the evaluation of the oxidation catalyst. Please call or e-mail me if you have any questions. I'm at 850/921-9519.

-Joe

ECT
Environmental Consulting & Technology, Inc.

May 15, 2000

Mr. Joseph Kahn, P.E.
New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
111 South Magnolia Avenue, Suite 4
Tallahassee, FL 32301

SUBJECT: Response to Request for Additional Information
DEP File No. 0570373-009-AC (PSD-FL-291)
Howard F. Curren AWTF, Engines 7 and 8

Dear Mr. Kahn:

On behalf of the City of Tampa and Tampa Electric Company, the following responses to the issues raised in your May 5, 2000 correspondence are provided for your review.

Item 1. NO_x NAAQS Receptor Grid

In accordance with your email message dated May 5, 2000, the receptor grid employed in the modeling analysis is no longer an issue. Accordingly, a response to this item is not required.

Items 2. and 3. NO_x NAAQS and PSD Emission Inventory

The Gulf Marine Repair Corporation and Sea 3 of Florida, Inc. emission sources were not included in our initial modeled emission inventory because stack parameter information for these sources was not specified in the emission inventory data provided by the Department. Following discussions this issue with Mr. Chris Carlson of the Department, stack data for these two emission sources was subsequently provided by Mr. Carlson.

The annual emission rates included in the ISCST3 input files for both the NO_x PSD Increment and NAAQS analyses were based on the highest emission rate for all fuel types. These emission rates were reviewed and discussed with Mr. Carlson. Annualized emission rates, reflecting the maximum combined annual rates for all fuel types, are provided on Table 1 attached. The maximum annual emission rates for all fuel combinations in tons per year (tpy) were converted to grams per second (g/s) for use in the ISCST3 interactive modeling analysis.

The interactive NO_x PSD Class II increment and NAAQS analyses were repeated in accordance with the changes detailed above. Total impacts, at all locations where the proposed Project had a significant impact, were found to be well below both the PSD Class II increments and the NAAQS. Revised Tables 7-9 and 7-10 showing the model results are attached. Electronic copies of the revised modeling files are provided on the attached diskette.

3701 Northwest
98TH Street
Gainesville, FL
32606

(352)
332-0444

FAX (352)
332-6722

Item 4. Class I Impact Analyses

As requested, analyses of Class I impacts on the Chassahowitzka National Wildlife Reserve using the CALPUFF dispersion model and procedures in the EPA *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2* document were conducted. As shown in the attached report, all Class I impacts were found to be well below the Class I significance levels.

If you have any questions concerning these responses, please contact either myself at (352) 332-6230, Ext. 351 or Mr. Shannon Todd of Tampa Electric Company at (813) 641-5125.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Thomas W. Davis, P.E.
Principal Engineer

Attachments

cc: Mr. Shannon Todd
Tampa Electric Company

Table 1. Request for Additional Information.

REQUEST FOR ADDITIONAL IMFORMATION ITEM #	FACILITY ID	COMPANY NAME	EU ID	MODELED EMISSION RATES (tpy)	(g/s)
3a.	490043	IPS AVON PARK CORPORATION	1	252	7.3
3a.	490043	IPS AVON PARK CORPORATION	2	252	7.3
3a.	490043	IPS AVON PARK CORPORATION	3	252	7.3
3a.	490043	IPS AVON PARK CORPORATION	4	252	7.3
3b.	570029	NITRAM, INC.	7	294	8.5
3b.	570029	NITRAM, INC.	13	8	0.2
3c.	810007	TROPICANA PRODUCTS, INC.	11	138	4.0
3c.	810007	TROPICANA PRODUCTS, INC.	12	424	12.2
3c.	810007	TROPICANA PRODUCTS, INC.	14	391	11.2
3c.	810007	TROPICANA PRODUCTS, INC.	15	109	3.1
3c.	810007	TROPICANA PRODUCTS, INC.	16	315	9.0
3c.	810007	TROPICANA PRODUCTS, INC.	21	4	0.1
3c.	810007	TROPICANA PRODUCTS, INC.	22	1	0.03
3c.	810007	TROPICANA PRODUCTS, INC.	23	11	0.3
3d.	1010373	IPS AVON PARK CORP.	1	252	7.3
3d.	1010373	IPS AVON PARK CORP.	2	252	7.3
3d.	1010373	IPS AVON PARK CORP.	3	252	7.3
3e.	1030011	FLORIDA POWER CORPORATION	1	1,445	41.6
3e.	1030011	FLORIDA POWER CORPORATION	2	1,615	46.5
3e.	1030011	FLORIDA POWER CORPORATION	3	4,818	138.6
3e.	1030011	FLORIDA POWER CORPORATION	4	10	0.3
3e.	1030012	FLORIDA POWER CORPORATION	1	1,680	48.3
3e.	1030012	FLORIDA POWER CORPORATION	2	1,603	46.1
3e.	1030012	FLORIDA POWER CORPORATION	3	1,680	48.3
3e.	1030012	FLORIDA POWER CORPORATION	4	1,197	34.4
3e.	1030012	FLORIDA POWER CORPORATION	5	1,197	34.4
3e.	1030012	FLORIDA POWER CORPORATION	6	1,335	38.4
3e.	1030012	FLORIDA POWER CORPORATION	7	1,335	38.4
3f.	1050003	LAKELAND ELECTRIC & WATER UTILITIES	3	674	19.4
3f.	1050003	LAKELAND ELECTRIC & WATER UTILITIES	4	1,448	41.7
3f.	1050003	LAKELAND ELECTRIC & WATER UTILITIES	5	639	18.4
3f.	1050003	LAKELAND ELECTRIC & WATER UTILITIES	6	639	18.4
3f.	1050003	LAKELAND ELECTRIC & WATER UTILITIES	8	425	12.2
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	1	2,317	66.7
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	2	380	10.9
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	3	380	10.9
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	4	978	28.1
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	5	1,465	42.1
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	6	11,160	321.0
3f.	1050004	LAKELAND ELECTRIC & WATER UTILITIES	28	1,809	52.0
3g.	1050233	TAMPA ELECTRIC COMPANY (Polk)	1	2,908	83.7
3g.	1050233	TAMPA ELECTRIC COMPANY (Polk)	3	18	0.5
3g.	1050233	TAMPA ELECTRIC COMPANY (Polk)	9	270	7.8
3g.	1050233	TAMPA ELECTRIC COMPANY (Polk)	10	270	7.8

Sources: FDEP, 2000.
ECT, 2000.

Table 7-9. Revised 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 ($\mu g/m^3$)	13.778	13.953	15.422	14.594	16.123
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 (%)	55.1	55.8	61.7	58.4	64.5
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 Plant Bench Mark (m)	471	445	495	495	495
Direction From Plant Bench Mark (Vector °)	78	72	83	83	83

Source: ECT, 2000.

Table 7-10. Revised 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 ($\mu g/m^3$)	55.442	56.198	64.038	37.074	36.084
Tier 1 Impact ($\mu g/m^3$)[1]	55.442	56.198	64.038	37.074	36.084
Tier 2 Impact ($\mu g/m^3$)[2]	41.582	42.149	48.028	27.805	27.063
Background ($\mu g/m^3$)	20.700	20.700	20.700	20.700	20.700
Total Impact ($\mu g/m^3$)	62.282	62.849	68.728	48.505	47.763
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 (%)	62.3	62.8	68.7	48.5	47.8
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.