Large Military Engines

P.O. Box 109600
West Palm Beach, FL 33410-9600
561-796-2000

Pratt & Whitney
A United Technologies Company

December 19, 2000

Mr. Al Linero, P.E. Administrator
Department of Environmental Protection
2600 Blairstone Rd.
Tallahassee, Florida 32399

Re: Air Permit Application for LOX/Kerosene Rocket Test Cell

Dear Mr. Linero:

UTC – Pratt & Whitney agrees to grant a waiver extending the 90-day permit-processing clock for the subject permit application. We agree to a 30-day extension.

We understand that the Department of Environmental Protection will issue an intent regarding this project by January 20, 2001and that final action would occur approximately 30 days following publication of the Public Notice of Intent to Issue Air Construction Permit.

The 30-day extension is reflected in the above date.

If you have any questions that would help process this permit please call Dean Gee at 561-796-2108.

Sincerely,

John Sillan, Manager
Facilities Management

Copies to: D. Alberghini
D. Gee

File: B.4.2.2.3 Lox / Kerosene Rocket Test Cell

file

Facsimile Transmission Form

Pratt & Whitney
A United Technologies Company

FACILITIES MANAGEMENT

Pratt & Whitney
Florida Plant Site
P.O. Box 109600
West Palm Beach, Fl 33410-9600

Date: 12/19/00

Deliver the following pages to:

Name AL LINERO Facsimile No.: 850 922-6979

Location: FDEP AIR From DEAN GEE

Ext.: 561 796 2108 M/S: _____ Dept. ENVI

Total Number of pages 2 including cover sheet

If you did not receive all the pages, please call ASAP 561-796-5299
Facsimile Number: 561-796-2787 Technet 8-796-5299

Message:

AL,

HERE IS FAX OF 30 DAY EXTENSION LETTER.

HARDCOPY TO ARRIVE US MAIL.

BEST REGARDS,

DEAN GEE

Large Military Engines

P.O. Box 109600
West Palm Beach, FL 33410-9600
561-796-2000

Pratt & Whitney
A United Technologies Company

December 19, 2000

Mr. Al Linero, P.E. Administrator
Department of Environmental Protection
2600 Blairstone Rd.
Tallahassee, Florida 32399

Re: Air Permit Application for LOX/Kerosene Rocket Test Cell

Dear Mr. Linero:

UTC – Pratt & Whitney agrees to grant a waiver extending the 90-day permit-processing clock for the subject permit application. We agree to a 30-day extension.

We understand that the Department of Environmental Protection will issue an intent regarding this project by January 20, 2001and that final action would occur approximately 30 days following publication of the Public Notice of Intent to Issue Air Construction Permit.

The 30-day extension is reflected in the above date.

If you have any questions that would help process this permit please call Dean Gee at 561-796-2108.

Sincerely,

John Sillan, Manager
Facilities Management

Copies to: D. Alberghini
D. Gee

File: B.4.2.2.3 Lox / Kerosene Rocket Test Cell

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

November 10, 2000

9939571

Florida Department of Environmental Protection
New Source Review Section
2600 Blair Stone Road
Tallahassee, FL, 32399-2400

Attention: A. A. Linero, P.E.

RE: PRATT & WHITNEY'S RESEARCH & DEVELOPMENT FACILITY
LOX/KEROSENE ROCKET ENGINE STAND PROJECT
DEP FILE NO. 0990021-004-AC (PSD-FL-294)

Dear Mr. Linero:

Golder Associates Inc. (Golder), on behalf of Pratt & Whitney, has prepared the following replacement tables to our response letter dated October 6, 2000 to the Florida Department of Environmental Protection (DEP).

Table 4 has been revised to show the maximum allowable hourly emission rates of sources modeled. In the original analysis, several sources were inadvertently modeled with annual emission and, for one facility (Sugar Cane Growers) the sources were modeled with higher emission rates than the maximum allowable rates. Based on these corrected emission rates, the air dispersion model was rerun with the revised rates. The results of the screening modeling indicate similar or that slightly lower impacts were produced than previously reported. The revised maximum CO concentrations from the screening analysis impacts are presented in Table 5.

Similarly refined molding was performed with the revised emission rates. However, the results from the refined analysis show that the maximum CO concentrations did not change from those reported earlier. A copy of Table 6 from the previous report showing the maximum CO concentrations predicted in the refined analysis is presented for your convenience.

Please call if you have any questions concerning this information.

Sincerely,

GOLDER ASSOCIATES INC.

Benny Susi, P.E.
Principal Engineer
Florida P.E. #35042

BS/jkw
Enclosures
cc: Dale Francke, Pratt & Whitney
Darrel Graziani, PBCHD
Bob McCann, Golder
P:\Projects\1999\9939\9939571a Pratt & Whitney\04\#04ltr.doc

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility (Revised 11/4/00)

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters: Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s)
0990185	SIKORSKY AIRCRAFT CORP. - JUPITER							
		Paint spray booth (PS-13-SIK) with drying oven	SIK10	11.89	1.83	302.6	5.9	0.01
0990234	SOLID WASTE AUTH OF PBC/NO CO RRF							
		412.5MMBTU/HR RDF BOILER NO.1 (324,000 lb/hr STEAM)	SWPBC1	76.20	2.04	505.4	24.7	22.46
		412.5MMBTU/HR RDF BOILER NO.2 (324,000 lb./hr. steam)	SWPBC2	76.20	2.04	505.4	24.7	22.46
		Landfill Gas Coll Sys class I	SWPBC3	7.01	0.21	1033.2	24.4	1.96
		Landfill Gas Coll Sys class III	SWPBC4	7.01	0.15	1033.2	46.6	1.96
0990349	SFWMD PUMP STATION #S-5A							
		Six 1600 hp diesel engines powering flood control pumps	S5A1	4.88	0.99	685.9	5.3	10.57
0990019	OSCEOLA FARMS							
		BOILER #2 WITH SCRUBBERS AND 2 STACKS	OSBLR2	27.43	1.52	338.7	18.6	317.52
		BOILER #3 WITH SCRUBBER	OSBLR3	27.43	1.92	344.3	14.3	128.77
		BAGASSE BOILER #4 UNIT #5, 100000 LBS/HR STEAM MAX	OSBLR4	27.43	1.83	344.3	16.5	317.52
		165,000 LB/HR BAGASSE BOILER # 5 WITH 2 SCRUBBERS & 2 STACKS	OSBLR5	27.43	1.52	344.3	17.9	374.22
		BOILER #6 WITH SCRUBBER PSD	OSBLR6	27.43	1.92	338.7	18.3	310.40
0990331	OSCEOLA COGENERATION PLANT							
		760 MMBTU/HR BIOMASS/OIL/COAL FIRED BOILER	OSCOG1	60.96	3.05	419.3	15.9	33.52
		760 MMBTU/HR COGENERATION BOILER NO. 2	OSCOG2	60.96	3.05	419.3	15.9	33.52
0990333	FGT STATION NO. 21 (WPB)							
		COMPRESSOR #2101, 6500 BHP NATURAL GAS FIRED TURBINE	FGT1	15.24	1.01	763.7	56.4	0.81
		COMPRESSOR #2102, 6500 BHP NATURAL GAS FIRED TURBINE	FGT2	15.24	1.01	763.7	56.4	0.81
0990344	PARKWAY ASPHALT (RIVIERA)							
		Asphalt rotary drum dryer (400 TPH); counterflow	PARK1	12.80	1.42	422.0	18.5	0.32
0850102	INDIANTOWN COGENERATION PLANT							
		Pulverized Coal Main Boiler	INDCG1	150.88	4.88	333.2	28.4	47.38
		(2) Auxiliary Boilers	INDCG3	64.01	1.52	449.8	26.7	6.05
0850002	CAULKINS INDIANTOWN CITRUS							
		PEEL DRYER #1 WASTE HEAT EVAPORATOR (54,000 LB/HR CAPACITY)	CAULK4	28.65	0.98	343.2	11.6	0.16
		30 T/HR CITRUS PEEL DRYER #2	CAULK5	32.92	1.52	255.4	0.0	0.05
0990123	PHYSICAL DISTRIBUTION CENTER & OSF							
		12.5 mmBTU/hr boiler #1 (Unit A) burning No.6 fuel oil	PHYD1	9.14	0.52	491.5	10.1	0.05
		12.5 mmBTU/hr boiler #2 (Unit B) burning No.6 fuel oil	PHYD2	9.14	0.52	491.5	10.1	0.05
0990583	MAGNUM ENV. SERVICES, INC. - WPB							
		Soil thermal treatment facility	MAGN1	9.75	0.98	1144.3	31.6	0.71

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility (Revised 11/4/00)

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters				Emission Rate
				Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	(g/s)
0990087	WEST PALM PLANT							
		Double drum dryer (250 TPH) burning low sulfur residual oil	WPP4	10.97	1.01	394.3	41.1	1.13
0990188	ANIMAL RESCUE LEAGUE							
		ANIMAL CREMATION INCINERATOR; CRAWFORD #C-1000S; 250 LB/HR	ARL3	6.10	0.52	733.2	8.8	0.08
		ANIMAL CREMATION INCINERATOR; CRAWFORD #C-500P; 75 LB/HR	ARL4	6.10	0.52	788.7	3.4	0.03
0990056	ST. MARY'S HOSPITAL, INC.							
		Two identical process steam boilers; natural gas fired	STMAR2	24.38	1.22	505.4	0.1	0.03
0990325	ROYAL PALM MEMORIAL GARDENS, INC.							
		HUMAN CREMATION INCINERATOR, IEE CO. #IE 43-PPII (100 LB/HR)	RPMG1	6.10	0.55	865.9	4.9	0.04
0990061	U.S. SUGAR CORP. BRYANT MILL							
		BOILERs #1,#2,#3 WITH SCRUBBERS	USSBM123	19.81	1.65	338.7	36.4	1309.77
		BOILER #5 WITH TWO SCRUBBERS.	USSBM5	45.72	2.90	338.7	18.0	760.91
0990042	RIVIERA POWER PLANT							
		Fossil Fuel Steam Generator, Unit 3 -Phase II Acid Rain Unit	RIVP3	90.83	4.88	401.5	26.9	16.63
		Fossil Fuel Steam Generator, Unit 4 -Phase II Acid Rain Unit	RIVP4	90.83	4.88	401.5	26.6	16.63
0850001	FPL MARTIN POWER PLANT							
		Units 1 & 2	MART12	152.1	7.99	420.9	21.03	38.92
		Aux Blr PSD	MARTAUX	18.3	1.10	535.4	15.24	0.00
		Diesel Gens PSD	MARTGEN	7.6	0.30	785.9	39.62	0
		Units 3 & 4 PSD	MART34	64.9	6.10	410.9	18.90	26.66
0990016	ATLANTIC SUGAR MILL							
		BOILER #1 WITH SCRUBBER	ATLSM1	27.43	1.83	346.0	18.0	242.68
		BOILER #2 WITH 1 JOY TURBULAIRE TYPE D-40 IMPINGEMNT SCRUBBE	ATLSM2	27.43	1.83	350.0	23.4	242.68
		BOILER #3 WITH 2 JOY TURBULAIRE IMPINGEMENT SCRUBBERS	ATLSM3	27.43	1.83	350.0	21.6	294.84
		BOILER # 4	ATLSM4	27.43	1.83	344.0	25.2	311.85
		253 MM BTU/HR BAGASSE BOILER #5 W/SUPP FUEL OIL #6	ATLSM5	27.43	1.68	339.0	19.2	209.11
0850015	AYCOCK FUNERAL HOME							
		IND. EQUIP. & ENGR. MODEL IE43-PPII CREMATOR	AYCK2	7.32	0.52	865.9	5.5	0.04
0850006	MARTIN MEMORIAL HEALTH SYSTEMS							
		CLEAVER BROOKS MODEL CB 150 HP BOILER - UNIT #1	MMHS1	5.79	0.40	499.8	8.2	0.02
		CLEAVER BROOKS MODEL CB-150 HP STEAM BOILER #2	MMHS5	5.79	0.40	499.8	8.2	0.02
0850108	OUTBOARD MARINE/RALPH EVINRUDE TEST CTR							
		Engine Testing Cells (02), 2 Test tanks and 2 Cooling towers	OUTI	12.19	0.61	310.9	9.7	12.29
0990026	SUGAR CANE GROWERS CO-OP							
		BOILERS #1 AND #2 WITH 2 SCRUBBERS AND 1 STACK	SCGC12	45.72	1.87	339.0	21.8	505.15

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility (Revised 11/4/00)

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters: Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s)
		BOILER #3 WITH SCRUBBER	SCGC3	27.43	1.52	339.0	22.3	172.85
		BOILER #4 WITH CYCLONES AND 3 SCRUBBERS WITH ONE STACK	SCGC4	54.90	2.44	339.0	21.7	432.19
		BOILER #5 WITH CYCLONES, TWO SCRUBBERS, AND ONE STACK	SCGC5	45.72	2.30	339.0	15.9	331.96
		504 MMBTU/HR BOILER # 8 RESIDUE/BAGASSE/OIL	SCGC8	47.24	2.90	339.0	13.6	349.27
0990045	T G SMITH PLANT							
		2000 KW DIESEL GENERATOR # 1 PEAKING UNIT	TGSM01	5.18	0.56	625.9	37.1	2.14
		2000 KW DIESEL GENERATOR # 2 PEAKING UNIT	TGSM02	5.18	0.56	625.9	37.1	2.14
		2000 KW DIESEL GENERATOR # 3 PEAKING UNIT	TGSM03	5.18	0.56	625.9	37.1	2.14
		2000 KW DIESEL GENERATOR # 4 PEAKING UNIT	TGSM04	5.18	0.56	625.9	37.1	2.14
		2000 KW DIESEL GENERATOR # 5 PEAKING UNIT	TGSM05	5.18	0.56	625.9	37.1	2.14
		GAS TURBINE # 1	TGSM06	14.02	4.88	720.4	24.8	2.65
		7.5 MW FOSSIL FUEL STEAM GENERATING UNIT I	TGSM07	18.29	1.52	422.0	10.5	0.50
		FOSSIL FUEL STEAM GENERATOR #3 (Phase II, Acid Rain Unit)	TGSM09	34.44	2.13	418.2	15.7	1.64
		FOSSIL FUEL STEAM GENERATOR #4 (Phase II, Acid Rain Unit)	TGSM10	35.05	2.29	418.2	17.0	2.02
		COMBINED CYCLE UNIT (GT-2/S-5)	TGSM11	22.86	3.05	479.8	26.7	4.41
0990568	LWG PLANT							
		186 MW combined cycle gas turbine, GE Frame 7FA	LWG1	45.72	5.49	377.6	24.3	9.36
0990332	OKEELANTA COGENERATION PLANT							
		715 MMBTU/HR COGENERATION BOILER NOS. 1,2,3	OKCOGEN	60.60	3.05	438.7	17.5	94.61
0510003	U.S. SUGAR CLEWISTON MILL AND REFINERY							
		BOILER #1 WITH SCRUBBER	USSCM01	64.92	2.44	347.0	15.4	811.79
		BOILER #2 WITH SCRUBBER	USSCM02	64.92	2.44	338.7	13.9	732.19
		BOILER #3 WITH SCRUBBER	USSCM03	64.92	2.44	333.2	6.8	334.28
		BOILER #5 WITH SCRUBBER	USSCM04	45.72	2.51	344.3	20.3	518.43
		Boiler #7	USSCM07	68.58	2.59	405.4	20.8	71.62
0510015	SOUTHERN GARDENS CITRUS PROCESSING CORP.							
		Peel Dryer	SGARDDRY	38.1	7.45	1.16	353.0	65.69
		Boilers 1-3	SGARDBLR	16.8	14.23	1.22	478.0	0.23

Source: Florida Department of Environmental Protection (9/2000)

Table 5. Maximum CO Impacts Predicted for Sources at the Pratt & Whitney Facility Including Other Facilities - Screening Analysis (Revised 11/4/00)

Averaging Time, Rank	Concentration[a] ($\mu g/m^3$)	Receptor Location[b]		Time Period (YYMMDDHH)
		Direction (degree)	Distance (m)	
8-Hour, Highest				
	2,667	260	30,000	87090516
	5,178	260	30,000	88060816
	3,222	250	25,000	89012116
	3,082	250	25,000	90041216
	2,783	260	30,000	91051416
8-Hour, HSH				
	2,581	260	30,000	87011916
	2,694	260	30,000	88022016
	2,484	250	25,000	89102216
	2,246	260	30,000	90062316
	2,613	260	30,000	91082416
1-Hour, Highest				
	9,440	260	30,000	87090509
	10,198	260	30,000	88042411
	9,274	260	30,000	89072009
	10,089	260	30,000	90062310
	10,148	260	30,000	91082412
1-Hour, HSH				
	9,382	260	30,000	87041514
	10,090	260	30,000	88090711
	8,616	260	30,000	89080210
	9,563	260	30,000	90010613
	9,405	260	30,000	91082010

[a] Based on 5-year meteorological record, West Palm Beach, 1987-91
[b] Relative to engine discharge location
YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6. Maximum CO Impacts Predicted for Comparison to AAQS, Refined Analysis

Averaging Time, Rank	Concentration (μg/m3)			Receptor Location[b]		Time Period (YYMMDDHH)	Florida AAQS (μg/m3)
	Total	Modeled[a]	Background	Distance X (m)	Distance Y (m)		
From PSD Application							
8-Hour, HSH	3,927.8	477.8[a]	3,450[c]	-951	1,409	90082912	10,000
1-Hour, HSH	10,262	3,822[a]	6,440[c]	-951	1,409	90082912	40,000
Additional Modeling With Other Sources							
8-Hour, HSH	6,973	5,823[d]	1,150[e]	-30,300	-5,960	89051916	10,000
1-Hour, HSH	12,309	11,009[d]	1,300[e]	-30,050	-5,460	90083113	40,000

[a] Based on the HSH concentration predicted for the project's emissions with 5-year meteorological record of 1987 to 1991 from West Palm Beach

[b] Relative to Engine Discharge Location.

[c] Based on the second highest measured concentrations from January 1998 to June 1999 at West Palm Beach

[d] Based on the HSH concentrations predicted for all modeled sources with the 5-year meteorological record of 1987 to 1991 from West Palm Beach

e Based on the 90th percentile of measured concentrations from 1998 to 1999 at West Palm Beach

YYMMDDHH = Year, Month, Day, Hour Ending.

HSH = Highest, Second-Highest Concentration in 5 years.

Pratt & Whitney - GESP
P.O. Box 109600
W. Palm Beach, FL 33410-9600

Pratt & Whitney
A United Technologies Company

CERTIFIED MAIL

June 9, 2000

RECEIVED
JUN 20 2000
BUREAU OF AIR REGULATION

A. A. Linero, P.E., Administrator
Florida Department of Environmental Protection
New Source Review
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Re: Air Construction Permit Application and
Prevention of Significant Deterioration Analysis

Dear Mr. Linero:

Please find enclosed seven (7) copies of an Air Construction Permit Application and Prevention of Significant Deterioration Analysis for a new LOX (liquid oxygen)/kerosene rocket engine test stand. This test stand is planned for the Pratt & Whitney facility in Palm Beach County. The test stand will be used for testing Pratt & Whitney's latest space vehicle propulsion product, a LOX/kerosene powered rocket engine.

Also enclosed is Pratt & Whitney check number 726873 for $7,500 to cover the application fee.

A copy of this application has also been sent to Darrel Graziani, Palm Beach County Health Unit, for his use and records.

If you have any questions about the permit application please call our contact person Dale Francke, phone 561-796-3733 , e-mail frncked@pwfl.com. Dale will be glad to answer any questions or get the information to you.

Sincerely,

John Sillan

John K. Sillan, Manager
Facilities Management

Copies: Darrel Graziani, Palm Beach County Health Unit, (1 copy of application)
Miguel Cires (1 copy of application)
File: B.4.2.2.3 – LOX/Kerosene Rocket Test Stand, (1 copy of application)
SED
EPA
NPS
J. Reynolds

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

June 21, 2000

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gregg Worley, Chief
Air, Radiation Technology Branch
Preconstruction/HAP Section
U.S. EPA – Region 4
61 Forsyth Street
Atlanta, GA 30303

Re: United Technologies-Pratt & Whitney
Project: LOX/Kerosene Rocket Engine Stand
PSD-FL-294
Facility ID No. 0990021-004-AC

Dear Mr. Worley:

Enclosed for your review and comment is an application for construction of a LOX/kerosene rocket engine stand at the existing Pratt & Whitney research and development facility in Palm Beach County, Florida. The proposed project will require a PSD review for carbon monoxide.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact the project engineer, John Reynolds, at 850/921-9536.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/jra

Enclosures

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

June 21, 2000

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Bunyak, Chief
Policy, Planning & Permit Review Branch
NPS – Air Quality Division
P.O. Box 25287
Denver, CO 80225

Re: United Technologies-Pratt & Whitney
Project: LOX/Kerosene Rocket Engine Stand
PSD-FL-294
Facility ID No. 0990021-004-AC

Dear Mr. Bunyak:

Enclosed for your review and comment is an application for construction of a LOX/kerosene rocket engine stand at the existing Pratt & Whitney research and development facility in Palm Beach County, Florida. The proposed project will require a PSD review for carbon monoxide.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact the project engineer, John Reynolds, at 850/921-9536.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/jra

Enclosures

Pratt & Whitney - GESP
P.O. Box 109600
W. Palm Beach, FL 33410-9600

Pratt & Whitney
A United Technologies Company

CERTIFIED MAIL

June 9, 2000

A. A. Linero, P.E., Administrator
Florida Department of Environmental Protection
New Source Review
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Re: Air Construction Permit Application and
Prevention of Significant Deterioration Analysis

Dear Mr. Linero:

Please find enclosed seven (7) copies of an Air Construction Permit Application and Prevention of Significant Deterioration Analysis for a new LOX (liquid oxygen)/kerosene rocket engine test stand. This test stand is planned for the Pratt & Whitney facility in Palm Beach County. The test stand will be used for testing Pratt & Whitney's latest space vehicle propulsion product, a LOX/kerosene powered rocket engine.

Also enclosed is Pratt & Whitney check number 726873 for $7,500 to cover the application fee.

A copy of this application has also been sent to Darrel Graziani, Palm Beach County Health Unit, for his use and records.

If you have any questions about the permit application please call our contact person Dale Francke, phone 561-796-3733 , e-mail frncked@pwfl.com. Dale will be glad to answer any questions or get the information to you.

Sincerely,

John Sillan

John K. Sillan, Manager
Facilities Management

Copies: Darrel Graziani, Palm Beach County Health Unit, (1 copy of application)
Miguel Cires (1 copy of application)
File: B.4.2.2.3 – LOX/Kerosene Rocket Test Stand, (1 copy of application)
SED
EPA
NPS
J. Reynolds

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

August 22, 2000

9939571

Florida Department of Environmental Protection
New Source Review Section
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Attention: A. A. Linero, P.E.

RE: PRATT & WHITNEY'S RESEARCH & DEVELOPMENT FACILITY
LOX/KEROSENE ROCKET ENGINE STAND PROJECT
DEP FILE NO. 0990021-004-AC (PSD-FL-294)

Dear Mr. Linero:

Golder Associates Inc. (Golder), on behalf of Pratt & Whitney has prepared the following responses to the Palm Beach County Health Department (PBCHD) letter dated July 13, 2000 and the Florida Department of Environmental Protection's (DEP) letter dated July 19, 2000.

PBCHD Question 1 - Emission estimates for the criteria pollutants are not adequately documented. Please request the applicant to supply documentation on the expected emissions. If a combustion model was used, please have them submit a copy. Particulate matter (PM) emissions need to include solids within the cooling water, volatile organic compound (VOC) also need to be documented given the high carbon dioxide (CO) numbers.

For your information, some of my work at NASA's Stennis Space Center dealt with the testing of similar engine. For that project, the combustion model predicted high CO rates at the engine exhaust. However, when the exhaust gases mix with air, the model predicted overall lower CO emissions and an increase rate of NO_x.

Response PBCHD 1 - The combustion model used to determine the pollutants expected from the rocket test stand is the "NASA Combustion Deck (TEP)". This model is a modified version of the original NASA combustion model. A description of the model is attached as part of the response to this question. An overview of the model can be found at http://www2.ari.net/ahsystems/tep.html.

The emissions provided in the application are those provided from the model simulations. Because liquid oxygen is used as a propellant there is no atmospheric nitrogen that will form NO_x. When the exhaust enters the silencer, about 2,700 pounds per second (lb/sec) of air will mix with the rocket exhaust and 27,800 lb/sec of water will be used to quench the exhaust. As provided in the application, the final exhaust will angled at 45 degree toward vertical and

consist of steam at 230 degrees Fahrenheit (°F) within an estimated 60-foot-diameter plume. Since the quenching will occur very rapidly, NO_x formation from the air entering the silencer is expected to be low. As a conservative estimate of the NO_x emissions using the AP-42 emission factor for flares has been calculated (see attached AP-42 Table 13.5-1, revise September 1998). The total heat input from the kerosene is 14.3 million Btu/sec (741.1 lb/sec x 19,300 Btu/lb). The estimated NO_x emissions are 0.97 lb/sec or 233.4 lb/test. The model simulations did not predict emission of VOCs. The information presented in Section 2.3 regarding exhaust gas concentrations account for all the carbon and hydrogen in the kerosene. Again, as a conservative estimate of the VOC emissions, the AP-42 emission factor for flares was used. The calculated emissions are 2 lb/hr and 480 lb/test.

The PM emissions from the cooling water were estimated based on the amount of water required to reduce the exhaust temperature to 230°F. The reduction was assumed for the combined flow of the rocket exhaust and entrained air (i.e., 5,600 lb/sec). The amount of water evaporated is estimated at 5,400 lb/sec. The water used for cooling has 300-parts per million (ppm) total dissolved solids, which can become PM emissions. The calculated emissions are 1.6 lb/sec or 389 lb/test.

Based on the above calculations, the maximum estimated emissions of NO_x, VOC, and PM emissions are 1.4 tons/year, 2.9 tons/year, and 2.3 tons/year, respectively. These emissions rates are less than the PSD significant emission rates for these pollutants.

PBCHD Question 2 - Emission estimates for HAPs have not been provided. The activity is a listed source category under Section 112 of the Clean Air Act and the applicant should specifiate PM and VOC emissions, if possible. A case-by-case MACT determination may be required.

Response PBCHD 2 - The PM emissions would be from evaporated water primarily containing common dissolved minerals. These would typically be non-HAPs such as calcium. Any HAPs generated from the combustion will likely be VOCs. As noted in the response to PBCHD-1, the estimate amount of VOCs is 2.9 tons/year. Kerosene has low amounts of other contaminants in the fuel. Using AP-42 emission factors (see attached Table 1.3-10, rev 9/98) for trace elements in the fuel the maximum calculated emissions of HAPs are 0.05 lb/test (0.0003 TPY) for a single HAP (i.e., selenium) and 0.16 lb/test (0.00097 TPY) for all trace element HAPs (arsenic, beryllium, cadmium, chromium, lead, mercury, manganese, nickel, and selenium) . These emissions are much less than the MACT criteria in 40 Code of Federal Regulation Part 63.

PBCHD Question 3 - There are a number of unregulated activities with significant allowable emissions. The source needs to include these activities with the modeling analyses.

Response PBCHD 3 - As noted by the above responses and the information contained in the application, modeling of unregulated activities is not considered necessary. The very short nature of these tests, together with the conservative nature of the modeling, does not suggest that AAQS would be violated by the tests together with other unregulated facilities.

PBCHD Question 4 - The applicant 's BACT analysis is not correct. There are controls on the Russian Test Stand, which go beyond BACT. My understanding is that the controls were implemented (Cold War Stuff) to hide research activities. The NASA people at SSC are aware of the controls and unless the Department of Defense is funding, the controls would be cost prohibited.

Response PBCHD 4 - Although the Russian Test Stand does contain an exhaust "ducting" which injects water, the device was initially installed in an attempt to remove or reduce the heat signature of the test firings so that Cold War surveillance by satellite would not identify the testing being conducted. The device was not a pollutant control device and there is no evidence to indicate that any significant pollutant reduction was realized. Even so, if it could be shown that there was a pollutant reduction to be realized, the cost of the Russian Test Stand exhaust system would be cost prohibited at a cost in excess of $100 million.

PBCHD Question 5 - I disagree with the modeling approach. Use of the puff model is more appropriate given the nature of the activity. NASA used such a modeling approach to support the ARSM PSD Permit application. The applicant needs to submit a revised modeling analysis.

Response PBCHD 5 - The ISCST3 model, a steady state model, was used for the modeling analysis. It is our opinion that the steady state modeling analysis is a conservative procedure for this application. The assumptions used in the model to evaluate impacts included the assumption that the test emissions are continuous over an entire hour. This assumption resulted in a prediction of 1-hour impacts for comparison to the CO ambient air quality standard.

The PUFF model is a non-regulatory model. Currently, no Guideline model exists that is capable of simulating instantaneous or short duration releases. Appendix B of the Guideline lists several accidental release models that simulate a short-term release, but these models have not been designed for CO emissions. In any event, use of a non-guideline model would require prior written approval from EPA. However, to address PBCHD's concern, an evaluation of impacts was performed using the PUFF model. The PUFF model assumes that all of the CO test mass is released instantaneously. Because the actual emission has a 4-minute release duration, this analysis would tend to over-predict very short-term concentrations (i.e., 4-minute duration). The PUFF model evaluated a combination of stability classes and wind speeds. A summary of the Puff model results is presented in Table 1. Only the Puff model results for stable stability and very light wind speeds approached the magnitude of the presented ISCST3 model concentrations. This meteorological condition occurs less than 3 percent of the time (based on 5 years of weather data from Palm Beach International Airport, 1987-1991). Both models predicted maximum impacts well below the AAQS. Based on the nature of the 4-minute test, and the assumptions used for the PUFF modeling, it is Golder's opinion that the steady state analysis resulted in a conservative assessment.

DEP Question 1 - The receptors used to model impacts at the site boundary were not spaced at 100 m. Please re-evaluate impacts at the site boundary by using a fence line receptor network that has a 100-m resolution. Also in the receptor grid used for the screening analysis contained a 7-kilometer gap between the site boundary receptors and the nearest ring polar receptors. Please update the screening analysis to include a receptor grid that contains a denser mid-field receptor network.

Response DEP 1 - A revised modeling analysis has been performed. The modeling files to this response will be provided separately. The revised screening modeling results, Table 6-3, is attached. The screening results indicate no changes in the magnitude and location of the highest and highest, second highest predicted 1-hour concentrations.

DEP Question 2 - In the application it is assumed that all land enclosed by the site boundary is non-ambient. However, if there is no physical barrier about this property, the assumption is not valid. Please confirm the existence of a physical barrier that prevents public access onto the land that is enclosed by the site boundary that was used in the modeling.

Response DEP 2 - There is a fence around the property.

DEP Question 3 - Please prepare a CO emission inventory for the NAAQS. The inclusion of only monitored background data does not sufficiently demonstrate compliance with NAAQS.

Response DEP 3 - The air modeling analysis was designed to produce conservative air quality impacts. To determine compliance with the 1-hour CO AAQS, the following criteria was used for the test burn analysis:

a. The emission release is for 4 minutes and will occur only 12 times per year.
b. The only significant CO emission sources in the vicinity of Pratt & Whitney are road vehicles. The nearest non-mobile emissions are in 20 kilometers away in Belle Glade.
c. The background CO values considered in the analysis were obtained from Palm Beach, an area that has a high traffic density. The area in the vicinity of the test does not have a high traffic density, and in fact, it is located in the extreme remote area of the Pratt & Whitney campus.

It is Golder's opinion that the use of the Palm Beach CO data produces a highly conservative impact assessment, which considering the transient nature of the test emissions, compensates for the added affect of other distance continuous emission sources.

Please call if you have any questions concerning this information.

Sincerely,

GOLDER ASSOCIATES INC.

Benny Susi, P.E.
Principal Engineer
Florida P.E. #35042

BS/jkw

Enclosures

cc: Dale Francke, Pratt & Whitney
Darrel Graziani, PBCHD
Ken Kosky, Golder
G. Reynolds
P:\Projects\999939\9939571a Pratt & Whitney\01\#011tr.doc
SED
EPA
NPS
C. Holladay

Table 1. Summary of PUFF and ISCST3 1-Hour Model Results

Stability Class	Wind Speed (m/s)	Mixing Height (m)	Concentration (ug/m3)
ISCST3	High		5,012
	High, 2nd-High		3,822
PUFF			
Unstable	1	500	23
	1	1000	12
	2	1000	12
	3	1000	12
Neutral	1	1000	66
	2	1000	65
	3	1000	65
	4	1000	63
	5	1000	62
	6	1000	60
Stable	1	1000	5,633
	2	1000	4,800
	3	1000	3,856
AAQS			40,000

Table 6-2. Summary of CO Emissions and Stack Parameters for Engine Test Burn

Emissions (a)		Release Height		Diameter		Velocity (b)		Temperature	
lb/hr	g/s	ft	m	ft	m	fps	m/s	F	K
166656	20,999	70	21.3	60.00	18.3	40.0	12.20	230	383.2

(a) Based on 694.4 lb/sec for 240 seconds

(b). Maximum 45-degree discharge velocity times sine (38 degrees)

Table 6-3. Predicted CO Impacts From Proposed Project - Screening Analysis

Averaging Time	Concentration[a] (ug/m^3)	Receptor Location[b]		Time Period (YYMMDDHH)
		Direction (degree)	Distance (m)	
High 8-Hour[c]				
	351	318	5000	87090711
	533	204	1500	88060411
	480	200	1500	89081511
	623	140	1500	90082412
	374	246	4000	91061913
HSH 8-Hour[c]				
	336	4106	3561	87071211
	376	284	4000	88091101
	323	236	5000	89070311
	443	326	2000	90082119
	344	244	5000	91083007
High 1-Hour				
	2811	318	5000	87090613
	4264	204	1500	88032713
	3840	200	1500	89070114
	4982	140	1500	90072212
	2990	246	4000	91082611
HSH 1-Hour				
	2685	4106	3561	87071211
	3008	284	4000	88091712
	2585	236	5000	89082611
	3543	326	2000	90082912
	2749	244	5000	91092012

[a] Based on 5-year meteorological record, West Palm Beach, 1987-91

[b] Relative to engine discharge location

[c] Because no test emissions occur for the additional 7 hours of the period, 8-hour concentrations are set equal to 1/8 of 1-hour concentrations.

YYMMDDHH = Year, Month, Day, Hour Ending

HSH = Highest, Second-Highest

Table 6-4. Maximum Predicted CO Impacts Due to the Proposed Project Only, Refined Analysis

Averaging Time	Concentration[a] (ug/m^3)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)	EPA Significant Impact Level (ug/m^3)	*de Minimis* Air Monitoring Concentration (ug/m^3)
High 8-Hour	627[c]	140	1,600	90082412	500	575
High 1-Hour	5,012	140	1,600	90082412	2,000	NA

[a] Based on highest predicted with 5-year meteorological record, West Palm Beach, 1987-91
[b] Relative to Engine Discharge Location
[c] Because no test emissions occur for the additional 7 hours of the period, set equal to 1/8 of 1-hour concentrations
YYMMDDHH = Year, Month, Day, Hour Ending

Table 6-5. Maximum Predicted CO Impacts Due to the Test Burn For Comparison to AAQS, Refined Analysis

Averaging Time	Concentration (ug/m^3)			Receptor Location[b]		Time Period (YYMMDDHH)	Florida AAQS (ug/m^3)
	Total	Modeled[a]	Background[c]	Direction (degree)	Distance (m)		
HSH 8-Hour[d]	3,928	478	3,450	326	1700	90082912	10,000
HSH 1-Hour	10,262	3,822	6,440	326	1700	90082912	40,000

[a] Based on predicted HSH 1-hour concentration with 5-year meteorological record, West Palm Beach, 1987-91

[b] Relative to Engine Discharge Location

[c]. Based on the HSH measured concentrations from 1/98-6/99 at West Palm Beach.

[d]. Because no test emissions occur for the additional 7 hours of the period, set equal to 1/8 of 1-hour concentrations

YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest Concentration in 5 years.

Table 1.3-10. EMISSION FACTORS FOR TRACE ELEMENTS FROM DISTILLATE FUEL OIL COMBUSTION SOURCES[a]

EMISSION FACTOR RATING: E

Firing Configuration (SCC)	Emission Factor ($lb/10^{12}$ Btu)										
	As	Be	Cd	Cr	Cu	Pb	Hg	Mn	Ni	Se	Zn
Distillate oil fired (1-01-005-01, 1-02-005-01, 1-03-005-01)	4	3	3	3	6	9	3	6	3	15	4

[a] Data are for distillate oil fired boilers, SCC codes 1-01-005-01, 1-02-005-01, and 1-03-005-01. References 29-32, 40-44 and 83. To convert from $lb/10^{12}$ Btu to pg/J, multiply by 0.43.

Since flares do not lend themselves to conventional emission testing techniques, only a few attempts have been made to characterize flare emissions. Recent EPA tests using propylene as flare gas indicated that efficiencies of 98 percent can be achieved when burning an offgas with at least 11,200 kJ/m^3 (300 Btu/ft^3). The tests conducted on steam-assisted flares at velocities as low as 39.6 meters per minute (m/min) (130 ft/min) to 1140 m/min (3750 ft/min), and on air-assisted flares at velocities of 180 m/min (617 ft/min) to 3960 m/min (13,087 ft/min) indicated that variations in incoming gas flow rates have no effect on the combustion efficiency. Flare gases with less than 16,770 kJ/m^3 (450 Btu/ft^3) do not smoke.

Table 13.5-1 presents flare emission factors, and Table 13.5-2 presents emission composition data obtained from the EPA tests.[1] Crude propylene was used as flare gas during the tests. Methane was a major fraction of hydrocarbons in the flare emissions, and acetylene was the dominant intermediate hydrocarbon species. Many other reports on flares indicate that acetylene is always formed as a stable intermediate product. The acetylene formed in the combustion reactions may react further with hydrocarbon radicals to form polyacetylenes followed by polycyclic hydrocarbons.[2]

In flaring waste gases containing no nitrogen compounds, NO is formed either by the fixation of atmospheric nitrogen (N) with oxygen (O) or by the reaction between the hydrocarbon radicals present in the combustion products and atmospheric nitrogen, by way of the intermediate stages, HCN, CN, and OCN.[2] Sulfur compounds contained in a flare gas stream are converted to SO_2 when burned. The amount of SO_2 emitted depends directly on the quantity of sulfur in the flared gases.

Table 13.5-1 (English Units). EMISSION FACTORS FOR FLARE OPERATIONS[a]

EMISSION FACTOR RATING: B

Component	Emission Factor (lb/10^6 Btu)
Total hydrocarbons[b]	0.14
Carbon monoxide	0.37
Nitrogen oxides	0.068
Soot[c]	0 - 274

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (μg/L); lightly smoking flares, 40 μg/L; average smoking flares, 177 μg/L; and heavily smoking flares, 274 μg/L.

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

October 6, 2000

993-9571

RECEIVED

OCT 09 2000

BUREAU OF AIR REGULATION

Florida Department of Environmental Protection
New Source Review Section
2600 Blair Stone Road
Tallahassee, FL, 32399-2400

Attention: A. A. Linero, P.E.

RE: PRATT & WHITNEY'S RESEARCH & DEVELOPMENT FACILITY
LOX/KEROSENE ROCKET ENGINE STAND PROJECT
DEP FILE NO. 0990021-004-AC (PSD-FL-294)
ADDITIONAL CARBON MONOXIDE AIR QUALITYIMPACT ANALYSES

Dear Mr. Linero:

Golder Associates Inc. (Golder), on behalf of Pratt & Whitney, has performed additional air quality impact analyses for carbon monoxide (CO) emissions to further address Comment No. 3 made in the Department of Environmental Protection's (DEP) letter dated July 19, 2000. These analyses were based on modeling the Project's CO emissions together with CO emissions of other sources within the Project's modeling and screening areas. The Project's modeling area extended out to 35 km at which distance the Project's impacts are predicted to be below the 1-hour and 8-hour significant impact levels of 2,000 and 500 ug/m^3, respectively. The Project's screening area is predicted to extend out to 85 km that is 50 km beyond the modeling area. As shown in these analyses, the Project's CO impacts, together with those from background CO emission sources, are predicted to be well below the national and state ambient air quality standards (AAQS). The following summary provides descriptions of the methods and assumptions used to estimate total air quality CO concentrations for the Project and other sources.

Air Modeling Methods and Approach

The air modeling analyses were based on using the same methods and assumptions that were in the PSD permit application for the Project. The CO concentrations were predicted with the Industrial Source Complex Short-term (ISCST3, Version 00101) dispersion model (EPA, 1995) and five years of meteorological data from the National Weather Service (NWS) office at Palm Beach International Airport, which were used in the modeling presented in the PSD application. The 5-year period of meteorological data was from 1987 through 1991. Similarly, concentrations were predicted using the same screening receptor grid, and refinements were performed based on the results obtained from the screening grid.

Emission Inventory

The CO emission and operating data for the proposed engine test were presented in the PSD application. For this analysis, the CO emissions, stack parameters, and locations for the existing sources at the Pratt & Whitney facility were developed and are presented in Tables 1 and 2. The CO emission data were obtained by using emission factors from the USEPA document, *Compilation of Air Pollutant Emission Factors, Volume I*, referred to as AP-42, or from the annual operating report (AOR) prepared in 1999. Stack and operating data were obtained from the Title V permit application.

The emission inventories for background facilities were developed from data bases obtained from the DEP, previous air modeling studies performed by Golder Associates, and air permit data. All background sources that were in these inventories and located within the Project's modeling area (defined as the significant impact area for the Project) were included in the modeling.

For sources located in the screening area (defined as 50 km beyond the modeling area), a technique was used for eliminating sources in the modeling analyses if the source's emissions do not meet an emission criterion. This technique, which is approved for use by the DEP and the USEPA, is the *Screening Threshold* method, developed by the North Carolina Department of Natural Resources and Community Development. The method is designed to objectively eliminate from the emission inventory those sources that are unlikely to have a significant interaction with the source undergoing evaluation. In general, sources that should be considered in the modeling analyses are those with emissions greater than a screening threshold value (in TPY) that is calculated by the following criteria:

$$Q = 20 \times D$$

where Q = the screening threshold value (TPY), and
D = The distance (km) from the proposed facility to the source undergoing evaluation for short-term analysis, or
The distance (km) from the edge of the proposed facility's significant impact area to the source undergoing evaluation for long-term (annual) analysis.

For this analysis, the long-term criterion was used since fewer facilities would be eliminated than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold value. These methods result in a more conservative approach to produce higher-than-expected concentrations. Those facilities with maximum allowable emissions that are below the calculated *screening threshold* were eliminated from further consideration in the AAQS modeling analyses.

A summary of the facilities considered for inclusion in the modeling analyses is presented in Table 3. This summary identifies those facilities located within the Project's modeling area and screening area. The facilities that were not included in the modeling analyses because

their CO emissions were less than the *screening threshold* criteria are also identified. A summary of the stack, operating, and emission data for sources used in the modeling analyses is presented in Table 4.

Background Concentrations

To estimate the total CO air quality concentrations, 1-hour and 8-hour background concentrations were added to the modeling results. The background concentration is considered to be the air quality concentration contributed by sources not included in the modeling evaluation. Because other background sources were modeled, a background value was used that was considered to be realistic but still conservative. In this analysis, background concentrations were assumed to be represented by the 90th percentile of concentrations measured from the nearest monitors.

The CO monitors nearest to the site are the DEP monitor, number 12-057-1006, located at 50 South Military Trail in West Palm Beach, and monitor number 12-057-1004, 3700 Belevedere Road in Palm Beach. For 1998 and 1999, the highest 90th percentile of the 1-hour and 8-hour measured concentrations at these monitors were 1.1 parts per million (ppm) (1,300 microgram per cubic meter (ug/m^3)) and 1.0 ppm (approximately 1,150 ug/m^3), respectively. These background levels were added to the refined model-predicted concentrations to estimate total CO air quality levels for comparison to the AAQS.

Summary of Results

A summary of the maximum 1-hour and 8-hour average CO concentrations predicted in the screening analysis is presented in Table 5. Based on the screening results, modeling refinements were performed for both the 1-hour and 8-hour averaging times. The results of the refined modeling analyses from the PSD application and this analysis are summarized in Table 6. For this analysis, the maximum 1-hour and 8-hour average CO concentrations due to all sources, including background concentrations, are 12,309 and 6,973 ug/m^3, respectively. These concentrations are 31 and 70 percent of the AAQS of 40,000 and 10,000 ug/m^3, respectively. These results are comparable to those presented in the PSD application.

Based on these air modeling results, the maximum CO concentrations from the Project and other CO emission sources will comply with the AAQS.

The air modeling output files which contain the results of the CO concentrations predicted for the Pratt & Whitney facility and background sources have been forwarded to the DEP using Golder's ftp site.

Please call if you have any questions concerning this information.

Sincerely,
GOLDER ASSOCIATES INC.

Benny Susi, P.E.
Principal Engineer
Florida P.E. #35042

BS/jkw
cc: Dale Francke, Pratt & Whitney
K. Kosky, Golder
R. McCann, Golder
J. Reynolds
E. Halladay
O. Brazjani, PBCHD
SED
EPA
NPS

Table 1. Emission Calculations for Air Emission Sources at the Pratt & Whitney Facility

Emission Unit Number	Source Description	Emission Factor[a]	Maximum Heat Input (mmBTU/hr)	Maxium Fuel Use (gal/hr)	Maxium Fuel Use (ft^3/hr)	CO Emission Rate (lb/hr)	CO Emission Rate (g/s)
1	Slave Engine	6.72 lb/1000 gal	264	1,927	NA	12.95	1.63
16	Boiler BO-12-E6	84 lb/MMSCF	42	NA	40,777	3.43	0.43
22	Boilers BO-1-MBH and BO-2-MBH	84 lb/MMSCF	108	NA	104,854	8.81	1.11
40	Furnaces FU-3-MHT and FU-4-MHT	84 lb/MMSCF	12	NA	11,650	0.98	0.12
45	Evaporator EV-1-MW	84 lb/MMSCF	195	NA	189,320	15.90	2.01
59	Miscellaneous heaters	84 lb/MMSCF	62	NA	60,194	5.06	0.64
66	Boiler, BO-14-E8	1.9 lb/1000 gal	6.7	NA	6,505	0.01	0.00
68	Emergency Elect Gen Facility	1 lb/MMBTU	245	1,788	NA	1.79	0.23
69	Jet Engine Test Stands (all)	Average lb/hr	NA	NA	NA	47.40	5.98

NA = not applicable

[a] Emission factors based on EPA factors from Compilation of Air Pollutant Emission Factors, Volume I, AP-42 (7/1998), or Annual Operating Report (AOR) data from Pratt & Whitney (P&W)

EU 1- from P&W AOR 99
EU 16, 22, 40, 45,59- AP-42 Table 1.4.1
EU 66- AP-42 1.5.1
EU 68- AP-42 Table 3.4.1
EU 69- See P&W AOR 99 for specific CO emission factors for various jet engines

Table 2. Summary of Stack Parameters for Air Emission Sources at the Pratt & Whitney Facility

Emission Unit Number	Source Description[a]	Release Height (ft)	Release Height (m)	Diameter (ft)	Diameter (m)	Velocity (fps)	Velocity (m/s)	Temperature (°F)	Temperature (°K)
1	Slave Engine	50	15.2	3.0	0.9	471.6	143.7	1000	810.9
16	Boiler BO-12-E6	15	4.6	2.5	0.8	22.7	6.9	500	533.2
22	Boilers BO-1-MBH, BO-2-MBH	66	20.1	7.6	2.3	33.4	10.2	750	672.0
40	Furnaces FU-3-MHT, FU-4-MHT	49	14.9	4.0	1.2	0.1	0.04	77	298.2
45	Evaporator EV-1-MW	12	3.7	0.5	0.2	8.5	2.6	77	298.2
59	Miscellaneous heaters	20	6.1	1.5	0.5	16.0	4.9	500	533.2
68	Emergency Elect Gen Facility	12	3.7	0.8	0.2	496.7	151.4	1200	922.0
69	Jet Engine Test Stands (all)	18	5.5	12.0	3.7	0.3	0.08	300	422.0

[a] See Table 1; Boiler, BO-14-E8 (No. 66) not included in modeling analyses due to low emission rate.

Table 3. Summary of Facilities With CO Emissions (>1 TPY) Considered for Inclusion in the AAQS Air Modeling Analyses for the Pratt & Whitney Facility

Facility ID	Facility Name	Source Location North (km)	Source Location East (km)	Relative Location[a] X (km)	Y (km)	Distance (km)	Direction (deg.)	CO Emissions Rate (TPY)	Q Emissions Threshold[b] [(Dist. - SIA) X 20]	Include in Modeling Analysis?
0990185	SIKORSKY AIRCRAFT CORP. - JUPITER	2975.0	567.5	0.0	0.0	0.0	0	0.5	SIA	Yes
0990234	SOLID WASTE AUTH OF PBC/NO CO RRF	2961.3	584.5	17.0	-13.7	21.9	129	1,733.3	SIA	Yes
0990304	VETERANS AFFAIRS MEDICAL CENTER	2963.0	584.0	20.5	-12.0	23.8	120	5.0	SIA	Yes
0990349	SFWMD PUMP STATION #S-5A	2951.3	562.6	-5.0	-23.7	24.2	192	367.3	SIA	Yes
0850129	AMERICAN POWER TECH/INDIANTOWN	2990.8	549.1	-18.4	15.8	24.3	311	3.8	SIA	Yes
0990019	OSCEOLA FARMS[c,d]	2968.0	544.2	-23.3	-7.0	24.3	253	25,175.0	SIA	Yes
0990331	OSCEOLA COGENERATION PLANT[e]	2968.0	544.0	-23.5	-7.0	24.5	253	1,436.4	SIA	Yes
0990333	FGT STATION NO. 21 (WPB)	2957.1	584.4	16.9	-17.9	24.6	137	56.6	SIA	Yes
0990344	PARKWAY ASPHALT (RIVIERA)	2962.1	588.5	21.0	-12.9	24.6	122	14.1	SIA	Yes
0850102	INDIANTOWN COGENERATION PLANT	2990.7	547.7	-19.9	15.7	25.3	308	1,673.0	SIA	Yes
0850002	CAULKINS INDIANTOWN CITRUS	2991.5	548.0	-19.5	16.5	25.5	310	9.3	SIA	Yes
0990123	PHYSICAL DISTRIBUTION CENTER & OSF	2961.2	589.7	22.2	-13.8	26.1	122	4.0	SIA	Yes
0990583	MAGNUM ENV. SERVICES, INC. - WPB	2952.0	580.2	12.7	-23.0	26.3	151	22.1	SIA	Yes
0990087	WEST PALM PLANT	2951.7	579.9	12.4	-23.3	26.4	152	11.7	SIA	Yes
0990056	ST. MARY'S HOSPITAL, INC.	2959.7	593.0	25.5	-15.3	29.7	121	3.7	SIA	Yes
0990325	ROYAL PALM MEMORIAL GARDENS, INC.	2960.2	593.4	25.9	-14.8	29.8	120	1.4	SIA	Yes
0990061	U.S. SUGAR CORP. BRYANT MILL[c,f]	2969.1	537.8	-29.7	-5.9	30.2	259	2,071.0	SIA	Yes
0990042	RIVIERA POWER PLANT	2960.6	594.3	26.8	-14.4	30.4	118	1,156.0	SIA	Yes
0850001	FPL MARTIN POWER PLANT[g]	2992.7	542.7	-24.8	17.7	30.5	305	1,816.0	SIA	Yes
0990016	ATLANTIC SUGAR MILL[c,g]	2945.2	552.4	-15.1	-29.8	33.4	207	25,065.0	SIA	Yes
0850015	AYCOCK FUNERAL HOME	3008.4	573.5	6.0	33.4	33.9	10	1.5	SIA	Yes
0850006	MARTIN MEMORIAL HEALTH SYSTEMS	3008.7	574.2	6.7	33.7	34.3	11	2.0	SIA	Yes
0850108	OUTBOARD MARINE/RALPH EVINRUDE TEST CTR	3009.4	572.5	5.0	34.4	34.7	8	97.5	SIA	Yes
0990562	SOUTH FLORIDA SHAVINGS CO.	2941.1	579.2	11.7	-33.9	35.9	161	1.5	17	No
0990026	SUGAR CANE GROWERS CO-Op[c,h]	2963.3	534.9	-32.6	-21.7	39.2	236	33,771.0	83	Yes
0990045	T G SMITH PLANT	2943.7	592.8	25.3	-31.3	40.2	141	762.5	105	Yes
0990568	LWG PLANT[i]	2943.7	592.8	25.3	-31.3	40.2	141	204.5	105	Yes
0990322	TREASURE COAST CREMATORY	2941.0	594.0	26.5	-34.0	43.1	142	6.6	162	No
0990350	SFWMD PUMP STATION #S-6	2927.8	566.2	-11.3	-47.2	48.5	194	107.9	270	No
0990095	BETHESDA MEMORIAL HOSPITAL	2931.8	592.6	25.1	-43.2	50.0	150	5.3	299	No
1110040	RANGER/FT PIERCE/PLNT#129	3030.2	561.7	-5.8	56.2	56.5	354	9.9	410	No
0990332	OKEELANTA COGENERATION PLANT[c,d,e]	2940.0	524.1	-43.4	-35.0	55.8	231	3,289.0	415	Yes
1110003	FT PIERCE UTIL/H D KING PWR PLNT	3036.4	566.1	-1.4	61.3	61.4	359	416.8	527	No
1110060	FLORIDA GAS TRANSMISSION/ST LUCIE/STA 20	3035.8	567.2	-10.3	60.8	61.6	350	214.4	533	No
0510001	EVERGLADES SUGAR REFINERY	2954.0	509.5	-58.0	-21.0	61.7	250	16.3	534	No
0990119	BOCA RATON COMMUNITY HOSPITAL	2915.5	589.5	22.0	-59.5	63.4	160	4.3	569	No
0510003	U.S. SUGAR CLEWISTON MILL AND REFINERY[c,f]	2956.9	506.1	-61.4	-18.1	64.0	254	108,259.2	580	Yes
0990015	BOCA RATON RESORT AND CLUB	2913.7	592.0	24.5	-61.3	66.0	158	13.8	620	No
0110045	HARDRIVES ASPHALT(DEERFIELD PLANT)	2910.0	584.8	17.3	-65.0	67.3	165	11.4	645	No
0112094	WASTE MGMT-CENTRAL SANIT L F & RECYCLING	2908.0	583.2	15.7	-67.0	68.8	167	150.8	676	No
0112120	WHEELABRATOR NORTH BROWARD	2907.6	583.9	16.4	-67.4	69.4	166	357.7	687	No
0112103	SUN GRAPHIC, INC.	2904.3	585.2	17.7	-70.7	72.9	166	2.2	758	No
0110351	SFWMD PUMP STATION #S-8	2912.2	522.3	-45.2	-62.8	77.3	216	245.0	847	No
0610080	AMERICAN POWER TECH	3051.1	550.7	-16.8	76.1	77.9	348	1.1	859	No
0610021	OCEAN SPRAY CRANBERRIES/VERO BEACH	3051.3	550.6	-16.9	76.3	78.1	348	3.6	863	No
0430008	SOUTH FLORIDA THERMAL SERVICES, INC.	2966.6	489.2	-78.3	-8.4	78.7	264	10.5	875	No
0112146	ATLANTIC BURIAL CASKET CO. DBA ABCO	2897.7	584.3	16.8	-77.3	79.1	168	1.9	882	No
0112152	GOLD COAST CREMATORY	2897.6	584.6	17.1	-77.4	79.3	168	2.1	885	No
0610029	CITY OF VERO BEACH MUNICIPAL UTILITIES	3056.5	561.4	-6.1	81.5	81.7	356	348.1	935	No
0510015	SOUTHERN GARDENS CITRUS PROCESSING CORP.[b]	2957.6	487.5	-80.0	-17.4	81.9	258	2,891.2	937	Yes

Source: Florida Department of Environmental Protection (9/2000)

[a] Realtive location is with respect to the Pratt Whitney facility, which is located at UTM Coordinates: North 2975 km, East 567.5 km

[b] The significant impact area (SIA) for the project determined by modeling is 35 km

[c] Facilities or sources with facilities that operate only during the November 1 through April 30 crop season.

[d] Facility has sugar mill sources that operate all year

[e] Emissions and parameters taken from Title V Permit (3/21/1996)

[f] Parameters taken from Title V Permit (6/10/1996)

[g] Emissions and parameters taken from Atlantic Sugar PSD Application (10/99)

[h] Emissions and parameters taken from Title V Permit Application (6/15/1996)

[i] Emissions and parameters taken from Special Land Use and Site Plan Application (8/1999)

[j] Emissions and parameters taken from PSD Application (8/2000)

[k] Emissions and parameters taken from PSD Application (8/2000)

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s)
0990185	SIKORSKY AIRCRAFT CORP. - JUPITER							
		Paint spray booth (PS-13-SIK) with drying oven	SIK10	11.89	1.83	302.6	5.9	0.01
0990234	SOLID WASTE AUTH OF PBC/NO CO RRF							
		412.5MMBTU/HR RDF BOILER NO.1 (324,000 lb/hr STEAM)	SWPBC1	76.20	2.04	505.4	24.7	17.80
		412.5MMBTU/HR RDF BOILER NO.2 (324,000 lb./hr. steam)	SWPBC2	76.20	2.04	505.4	24.7	17.80
		Landfill Gas Coll Sys class I	SWPBC3	7.01	0.21	1033.2	24.4	1.96
		Landfill Gas Coll Sys class III	SWPBC4	7.01	0.15	1033.2	46.6	1.96
0990349	SFWMD PUMP STATION #S-5A							
		Six 1600 hp diesel engines powering flood control pumps	S5A1	4.88	0.99	685.9	5.3	8.37
0990019	OSCEOLA FARMS							
		BOILER #2 WITH SCRUBBERS AND 2 STACKS	OSBLR2	27.43	1.52	338.7	18.6	317.52
		BOILER #3 WITH SCRUBBER	OSBLR3	27.43	1.92	344.3	14.3	128.77
		BAGASSE BOILER #4 UNIT #5, 100000 LBS/HR STEAM MAX	OSBLR4	27.43	1.83	344.3	16.5	317.52
		165,000 LB/HR BAGASSE BOILER # 5 WITH 2 SCRUBBERS & 2 STACKS	OSBLR5	27.43	1.52	344.3	17.9	374.22
		BOILER #6 WITH SCRUBBER PSD	OSBLR6	27.43	1.92	338.7	18.3	310.40
0990331	OSCEOLA COGENERATION PLANT							
		760 MMBTU/HR BIOMASS/OIL/COAL FIRED BOILER	OSCOG1	60.96	3.05	419.3	15.9	16.37
		760 MMBTU/HR COGENERATION BOILER NO. 2	OSCOG2	60.96	3.05	419.3	15.9	16.37
0990333	FGT STATION NO. 21 (WPB)							
		COMPRESSOR #2101, 6500 BHP NATURAL GAS FIRED TURBINE	FGT1	15.24	1.01	763.7	56.4	0.65
		COMPRESSOR #2102, 6500 BHP NATURAL GAS FIRED TURBINE	FGT2	15.24	1.01	763.7	56.4	0.65
0990344	PARKWAY ASPHALT (RIVIERA)							
		Asphalt rotary drum dryer (400 TPH); counterflow	PARK1	12.80	1.42	422.0	18.5	0.32
0850102	INDIANTOWN COGENERATION PLANT							
		Pulverized Coal Main Boiler	INDCG1	150.88	4.88	333.2	28.4	37.60
		(2) Auxiliary Boilers	INDCG3	64.01	1.52	449.8	26.7	0.55
0850002	CAULKINS INDIANTOWN CITRUS							
		PEEL DRYER #1 WASTE HEAT EVAPORATOR (54,000 LB/HR CAPACITY)	CAULK4	28.65	0.98	343.2	11.6	0.16
		30 T/HR CITRUS PEEL DRYER #2	CAULK5	32.92	1.52	255.4	0.0	0.05
0990123	PHYSICAL DISTRIBUTION CENTER & OSF							
		12.5 mmBTU/hr boiler #1 (Unit A) burning No.6 fuel oil	PHYD1	9.14	0.52	491.5	10.1	0.05
		12.5 mmBTU/hr boiler #2 (Unit B) burning No.6 fuel oil	PHYD2	9.14	0.52	491.5	10.1	0.05
0990583	MAGNUM ENV. SERVICES, INC. - WPB							
		Soil thermal treatment facility	MAGN1	9.75	0.98	1144.3	31.6	0.50

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s)
0990087	WEST PALM PLANT							
		Double drum dryer (250 TPH) burning low sulfur residual oil	WPP4	10.97	1.01	394.3	41.1	0.27
0990188	ANIMAL RESCUE LEAGUE							
		ANIMAL CREMATION INCINERATOR; CRAWFORD #C-1000S; 250 LB/HR	ARL3	6.10	0.52	733.2	8.8	0.01
		ANIMAL CREMATION INCINERATOR; CRAWFORD #C-500P; 75 LB/HR	ARL4	6.10	0.52	788.7	3.4	0.004
0990056	ST. MARYS HOSPITAL, INC.							
		Two identical process steam boilers; natural gas fired	STMAR2	24.38	1.22	505.4	0.1	0.03
0990325	ROYAL PALM MEMORIAL GARDENS, INC.							
		HUMAN CREMATION INCINERATOR, IEE CO. #IE 43-PPII (100 LB/HR)	RPMG1	6.10	0.55	865.9	4.9	0.03
0990061	U.S. SUGAR CORP. BRYANT MILL							
		BOILERs #1,#2,#3 WITH SCRUBBERS	USSBM123	19.81	1.65	338.7	36.4	1309.77
		BOILER #5 WITH TWO SCRUBBERS.	USSBM5	45.72	2.90	338.7	18.0	760.91
0990042	RIVIERA POWER PLANT							
		Fossil Fuel Steam Generator, Unit 3 -Phase II Acid Rain Unit	RIVP3	90.83	4.88	401.5	26.9	13.18
		Fossil Fuel Steam Generator, Unit 4 -Phase II Acid Rain Unit	RIVP4	90.83	4.88	401.5	26.6	13.18
0850001	FPL MARTIN POWER PLANT							
		Units 1 & 2	MART12	152.1	7.99	420.9	21.03	38.92
		Aux Blr PSD	MARTAUX	18.3	1.10	535.4	15.24	0
		Diesel Gens PSD	MARTGEN	7.6	0.30	785.9	39.62	0
		Units 3 & 4 PSD	MART34	64.9	6.10	410.9	18.90	26.66
0990016	ATLANTIC SUGAR MILL							
		BOILER #1 WITH SCRUBBER	ATLSM1	27.43	1.83	346.0	18.0	242.68
		BOILER #2 WITH 1 JOY TURBULAIRE TYPE D-40 IMPINGEMNT SCRUBBE	ATLSM2	27.43	1.83	350.0	23.4	242.68
		BOILER #3 WITH 2 JOY TURBULAIRE IMPINGEMENT SCRUBBERS	ATLSM3	27.43	1.83	350.0	21.6	294.84
		BOILER # 4	ATLSM4	27.43	1.83	344.0	25.2	311.85
		253 MM BTU/HR BAGASSE BOILER #5 W/SUPP FUEL OIL #6	ATLSM5	27.43	1.68	339.0	19.2	209.11
0850015	AYCOCK FUNERAL HOME							
		IND. EQUIP. & ENGR. MODEL IE43-PPII CREMATOR	AYCK2	7.32	0.52	865.9	5.5	0.03
0850006	MARTIN MEMORIAL HEALTH SYSTEMS							
		CLEAVER BROOKS MODEL CB 150 HP BOILER - UNIT #1	MMHS1	5.79	0.40	499.8	8.2	0.02
		CLEAVER BROOKS MODEL CB-150 HP STEAM BOILER #2	MMHS5	5.79	0.40	499.8	8.2	0.02
0850108	OUTBOARD MARINE/RALPH EVINRUDE TEST CTR							
		Engine Testing Cells (02), 2 Test tanks and 2 Cooling towers	OUT1	12.19	0.61	310.9	9.7	2.22
0990026	SUGAR CANE GROWERS CO-OP							
		BOILERS #1 AND #2 WITH 2 SCRUBBERS AND 1 STACK	SCGC12	45.72	1.87	339.0	21.8	547.09

Table 4. Summary of CO Sources Included in the Air Modeling Analyses for the Pratt & Whitney Facility

Facility ID	Facility Name	Emission Units	Modeling ID Name	Stack Parameters Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s)
		BOILER #3 WITH SCRUBBER	SCGC3	27.43	1.52	339.0	22.3	187.61
		BOILER #4 WITH CYCLONES AND 3 SCRUBBERS WITH ONE STACK	SCGC4	54.90	2.44	339.0	21.7	467.71
		BOILER #5 WITH CYCLONES, TWO SCRUBBERS, AND ONE STACK	SCGC5	45.72	2.30	339.0	15.9	359.60
		504 MMBTU/HR BOILER # 8 RESIDUE/BAGASSE/OIL	SCGC8	47.24	2.90	339.0	13.6	381.02
0990045	T G SMITH PLANT							
		2000 KW DIESEL GENERATOR # 1 PEAKING UNIT	TGSM01	5.18	0.56	625.9	37.1	1.70
		2000 KW DIESEL GENERATOR # 2 PEAKING UNIT	TGSM02	5.18	0.56	625.9	37.1	1.70
		2000 KW DIESEL GENERATOR # 3 PEAKING UNIT	TGSM03	5.18	0.56	625.9	37.1	1.70
		2000 KW DIESEL GENERATOR # 4 PEAKING UNIT	TGSM04	5.18	0.56	625.9	37.1	1.70
		2000 KW DIESEL GENERATOR # 5 PEAKING UNIT	TGSM05	5.18	0.56	625.9	37.1	1.70
		GAS TURBINE # 1	TGSM06	14.02	4.88	720.4	24.8	2.07
		7.5 MW FOSSIL FUEL STEAM GENERATING UNIT I	TGSM07	18.29	1.52	422.0	10.5	0.43
		FOSSIL FUEL STEAM GENERATOR #3 (Phase II, Acid Rain Unit)	TGSM09	34.44	2.13	418.2	15.7	1.25
		FOSSIL FUEL STEAM GENERATOR #4 (Phase II, Acid Rain Unit)	TGSM10	35.05	2.29	418.2	17.0	1.64
		COMBINED CYCLE UNIT (GT-2/S-5)	TGSM11	22.86	3.05	479.8	26.7	3.49
0990568	LWG PLANT							
		186 MW combined cycle gas turbine, GE Frame 7FA	LWG1	45.72	5.49	377.6	24.3	5.48
0990332	OKEELANTA COGENERATION PLANT							
		715 MMBTU/HR COGENERATION BOILER NOS. 1,2,3	OKCOGEN	60.60	3.05	438.7	17.5	94.61
0510003	U.S. SUGAR CLEWISTON MILL AND REFINERY							
		BOILER #1 WITH SCRUBBER	USSCM01	64.92	2.44	347.0	15.4	811.79
		BOILER #2 WITH SCRUBBER	USSCM02	64.92	2.44	338.7	13.9	732.19
		BOILER #3 WITH SCRUBBER	USSCM03	64.92	2.44	333.2	6.8	334.28
		BOILER #5 WITH SCRUBBER	USSCM04	45.72	2.51	344.3	20.3	518.43
		Boiler #7	USSCM07	68.58	2.59	405.4	20.8	71.62
0510015	SOUTHERN GARDENS CITRUS PROCESSING CORP.							
		Peel Dryer	SGARDDRY	38.1	7.45	1.16	353.0	65.69
		Boilers 1-3	SGARDBLR	16.8	14.23	1.22	478.0	0.23

Source: Florida Department of Environmental Protection (9/2000)

Table 5. Maximum CO Impacts Predicted for Sources at the Pratt & Whitney Facility Including Other Facilities - Screening Analysis

Averaging Time, Rank	Concentration[a] ($\mu g/m^3$)	Receptor Location[b]		Time Period (YYMMDDHH)
		Direction (degree)	Distance (m)	
8-Hour, Highest				
	2,670	260	30,000	87090516
	5,186	260	30,000	88060816
	3,221	250	25,000	89012116
	3,079	250	25,000	90041216
	2,788	260	30,000	91051416
8-Hour, HSH				
	2,591	260	30,000	87011916
	2,702	260	30,000	88022016
	2,479	250	25,000	89102216
	2,248	260	30,000	90062316
	2,615	260	30,000	91082416
1-Hour, Highest				
	9,458	260	30,000	87090509
	10,204	260	30,000	88042411
	9,285	260	30,000	89072009
	10,098	260	30,000	90062310
	10,155	260	30,000	91082412
1-Hour, HSH				
	9,387	260	30,000	87041514
	10,096	260	30,000	88090711
	8,626	260	30,000	89080210
	9,570	260	30,000	90010613
	9,415	260	30,000	91082010

[a] Based on 5-year meteorological record, West Palm Beach, 1987-91
[b] Relative to engine discharge location
YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6. Maximum CO Impacts Predicted for Comparison to AAQS, Refined Analysis

Averaging Time, Rank	Concentration (μg/m3)			Receptor Location[b]		Time Period (YYMMDDHH)	Florida AAQS (μg/m3)
	Total	Modeled[a]	Background	Distance X (m)	Distance Y (m)		
From PSD Application							
8-Hour, HSH	3,927.8	477.8[a]	3,450[c]	-951	1,409	90082912	10,000
1-Hour, HSH	10,262	3,822[a]	6,440[c]	-951	1,409	90082912	40,000
Additional Modeling With Other Sources							
8-Hour, HSH	6,973	5,823[d]	1,150[e]	-30,300	-5,960	89051916	10,000
1-Hour, HSH	12,309	11,009[d]	1,300[e]	-30,050	-5,460	90083113	40,000

[a] Based on the HSH concentration predicted for the project's emissions with 5-year meteorological record of 1987 to 1991 from West Palm Beach

[b] Relative to Engine Discharge Location.

[c] Based on the second highest measured concentrations from January 1998 to June 1999 at West Palm Beach

[d] Based on the HSH concentrations predicted for all modeled sources with the 5-year meteorological record of 1987 to 1991 from West Palm Beach

e Based on the 90th percentile of measured concentrations from 1998 to 1999 at West Palm Beach

YYMMDDHH = Year, Month, Day, Hour Ending.

HSH = Highest, Second-Highest Concentration in 5 years.

Z 341 355 333

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to: John K Silan - Pratt + Whitney
Street & Number: PO Box 109600
Post Office, State, & ZIP Code: WPB, FL 33410-9600

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	7/17/00

PS Form **3800**, April 1995

[redacted] envelope to

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. John K. Silan
Manager Facilities Management
United Technologies Corp -
Pratt & Whitney
P.O. Box 109600
West Palm Beach, FL 33410-9600

COMPLETE THIS SECTION ON DELIVERY

A. Received by *(Please Print Clearly)* | B. Date of Delivery

C. Signature
X
☐ Agent
☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

PALM BEACH JUL 19 2000 33410-9998

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)*
Z 341 355 333

PS Form 3811, July 1999 Domestic Return Receipt 102595-99-M-1789

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

July 13, 2000

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. John K. Silan
Manager Facilities Management
United Technologies Corp – Pratt & Whitney
P.O. Box 109600
West Palm Beach, Florida 33410-9600

Re: DEP File No. 0990021-004-AC (PSD-FL-294) – LOX/Kerosine Rocket Engine Stand Project at Pratt & Whitney's Research & Development Facility in West Palm Beach

Dear Mr. Silan:

The Bureau of Air Regulation received the enclosed comments from the Palm Beach County Health Department concerning the referenced permit application. Please address the issues raised in the County's letter. Also, please provide an estimate of the current actual annual CO emissions for the referenced facility.

If there are any questions regarding the above, please call John Reynolds at 850/921-9536.

Sincerely,

7/13

A. A. Linero, P.E. Administrator
New Source Review Section

Enclosure

AAL/JR

cc: Gregg Worley, EPA
John Bunyak, NPS
Isidore Goldman, SED
Darrel Graziani, PBCHD
Benny Susi, Golder Assoc.

INTEROFFICE MEMORANDUM

Date: 10-Jul-2000 09:34am
From: Darrel_Graziani
Darrel_Graziani@doh.state.fl.us
Dept:
Tel No:

To: John.Reynolds (John.Reynolds@dep.state.fl.us)
CC: Jim_Stormer (Jim_Stormer@doh.state.fl.us)
CC: Ajaya_Satyal (Ajaya_Satyal@doh.state.fl.us)
CC: Larry.George (Larry.George@dep.state.fl.us)

Subject: P&W PSD Application

John,

Comments on the application for the new rocket engine test stand at Pratt & Whitney's Palm Beach operations.

1. Emission estimates for the criteria pollutants are not adequately documented. Please request the applicant to supply documentation on the expected emissions. If a combustion model was used, please have them submit a copy. PM emissions need to include solids within the cooling water. VOC emissions also need to be documented given the high CO numbers.

For your information, some of my work at NASA's Stennis Space Center dealt with the testing of a similar engine. For that project, the combustion model predicted initial high CO rates at the engine exhaust. Howerver, when the exhaust gases mix with the air, the model predicted overall lower CO emissions and an increased rate of NOx.

2. Emission estimates for HAPs have not been provided. The activity is a listed source category under Section 112 of the Clean Air Act and the applicant should specifiate PM and VOC emissions, if possible. A case-by-case MACT determination may be required.

3. There are a number of unregulated activities with significant allowable emissions. The source needs to include these activities within the modeling analyses.

4. The applicant's BACT analysis is not correct. There are controls on a Russian Test Stand which go beyond BACT. My understanding is that the controls were implemented (Cold War Stuff) to hide research activities. The NASA people at SSC are aware of the controls and unless DOD is funding the controls would be cost prohibited.

5. I disagree with the modeling approach. Use of the a puff model is more appropriate given the nature of the activity. NASA used such modeling to support the ARSM PSD Permit application. The applicant needs to submit a revised modeling analysis.

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. John K Silan
Manager Facilities Mgt.
United Technologies Corp
Pratt + Whitney
P.O. Box 109600
West Palm Beach, FL 33410

COMPLETE THIS SECTION ON DELIVERY

A. Received by *(Please Print Clearly)* | B. Date of Delivery

C. Signature
X [signature] ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)*
Z 341 355 340

PS Form 3811, July 1999 Domestic Return Receipt 102595-99-M-1789

Z 341 355 340

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to John Silan	
Street & Number P.O. Box 109600	
Post Office, State, & ZIP Code West Palm Beach, FL 33410-9602	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 7/19/00 United Tech. Corp - Pratt + Whitney	

PS Form **3800**, April 1995

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

July 19, 2000

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. John K. Silan
Manager Facilities Management
United Technologies Corp – Pratt & Whitney
P.O. Box 109600
West Palm Beach, Florida 33410-9600

Re: DEP File No. 0990021-004-AC (PSD-FL-294) – LOX/Kerosine Rocket Engine Stand Project at Pratt & Whitney's Research & Development Facility in West Palm Beach

Dear Mr. Silan:

Based on our review of the proposed project, we have determined that the following additional information is needed in order to continue processing this application package:

1. The receptors used to model impacts at the site boundary were not spaced at 100 m. Please re-evaluate impacts at the site boundary by using a fence line receptor network that has a 100 m resolution. Also, in the receptor grid used for the screening analysis contained a 7 kilometer gap between the site boundary receptors and the nearest ring of polar receptors. Please update the screening analysis to include a receptor grid that contains a denser mid field receptor network.

2. In the application, it is assumed that all land enclosed by the site boundary is non-ambient air. However, if there is no physical barrier about this property, the assumption is not valid. Please confirm the existence of a physical barrier that prevents public access onto the land that is enclosed by the site boundary that was utilized in the modeling.

3. Please prepare a CO emission inventory for the NAAQS compliance analysis. The inclusion of only monitored background data does not sufficiently demonstrate compliance with the NAAQS.

If there are any questions regarding the above, please call John Reynolds at 850/921-9536.

Sincerely,

7/19

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/JR

cc: Gregg Worley, EPA
John Bunyak, NPS
Isidore Goldman, SED
Darrel Graziani, PBCHD
Benny Susi, Golder Assoc.

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

TRANSMITTAL LETTER

To:

Mr. Dale Franke
Pratt & Whitney
Jupiter, Florida

Date: August 22, 2000
Project No.: 9939571-0100

Sent by: **mhr/arz**

- ☐ Mail
- ☐ Air Freight
- ☐ Hand Carried
- ☐ UPS
- ☒ Federal Express

Per: **Benny Susi**

Quantity	Item	Description
6	Response to Comments by FDEP	Letter with attached tables

Remarks:

Mr. Franke,

Please forward 4 copies of the letter with official P.E. signature to FDEP.
Please forward 1 copy of the letter to Darrel Graziani, PBCHD.
One copy is for your files.

Thank you.

P:\Projects\99\9939\9939571a Pratt & Whitney\01\#01-LOT.doc