Shuttle

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

REPLY TO ATTN OF: RS

June 14, 1973

MEMORANDUM

TO: RD-P/Deputy Associate Administrator (Programs)
Office of Aeronautics and Space Technology

FROM: RS/Director, Manned Space Technology Office

SUBJECT: Summary of Actions related to potential use of Plum Brook Facilities by OMSF Programs for the period between April 9 and June 7, 1973

REF: Ltr from K. Strass to W. Hayes, subj: Review and Analysis of OMSF Test Planning to Identify Potential Programs Suitable for Performance at the Plum Brook Facility, dtd April 5, 1973

On April 16, the undersigned visited the Plum Brook Station for a first-hand inspection of facilities. Contacts were:

Mr. G. Hennings, Chief, Spacecraft Propulsion Division

Mr. D. H. Reilly, Chief, Space Power Facility Division

Dr. J. V. Dugan, Physicist Cryophysics Branch, on special assignment by the Director, LeRC

Several facilities were inspected including the Hypersonic Engine Test Facility, the Spacecraft Propulsion Facility (B-2), and the Space Power Facility (SPF). After extensive discussion, it was determined that both the B-2 and SPF had a capability for testing elements of the shuttle, tug, and payloads if needed.

During the period between April 16 and May 28, several meetings were held with OMSF personnel including Mr. C. J. Donlan, Deputy Associate Administrator (Technical), and Mr. W. A. Summerfelt, Director, Shuttle Engineering

to discuss the most appropriate way to conduct an analysis of possible shuttle and tug requirements for the use of Plum Brook.

On May 16 the undersigned visited the Lewis Research Center to discuss the requirements for propulsion systems tests for the interim and all-up tug. Contacts were:

Mr. H. W. Douglass, Chief, Chemical Propulsion Division

Mr. J. W. Gregory, Head, Propulsion Systems Branch

Dr. J. V. Dugan, Physicist, Cryophysics Branch

Because of the preliminary status of the tug no specific requirements for tug testing have been defined; however, Mr. Gregory will generate typical requirements and Plum Brook personnel will develop a responsive test plan and schedule. This information will provide an assessment of potential requirements for both the B-2 and the SPF. A review of this activity will be held at LeRC on June 18.

On June 6, Messrs. G. Hennings and D. H. Reilly of Plum Brook Station, Dr. J. V. Dugan, LeRC, and the undersigned visited the Johnson Space Center to discuss Shuttle testing requirements. Contacts were:

Mr. J. G. Thibodaux, Chief, Propulsion and Power Division

Mr. W. Karakulko, Auxiliary Propulsion and Pyrotechnics Branch

Mr. J. D. Norris, Primary Propulsion Branch

Mr. C. E. Humphries, Primary Propulsion Branch

Mr. H. O. Pohl, Chief, Auxiliary Propulsion and Pyrotechnics Branch

Mr. C. W. Yodzis, Chief, Primary Propulsion Branch

Mr. Z. D. Kirkland Head, Systems Analysis Section, Primary Propulsion Branch

Mr. D. G. Stafford, Primary Propulsion Branch

Mr. R. R. Tillett, Supervisor, Aerospace Engineering, White Sands Test Facility

Messrs. Henning and Reilly described the facilities at the Plum Brook Station and Mr. Tillett described those at White Sands. Mr. Thibodaux made the following observations concerning shuttle propulsion systems tests.

a. The Shuttle orbiter main engine will be tested only at atmospheric pressure since firing will be initiated at launch. No vacuum testing facilities will be required.

b. The OMS engine tests will need the 40-minute run time available at White Sands as opposed to 15-minutes at Plum Brook. White Sands can test an entire engine plus fuel tanks and cargo bay kit with additional propellants. Some small modification would be required to handle the storable propellants at Plum Brook.

c. Shuttle ACPS testing generally will be less extensive than for Apollo.

d. Technology program tests will begin during the week of June 10 at White Sands while systems tests are scheduled for mid-1975, and design certification for mid-1976.

e. White Sands currently employs only about 50 Civil Service and 150 Support Service contractor personnel to operate facilities. Minimum modifications to these facilities are planned only to reduce operating costs further.

f. The relationship between JSC and WSTF management is excellent and they form a highly effective experienced team within easy access.

On June 7, Messrs. Hennings and Reilly, Dr. Dugan, and the undersigned met with Mr. R. F. Thompson, Manager of the Shuttle Program, for a general discussion of shuttle testing. Mr. Thompson confirmed Mr. Thibodaux's statements and emphasized the thrust toward reduced testing wherever safety permits.

In conclusion, there seem to be no obvious engineering or economic advantages which accrue to use of Plum Brook for either OMS or ACPS testing.

Messrs. Hennings and Reilly and Dr. Dugan remained at JSC for further discussions with Mr. A. C. Bond, Assistant Director for Chemical and Mechanical Systems, concerning

the use of the SPF as a facility to complement SESL for thermal vacuum testing of shuttle and sortie lab components. This will be reported in detail by Dr. Dugan.

William C. Hayes, Jr.

cc:

RD-M/E. Kilgore
MD-T/C. Donlan
MH/M. Malkin
JSC/R. F. Thompson (LA)

bcc:

Mr. Strass(RF)
J.G. Thibodaux (JSC)
J. Dugan (LeRC)