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WEEKLY REPORT OF EXTRA LABORATORY ACTIVITY
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Week Ending March 14, 1962

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The Atomic Energy Commission
H. R. Canell
Chief, Declassification Branch

A - Material

During the week a letter was received from Mr. Alexander indicating that metal is in production at the Beverly plant. The metallic powder is being successfully melted into ingot form in the high frequency, induction, vacuum furnace at MIT. Lumps from a few grams up to several pounds have been cast in this fashion and the last ingot weighed something over six pounds. It seems probable, in view of this that much larger ingots can be cast when desired. The estimate of the MIT group is that they can cast ingots of up to 100 pounds without difficulty. The other development at Beverly is that the spectroscopic analysis work which Mr. Alexander has turned over to Harrison's group at MIT, is going ahead satisfactorily. They not only have the test for boron fairly well in hand, but are making very definite progress with analyses for the rare earths, according to Alexander's report.

At Bloomfield the Westinghouse group now have, not only the experimental contract, as a sub-contract from the University of Chicago project, but also have a larger contract for six tons of material to be delivered in metallic ingots. Dr. Martin is still in need of chemical assistants which we hope to be able to supply in the very near future. It is hoped that it will be possible to cast a two inch sphere for Creutz next week.

The situation as far as the ^{oxide} ~~substance~~ is concerned has been clarified during the week. Up to the present time Pergel had been operating without any official orders for oxide. During the week he was given a definite order, verbally, for 60 tons of pure oxide. ~~During the week he was given a definite order, verbally, for 60 tons of pure oxide and was awaiting the letter of intent from the O.S.R.D. when Dr. ~~Wheeler~~'s letter was sent, on March 18th.~~ This will enable the Florida people to obtain the necessary machinery and get their mines in condition for full operation. They have already completed the 10,000 pounds of oxide required for the Bureau of Standard's order and this material has been delivered, or is in process of delivery to Alexander at the Beverly plant. This 10,000 pounds it is estimated, will be sufficient to care for Alexander's needs for three months or perhaps more. It is estimated that at the present time Martin will require not more than two tons

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Materials (cont'd)

of oxide per month. Fuzgel estimates that they can bring their plant capacity up to eight tons of triply leached oxide per month. This would leave somewhere in the neighborhood of 3 tons per month available for experimental work here at Chicago. An order for 15 tons of this oxide has been approved by the planning board to be ordered from funds made available to our contract. This makes it possible for us to place orders directly to Fuzgel for the delivery of this experimental material.

During the week a report was received from the Bureau of Standards on the Spear company's graphite electrode, which was specially graphitized for us in an oven packed with petroleum rather than foundry coke. This analysis indicated that the boron content of these electrodes extended well into the interior of the electrode and was as high as 1.2 part per million. This was disappointing in view of the fact that National Carbon Company's AGX runs as low as 1.8 parts per million without special precaution. However, a letter from Wensel just received indicates that this analysis is in error since it was made spectroscopically and a change in the basis matrix made the standards used for the spectroscopic comparison, unreliable. The chemical analysis of this same material showed considerably less than half the amount given by the spectroscopic analysis. This would reduce the boron content to somewhat less than one-half part per million, which is a very considerable improvement over the present graphite.

B - EXPERIMENTS

At Princeton the work on the $U_2^{233}O_3$ has been completed and it is hoped that during this week the spurs will be ready for the experiments on the metal. Greutz reports that he has been unable to discover any fissions in either samarium or gadolinium under slow neutron bombardment.

C - THE ST. LOUIS EXPERIMENT

Dr. Martin Kamen reported here on his visit to St. Louis where he examined the St. Louis cyclotron. He states that using a target of beryllium, silver soldered into a

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C- (continued)

brass backing, the cyclotron was operating with a beam of 200 Microamperes and a potential between 11 and 12 million electron volts. He estimated the yield of 94-239 produced by the St. Louis cyclotron to be approximately half of that produced by the sixty inch cyclotron at Berkley. He suggested to them the construction of a bell jar electrode making it possible to bombard uranium electrodes directly with the deuteron beam. This electrode is in the process of construction. Such bombardment makes available 94-238 which has a much more intense alpha particle emission and consequently is much more suitable for tracer studies of the chemistry of 94. The present plan is for the Chicago project to supply Washington University with a crew of men to operate their cyclotron and to pay for the cost of operation out of our funds. Presumably this will make necessary, our assuming at least part of the salaries of Dr. Langsdorf and his assistants at St. Louis so that we may properly take action in securing their clearance and in securing their deferment.

D - NEW YORK UNIVERSITY EXPERIMENTS

During the week Dr. Serge Korff of New York University and his group filled a number of Geiger-Miller tubes for the counting circuits at Chicago, and ran the plateau characteristics curves for them. Since these counter tubes, up to the present, have been manufactured by Neek & Krieb in New York, the use of the New York University group to obtain these shells and then fill them appeared to be of some assistance. As a result, a suggested budget was drawn up to establish this unit as an auxiliary of the Chicago group, for the preparation of counter tubes and for development of detecting devices. It is assumed that this group will cooperate actively with the group of Dr. Volney T. Wilson, in providing him with the actual detection devices needed in the work here in Chicago. It is also hoped that it may be possible to make certain routine cross-section measurements with the equipment already available at New York University.

E - CORNELL EXPERIMENTS

Dr. Robert Nacher visited the project during the latter part of the week. He brought with him a report on the resonance energy levels in gold, indium and iodine in

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particular. The question was raised as to the future of these experiments and after consultation with the research committee, it seemed advisable for the Cornell group to continue its measurements and in particular to make a study of the variation of the fission cross section of uranium, making a detailed comparison of the variation of this cross section with energy with that for boron. A tentative budget for this work was drawn up.

F - Berkley Experiments

Dr. Kennedy stopped at the Chicago Project again on his way from Washington back to Berkley for a discussion of the experiments now being carried on at Berkley. In particular the question of the formation of the chemical unit here at the University of Chicago was discussed with Dr. Kennedy. It appeared from this discussion and from a letter written by Dr. Lawrence that it will shortly be necessary for Dr. Segre to leave Berkley and the suggestion at the present time is that he join the group here at Chicago even though he is in the status of an enemy alien without clearance. Also as a result of these discussions the name of Dr. Wahl was suggested as the ideal person from California to assist in the experiments here in Chicago.

Dr. Wahl has just received his degree at California and has been actively involved in all of the chemical work done there under the direction of Dr. Seaborg on the separation of element 94 and on its chemistry. This would undoubtedly hinder Seaborg's work at Berkley. If the production of 94 is to be carried on in St. Louis rather than at Berkley, the question immediately arises as to whether or not it would not be a good idea for Seaborg himself to come to Chicago to join the group here. It appeared quite necessary for Dr. Kennedy to remain in Berkley as he is, at present, responsible for the assay of samples which Lawrence is producing. Dr. Kennedy, at present, is carrying on the work on the spontaneous fission of the separated isotopes, and undoubtedly, this work should continue at Berkley independent of the decision as to the chemical problems in progress there. Both because Dr. Kennedy is essential for the carrying on of the separation work and because the samples are most readily available at Berkley.

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