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LEXINGTON PROJECT REPORT

NO. 100

MEETING WITH DR. MANSON BENEDICT --

REACTOR LOCATION

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ABSTRACT

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Lexington Project Report #100

Title: Meeting with Dr. Manson Benedict -- Reactor Location
Date: July 23, 1948
Notes by: E. W. Thiele
Place: Lexington
Present: Whitman, Loomis, Young, Drew, Rothrock, Stever, and Thiele

It was pointed out to Dr. Benedict that we were interested in the possibilities for the location of a high-flux unit for making tests on metals at high temperatures and for shielding tests. This might well be a combination water-BeO pile. At a later date a prototype airplane pile of possibly 200,000 kw. output in very small dimensions would have to be located.

Dr. Benedict explained that the hazards considered by the Safeguard Committee (of which he is a member) were primarily the chance of a pile's becoming super-critical and exploding or of losing its cooling agent and vaporizing. The amount of radioactive material (and plutonium) which might be released was estimated, and a crude guess based on low wind velocities was made for three radii: (1) that in which fatalities might be expected to occur and where only AEC personnel aware of the risk would enter; (2) that in which there was some danger of injury and where non-AEC personnel might live; and (3) an area in which an accident might cause alarm and interruption to production, so that vital industries should not be present. In the case of a 200,000 kw pile, the first radius would be about 5 miles, the second about 50 and the third about 150 miles. Consideration is also given to contamination of the water supply. Pile location with regard to possible enemy attack has not been a factor; neither have many minor effects (like fogging of photographic film) been considered.

The pile now being constructed at Brookhaven (30,000 kw) is regarded as inherently quite safe. The proposed high-flux pile in its present form is not considered safe for DuPage County, although revisions now proposed, which would allow flooding of the pile in case of trouble, would greatly reduce the chance of trouble, and might make it suitable. The description of the early submarine pile suggest that it might be in the same range as the high-flux pile and the same is true of the experimental pile for materials testing. Dr. Benedict, while emphasizing that no individual member could speak for the Safeguard Committee and that each case which was put before the Committee represented a special one, felt that perhaps any of these piles might be put at Oak Ridge so far as safety goes. However, since the prototype airplane pile would require about a 5 mile radius, it is doubtful whether an area could be found at Oak Ridge unless the reservation is enlarged. Oak Ridge is much better than DuPage County with regard to population outside the primary area. Hanford is a suitable area but might have to be enlarged.

In general, Dr. Benedict considered that the AEC should acquire a large tract in uninhabited territory, large enough to accumulate the maximum number of high-power hazardous piles. If these were to be 6 in

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number, such a tract might be about 1000 square miles. It is true that such a large area is hard to find in this country, and it might be more feasible to obtain separate smaller locations for each pile. The fact that these piles would be inconveniently located would have to be accepted, and presumably only development personnel would be located at them. The locations would doubtless have to be accessible to cooling water and to power.

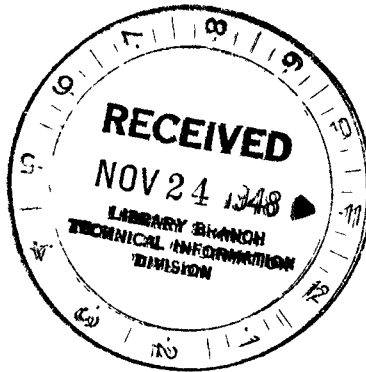
The matter of launching a nuclear-powered airplane was discussed. Since sites for this purpose need not have a large civilian personnel, they might be located in remote areas, such as Pacific Islands, or northern Canada or Alaska. If one of the planes crashes, the area immediately surrounding it could be approached only for short periods and would essentially become useless.

The choice of organizations to develop the various types of power plant was discussed. Dr. Benedict favors employment of suitable commercial organizations rather than attempting to do the work with AEC personnel. For this type of work, personnel skilled in development rather than in either construction or research is required.

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