

Commanding General,
AAF Materiel Command,
Reference: Dept. 57.
Wright Field, Dayton, Ohio.

Capt. John Duckworth
1hb:57. Ext. 3-0227

24 JUN 1944

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Test Program for Nominal Grades 94/114 and
100/150 Fuels. Twenty-eighth Progress Report.

Commanding General,
Army Air Forces,
Washington 25, D. C.

Att: AC/AS-M.M. & D. - Lt. Col. G. D. Gasser.

1. In conformance with your verbal request, the following information is the twenty-eighth progress report on action being taken in compliance with teletypes AFDMA-1-318 dated 8 December 1943, AFDMA-2E-473 dated 9 December 1943 and AFDMA-2E-1089 dated 4 March 1944, and in conformance with OTI-1509 dated 7 December 1943, Addendums 1, 2 and 3, dated 13 December 1943, 21 February 1944 and 7 March 1944, respectively, which have been issued to cover this work.

2. P-47D Airplane Performance Tests at 70 In. Hg. Manifold Pressure.- The P-47D airplane has been released for 70 In. Hg. MAP using Grade 100/150 fuel with water injection, (No. 13 water jet). Operating instructions are being worked out for operation at this power level. These instructions will be carried to the applicable theatre of war by Captain B. S. Bailey, Materiel Command representative. Also, copies of these instructions will be forwarded to your office. Release of operation at this power level was forwarded to your office by teletype, ENG-7749, dated 22 June 1944, a copy of which is included herewith.

3. Installation of Equipment on B-29 Airplane at Clovis Army Air Field.- Information was received from Captain Wm. W. Horstman, Materiel Command representative, that B-29 fuel test airplanes at Clovis are out of commission at the present time due to necessary engine changes. These engines had each accumulated approximately 170 hours operation and since the average engine time before overhaul appears to be about 200 hours at Clovis, engine changes are being made prior to the range tests planned on B-29 airplanes. It is estimated that approximately 30 days will be required to effect engine change and therefore range tests will be delayed for that length of time. Detonation detection equipment appeared to be operating satisfactorily prior to engine change and complete change of detonation detection equipment will not be required.

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4. Fuel Tests on B-24 Airplane at Hamilton Field.- No further report has been received on this portion of the project since last progress report.

5. Flight Service Tests on P-51B Airplanes using V-1650-3 Engines.- P-51B airplane, AAF #43-12136, with V-1650-3 engine, has accumulated 8 hours slow time on 44-1 fuel, at Vandalia. P-51B airplane, AAF #43-688E, is in the final stages of engine installation and should be flying by 26 June 1944.

6. Spark Plug Fouling Tests.- As stated in the 27th progress report, spark plug fouling tests are being conducted on a V-1710 engine. Subsequent to that report, two additional cycles have been run in an attempt to further evaluate the effect of additional bromine in the tetraethyl lead. The test cycle is an attempt to simulate a "sortie" which consists of warm-up, taxi, take-off, land, taxi and idle. The above schedule is of three hours duration and was proposed by the British as being conducive to spark plug fouling. The first run made following this schedule was with fuel 28-R, to which had been added additional ethylene dibromide to bring the amount to 1.5 x the theoretical amount necessary to properly scavenge lead compounds from the engine. This run resulted in exceptionally clean spark plugs but since no base line had been established using fuel containing lead with normal amount of ethylene dibromide, a second run was made to establish this base line. The second run resulted in clean spark plugs, not significantly different from the previous test. From this it would appear that the simulated "sortie" is not particularly conducive to spark plug fouling. However, this engine had accumulated approximately 45 hours previously on fuel containing a high content of ethylene dibromide and there is a possibility that the entire engine contained very little lead deposits and that a test of 3 hours duration would not immediately show spark plug fouling, such test being on fuel containing a normal amount of ethylene dibromide. In view of the above, a third test is being run using simulated "sortie" schedule with 28-R fuel containing a normal amount of ethylene dibromide. This test is expected to be completed 24 June 1944. If results of this test show no significant amount of spark plug fouling, further testing will be made on the 15-hour test schedule as described in the 27th progress report. The P-51B airplane is being tested on a 6-hour flight schedule using PPF 44-1 containing 1.5 theoretical amount of ethylene dibromide. This 6-hour schedule on the P-51B airplane has resulted in fairly consistent spark plug fouling. It is expected that this flight will be completed 24 June 1944. It is planned to continue this type of testing and to attempt to secure a bracket on the effect of ethylene dibromide by using tetraethyl lead with no ethylene dibromide present. It is also planned to conduct some tests using ethylene dichloride in lieu of ethylene dibromide, since if increased amounts of

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of halogen compounds would reduce spark plug fouling, comparative information between bromine and chlorine should be known, in view of the fact that additional amounts of bromine are not readily available.

7. Installation of Detonation Detection Equipment at Douglas and at Eglin Field.- No further report has been received regarding the C-54A-1 airplane at Douglas since the last progress report. At Eglin Field, the following work has been accomplished:

- a. P-63A airplane, AAF #42-68929 - Instrumentation has been completed and ground checked. Flight test was scheduled to begin 21 June 1944.
- b. P-51D-5 airplane, AAF #44-13254 - Installation of detonation detection equipment has been completed but additional airplane work is necessary before ground check and flight check can be made.
- c. P-38J-15 airplane, AAF #43-28449 - Installation of detonation detection equipment was proceeding and should have been completed by 23rd June 1944. This aircraft also requires additional airplane work before it is ready for ground and flight check.

8. Tests on B-29 Airplane at Boeing.- No further fuel test reports are available regarding the XB-29 airplane. Boeing has received test program on further work on both the B-29 and the B-17F airplanes.

For the Commanding General:

JON H. OBER
Captain, Air Corps
Asst. Technical Executive

T. A. SIMS
Colonel, Air Corps
Deputy Chief of Staff

1 Incl. Cy. Teletype ENG-7749 dated 22 June 1944.

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