Columbia University
in the City of New York
DEPARTMENT OF PHYSICS

January 22, 1941

Mr. J. H. Critchett, Vice President
Union Carbide and Carbon Corporation
30 East 42nd Street
New York, N. Y.

In re: Uranium alloys

Dear Mr. Critchett:

I am writing to you to confirm our conversation of January 20, 1941, concerning uranium alloys.

We will be interested in the possibility of your being able to manufacture certain uranium alloys containing perhaps 5% of either lead or tin or bismuth. It is not possible for us to state as yet just how much of these alloying elements could be tolerated, but if you were to find the minimum quantity necessary to obtain a fused uranium alloy at a reasonable cost, we would then make a detailed investigation to determine whether the amount which you quote can be tolerated or not before asking you to submit an estimate of cost in one-ton lots.

If your experts think of any particular line which they want to try, we would appreciate it if they would let us know. By keeping in close touch with us we could prevent all unnecessary repetition of experiments and overlapping of work. For instance, some experiments will probably be conducted at the National Bureau of Standards, at our request, along one specific line of development, and another line of experiments using calcium or calcium hydride as the reducing agent is also being followed up. We would not feel justified in asking you to go to any expense along these specific lines at the present time, but you might be able to devise and test methods which are not at present under consideration elsewhere, and we would much appreciate your help in this connection.

Thanking you for the kind attention which you are giving to this matter, I am

Yours very truly,

(Leo Szilard)

LS:H
cc: Mr. Bliss

Dr. Szilard

January 22, 1941

Mr. J. H. Critchett, Vice President
Union Carbide and Carbon Corporation
30 East 42nd Street
New York, N. Y.

In re: Uranium dioxide

Dear Mr. Critchett:

I am writing to you to confirm our conversation of January 20, 1941, concerning uranium dioxide, and in order to repeat some of the data which I submitted to you.

We would be interested if your company could put in a bid at some later date for the supply of uranium dioxide in one-ton lots. We may need about seven tons of this material in the not too distant future. We should appreciate it if you could let us have a sample of a few pounds of this material on which we could carry out some preliminary tests. As far as this first sample is concerned, we are not yet interested in the degree of purity which we later may require, but chiefly in the mechanical properties of the material. Therefore a purity of about 98% would be quite satisfactory.

One way in which uranium dioxide may be produced is apparently by reducing U_3O_8 in an atmosphere of hydrogen between 900 and 1000°C. We are interested in obtaining a product which has a real density of about 11, whereas U_3O_8 has a real density of about 7. I am mentioning this point because apparently certain processes of reduction lead to a uranium dioxide which has a considerably lower real density and which we could not use. The Handbook of Gmelin, edition of 1936, contains some data which your chemists might find useful to consult in this connection.

As to the purity of uranium dioxide which we would ultimately need, this point will require further careful consideration and discussion with your chemists in order to arrive at a reasonable compromise between our requirements of purity and the manufacturing cost. As a first indication it may, however, be said that silicon is an impurity which is relatively harmless, and that a

vanadium content of one part in 1000 by weight and an iron content of one part in 250 by weight could most probably be tolerated.

I am writing a separate letter concerning other questions which we discussed at Monday's interview.

Thanking you for the kind attention which you are giving to this matter, I am

Yours very truly,

L. S.

LS:H (Leo Szilard)

cc: 1 - Pegram
1 - Szilard
2 - Mitchell
1 - Fermi
1 - Mr. Bliss

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

MANUFACTURERS "ELECTROMET" BRAND
FERRO-ALLOYS AND OTHER ELECTRO METALLURGICAL PRODUCTS

CARBIDE AND CARBON BUILDING
30 EAST 42ND STREET, NEW YORK

January 29, 1941

Mr. Leo Szilard,
King's Crown Hotel,
420 West 116th Street,
New York, N. Y.

Dear Mr. Szilard:

This will acknowledge your letter of January 22. We will be interested in receiving the additional letter to which you refer, dealing with the metallic uranium material in which you might be interested.

Very truly yours,

J. H. Critchett

Vice President

JHC:MYR

copied 2/6/41
H. Hall

February 7, 1941

Mr. J. H. Critchett, Vice President
Electro Metallurgical Company
Carbide and Carbon Building
30 East 42nd Street
New York, N. Y.

Dear Mr. Critchett:

Many thanks for your kind letter of January 29. I am deferring my answer to it for about a fortnight. During this period I hope to gather some information about certain uranium alloys which have been prepared at our request, so that we may be in a better position to give you a clear picture of the type of metallic uranium material in which we might be interested.

I wish to thank you for the attention which you are giving to this matter.

Very truly yours,

L. S.

(Leo Szilard)

LS:H

CC: 1 - Pegram
1 - Szilard
2 - Mitchell