

Cleveland, Ohio
Date OCT 29 1946

A40574
X 74 ✓

From Cleveland
To NACA

Subject: **Transmittal of memorandum dated October 29, 1946
regarding NACA work on Nuclear Energy Power
Plants for Aircraft.**

Reference:

Please take the action indicated below:

- A Advise status.
- XX** B For your information, proper action, and files.
- C For reply by your office.
- D Forward (on loan) (for our files).
- E Translate for laboratory files.
- XX** F There (~~is~~) (are) transmitted herewith the following:
- G The following visited the laboratory on dates given:
- H Hold for further information.
- I Copy of this letter enclosed with shipment.
- J Advise whether order will be placed soon.
- K Return catalogs and literature furnished by low bidder.
- L Return samples submitted with letter of award.
- M Send catalog and price list applying to general schedule.

Remarks: **Original and two copies of subject memorandum.**

EDWARD R. SHARP

Edward R. Sharp,
Manager.

ac

Enc*

**RETURN TO MAIL
ADMINISTRATIVE FILES**

*Taken to Washington by
A.M. Rothrock 10-29-46.
ac*

C.1



[REDACTED]

NACA - Cleveland

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A40574
Cleveland, Ohio,
October 29, 1946.

MEMORANDUM For Director of Aeronautical Research.

Subject: NACA work on Nuclear Energy Power Plants for Aircraft

- References: (a) Memo. for Director of Aeronautical Research,
Mar. 15, 1946, RFS:rhk Encs*
(b) Cleveland let. to NACA, Sept. 6, 1946, JRD:raw/jhg
BP RFS AMR Encs*
(c) Memo. for Manager, Sept. 21, 1946, RFS:jhg Encs*

1. A summary statement of the activities of the Nuclear Energy Committee at this Laboratory was transmitted last March 15, reference (a), for the information of the Director of Aeronautical Research. At that time it did not appear desirable, in view of the Nuclear Energy Committee's limited information, to recommend specific nuclear energy work by the NACA. As a consequence, the recommendations submitted were limited to interim proposals which would advance the NACA position in the field of nuclear energy as rapidly as possible.

2. Further consideration of this problem of nuclear energy application to aircraft in the light of more recent information has permitted a more realistic evaluation of the role which the NACA can play in this important field. Immediate research on high temperature heat transfer and on materials can be undertaken as soon as personnel and some special equipment can be provided. Budget estimates to implement this immediate research, procurement of 65 personnel, personnel training, special travel funds, and support for University research projects have been submitted in reference (b) for inclusion in the Budget for fiscal year 1948. The character and limited scope of this immediate research program was discussed with Dr. Farrington Daniels during his visit to the Cleveland Laboratory on October 27, 1946 and received his vocal endorsement.

3. If this program is supported as recommended, it is our conviction that NACA experimental research on a nuclear energy pile can begin within two to six years. Once started, it should be possible to extend this research to include power piles (designed for eventual application to aircraft) within an additional two to three years. Estimates supporting this initial development of experimental research facilities were submitted in reference (c), a copy of which I left with Mr. Robinson on September 24. This proposal showed a tentative construction program costing about \$54,000,000 by 1957. The estimated research staff (exclusive of all administrative and service groups) would amount to 390 professionals at the end of this last construction phase, provided the country remains at peace. A breakdown of these personnel in terms of the research projects that can be foreseen at this time was also included.

[REDACTED]

4. The reference (c) material was assembled on the basis that the Nuclear Energy Aircraft Propulsion Laboratory would be an independent research facility in an isolated region. Adequate machine shop and chemical facilities would have to be provided under these circumstances. The construction costs were based upon the expected rates applicable at the present time. The building designs should be such that continual modernization is possible. Any power piles will require frequent rebuilding as these must meet development as well as research requirements. The piles for shielding research, nuclear reaction research, and materials research would constitute the fundamental research portion of the project and the power piles the applied research or development portion of the project.

5. The Nuclear Energy Aircraft Propulsion Laboratory proposal does not duplicate any research facilities in existing or proposed NACA laboratories. Its sole objective is the development of a power plant pile for aircraft. Once this is accomplished, research on a complete power plant is obviously in order, but research on all other power plant components belongs elsewhere. Large compressed air requirements are anticipated particularly for a nuclear energy ram jet. The power requirements for this project might well approach 400,000 h.p. These units cannot be scaled down in physical size below some minimum value because of nuclear considerations. In other words, the pile portion of the ram jet must be investigated full size or not at all. With other types of power plants the pile size must also exceed some minimum value but the power output per unit volume can be more moderate.

6. Our recent conference with Dr. Daniels has been most helpful in crystallizing our conviction that nuclear energy is a potential means of aircraft propulsion. He was careful to point out the health hazards involved and the necessity for adequate shields. In spite of these difficulties, he seemed agreeable to the idea that work on a power pile for aircraft should be undertaken as early as facilities and personnel can be provided. Given adequate personnel, he saw no reason why design work on such piles should not be started within two or three years.

EDWARD R. SHARP

Edward R. Sharp,
Manager.

RFS:ao
ERS

Cleveland, Ohio,
October 29, 1946.

MEMORANDUM For Director of Aeronautical Research.

Subject: NACA work on Nuclear Energy Power Plants for Aircraft

References: (a) Memo. for Director of Aeronautical Research,
Mar. 15, 1946, RFS:rhk Encs*
(b) Cleveland let. to NACA, Sept. 6, 1946, JRD:raw/jhg A-3765
BP RFS AMR Encs*
(c) Memo. for Manager, Sept. 21, 1946, RFS:jhg Encs*

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RETURN TO
ADDRESS

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