[redacted] Cop... 1 ... 23 Series B ... 7 pages

GENERAL ADVISORY COMMITTEE
to the
U. S. ATOMIC ENERGY COMMISSION
Washington 25, D. C.

73454

DELETED VERSION ONLY

June 3, 1954

AUTHEN... June 3 1954
U. S. ATO...
BY: ...
DOCUMENT NO. ...

Mr. Lewis L. Strauss, Chairman
U. S. Atomic Energy Commission
Washington 25, D. C.

DELETED VERSION ONLY

Dear Mr. Strauss:

Herewith is the summary report of the 40th Meeting of the General Advisory Committee, held in Washington on May 27, 28, and 29, 1954.

All members with the exception of Dr. Libby were in attendance. Dr. Libby was unavoidably absent since he was out of the country.

We wish to thank the Commission and its staff for their cooperation in supplying background information for the subjects to be considered. We particularly wish to thank the Division of Military Application for providing for the presence of Drs. Graves, Mark, and York, who greatly aided our deliberations in the presentation of the results of the CASTLE tests, and the tentative programs of the weapons laboratories for the future. Our discussions were greatly helped by the attendance of Gen. Luedecke, Dr. Scoville, Col. Kaesser, and Capt. Maynard of the AFSWP, and Dr. Machta of the Weather Bureau, who gave us much valuable information in regard to radioactive fall-out under various conditions of weather and height of burst.

CLASSIFICATION CANCELLED
WITH DELETIONS
BY AUTHORITY OF DOE/OC

Herewith are our recommendations:

1. Materials Testing Accelerator Program. In our discussions with the Division of Reactor Development, and from a very able presentation of Mr. W. K. Davis, we came to the conclusion that there exists no demand for MTA from either the Production Division or the Reactor Development Division. Neither of these Divisions foresees MTA as an important and economical tool for increasing the amounts of fissionable material.

This circumstance made us consider the MTA program as a program for the Research Division. The Committee was of the opinion that on this basis it could not recommend that we go forward with the MTA program as a part of our research efforts.

[redacted]

28

6-3-54

2. Aircraft Nuclear Propulsion Program. The Committee had an excellent briefing on this subject from Gen. Keirn, Col. Wassell, and Col. Krisberg.

The Committee was favorably impressed by the plan to marry the ORNL-Pratt & Whitney programs for the so-called "fireball" propulsion mechanism, which would provide atomic power for cruising and chemical power for the take-off, and both chemical and atomic power for the run over the target. Two other possibilities were suggested in the discussion. They included a General Electric device, and another proposal made by the Nuclear Development Associates. The Committee did not learn enough about these proposals to form any opinion.

However, we suggest that a study be made of the program as a whole in regard to unnecessary duplication, and the sharpening of objectives to prevent the program from going off into too many directions. These reservations should not be construed to suggest a delay in the combined ORNL-Pratt & Whitney program.

3. Cost of fabrication of fuel elements. Mr. Davis presented the question to us of whether we had any suggestions for reducing the cost of fabrication of fuel elements for reactors, particularly in the Pressurized Water Reactor.

While the Committee has no positive suggestion to make, the question arose in our discussion whether we have not been paying too much attention in our reactor designs to reducing the amounts of fissionable material for loading at the price of high cost for fabrication of fuel elements and other parts of the structure, and whether an important reduction in overall costs could be effected as a result of the application of less stringent tolerances in fabrication. The greater availability of fissionable material makes this line of development more promising than it had been in the past.

4. Scientific conference in support of the President's plan for an international pool of fissionable material. This subject was discussed at great length by the Committee without reaching a unanimous conclusion.

Since the Commission had the opportunity of hearing the opinion of each member of the Committee, I shall not try to make any summary in this report. The various suggestions will be available in the Minutes of the Meeting.

[redacted]

5. Successor to Dr. James G. Beckerley. The Committee discussed a request of the Commission and General Manager for suggestions of the names of individuals who could succeed Dr. Beckerley as the Director of the Office of Classification.

The Committee, as such, did not make any single recommendation. However, individual members had certain suggestions which have already been transmitted orally to the General Manager. In general, the Committee was of the opinion that it would be wise to obtain the services of an individual already in the Commission organization, whether directly employed, or in a Commission laboratory or facility. It was the opinion of the Committee that such a policy of selection could obtain the services of very capable people, and make for closer connection between the Washington offices and the field.

6. Pricing of fissionable material. The Committee has studied the paper, "Plan for an accelerated reactor development program" (AEC 152/49), and finds it is in warm agreement with the general direction of policy which is therein outlined.

7. Accelerators. The Committee wishes to approve the desire of the Division of Research to support the Argonne National Laboratory in its proposed study of a high energy accelerator to be constructed sometime in the future.

The Committee also wishes to suggest to the Commission that the cooperation of the Midwestern scientists who are interested in high energy research be sought for the design of this machine.

8. CASTLE tests. The Committee wishes to express its highest admiration for the excellent job which was done by the personnel who carried out the CASTLE series of tests of thermonuclear weapons. It was most successful in spite of great difficulties incident to carrying out exact measurements at a remote base under very restrictive weather conditions.

The Committee naturally is very highly gratified with the results of these tests which have not only increased the power of our weapons, but opened very promising avenues of research and development for the future. In this connection, we wish to approve the suggested plan of the Commission to obtain a Presidential citation for the superb performance of the Los Alamos Scientific Laboratory.

[redacted]

9. "Fall-out" problems in the employment of thermonuclear and fission weapons. This Committee has long been concerned with the question of the deposition of radioactive products which result from nuclear explosions on solid ground and in the air. This concern is of course greatly increased by the data which was obtained from the test of CASTLE-[redacted]

As a result of our discussion with Dr. Bugher, Gen. Luedecke, Dr. Scoville, Col. Kaesser, Capt. Maynard, and Dr. Machta, we came to the conclusion that for the very large weapons exploded near the ground or near the surface of water, a large fraction of the radioactive material produced falls out over an area which is conditioned by the wind structure at the time of the explosion. This area scales up from the results of tests already made in Nevada from much smaller weapons; and it is almost inevitable that an atomic explosion, where a substantial portion of the fireball reaches the surface, will result in a heavy and lethal fall-out over an area much greater by a factor up to 10 than the area of blast damage. Therefore, weapons exploded at an altitude of $1\frac{1}{2}$, or greater, times the radius of the fireball will not result in a high degree of local fall-out, but in a wide distribution of fall-out over a long period of time. Although these gross effects just described appear to be understood, the details are not at all well understood, e.g. the amount of fractionation of radioactive material which falls out, and the decay time of the fall-out material in different regions. We suggest that the fall-out studies merit continued support and attention.

The Committee recommends that, when the fall-out phenomenon from low bursts is better understood, other Government agencies and the public should be informed of the facts. It is clear that if this country were involved in war, with a power which possesses thermonuclear weapons, fall-out from low thermonuclear bursts could have very serious results if we were unprepared to meet the situation. The Committee further suggests that the Commission in conjunction with the other appropriate agencies study the longer-range problem of what would happen to the environment, and to plant and animal life, which had been subjected to intense fall-out amounting to 500 roentgens in 50 hours over an area of approximately 5000 square miles, as occurred over the Pacific in the [redacted] test. It is hardly necessary to point out the importance, and our present high degree of ignorance, of this problem. Some of our members pointed out the implications of the results of these tests insofar as defense is concerned. Since the effects of fall-out were strongly felt at a distance of 300 miles, present plans for point-defense of important targets may have to be re-evaluated in the light of these results.

10. Two other recommendations on the subjects of the test program, and the "L" area have already been transmitted to you, and are herewith appended for the record.

[redacted]

On July 7, 8, and 9, the Subcommittee on Reactors, Materials and Production intends to visit the Argonne National Laboratory, as suggested in the 39th Meeting report.

The next meeting of the General Advisory Committee will be held at Los Alamos and Sandia on July 12, 13, and 14, 1954. We hope that some of the Commissioners will be able to join us on that occasion. In the meantime the members of the Committee will continue to be available to the Commission for any problems which may arise.

Sincerely yours,

I. I. Rabi
Chairman

Attachments (2)

[redacted]