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DIVISION OF INTERNATIONAL AFFAIRS

MEMORANDUM OF CONVERSATION

November 7, 1957

PARTICIPANTS: Dr. G. K. Beck/GA AEC
T. G. Jones/DIA "
C. E. Jones/DIA "

G. D. L. White - Counselor, New Zealand Embassy

SUBJECT: CRITERIA FOR SITING A RESEARCH REACTOR

COPIES TO: G. E. Rogers (2) Farley/STATE (2) DIA Participants (1)
G. K. Beck/GA (V)

Mr. White opened the discussion by presenting a memorandum summarizing New Zealand's preliminary steps toward selection of a site for a contemplated research reactor. He stated that the New Zealand authorities would welcome advice from the United States Atomic Energy Commission in this regard and noted that in determining the size of the area to be evacuated if a reactor accident occurred the New Zealanders were using a general formula developed by the United States Atomic Energy Commission (radius in miles = .01 $\sqrt{\text{Power in Kw.}}$).

Mr. Beck stated that the formula to which Mr. White referred was now outmoded by more refined techniques. He then went on to discuss various factors which should be taken into consideration in siting a reactor. Mr. White remarked that he thought the wind factor would be quite important in New Zealand as winds are frequent and prevailingly blow from Greenfield (one of the contemplated reactor sites) over Wellington.

Mr. Beck then observed that in the United States, reactors in populated areas are generally built with containers around them. With regard to containers there are two problems, one being the amount of direct radiation which may penetrate them under operating conditions, and the other being the adequacy of the containment. With regard to the latter point the

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following items must be taken into consideration: (a) leak rate, (b) pressure capacity, (c) penetration by missiles, and (d) shock waves. With regard to shock waves Mr. White mentioned that earthquakes were not uncommon in New Zealand. Dr. Beck remarked that this also was a problem in connection with reactors located in California and that it was possible for a device called a P-wave meter to be made a part of the reactor installation. In the event of an earthquake the initial wave, which does not cause damage, would trigger a mechanism which would automatically shut down the reactor, thus minimizing any hazard problems caused by subsequent more powerful waves.

Dr. Beck then observed that the selection of the site depends on the type and purpose of the reactor operation. The general features of the reactor and its power level must be determined first. A reactor, he noted, can be placed most anywhere if one puts enough containment and shielding around it. This, however, would be quite expensive.

The discussion then turned briefly to types of research reactors in which New Zealand might be interested, with Mr. White indicating he thought it likely that with regard to the reactor itself New Zealand would wish to remain within range of half a million dollars. Dr. Beck listed the following types as being of potential interest to New Zealand: swimming pool, homogeneous water boiler, Argonaut, and a new reactor made by General Dynamics. While pointing out that each type had certain advantages and disadvantages, he stated that the General Dynamics reactor, which will be on exhibition at the 1958 Geneva Conference, was probably the safest of the four and appeared very favorable.

At the conclusion of the meeting Mr. White was furnished several documents setting forth information on site selection, for transmittal to the New Zealand authorities. He stated that the information received would prove very useful in laying a satisfactory groundwork on this subject prior to the arrival of the AEC mission to New Zealand in early 1958.

S. H. Jones
LA:AA:
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