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1. Article Addressed to:

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

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PS Form 3800, February 2000 See Reverse for Instructions

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

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

DEP File No. 0990021-004-AC
Permit No. PSD-FL-294
LOX/Kerosene Rocket Engine Test Stand
Palm Beach County

Enclosed is the Final Permit Number PSD-FL-294 to construct a liquid oxygen and kerosene-fueled rocket engine test stand at the existing United Technologies – Pratt and Whitney facility near Jupiter in Palm Beach County County. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

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

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail* and copies were mailed by U.S. Mail before the close of business on 9/5/01 to the person(s) listed:

John K. Sillan, UTC-P&W*
Benny Susi, P.E. Golder Associates
Gregg Worley, EPA
John Bunyak, NPS
Isidore Goldman, DEP SED
Jim Stormer, Palm Beach County PHU ✓

Clerk Stamp

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

Barbara J. Friday 9/5/01
(Clerk) (Date)

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

PERMITTEE

United Technologies Corp.-Pratt & Whitney
P.O. Box 109600
West Palm Beach, FL 33410-9600

Permit No.	0990021-004-AC PSD-FL-294
Project	LOX/Kerosene Rocket Engine Test Stand
Expires:	June 30, 2003

AUTHORIZED REPRESENTATIVE:

Mr. John K. Sillan, Manager Facilities Management

PROJECT AND LOCATION

This permit authorizes the permittee to construct a LOX/Kerosene Rocket Engine Test Stand at its existing facility located on 17900 Beeline Highway (SR 710) in Palm Beach County. The permittee is limited to firing no more than 318,000 gallons of fuel per year in the test stand and is required to establish an ambient air quality monitoring program. The SIC codes for this facility are 3724 and 3764.

The UTM coordinates of the site are Zone 17; 567.3 km E; 2974.4 km N. The Everglades National Park is approximately 120 km (74.9 miles) from the site.

STATEMENT OF BASIS

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

APPENDICES

The attached appendices are a part of this permit:

Appendix BD	BACT Determination
Appendix GC	General Permit Conditions
Appendix NSPS-Kb	40 CFR 60 Subpart Kb - Standards Of Performance For Volatile Organic Liquid Storage Vessels

Howard L. Rhodes, Director
Division of Air Resources Management

SECTION I. FACILITY INFORMATION

FACILITY DESCRIPTION

United Technologies Corp.- Pratt & Whitney (UTC-P&W) proposes to construct a Liquid Oxygen (LOX)/Kerosene Rocket Engine Test Stand at the E-5 rocket test area located at 17900 Beeline Highway (SR 710) in West Palm Beach, Palm Beach County.

The proposed project will result in a significant emissions increase of carbon monoxide (CO) according to Table 212.400-2, Florida Administrative Code (F.A.C.). The project is therefore subject to review for Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rule 62-212.400, F.A.C.

PROJECT DETAILS

The applicant proposes to construct and operate a LOX/Kerosene Rocket Engine Stand at its existing rocket test facility in Palm Beach County. The applicant also operates a gas turbine testing facility and a helicopter development facility at the existing site. This project will consist of: liquid oxygen and fuel storage tanks with respective capacities of approximately 64,000 and 36,000 gallons capacities; an engine containment can; a water-cooled silencer; an exhaust gas deflector; a lined cooling water retention pond; and an elevated 1-million gallon water supply tank.

The proposed facility will consist of the following emissions units.

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
075	LOX/Kerosene Rocket Engine Test Stand
076	NSPS Storage Tank – Approximately 36,000 Gallon Capacity

REGULATORY CLASSIFICATION

The facility is classified as a Major Source of air pollution under the PSD and Title V programs based on potential emissions of carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), sulfur dioxide (SO_2), trichloroethylene, and total combined hazardous air pollutants (HAPs). This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. The project permitted herein is subject to the requirements of the Prevention of Significant Deterioration air quality rules for CO emissions and New Source Performance Standards for fuel storage tanks as well as state rules cited in the general and specific conditions.

REVIEWING AND PROCESS SCHEDULE

- Date of Receipt of Application 06-20-00
- First Request for Additional Information 07-19-00
- Final Request for Additional Information 10-01-00
- Date Application Complete 10-09-00
- Waiver of Processing Clock by 30 days 12-19-00
- Intent Issued 01-29-01
- Received Request to Extend Time to File Petition until 05-17-01 02-22-01
- Received Request to Extend Time to File Petition until 08-15-01 05-17-01
- Re-issued Intent, Draft Permit and Draft BACT 07-10-01
- Received Proof of Publication 07-26-01
- Permit Issued 08-31-01

RELEVANT DOCUMENTS

The documents listed below constitute the basis for the permit and are on file with the Department.

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

SECTION II. FACILITY-WIDE SPECIFIC CONDITIONS

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

ADMINISTRATIVE

1. Regulating Agencies: All documents related to applications for permits to construct, or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, phone number 850/488-0114. All documents related to reports, tests, operation permit applications, minor modifications and notifications shall be submitted to the Palm Beach County Health Department, post Office Box 29, 901 Evernia Street, West Palm Beach, Florida 33402-0029, Phone 562-355-3136.

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

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

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

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

6. Expiration: This air construction permit shall expire on June 30, 2003. The permittee, for good cause, may request that this construction/PSD permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit.
[Rules 62-210.300(1), 62-4.070(4), 62-4.080, and 62-4.210, F.A.C]

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

   BACT Determination: In conjunction with extension of the 18 month period to commence or continue construction, or extension of the permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of Best Available Control Technology (BACT) for the source as applied to any new or modified emission units.
[Rules 62-4.070(4), 62-4.210(2) & (3), 62-210.300(1)(a), and 62-212.400(6)(b), F.A.C.]

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

8. Title V Operation Permit Required: This permit authorizes construction and/or installation of the permitted emissions unit and initial operation to determine compliance with Department rules. A revision to the facility's Title V operation permit is required for regular operation of the permitted emissions unit. The owner or operator shall apply for and receive a Title V operation permit or permit modification prior to expiration of this permit. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Department's appropriate District office.
[Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

GENERAL EMISSIONS LIMITING STANDARDS

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

10. Unconfined Emissions of Particulate Matter: [Rules 62-296.320(4)(c) and 62-212.400, F.A.C.]

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

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

    (iii) Reasonable precautions include the following:

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

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

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

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

(ii) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor. (Not federally enforceable)

[Note: An objectionable odor is defined in Rule 62-210.200(203), F.A.C., as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance.]

OPERATIONAL REQUIREMENTS

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

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

14. Excess Emissions: For purposes of this permit, all limits established pursuant to the State Implementation Plan, including those limits established as BACT, include emissions during periods of startup and shutdown, and are not subject to the provisions of Rule 62-210.700(1), F.A.C.

Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during start-up, shutdown or malfunction shall be prohibited pursuant to Rule 62-210.700(4), F.A.C. [Rules 62-4.070(3) and 62-210.700(5), F.A.C.]

COMPLIANCE MONITORING AND TESTING REQUIREMENTS

15. Determination of Process Variables: [Rule 62-297.310(5), F.A.C.]

(i) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(ii) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

16. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

REPORTING AND RECORD KEEPING REQUIREMENTS

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

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

25. Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the appropriate Department District Office and the appropriate local program within one working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. [Rule 62-4.130, F.A.C.]

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

27. Annual Operating Report for Air Pollutant Emitting Facility: The Annual Operating Report for Air Pollutant Emitting Facility shall be completed each year and shall be submitted to the appropriate Department District Office and the appropriate local program by March 1 of the following year. [Rule 62-210.370(3), F.A.C.]

SECTION III. EMISSIONS UNIT SPECIFIC CONDITIONS

SUBSECTION A: The following specific conditions apply to the following emissions units:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
075	LOX/Kerosene Rocket Engine Test Stand

EMISSIONS UNIT(S) DETAILS

LOX/Kerosene Rocket Engine Test Stand, designated Emissions Unit 075, consisting of an engine containment can, a water-cooled silencer, and an exhaust gas deflector. Emissions are controlled through the use of a minimum oxidant to fuel ratio and the water-cooled silencer.

{Permitting note(s): The emissions unit has been reviewed under the PSD Program for carbon monoxide (CO). As a new major source of CO, the emissions unit is subject to the Best Available Control Technology (BACT) requirements of Rule 62-212.400(5)(c), F.A.C. Potential emissions of particulate matter (PM and PM10), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and volatile organic compounds have been estimated at 2.3, 1.4, 1.4, and 2.9 tons per year, respectively. The emissions unit is not subject to any New Source Performance Standards (40 CFR Part 60) or National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61). The emissions unit has been identified as a Source Category for future regulatory action under the National Emission Standards for Hazardous Air Pollutants for Source Categories (40 CFR Part 63). A case-by-case determination of the Maximum Achievable Control Technology (MACT) under 40 CFR Part 63, Subpart B was not required.}

CONSTRUCTION REQUIREMENTS

A.1. **Test Stand**: The test stand shall be constructed in accordance with the conceptual design specifications provided within the application and the following specifications:

(i). **Water Cooled Silencer**: Approximate diameter of 20 feet and an approximate length of 80 feet; and

(ii). **Exhaust Gas Deflector**: Approximate height of 70 feet, approximate distance from Water Cooled Silencer of 100 feet. The surface between the water-cooled silencer shall be paved to minimize soil erosion.

[BACT and Rules 62-4.070(3) and 62-296.320(4)(c), F.A.C.]

The applicant will provide detailed dimensions once the final design is completed.

A.2. **Oxygen Injection Study**: Within 180 days of the issuance of this permit, the permittee shall develop a plan for an Oxygen Injection Study for review and approval by the Department. The permittee shall complete and submit to the Department an engineering and cost study evaluating the technical feasibility and cost effectiveness of direct O_2 injection for reducing CO emissions in the exhausts of rocket engines tested at the permittee's facility. The study shall be completed within one year of approval by the Department of the plan for the oxygen injection study. [Rule 62-4.070(3) and BACT]

OPERATING RESTRICTIONS

A.3. **Permitted Capacity**: The permittee shall not allow, cause, suffer or permit the operation of the unit in excess of the following capacities without prior authorization from the Permitting Authority:

(i). **Test Duration**: Rocket engine test firing duration shall not exceed a total of 240 seconds per 8-hour period.

(ii). **Test Firings**: Rocket engine test firings shall not exceed 2,880 seconds per year (12-month rolling total).

(iii). **Oxidant/Fuel Ratio**: All rocket engine test firings shall be conducted at a minimum oxidant/fuel ratio of 2.72 pounds of oxygen per pound of fuel (4-minute average).

(iv). **Fuel Usage**: Rocket engine test firings shall not consume more than 6,625 gallons per minute (4-minute average), 26,500 gallons per 8-hour period, and 318,000 gallons per year (12-month rolling total)

(v). **Quench Water**: All rocket engine test firings shall be conducted with sufficient quench water flow to minimize NO_X formation.

[BACT, Rules 62-4.160(2), 62-210.200(228), and 62-210.300, F.A.C.]

{Permitting note: Prior authorization includes the issuance of construction, reconstruction, or modification permits or a determination by the Permitting Authority that the action is not subject to Rule 62-210.300(1), F.A.C.}

A.4. **Methods of Operation**: The permittee shall not allow, cause, suffer or permit any change in the method(s) of operation resulting in increased short-term or long-term potential emissions, without prior authorization from the Permitting Authority. The authorized methods of operation include the following:

(i) **Fuels**: The permittee is authorized to use kerosene as the rocket engine fuel.

(ii). **Oxidants**: The permittee is authorized to use liquid oxygen (LOX) as the rocket engine fuel oxidizer.

[BACT, Rules 62-4.160(2), 62-210.200(228) and 62-210.300, F.A.C.]

A.5. **Test Conditions**: Rocket engine test firings shall be restricted to daylight hours (1 hour after sunrise and 1 hour prior to sunset) and only under ambient conditions that provide good dispersion of the exhaust gases in accordance with a Test Plan to be submitted to the Palm Beach County Health Department (PBCHD) for approval prior to the initial test. The Palm Beach County Health Department (PBCHD) may approve non-daylight hour testing on a case-by-case basis. [BACT, Rules 62-4.070(3), F.A.C.]

A.6. **Hours of Operation**: The permittee is authorized to operate the unit continuously within the limits of the permitted capacities of **Condition A.3** and the test conditions of **Condition A.5** of this permit. [BACT, Rules 62-4.160(2), 62-210.200(228) and 62-210.300, F.A.C.]

EMISSION LIMITATIONS AND STANDARDS

A.7. **Visible Emissions**: The permittee shall not allow visible emissions that exceed forty (40) percent opacity from any rocket engine test firing. [BACT, Rule 62-212.400, F.A.C.]

A.8. **Carbon Monoxide Emissions**: Rocket engine test firings shall not result in CO emissions greater than 20.75 tons per minute (4-minute average), 83 tons per 8-hour period, and 1,000 tons per year (12-month rolling total) as determined using the NASA-Lewis chemical equilibrium computer program or equivalent method approved by the Department or the Palm Beach County Health Department. [BACT, Rules 62-4.160(2), 62-210.200(228), and 62-210.300, F.A.C.]

A.9. **BACT Determination**: The permittee shall comply with the requirements of Appendix BD of this permit. [BACT and Rule 62-212.400(5)(c), F.A.C.]

TEST METHODS AND PROCEDURES.

A.10. **Visible Emissions**: All visible emissions tests performed pursuant to the requirements of this permit shall comply with the following provisions:

(i). **Test Method**: The test method for visible emissions shall be DEP Method 9, incorporated in Rule 62-297.401(9)(c), F.A.C. The required minimum period of observation for a compliance test shall for operations that are normally completed within less than the minimum observation period and do not recur within that time, the period of observation shall be equal to the duration of the operation completion time. The opacity test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. [BACT, Rule 62-297.310(4)(a)2.a, F.A.C.]

(ii). **Test Procedures**: Test procedures shall meet all applicable requirements of Chapter 62-297, F.A.C. [Rule 62-296.410(3)(c), F.A.C.]

A.11. **Carbon Monoxide Emissions**: The permittee shall, prior to any rocket engine test firings, establish an ambient air quality monitoring program to measure ambient air concentrations of CO before, during, and after a rocket engine test firing. The program shall be approved by the Palm Beach County Health Department (PBCHD). It may be discontinued upon request and with approval of PBCHD following a minimum of four test firings.

[Rule 62-212.400(5)(g), F.A.C.]

COMPLIANCE DEMONSTRATIONS AND PERIODIC MONITORING

A.12. **Initial Compliance Demonstrations**: The permittee shall conduct a visible emissions compliance test during the initial rocket engine test firing and each subsequent test firing when a lower average oxidant/fuel ratio is used. Initial compliance with the CO emission limitations shall be demonstrated through compliance with **Conditions A.8** and **A.11** of this permit.

[BACT and Rule 62-297.310(7)(a)1., F.A.C.]

A.13. **Compliance Demonstrations**: The permittee shall demonstrate compliance with the CO emission limitation by use of the ambient air quality monitoring program required by **Condition 11** of this permit. [BACT and Rule 62-4.070(3), F.A.C.]

A.14. **Compliance Demonstrations for Permit Renewal**: The permittee shall have a formal compliance test conducted for visible emissions annually during each federal fiscal year (October 1 – September 30).

[BACT and Rule 62-297.310(7), F.A.C.]

A.15. **Flow Monitors**: The permittee shall install, maintain, operate and calibrate flow monitors to measure the oxidant, fuel and quench water flow rates during each rocket engine test firing. All instrumentation shall be properly maintained and functional at all times, except during instrument breakdown, calibration or repair to ensure compliance with **Conditions A.3**, **A.4**, **A.5**, and **A.8** of this permit. [Rule 62-4.070(3), F.A.C.]

A.16. **Recordkeeping**: The permittee shall maintain the following records:

(i). Test Identification Number;
(ii). Test Date and Time (Start and Finish);
(iii). Test Duration (Planned and Actual);
(iv). Oxidant and Fuel Types;
(v). Oxidant/Fuel Ratio (Planned and Actual);
(vi). Fuel Usage (gallons per minute);
(vii). Quench Water System in Operation During Test;
(viii). Test Condition Summary;
(ix). CO Ambient Concentrations;
(x). Test Plan Conditions Excursions; and
(xi). Daily and Monthly Totals of Test Duration, Test Firings, and Fuel Usage.

[Rule 62-4.070(3), F.A.C.]

A.17. **Reporting**: The permittee shall submit the following reports:

(i). **Test Notifications**: Notification to the PBCHD at least 24 hours prior to a rocket engine test firing. The notification shall include the date and time of the test firing, the expected duration of the test firing, the planned oxidant/fuel ratio, and the planned fuel usage rate.

[BACT and Rule 62-4.070(3), F.A.C.]

(ii) **Test Plan Excursion Reports**: In the event an excursion from the test plan conditions (i.e., test duration > 240 seconds, O/F ratio less than 2.72, fuel usage > 26,500 gallons, a flame out, etc.) occurs during a test, a verbal report shall be provided to the PBCHD within 24 hours of the test. Within sixty (60) days of an excursion, the permittee shall submit an analysis describing the excursion event/parameter, measures taken to prevent recurrences, and excess emissions (opacity) observed, if any. The report shall include ambient air quality impacts associated with the excess emissions if requested by PBCHD.

[Rule 62-4.130, F.A.C.]

A.18. **Excess Emissions**: Excess emissions and excursion from test plan conditions shall be reported to PBCHD as described in **Condition A.17**. Excess emissions parameters reported shall be limited to visible emissions (opacity) and shall be allowed provided the permittee demonstrates that the emissions did not result in a predicted ambient impact greater than the National Ambient Air Quality Standards (NAAQS) for CO. [BACT and Rule 62-4.070(3), F.A.C.]

SUBSECTION B: The following specific conditions apply to the following emissions units:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
076	NSPS Storage Tank – 36,000 Gallon Nominal Capacity

EMISSIONS UNITS DETAILS

Emissions Unit 076 is a stationary storage tank having an approximate capacity of 36,000 gallons. The tank is subject to specific recordkeeping requirements of 40 CFR 60 Subpart Kb. The tank will store and handle kerosene, a volatile organic liquid (VOL), for the LOX/Kerosene Rocket Engine Test Stand (E.U. ID No. 075).

{Permitting notes: The unit is classified as a new facility under the New Source Performance Standards (40 CFR 60 Subpart Kb) and subject to the recordkeeping requirement of 40 CFR 60 Subpart Kb.}

The following specific conditions apply to the emissions unit(s) listed above:

OPERATING RESTRICTIONS

B.1. **Permitted Tank Throughput:** The permittee shall not allow, cause, suffer, or permit the operation of Emissions Unit 076 in excess of 354,000 gallons throughput per year without prior authorization from the Permitting Authority. This annual throughput represents fuel volume consumed by 12 rocket tests plus 1 tank refill. [Rules 62-4.160(2), 62-210.200(228), 62-210.300, F.A.C.]

B.2. **Methods of Operation:** The permittee shall not allow, cause, suffer or permit any change in the method of operation of Emissions Unit 076 without prior authorization from the Permitting Authority. The authorized methods of operation include the following:

(i). VOL Type(s): The permittee is authorized to store and handle kerosene.

(ii). VOL Vapor Pressure: The permittee shall not store or handle any fuels within the units with a maximum true vapor pressure greater than 15.0 kPa (2.176 psi).

[Rules 62-4.160(2), 62-210.200(228), 62-210.300, F.A.C., 40 CFR 60.110b(c)]

B.3. **Hours of Operation:** The permittee is authorized to operate the units continuously.

[Rule 62-4.070(3), F.A.C.]

COMPLIANCE DEMONSTRATIONS AND PERIODIC MONITORING

B.4. **Compliance Demonstrations:** The permittee shall demonstrate compliance with the operating restriction of **Condition B.1.** based on record keeping as required by **Condition B.5.** of this permit. [Rule 62-297.310(7), F.A.C.]

B.5. **Records:** The permittee shall implement the following periodic monitoring requirements to ensure compliance with the Specific Conditions **B.1** and **B.2.** of this permit:

(i). Monthly Throughput: The permittee shall monitor and record the monthly throughput of volatile organic liquids through each tank.

(ii). Volatile Organic Liquid Types: The permittee shall monitor and record the type (Name and True Vapor Pressure at 80°F) of volatile organic liquids stored and handled in each tank.

[Rule 62-213.440(1)(b), F.A.C.]

New Source Performance Standards (NSPS)

{Permitting note: The unit is subject to the recordkeeping requirements of 40 CFR 60 Subpart Kb provided the permittee complies with the requirements of 40 CFR 60.110b, Applicability.}

B.6. 40 CFR 60 Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced after July 23, 1984: The permittee shall comply with the applicable requirements of 40 CFR 60 Subpart Kb contained in Appendix NSPS-Kb. Specifically:

(a) 40 CFR 60.110b, Applicability,

(b) 40 CFR 60.111b, Definitions,

(c) 40 CFR 60.116b, Monitoring of Operations

[40 CFR 60.40b(a), Rule 62-204.800(7)(b), F.A.C.]

APPENDIX BD - DETERMINATION OF

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

United Technologies Corp.- Pratt & Whitney
LOX/Kerosene Rocket Engine Stand Project
Palm Beach County

DEP File No. 0990021-004-AC
PSD-FL-294

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

August 31, 2001

United Technologies Corp. – Pratt & Whitney
LOX/Kerosene Rocket Engine Stand Project
Palm Beach County

United Technologies Corp.- Pratt & Whitney (UTC-P&W) proposes to construct a Liquid Oxygen (LOX)/Kerosene Rocket Engine Test Stand at the E-5 rocket test area located at 17900 Beeline Highway (SR 710) near Jupiter, Palm Beach County.

The proposed project will result in a significant emissions increase of carbon monoxide (CO) according to Table 212.400-2, Florida Administrative Code (F.A.C.). The project is therefore subject to review for Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rule 62-212.400, F.A.C.

The details of PSD applicability and a description of the process are presented in the separate Technical Evaluation and Preliminary Determination issued concurrently with this determination.

BACT DETERMINATION REQUESTED BY THE APPLICANT:

The applicant requested that the Department's BACT determination for CO emissions require no control equipment due to prohibitive cost and impracticability of controlling such a large exhaust stream. Instead, the applicant proposed that the BACT requirements focus on combustion control by way of adjusting the oxygen to fuel ratio to maximize combustion efficiency thus reducing CO emissions.

BACT DETERMINATION PROCEDURE:

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

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

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically infeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process

continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

Under 40 CFR Part 60 - Standards of Performance for New Stationary Sources (NSPS) there is no promulgated emission standard that applies to emissions from rocket engine test facilities.

Under 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP) there is a promulgated emission standard that applies to emissions from rocket engine test facilities. The Standard, 40 CFR Part 61, Subpart D applies specifically to Beryllium Rocket Motor Firing. It includes an emission standard based on a time-weighted atmospheric concentration of beryllium and a requirement to monitor ambient air concentrations to ensure compliance with the emission standard. The monitoring program requires prior approval from the Administrator.

Under 40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories, Rocket Engine Test Firing is a targeted source category. On December 8, 1998 the EPA workgroup working on this matter, distributed Information Collection Requests to the major companies (including OTC Pratt & Whitney) potentially affected by such a NESHAP. The Department's contacted Mr. Richard A. Copland, the project team leader at EPA. According to Mr. Copeland, (based on the information received) it appears at this time that there will be no controls due to the relatively short firing time, remote facility locations, costs, etc. EPA is still researching the matter so Mr. Copeland's assessment of the present situation is not considered as final.

BACT DETERMINATIONS BY EPA AND STATES:

The Department's review for any prior BACT determinations for emissions from rocket engine test facilities referred to in the RACT/BACT/LAER Clearinghouse identified the following:

- MS-0019, State of Mississippi, December 1990 BACT Determination for the National Aeronautics and Space Administration's (NASA) Stennis Space Center. The BACT determination required use of a deflector ramp to aid in dispersion and prevent scouring of soil and restrictions on meteorological conditions to prevent possible acid rain formation. Specific numerical limits were not established. The project was associated with the Advanced Solid Rocket Motor (ASRM). The project was later discontinued when Congress suspended funding.

OTHER INFORMATION AVAILABLE TO THE DEPARTMENT

The primary sources of information related to rocket engine test stands included the applicant's data, the MDEQ, and the NESHAP activities. These sources provided information on existing test stands, emissions, permitting requirements and control strategies.

The applicant provided estimates of emissions based on a fuel combustion model developed by NASA. Known as the NASA-Lewis chemical equilibrium computer program, emission estimates were provided by the applicant in supplemental information filed during the application completeness process. The NASA-Lewis chemical equilibrium computer program appears to be the primary source of most emission estimates for rocket engine test operations.

The Department contacted the Mississippi Department of Environmental Quality (MDEQ) regarding the 1990 BACT determination. MDEQ provided additional information as well as

identifying a current in-house project for the NASA Stennis Space Center. The project included the establishment of federally enforceable permit conditions on the facility's LOX/hydrocarbon rocket engine test stands. A copy of the draft permit (1000-00005) was provided to the Department for review. The enforceable conditions within the permit included the following:

- Emissions Limitations: PM (10,270 lb/test), PM_{10} (6,060 lb/test), SO_2 (2,520 lb/test), NO_X (2520 lb/test) CO (558,600 lb/test) and VOC (50 lb/test).
- Fuel Authorizations: Liquid Hydrogen (LH2)/Liquid Oxygen (LOX) and hydrocarbon fuels.
- Emission Estimates: NASA-Lewis chemical equilibrium computer program or an equivalent version.
- Records: For each test - the duration, the fuels and the calculated emission rates for PM, PM_{10}, SO_2, NO_X, CO, and VOC. Semiannual report showing number of tests per month, total emissions per month, and the highest lb/test emissions rate during the reporting period.

The Department is also aware of the other rocket engine test stands, however, the 1990 MDEQ PSD review is the only one that included a BACT determination and is thus the BACT "floor."

PROPOSED PROJECT AND EMISSIONS

The applicant proposes to construct and operate a LOX/Kerosene Rocket Engine Stand at its existing rocket test facility in Palm Beach County. The applicant also operates a gas turbine testing facility and a helicopter development facility at the existing site. This project will consist of liquid oxygen and fuel storage tanks (64,000 and 36,000 gallon capacities), an engine containment can, a water-cooled silencer, an exhaust gas deflector, a lined cooling water retention pond, and an elevated 1-million gallon water supply tank.

Emissions will be generated from combustion of fuel during 12 test firings per year lasting 240 seconds each. These emissions have been estimated according to the NASA combustion model as indicated next:

Pollutant	CO	CO_2	H_2	VOC	PM	SO_X	NO_X
lb/sec	694	1,366	17	2	1.6	<1	1
TPY	1,000	1,967	25	3	2.3	1.4	1.4

As indicated in the table above, the only regulated pollutant believed to be emitted in significant quantities is CO in the amount of 1,000 TPY. No estimates are given for HAPs. In any case, HAPs emissions are believed to be less than 10 TPY of any single HAP and less than 25 TPY of all HAPs combined.

BACT CONTROL OPTIONS

The applicant has requested that the Department's BACT determination for CO emissions require no add-on control equipment due to prohibitive cost and impracticability of controlling such a large exhaust stream. Instead, the applicant proposed that the BACT requirements focus on combustion control by way of adjusting the oxygen to fuel ratio to maximize combustion efficiency thus reducing CO emissions, limiting test duration to no longer than 240 seconds per test, and limiting testing to no more than 12 tests per year.

The applicant's BACT evaluation referred to a Russian rocket test stand that employed a water injection and ducting system solely for the purpose of avoiding heat detection by surveillance satellites during the Cold-War era. According to the applicant, the Russian test stand was not designed as an emission control system and should not be considered as any sort of exemplary emission control system. This is the only rocket test stand reported by the applicant that may be construed to have any add-on controls.

BACT DETERMINATION

If the BACT analysis is based on the transfer of CO oxidation technology from the gas turbine industry, differences in exhaust concentrations must be considered. Based on the modeled exhaust flow, the molar concentration of exhaust gases will be about 23% CO, 28% CO_2, 8% H_2 and 41% H_2O vapor. Kerosene rocket engines fire a fuel rich mixture for heat control flexibility, firing at approximately 82% of theoretical O_2 required for complete combustion. Consequently, CO emissions from engines of this type are very high compared to combustion turbines that rarely exceed 150-200 ppm CO even at medium loads.

Turbine exhaust oxidation technology applied to a rocket engine test stand will result in far greater costs. Estimates provided by the applicant indicate that a conventional incinerator would cost about $579,000,000 with an annualized cost of about $68,000,000. An additional $100,000,000 would be required, according to the applicant, to construct an appropriate infrastructure for a control device designed to withstand the maximum thrust and high temperatures of the rocket engine exhaust. The Department does not necessarily accept these figures, but agrees that actual figures can be many millions of dollars.

If a system could be designed to capture the rocket engine exhaust gases and convert the CO to CO_2 catalytically or by thermal oxidation, it would be massive (~ 60 ft. diameter) and have to withstand extreme temperatures and thrust pressures adding significantly to construction and operating costs. Cost effectiveness for catalytic oxidation of natural gas-fired turbine exhausts for the largest sizes of utility turbines ranges from $5,000 to over $8,000 per ton of CO removed. When scaled up for the extreme conditions of a rocket engine exhaust and the numerous uncertainties inherent in such a system, the overall cost effectiveness might exceed $100,000 per ton depending on the safety factors used in the design. Considering these uncertainties, the Department concludes that catalytic oxidation such as employed by turbines would not be practicable or cost-effective and neither would incineration.

Yet, it is conceivable that other means could be used for injecting oxygen into the exhaust gases to create conditions suitable for oxidation of much of the CO. An automobile emission control system with air injection is one example. Since this facility will emit at least 1,000 TPY CO, and since CO is a criteria air pollutant, the Department proposes that a study be done by the applicant

to evaluate the feasibility of direct O_2 injection into the gas stream downstream of the body of the engine. The study should employ kinetic modeling to determine the practicability and economic feasibility of adding the balance of stoichiometric oxygen required for complete combustion via direct injection at an appropriate point or points in the rocket engine exhaust. A period of one year is provided for completion of the study and submitting it to the Department.

The Department agrees with the applicant's finding that existing oxidation technology is not feasible at this time. As a result, the Department has determined BACT for the rocket engine test stand to be a visible emissions limitation of forty (40) percent opacity and the following work practices:

- Carbon Monoxide (CO) Emissions – Rocket engine test firings shall not result in CO emissions greater than 20.75 tons per minute (4-minute average), 83 tons per 8-hour period, and 1,000 tons per year (12-month rolling total) as determined using the NASA-Lewis chemical equilibrium computer program or equivalent method approved by the Department or the Palm Beach Public Health Department.
- Test Stand - The test stand shall be constructed in accordance with the conceptual design specifications provided within the application including a Water Cooled Silencer and an Exhaust Gas Deflector with an approximate height of 70 feet, an approximate distance from Water Cooled Silencer of 100 feet. The surface between the water-cooled silencer and the exhaust gas deflector shall be paved.
- Test Duration – Rocket engine test firings shall not exceed a total of 240 seconds per 8-hour period.
- Test Firings – Rocket engine test firings shall not exceed 2,880 seconds per year (12-month rolling total).
- Oxidant/Fuel Ratio – All rocket engine test firings shall be conducted at a minimum oxidant/fuel ratio of 2.72 lb O_2/lb of fuel (4 minute average).
- Fuel Usage – Rocket engine test firings shall not consume more than 6,625 gallons per minute (4-minute average), 26,500 gallons per 8-hour period, and 318,000 gallons per year (12-month rolling total).
- Quench Water - All rocket engine test firings shall be conducted with sufficient quench water to minimize NO_X formation.
- Fuel and Oxidizer Types - Rocket engine test firings shall be limited to the firing of kerosene as the fuel and liquid oxygen (LOX) as the oxidizer.
- Test Conditions – Rocket engine test firings shall be restricted to daylight hours (1 hour after sunrise and 1 hour prior to sunset) and only under ambient conditions that provide good dispersion of the exhaust gases in accordance with a Test Plan to be submitted to the Palm Beach County Health Department (PBCHD) for approval prior to the initial test. PBCHD may approve non-daylight hour testing on a case-by-case basis.

- Within 180 days of the issuance of this permit, the permittee shall develop a plan for an Oxygen Injection Study for review and approval by the Department. The permittee shall complete and submit to the Department an engineering and cost study evaluating the technical feasibility and cost effectiveness of direct O_2 injection for reducing CO emissions in the exhausts of rocket engines tested at the permittee's facility. The study shall be completed within one year of approval by the Department of the plan for the oxygen injection study.

COMPLIANCE REQUIREMENTS

- The permittee shall, prior to any rocket engine test firings, establish an ambient air quality monitoring program to measure ambient air concentrations of CO before, during, and after a rocket engine test firing. The program shall be approved by the Palm Beach County Health Department (PBCHD). It may be discontinued upon request and with approval of PBCHD following a minimum of four test firings.
- The permittee shall conduct a visible emissions compliance test during the initial rocket engine test firing and each subsequent test firing when a lower average oxidant/fuel ratio is used. Initial compliance with the CO emission limitations shall be demonstrated through compliance with the oxygen to fuel requirements and the ambient monitoring program described above.
- Excess emissions and excursions from test plan conditions shall be reported to PBCHD. Excess emissions parameters reported shall be limited to visible emissions (opacity) and shall be allowed provided the permittee demonstrates that the emissions did not result in a predicted ambient impact greater than the National Ambient Air Quality Standards (NAAQS) for CO.
- Additional compliance requirements are incorporated as conditions in the permit.

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

A. A. Linero, P.E. Administrator A A Linero 8/30
Bureau of Air Regulation
2600 Blair Stone Road, MS # 5505
Tallahassee, Florida 32399-2400
850/488-0114

Recommended By:

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

Date: 9/4/01

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date: 9/4/01

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

G.13 This permit also constitutes:

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

G.14 The permittee shall comply with the following:

a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c) Records of monitoring information shall include:

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

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

Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

[SOURCE: 52 FR 11429, Apr. 8, 1987, unless otherwise noted.]

§ 60.110b Applicability and designation of affected facility.

(a) Except as provided in paragraphs (b), (c), and (d) of this section, the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 40 cubic meters (m^3) that is used to store volatile organic liquids (VOL's) for which construction, reconstruction, or modification is commenced after July 23, 1984.

(b) Except as specified in paragraphs (a) and (b) of § 60.116b, storage vessels with design capacity less than 75 m^3 are exempt from the General Provisions (part 60, subpart A) and from the provisions of this subpart.

(c) Except as specified in paragraphs (a) and (b) of § 60.116b, vessels either with a capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure less than 3.5 kPa or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from the General Provisions (part 60, subpart A) and from the provisions of this subpart.

(d) This subpart does not apply to the following:

(1) Vessels at coke oven by-product plants.

(2) Pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

(3) Vessels permanently attached to mobile vehicles such as trucks, railcars, barges, or ships.

(4) Vessels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer.

(5) Vessels located at bulk gasoline plants.

(6) Storage vessels located at gasoline service stations.

(7) Vessels used to store beverage alcohol.

[52 FR 11429, Apr. 8, 1987, as amended at 54 FR 32973, Aug. 11, 1989]

§ 60.111b Definitions.

Terms used in this subpart are defined in the Act, in subpart A of this part, or in this subpart as follows:

(a) Bulk gasoline plant means any gasoline distribution facility that has a gasoline throughput less than or equal to 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under Federal requirement or Federal, State or local law, and discoverable by the Administrator and any other person.

(d) Fill means the introduction of VOL into a storage vessel but not necessarily to complete capacity.

(e) Gasoline service station means any site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage tanks.

(f) Maximum true vapor pressure means the equilibrium partial pressure exerted by the stored VOL at the temperature equal to the highest calendar-month average of the VOL storage temperature for VOL's stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the National Weather Service for VOL's stored at the ambient temperature, as determined:

(1) In accordance with methods described in American Petroleum institute Bulletin 2517, Evaporation Loss From External Floating Roof Tanks, (incorporated by reference—see § 60.17); or

(2) As obtained from standard reference texts; or

(3) As determined by ASTM Method D2879–83 (incorporated by reference-see § 60.17);

(4) Any other method approved by the Administrator.

(g) Reid vapor pressure means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases, as determined by ASTM D323–82 (incorporated by reference—see § 60.17).

(h) Petroleum means the crude oil re-moved from the earth and the oils derived from tar sands, shale, and coal.

(i) Petroleum liquids means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery.

(j) Storage vessel means each tank, reservoir, or container used for the storage of volatile organic liquids but does not include:

(1) Frames, housing, auxiliary supports, or other components that are not directly involved in the containment of liquids or vapors; or

(2) Subsurface caverns or porous rock reservoirs.

(k) Volatile organic liquid (VOL) means any organic liquid which can emit volatile organic compounds into the atmosphere except those VOL's that emit only those compounds which the Administrator has determined do not contribute appreciably to the formation of ozone. These compounds are identified in EPA statements on ozone abatement policy for SIP revisions (42 FR 35314, 44 FR 32042, 45 FR 32424, and 45 FR 48941).

(l) Waste means any liquid resulting from industrial, commercial, mining or agricultural operations, or from community activities that is discarded or is being accumulated, stored, or physically, chemically, or biologically treated prior to being discarded or recycled.

[52 FR 11429, Apr. 8, 1987, as amended at 54 FR 32973, Aug. 11, 1989]

§ 60.112b Standard for volatile organic compounds (VOC).

§ 60.113b Testing and procedures.

§ 60.114b Alternative means of emission limitation.

§ 60.115b Reporting and recordkeeping requirements.

§ 60.116b Monitoring of operations.

(a) The owner or operator shall keep copies of all records required by this section, except for the record required by paragraph (b) of this section, for at least 2 years. The record required by paragraph (b) of this section will be kept for the life of the source.

(b) The owner or operator of each storage vessel as specified in § 60.110b(a) shall keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. Each storage vessel with a design capacity less than 75 m 3 is subject to no provision of this subpart other than those required by this paragraph.

(c) Except as provided in paragraphs (f) and (g) of this section, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 3.5 kPa or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 15.0 kPa shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period.

(d) Except as provided in paragraph (g) of this section, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 5.2 kPa or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa shall notify the Administrator within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range.

(e) Available data on the storage temperature may be used to determine the maximum true vapor pressure as determined below.

(1) For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar-month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the National Weather Service.

(2) For crude oil or refined petroleum products the vapor pressure may be obtained by the following:

(i) Available data on the Reid vapor pressure and the maximum expected storage temperature based on the highest expected calendar-month average temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517 (incorporated by reference-see § 60.17), unless the Administrator specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).

(ii) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa or with physical properties that preclude determination by the recommended method is to be determined from available data and recorded if the estimated maximum true vapor pressure is greater than 3.5 kPa.

(3) For other liquids, the vapor pressure:

(i) May be obtained from standard reference texts, or

(ii) Determined by ASTM Method D2879–83 (incorporated by reference-see § 60.17); or

(iii) Measured by an appropriate method approved by the Administrator; or

(iv) Calculated by an appropriate method approved by the Administrator.

§ 60.117b Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 111(c) of the Act, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities which will not be delegated to States: §§ 60.111b(f)(4), 60.114b, 60.116b(e)(3)(iii), 60.116b(e)(3)(iv), and 60.116b(f)(2)(iii).

[52 FR 11429, Apr. 8, 1987, as amended at 52 FR 22780, June 16, 1987]

Memorandum

Florida Department of Environmental Protection

AC

TO: Howard Rhodes

THROUGH: Clair Fancy

FROM: A. A. Linero 8/30

DATE: August 30, 2001

SUBJECT: United Technologies Corp.-Pratt & Whitney
DEP File No. 0990021-004-AC (PSD-FL-294)
LOX/Kerosene Rocket Engine Test Stand

Attached for your review and approval is the final permit for the construction of a LOX/Kerosene Rocket Engine Test Stand at the subject facility near in Palm Beach County.

They will conduct 12 tests per year lasting 240 seconds each. The project is a major source of carbon monoxide (~ 1000 tons per year). CO emissions will be reduced by a high oxygen to fuel ratio. The water quenching to reduce noise should also minimize NOx formation.

They will conduct testing in daylight hours and gather ambient data on CO during test firing to verify modeled CO concentrations.

Based on extension requests submitted by Pratt & Whitney as well as the date we received proof of Pubic Notice, I calculate Day 90 as September 15. I recommend your approval and signature.

AAL/