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

August 24, 1953

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

Dear Mr. Strauss:

Herewith is a summary report of the Thirty-sixth Meeting of the General Advisory Committee. We met in Washington on the 17th, 18th, and 19th of August, 1953, with all members in attendance. In both our informational and executive sessions we gave particular consideration to three subjects: (1) the technical prospects for achieving economic civilian power, the steps which the Commission has taken in this direction, and policy which may well guide its further actions; (2) the question of the further development of high energy particle accelerators, with particular reference to decision for taking the next step in this very promising field; and, (3) the extension of the Gabriel Project, known as Project Sunshine, dealing with the global hazards of the large scale occurrence of nuclear explosions and a proposed experimental program for reaching a sound evaluation of these hazards. In addition we had the pleasure of reviewing the current weapon situation with Gen. Fields and members of his staff, of a preliminary discussion with the General Counsel of legal and patent aspects of the Atomic Energy Act and proposed changes therein, and of reviewing the intelligence situation with Dr. Colby.

1. The Committee was pleased to have the opportunity of meeting with representatives of a number of groups, in the National Laboratories and in private industry, which are interested in the development or use of atomic power for civilian purposes. It was apparent to us that intensive and competent effort has gone into the conceptual development and design of several power reactor systems; we were impressed by the careful studies which have been made. These studies undoubtedly constitute valuable background experience for the future. It appears that there are several promising approaches toward economic civilian atomic power; and in this connection it is interesting to note that cost estimates, by different groups and referring to several different reactor designs, are tending to converge in a cost region of economic interest.

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In the report of our Thirty-fifth Meeting we referred to our understanding that the Commission intended to make a thorough technical review of the civil power substitute for the aircraft carrier propulsion reactor project in order to determine the best direction this should take for future progress. We regret that this course did not seem practical in advance of the Commission's decision to choose the reactor chiefly designed for this application as the first civilian power reactor. After the presentations made to us, it was the consensus of the Committee that the pressurized water reactor type, whether using light water and enriched uranium or heavy water and ordinary uranium, is one of the promising lines of development. However, it is not as yet evident to us that the particular design chosen will meet reasonable economic criteria. In this connection, some of our members felt strongly that if the first civilian power reactor were grossly uneconomic, the whole program would experience a severe set-back.

It was the consensus of the Committee that this development should be guided by the principle of arriving at a design for which reliable cost and performance estimates could be reached before construction, and that funds should not be committed for construction unless these reliable estimates fulfil certain economic criteria. Two alternative criteria were suggested: first, that the capital cost per installed kilowatt be not greater than twice that of a comparable steam power plant; or, second, that the cost of electricity from the plant not exceed the competitive cost in the area in which it would be placed by more than two mills per kilowatt-hour. While the Committee agreed that the first civilian power reactor should meet economic criteria, one of our members felt strongly that the most important application of atomic power is ship propulsion for military purposes.

There was a strong body of opinion in the Committee that the idea of Government subsidy in one form or other should be adopted during the first stages of the civilian use of atomic power, on the ground that such fostering of infant industries has ample precedent in our national history and would enable the program to advance much more rapidly than would otherwise be possible. Subsidy could take the form of a favorable price for the fuel material, a bonus on the basis of power delivered, or plutonium purchase.

As noted above the Committee feels that there are several promising lines of development in the civilian power field, of which the pressurized water type is one. One of the others is the sodium-graphite reactor, and we were gratified to learn that the Commission has found it possible to provide funds for a sodium-graphite reactor experiment.

2. We discussed with Dr. Johnson the plans of the Research Division to support the design and construction in the near future of an ultra-high energy particle accelerator in the multibillion volt (15-25 Bev) range. In the report of our Thirty-third Meeting we recommended that

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the Commission undertake such a step, and we reaffirm this recommendation. We discussed at length the question of whether the machine should be built at a university or at one of the National Laboratories. The conclusion to which we unanimously came is that it should be constructed at a National Laboratory.

Despite the enthusiasm of various university groups to build and operate such a facility, we fail to see any really convincing reason for associating an accelerator of this size with a university campus. We do not feel that it would be a vital element in the instruction of students or in any way an extension of the normal functions of a university department. On the other hand, it is basic to the whole concept of the National Laboratories that they shall supply central research facilities of an advanced nature for the use of cooperating universities and other research institutions in their region. We believe that it should be the policy of the Commission to see that the National Laboratories are equipped with the best and most advanced nuclear research facilities, e.g. large accelerators, that can be built with the existing technology and available funds at any particular time. To adopt any other course would, indeed, jeopardize the ability of these Laboratories to play the role in our national scientific effort for which they were established. There has been built up at the Brookhaven National Laboratory a very strong momentum in the ultra-high energy accelerator field as a result of their success with the cosmotron and in the further development of the "strong focussing" principle. We feel it important to utilize this momentum, which is a very valuable current asset of the Commission.

In view of these considerations, it is our recommendation that this accelerator be constructed at the Brookhaven National Laboratory.

We also recommend that the Commission issue a clear statement of its policy in such matters, since this would do much toward insuring that the interests and enthusiasms which exist are directed along the most constructive and efficient lines of effort.

3. The Committee was most favorably impressed with the progress which has been made since our last study of Project Gabriel, now labelled Project Sunshine. We feel that we are now on solid ground for further exploration of this important question. We recommend that the Commission proceed expeditiously with the immediate program of sample collection and analysis. From the presentation we had from the staff of Project Sunshine and from Dr. Libby we obtained a strong impression that this information may become vital in future decisions on weapon tests, and, in the event of war, may be of the greatest importance in determining tactics and strategy. All concerned with the re-orientation of this Project during this last summer are to be congratulated on a very satisfactory performance.

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4. We were pleased with the assurances given by the Chairman of the AEC that he will take steps to improve the flow of information to the GAC so that it may successfully fulfil its obligations under the Atomic Energy Act to advise the Commission on scientific and technical matters, while the questions are still pending.

5. The Committee did not have enough information on the results of the recent weapon test in the Soviet Union to consider the implications of this important event. We await with great interest the material which may be available at the time of our next meeting.

6. The next meeting of the General Advisory Committee will be held in Washington on November 4, 5, and 6, 1953. This meeting will be devoted in the first instance to such problems as the Commission wish to put before the GAC. We will also wish to consider certain matters of which the Commission will be notified well before our next meeting.

As always, members of the GAC will be available to the Commission for any problems which may arise between meetings. The Chairmen of the Subcommittees are also available to call special meetings should the Commission have emergency need of their services.

Sincerely yours,

I. I. Rabi
Chairman

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