

Long History - Second Version

When the Chicago project was set up in January 1942 its main task was to build up a large pile composed of pure graphite, pure uranium oxide and pure uranium metal and actually to set up chain reaction in such a pile. In order to fulfill this task it would have required authority to make arrangements for producing these materials, but the Chicago project lacked this authority. It was clearly recognized from the start by practically all members of the project that this would lead to very great difficulties and at a meeting held at Columbia University under the chairmanship of Dr. Compton this point was very thoroughly discussed. I remember that Dr. Smyth, Dr. Wigner, Dr. Fermi, and Dr. D. P. Mitchell were very outspoken in their opinions. Dr. Murphree of the Standard Oil Company of New Jersey was given the responsibility to provide us with the materials which we required and we did not believe that he would be able to fulfill this task. Some time later Dr. Compton asked the OSRD that he be given authority to make arrangements concerning our materials, but his request was turned down. A little later Dr. Wigner and Dr. Creutz visited Dr. Bush and put forward the same request and on May I wrote to Dr. Bush emphasizing the same point. I also went to see Dr. Bush and talked to him about this point.

We got out of a very bad situation in 1942 by the skin of our teeth and this only due to a number of lucky circumstances which were as follows: Through his personal connections with

Mallinckrodt Dr. Compton was able to arrange for the purification of uranium oxide by an ~~other purification~~ ^{extraction} method which Mallinckrodt was able to apply on an industrial scale. In desperation about the state of the metal production most of which was ~~based on the reduction process~~ requiring distilled calcium which was not available in quantity, I made inquiries ~~and found~~ at the Brush Beryllium Company and found that pure uranium metal could be produced by a reduction with commercially pure magnesium which was available in quantity. Finally, Dr. Spedding ^{of the Chicago project} worked out a practical method for the magnesium reduction and transformed his laboratory at Ames into a factory which by now has reached a production capacity of about two tons per day.

By May of 1942 Dr. Compton was willing to say officially that it would be possible to make the chain reaction go, but it was not possible to assemble the materials and demonstrate the chain reacting pile until December 1942.

When the Chicago project was set up in January 1942 it was not supposed to concern itself with the designing of a cooled power unit. This was supposed to be a task reserved for Dr. Murphree from Standard Oil of New Jersey. Mr. Moore from Standard Oil of New Jersey was attached to the Chicago project in order to learn enough of our work to enable him to make a design for a power unit and started work. In ^{June} July 1942 we learned that the War Department had been given the responsibility to look after the industrial development of our work ~~and decided~~

~~It was decided~~ that it would be necessary to set up a collaboration between the Chicago laboratory and an industrial firm who would act as a contractor of the War Department. While Dr. Compton discussed with ~~Dr. Murphree and others~~ ^{experts} the question of choosing a suitable firm, the War Department, over his head, placed a contract with Stone and Webster. We were supposed to design and build various power units in collaboration with Stone and Webster and under the general supervision of the Army engineers. It was obvious to practically everybody in the Chicago laboratory that this arrangement would not work. I drafted a letter addressed to Dr. Bush dated July 3, 1942 in which I said, "Dr. Compton reported on his return to a gathering of the group leaders of the Metallurgical Laboratory last Saturday, June 27, 1942. His report was followed by a discussion, but E. P. Wigner, E. Fermi, S. K. Allison refrained from making any comment. I thought it best to keep silent also. Subsequently I obtained privately an expression of opinion of all those within our group who have shown foresight in the past.

"To explain why our work would be slow if the proposed pattern were adopted would require a detailed presentation of the nature, scope and above all, the complexity of our task. I should be glad to furnish such a description if desired." This letter was not mailed, but I have it in my files. I also obtained expressions of opinion from Fermi, Wigner, Allison, and Stearns and all of them most emphatically negative and reported them to Dr. Compton. I remember Dr. Fermi's words, who said "they are sadly mistaken" if they believed that this

method of collaboration could be successfully carried out at that stage of our work. It took about four months, from June to October, until our point of view received official recognition and Stone and Webster was replaced concerning the most important tasks by other firms.

The work in the laboratory moved then essentially along three lines:

1. Preparations were made in collaboration with Stone and Webster to build near Chicago a power unit and attached to it a chemical separation plant. This program was unanimously *supported by Chicago project* approved in the laboratory since it was recognized that the production of about a gram a day of the product was urgently needed by our chemists. Construction was started and the chemical separation plant was scheduled to go into operation in May 1943. In September 1942 the laboratory was informed that it was decided not to build this chemical separation plant in the Argon forest but to build it at Site X. *I understand* that if all goes well the chemical separation plant at Site X may be in operation in October of this year so that the delay due to this shift in plans may not exceed five months. At the time when it was decided against the wish of the laboratory to shift the chemical separation plant from Chicago to Site X the decision was condemned as a mistake by practically all members of the laboratory who were concerned with this problem.

2. Moore and his group prepared a design for a helium cooled power unit capable of dissipating 100,000 k.w.