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ORC - 3262
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2 April 1962

MEMORANDUM FOR : The Record

SUBJECT : Review - ORCART Engine Program
Status at Pratt & Whitney, Hartford

1. Pratt & Whitney, Hartford was visited 28 March 1962 for subject review.

2. Delivery Engine Program

(a) The first delivery engine (YD-1) scheduled for June 1962 delivery is now 30% assembled and targeted for initial (green run) test on 15 April 1962. With the exception of certain control components and plumbing all hardware for this engine is visible in various stages of processing.

(b) Of the approximate total bill of material of 2900 parts per engine, shortages against engine YD-1 stood at 696 on 14 February 1962. On 28 March 1962 this same figure stands at 357. Of these 357 shortages, 355 are on schedule for the 15 April build completion date. The following items are felt to be pacing:

(1) Main Fuel Control - scheduled for delivery 26 April 1962.

(2) Afterburner Fuel Control - scheduled for delivery 19 April 1962.

The above two production items will not delay initial test as experimental units are available. The question is will they be available in a flightworthy condition for final test?

(3) Hydraulic Pump - although this unit has been delivered, because of the concurrency of endurance testing, will a final flightworthy configuration incorporating latest engineering changes be available for final test? Also, will the presently delivered unit be good enough for initial test?

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(4) Plumbing - 185 of the 357 parts scheduled for delivery prior to 15 April constitute plumbing. Fear is expressed that because of late engineering changes, difficulty may be experienced in assembling to the engine. Plumbing is usually a pacing item during final assembly and may be more so with the JT11 engine because of the completely "hard" configuration required for high temperature operation.

(c) Hardware for subsequent engines is visible in various stages of processing.

(d) It is intended that a system of weekly engine status reports be initiated after engine Y-1 has completed initial test.

(e) Barring the pacing items listed above and providing that the concurrent engine development program does not dictate excessive engineering changes, chances of meeting initial engine deliveries are good. This, of course, does not mean that these engines will be flightworthy. Flightworthiness depends upon the development program in Florida.

2. Hydraulic Pump Lubricity Additive:

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Since the writer's visit with [redacted] Director - Fuels and Oils Research, Pratt & Whitney, on 14 February 1962, progress has been made in the search for a lubricity additive to relieve hydraulic pump duress. Laboratory testing of the interim additive grade 1100 lubricating oil indicates a 400% increase in load carrying capability with the presence of 3% additive in fuel over that with fuel alone. This is still short of the desired target, and further, the presence of 3% 1100 oil has a deleterious effect on fuel thermal stability and heating value. This 1100 oil therefore is an interim fix only.

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Presently [redacted] in the search for a suitable production additive. This program should provide dividend benefits to the main and afterburner fuel controls in terms of seizure relief.

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3. Fuel

Difficulties heretofore experienced in initiating and maintaining refinery interest in the non-remunerative development of FWA-523 fuel in the face of the uneconomically small volume requirements for the GECART programs are becoming critical. Without West Coast fuel requirements, the [redacted] facility of [redacted] will soon be closed to FWA-523 production. Without an immediate Hartford requirement (hopefully imminent) [redacted] may be required to abandon FWA-523 production altogether.

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In view of the advantages to be gained by GECART and other similar programs in terms of continued fuel development and geographical location of facilities, it would appear prudent that consideration be given to the purchase of additional quantities of FWA-523 fuel by the Government over and above that required for GECART alone to assure continued industry participation and to gain additional production, handling, and transportation experience. Barring USAF regulatory limitations heretofore experienced, this fuel could be used in many present USAF applications.

4. J711 Altitude Test Facility

One engine test stand at the Willgoos Facility is capable of testing the J711 engine at mission environmental conditions of Mach 3.0 at 80,000 feet. This stand is used for short engineering calibration runs rather than the longer 50 hour and up endurance runs. The stand itself is physically capable of endurance, however, the overall facility was not sized with this in mind. Operation of this stand at Mach 3 conditions requires 66% of the entire Willgoos inlet air and nozzle exhaust capability. To run continuous mission endurance therefore would require a priority sufficient to allow deactivation of much of the facility. In December 1961, other programs reportedly using the Willgoos Facility were TF33 (B-52); TF33 (C-141); J730 (DC-8, B-707, B-720); J780 (B-727); J-75 (F-106, F-105); J74 (DC-8, B-707); J730 (B-707); TF30 (TF1); J60 (C-140, T-39); and J52 (A2F, GAH-77).

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