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5-7-56
BROOKHAVEN NATIONAL LABORATORY SURVEY TEAM
FOR A COLOMBO PLAN NUCLEAR CENTER
Brookhaven national Laboratory
Associated Universities, Inc.
Upton, Long Island, New York.

Tokyo, Japan.
June 12, 1956

Dr. S.K. Krishnan, Director,
National Physical Laboratory of India
Hillside Road,
New Delhi.

Dear Sir:

As we approach the end of our field trip, we find that our ideas about technical aspects of the proposed Regional Nuclear Center are beginning to take a definite pattern. We think it desirable at this stage to summarize these ideas for your personal information, and on a confidential basis, and hope that you may be able to send us your personal comments on the following points:

- (1) Are you in agreement with the lines of work set forth and with the priorities indicated?
- (2) Approximately how many experienced individuals do you think might be available from your country for positions on the staff of the Center in the various divisions indicated? (It would be helpful if you could indicate how many of these individuals you consider qualified by training and experience to fill senior staff positions.)
- (3) Approximately how many students holding the B.S. degree or the equivalent do you think your country would be likely to send to the Center for specialized training in nuclear techniques in each of the divisions indicated -- in 1957? 1958? 1959? 1960? 1961?
- (4) Approximately how many individuals do you think your country might be interested in sending to the Center for technician-level training in each of the same five years?

We wish to stress that the concept outlined in this letter is very preliminary at this stage and is subject to modifications as we complete our field trip and undertake the difficult task of framing a report of specific recommendations. It is for precisely this reason that your informal comments on the above questions will be invaluable to us even though we are sure that you will want to await receipt of the official U.S. proposal before considering any actual commitments.

OBJECTIVES AND PRIORITIES

It is our view that the objective of the proposed Center should be to accelerate the application of atomic energy techniques and related technology to the solution of problems of importance to the Asian members of the Colombo Plan. We feel that the Center can best accomplish this objective by complementing and supplementing the national atomic energy programs already in progress or soon to be launched in each of these nations. It is our conclusion that the Center can best complement and supplement the national efforts by initially concentrating on training and applied research. Later on, it would appear that the emphasis of the Center can gradually shift to more basic investigations and fundamental studies.

DIVISIONS

It is our present thinking that the following divisions will be established within the first five years of the program -- i.e., within five years from the date of approval of the project by the Colombo Plan nations:

(1) A RESEARCH REACTOR DIVISION. This would initially be equipped with a reasonably high-flux research reactor, possibly of the CP-5 type, plus necessary supporting facilities such as hot laboratory cells and special laboratory services. The initial emphasis would be on the production of radio-isotopes and labeled compounds for use in applied research at the Center and for distribution to nations participating in the project. The reactor would also be used in connection with the training of nuclear engineers and reactor operators and technicians.

(2) A BIOLOGY AND AGRICULTURE DIVISION. This would initially be equipped with radio-isotope laboratories, conventional laboratories for biological research, classrooms, offices, a reading and reference room, facilities for handling seed, cold storage rooms, extensive controlled-atmosphere chambers of the type known as a phytotron, apparatus for X-ray, X-ray, neutron VV and fast electron treatments, a gamma field and possibly a food technology pilot plant. Adequate acreage of land suitable for plant experimentation would be available at the center or within a convenient distance. The initial emphasis would be upon:

(a) The use of radio-isotopes in applied studies as the most efficient use of soils, water and fertilizers; in control of insects and diseases; and in the solution of animal husbandry problems.

(b) The use of radiation in plant mutation studies aimed at developing improved crop varieties and

(c) The use of radiation in the preservation of foods and in pest control.

As the training of scientists and technicians in these techniques progresses and similar lines of work are initiated in the various participating countries, the emphasis at the Center may be expected to shift to more basic investigations, although we would expect training and applied research to continue there for a number of years to come. It is hoped that it will be possible to coordinate the research carried out at the Center very closely with the many excellent agriculture research stations and biological laboratories now in existence in the region.

(3) MEDICAL DIVISION. This initially would consist of a small hospital and out-patient clinic equipped for the use of X-ray, radio-isotopes and gamma radiation in disease diagnosis and therapy. There would also be classrooms, offices, library facilities and laboratory space for supporting research -- the latter including animal laboratories. The training would initially emphasize the simpler techniques of diagnosis and therapy -- as, for example, the training of X-ray technicians, although more advanced training, and facilities for research would be available also. The research phases would be minimized at the outset, but would be gradually extended. Emphasis might lie in the directions of research in cancer, tropical diseases and nutritional diseases. The closest liaison would be maintained with medical research institutions and hospitals in the Colombo Plan region. Consultants from the Center would make frequent trips to such institutions.

(4) A TECHNOLOGY DIVISION. This would initially comprise three departments:

(a) A nuclear power department equipped with a 5,000 kw demonstration nuclear power plant, possibly of the water boiler type, plus supporting facilities for training courses in power reactor technology, operation and maintenance. The electrical distribution system would be designed to permit supplying the power generated to the Center or to an existing distribution grid. To permit maximum operational facility the Center would not be dependent upon this energy source. The power plant facilities would include spent-fuel storage facilities and de-contamination and maintenance shops.

(b) A raw materials department equipped for training and research in minerals prospecting, mining and processing techniques. The function of this department would be to assist the various participating nations in developing their mineral resources -- especially uranium and thorium. Consultants from the department would be available for field assistance. Quite possibly, the Center would make available equipment and crews for air radiometric survey work. Quite possibly also, the department's facilities would include semi-works facilities for pilot scale demonstration of ore processing methods, providing necessary data for the design of production scale facilities.

(e) A radiation technology department which would initially concentrate on training in the use of gamma sources for industrial radiography, but which would in due course conduct programs in the field of radiation, chemistry and food processing.

This division would also include a consulting staff qualified to advise on industrial development problems in general and on nuclear power application in particular.

(5) A TECHNICAL SERVICES DIVISION. In this would be centered health physics services, heavy maintenance and machine shops, glass blowing facilities, laboratory stores, etc.

(6) A RESEARCH LABORATORY AND TECHNICAL INFORMATION SERVICE.

(7) A CENTRAL CAFETERIA.

(8) AN ADMINISTRATION BUILDING AND CENTRAL AUDITORIUM.

(9) HOUSING FOR VISITING SCIENTISTS AND OFFICIAL VISITORS.

(10) WAREHOUSE FACILITIES.

(11) RECREATIONAL FACILITIES.

We are thinking in terms of a site of two or three hundred acres excluding crop acreage. Our present highly preliminary estimate is that by the end of the fifth year the staff of the Center might number approximately 1,000 divided as follows:

100 staff scientists
300 laboratory technicians and assistants
50 visiting scientists
250 students
300 administrative, clerical and miscellaneous supporting personnel (Guards, maintenance workers, etc.)

Initial Training It has been proposed that training courses be offered in disciplines necessary to set up and maintain laboratories in which electronic and radioactive materials are used. Such training would include instruction for electronics technicians, X-ray repair and maintenance, X-ray technicians and technician training in the use of isotopes. It is contemplated that training may be offered in radiation protection or health physics, as well as in radiation physics. It is anticipated that such training would be continued for as long as there is a need for it.

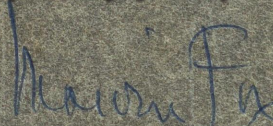
May I repeat that the above information embodies our preliminary thinking and is written before we have had an opportunity to complete our visit to one of the very important Colombo Plan nations, Japan.

Your general comments, as well as answers to the questions set forth at the beginning of this letter, would be greatly appreciated. If possible, we would like to have your reply in our hands at Brookhaven National Laboratory by the end of this month.

I would like to emphasize one point in particular, namely that the above ideas as to departments, facilities, program lines, size of staff, and the like have not as yet been subjected to a cost analysis. We have just assigned engineers to the task of preparing exploratory layouts and cost estimates based on the above concept. Clearly, when meaningful cost estimates are available, it may be necessary to modify the overall scale of the effort and to adjust the balance between the various departmental programs.

May I take this opportunity again to express my personal appreciation, that of my colleagues, and that of the Brookhaven National Laboratory for the many courtesies you extended to us during our recent visit to your country and for the splendid cooperation given us.

Very truly yours,

A handwritten signature in blue ink that reads "Marvin Fox". The signature is written in a cursive, slightly stylized font.

Marvin Fox