

**Space Propulsion**

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



**Pratt & Whitney**

A United Technologies Company

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January 31, 2003

Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Attention: Mr. Alvaro Linero

RE: PRATT & WHITNEY-LOX-KEROSENE ROCKET ENGINE  
DEP FILE NO. 0990021-004-AC (PSD-FL-294)  
Proposed Oxygen Injection Study Plan

RECEIVED

FEB 05 2003

BUREAU OF AIR REGULATION

Dear Mr. Linero,

Please find attached a proposed plan for an Oxygen Injection Study for the LOX/Kerosene Rocket Engine Test Stand.

This plan is submitted for FDEP review and approval in compliance with Section III, Condition A.2 of the revised construction permit.

The purpose of this plan is for "evaluating the technical feasibility and cost effectiveness of direct O2 injection for reducing CO emissions in the exhausts of rocket engines tested at permittee's facility." It is not a plan or proposal to implement any control devices for Pratt & Whitney's engine testing.

**Background:**

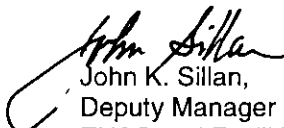
Pratt & Whitney requested a construction permit extension because changes in business and economic conditions impacted the feasibility of this new test stand and put its future in question. FDEP issued an extension in case these conditions improve. At this time, Pratt & Whitney is still uncertain whether this new rocket test stand will be built and is continuing to evaluate options.

In the interim, submittal of this oxygen injection study plan will maintain the construction permit in effect in the event that the new rocket test stand will be built eventually.

Should Pratt & Whitney decide that the new rocket test stand will not be constructed, Pratt & Whitney will notify FDEP to request the cancellation of this construction permit. Any work on the oxygen injection study would also be discontinued at that time.

Please contact Dean Gee @ 561-796-2108 if you have any questions.

Best regards,

  
John K. Sillan,  
Deputy Manager  
EH&S and Facilities

Enclosure: Proposed Plan for Oxygen Injection Study

Cc:

Palm Beach County Health Dept.  
Air Pollution Control Section  
Attn: Selva Selvendran  
POBox 29 (901 Evernia St.)  
West Palm Beach, FL 33402-0029

File: B.4.3.2.2

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Proposed Plan for Oxygen Injection Study to Control CO Emissions  
From LOX/Kerosene RD180 Rocket Tests  
Pratt & Whitney – West Palm Beach  
Title V Permit # 099-0021-002 -AV

### **Background:**

This proposed plan is submitted for FDEP review and approval in compliance with Section III, Condition A.2 of revised construction permit issued for the LOX/Kerosene Rocket Engine Stand. FDEP requires that this oxygen injection study must be completed within 1 year of FDEP's approval of this plan.

Pratt & Whitney has not begun construction of the new stand nor determined if it will be built yet. In the interim, submittal of this oxygen injection study plan will maintain the construction permit in effect in the event that the new rocket test stand will be built eventually.

Should Pratt & Whitney determine that the new rocket test stand is not needed and will not be constructed, Pratt & Whitney will notify FDEP and request the cancellation of this construction permit. This study would also be discontinued.

### **Proposed Plan:**

This Oxygen Injection Study plan is required by the construction permit issued by FDEP for a LOX/Kerosene test stand. The purpose of this plan is for "evaluating the technical feasibility and cost effectiveness of direct O<sub>2</sub> injection for reducing CO emissions in the exhausts of rocket engines tested at permittee's facility." It is not a plan or proposal to implement any control devices for Pratt & Whitney's engine testing. It is a "white paper" for discussion purposes and not a plan for implementation.

The main features of the Oxygen Injection Study plan are described below:

1. Review the current status of Best Available Control Technology for reducing CO emissions as applied to large combustion sources of similar operating duration and thrust (i.e., other LOX/kerosene fueled rocket testing applications).
2. Evaluate the combustion dynamics, combustion efficiency, and the stoichiometry of RD180 rocket engine CO emissions formation and potential control during testing.
3. Determine the mass of oxygen required to convert remaining CO to CO<sub>2</sub>.

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4. Determine potential methods of adding or injecting additional oxygen to achieve more complete combustion for CO as an "end of pipe" control method.
5. Develop conceptual design of most feasible method(s) of adding oxygen.
6. Develop order of magnitude costs for the oxygen injection method(s).
7. Evaluate the costs, benefits, safety, and environmental aspects to determine the technical and economic feasibility for oxygen injection to control CO emissions from RD180 testing.
8. It is proposed that one draft of the study will be submitted to FDEP for comments before submittal of the final report.