A E C GENERAL ADVISORY COMMITTEE

Dr. Warren C. Johnson, chairman; dean of physical sciences, University of Chicago, Chicago, Ill.

Dr. Jesse W. Beams, chairman, physics department, University of Virginia, Charlottesville, Va.

Dr. Manson Benedict, professor of nuclear engineering, Massachusetts Institute of Technology, Cambridge, Mass.

Dr. James W. McRae, vice president, American Telephone and Telegraph Co., New York, N. Y.

Eger V. Murphree, president, ESSO Research and Engineering Co., New York, N.Y.

Dr. Kenneth S. Pitzer, dean, College of Chemistry, University of California, Berkeley, California

Dr. J. C. Warner, president, Carnegie Institute of Technology, Pittsburgh, Pa.

Dr. Robert E. Wilson, Chicago, Ill.

Vacancy.

Dr. Jane H. Hall, secretary; Los Alamos Scientific Laboratory, Los Alamos, N. Mex.

Patent Compensation Board

Casper W. Ooms, chairman; firm of Casper W. Ooms, Chicago, Ill.

John V. L. Hogan, consulting engineer, Hogan Laboratories, Inc. New York, N. Y.

Lawrence E. Kingsland, Kingsland, Rogers & Ezell, St. Louis, Mo.

(This list was copied from "Atomic Industrial Progress and Second World Conference" July-December 1958 - United States Atomic Energy Commission)

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The truth is that, as far as the general development of the field of atomic energy is concerned, the record of the Commission is bad. The most important area of this field is the development of new methods for producing fissionable materials in general, and in particular, the development of new type reactors. In these past four years, not only have we failed to build reactors of any new type, but construction has not even been started on any such reactors. This and other failures of the Commission is a necessary consequence of the fact that the Commission did not tackle the job of enlisting scientific talent. The Commission was not even able to hold on to the best men who remained at work in this field at the time when it took over.

There are notable exceptions. There are at present three or four outstanding scientists working on a full-time basis in the field of atomic energy, directly for the Commission, or under its auspices.

The record of the extended hearings before the Joint Committee on Atomic Energy presents a grossly misleading picture, and we believe that it is the duty of the scientists to correct that picture. We believe that scientists ought to inform the chairman of the Joint Committee, Senator McMahon, of what they know about the performance of the Commission and make constructive proposals on how this performance could be improved in the future.

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comparatively few who are in an independant position and free to criticize. This increases rather than decreases the responsibility of these few. It is important that as time goes on, the number of those who are informed as well as independant, should considerably increase and that they should vigorously axercise the right and duty to criticize, publicly if necessary.

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As far as the development of the bomb is concerned in these past four years, xxxxx there was only an exceedingly small number of outstanding scientists who concerned themselves with this field, and who devoted their full time to it. Correspondingly, this development was small and followed conservative lines. The willingness or unwillingness of scientists to work in this field is determined by factors quite different from those which affect the participation of scientists in the field of reactor development, and some of the essential factors lie outside, and in the circumstances, one cannot say that the Commission's failure to enlist the cooperation of first-class scientists is the main reason for the xxx slow progress made in this field.

November 1, 1949

During this last year the Atomic Energy Commission was subjected to a congressional investigation arising out of the charges made by Senator Hickenlooper. The scientific community, with no single voice dissenting, supported the Commission against these particular charges. At the end of its investigation the Joint Congressional Committee on Atomic Energy exonerated the Commission by a majority vote. The undersigned believe that on the basis of the evidence placed before the Committee its verdict was correct.

However, for a long time now scientists, who kept in touch with the progress of the research and development work in this field, were increasingly uneasy about the performance of the Commission. Had the Commission not been attacked by Senator Hickenlooper for the wrong reasons, it is very likely that scientists would have voiced their criticism before this time.

While the Commission was exposed to attacks which scientists in general considered unjustified, apparently no scientist felt impelled to come forward and to volunteer information unfavorable to the Commission. But from now on scientists are going to speak up. For they cannot be expected individually to exercise such restraint any longer, and there must be no conspiracy amongst scientists aimed at the concealment of the truth.

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Some of us are going to inform the Chairman of the Joint Congressional Committee on Atomic Energy, Senator MacMahon, of what we know about the performance of the Atomic Energy Commission. We hope that others who are not signatories to this statement will do likewise. Any charges that are made ought to be substantiated. If the Chairman of the Committee finds that the new evidence warrants new hearings before Congress, we hope they will be open hearings.

The scientific community has high regard for the Chairman of the Commission, who time and again has given expression to their belief in the fundamental importance of our basic freedoms. The other members of the Commission are also good men -- men of intelligence and good will. We do not look to changes in the composition of the Commission as the way to improve the performance of the Commission.

A government agency which has the task of developing the field of Atomic Energy is confronted with many difficulties. It is subjected to many pressures and it frequently moves along the line of least resistance. We believe that, irrespective of who the members of the Commission may be, no substantial improvement in the performance of the Commission can be expected unless -- from here on -- it will be subjected to public criticism on the part of the scientists who are acquainted with the field of Atomic Energy.

At present there are only few scientists -- outside of the General Advisory Board of the Atomic Energy Commission which in some measure shares the responsibility for the Commission's record -- who are in an independent position and who have followed the activities of the Commission sufficiently closely to be able to speak with sufficient assurance. This increases rather than decreases the responsibility of these few. It is important that as time goes on the number of those who are informed as well as independent should considerably increase.

The main obstacles to progress in this field are two-fold:

1) No progress is possible if the Commission is harassed by charges of losing a few grams of fissionable uranium at a time when Russia is producing such material in quantity; if the Commission is harassed by charges of sending radio-isotopes to Norway at a time when Norway, as we now know, might have obtained those isotopes from Russia; if the Commission is harassed by charges of failing to keep our advances secret at a time when the only important secret was that we were not making any significant advances.

As long as Congress approaches the problem of Atomic Energy in an attitude which, for want of a better term, ~~we may~~ call "hickenlooperism", it will not be possible to make appreciable progress in this field.

2) The incentives normally operating in the field of private enterprise are not sufficient to insure a rapid development of Atomic Energy, and therefore the major part, if not the whole, of this development must of necessity remain a government financed operation. No progress is possible, however, if we do not succeed in freeing the research and development in this field from the impediments that usually afflict research and development work carried on within a large scale government operation. We must find a way to set up "research and development" units which can give their staff a reasonable assurance that the staff can look forward to accomplishing the task which they have set themselves, and that they will remain unhampered by rules and regulations which may be issued by the office of the General Manager of the Commission. Some way must be found to enable research and development units to operate in this field in much the same way as a private corporation would operate.

Even if the Commission should now undergo a change of heart and try to persuade first-class scientists to work in this field on a full-time basis, it will not succeed in doing so as long as it offers them nothing but frustration.

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The main obstacles to progress in this field are three-fold:

~~[illegible]~~

of the most trivial charges ~~to~~ (even) when they
could ~~[illegible]~~ have been easily cleared without
any hearing. ~~[illegible]~~ At the same time were (in case they should be denied clearance)
refused to guaranty a hearing for scientists
who ~~teach~~ are willing to seek ~~employment~~ ~~in this field~~
came into it, ~~[illegible]~~ ~~Unless this is changed~~
~~[illegible]~~
who were not ~~[illegible]~~ working in this field but)

then no [illegible]
~~this is one of the obstacles~~ ~~[illegible]~~
~~in this case alone~~ that stand in the way of [illegible]

1) No progress is possible if the Commission is harassed by charges of losing a few grams of fissionable uranium at a time when Russia is producing such material in quantity; if the Commission is harassed by charges of sending radio-isotopes to Norway at a time when Norway, as we now know, might have obtained those isotopes from Russia; if the Commission is harassed by charges of failing to keep our advances secret at a time when the only important secret was that we were not making any significant advances.

As long as Congress approaches the problem of Atomic Energy in an attitude which, for want of a better term, ~~we may call~~ scientists have begun to call "hickenlooperism", it will not be possible to make appreciable progress in this field.

2) ~~3~~) The incentives normally operating in the field of private enterprise are not sufficient to insure a rapid development of Atomic Energy, and therefore the major part, if not the whole, of this development must of necessity remain a government financed operation. No progress is possible, however, if we do not succeed ~~from~~ in freeing the research and development in this field from the impediments that usually afflict research and development work carried on within a large scale government operation. We must find a way to set up "research and development" units which can give their staff a reasonable assurance that the staff can look forward to accomplishing the task which they have set themselves, and that they will remain unhampered by rules and regulations which may be issued by the office of the General Manager of the Commission. Some way must be found to enable "research and development" units to operate in this field in much the same way as a private corporation would operate.

Even if the Commission should now undergo a change of heart and try to persuade first-class scientists to work in this field on a full-time basis, it will not succeed in doing so as long as it offers them nothing but frustration.

~~[illegible]~~ In the past the Commission ~~[illegible]~~ in deference to Congressional sentiment subjected scientists employed in this work) [illegible] on the [illegible]

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November 8, 1949

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Sunday, October 30, 1949

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While the Commission was exposed to attacks which scientists in general considered unjustified, apparently no scientist felt impelled to come forward and to volunteer information unfavorable to the Commission. But individual scientists cannot be expected indefinitely to exercise such restraint and there must be no conspiracy amongst scientists aimed at the concealment of the truth.

The truth is that, as far as general development of the field of Atomic Energy is concerned, the record of the Commission is bad. In these past four years not only have we failed to build reactors of any new type but construction has not even been started on any such reactor. This and other failures of the Commission are necessary consequences of the fact that the Commission did not tackle the job of enlisting scientific talent. The Commission was not even able to hold on to the best men who had remained at work in this field at the time when it took over.

There are notable exceptions. There are at present ~~a handful of~~ three or four outstanding ~~men~~ scientists working on a full-time basis in the field of Atomic Energy directly for the Commission or under its auspices.

We call upon our colleagues to inform the Chairman of the Joint Congressional Committee on Atomic Energy, Senator MacMahon, of what they know about the performance of the Atomic Energy Commission. He might then perhaps find that the new evidence warrants new hearings before Congress. If hearings are held they ought to be open hearings.

The scientific community has high regard for the Chairman of the Commission, who time and again has given expression to their ~~basic~~ belief in the fundamental importance of ~~human rights~~ our basic freedoms. The other members of the Commission are also outstanding men -- men of intelligence and good will. We do not look to changes in the composition of the Commission as the way to improve the performance of the Commission.

A government agency which has the task of developing the field of Atomic Energy is confronted with many difficulties. It is subjected to many pressures and it frequently moves along the line of least resistance. We believe that, irrespective of who the ~~commissioners~~ members of the Commission may be, no substantial improvement in the performance of the Commission can be expected unless -- from here on -- it will be subjected to public criticism on the part of the scientists who are acquainted with the field of Atomic Energy.

The main obstacles to progress in this field are two-fold:

1) No progress is possible if the Commission is harassed by charges of losing a few grams of fissionable uranium at a time when Russia is producing such material in quantity; if the Commission is harassed by charges of sending radioisotopes to Norway at a time when Norway, as we now know, might have obtained those isotopes from Russia; if the Commission is harassed by charges of failing to keep

our advances secret at a time when the only important secret was that we were not making any significant advances.

As long as Congress approaches the problem of Atomic Energy in an attitude which, for want of a better term, we may call "hickenlooperism", it will not be possible to make appreciable progress in this field.

2) No progress is possible if we do not succeed in freeing the research and development work in this field from the impediments that usually ~~accompany~~ afflict research and development work carried on within the framework of a large-scale government operation. The development of the field of Atomic Energy cannot be left to private enterprise because incentives normally operating in private enterprise are insufficient and inadequate to insure a rapid development of this field. The major part, if not the whole, of this development work must therefore of necessity remain a government operation. It is however possible, and it is necessary, to free important sectors of the research and development work from the type of bureaucratic control to which it is at present subjected. Constructive proposals along this line are needed and should be forthcoming as soon as scientists will discuss the issue involved in public.

Scientists may have no choice but to make grave charges against the Commission but each charge that is made ought to be substantiated when it is made. The scientists' case can be properly presented either in carefully considered magazine articles or possibly in open hearing before Congress. The undersigned ~~are confident~~ hope that adequate presentation of the issues involved will be forthcoming one way or another, and in the meantime they prefer to withhold further comment.

Confidential

November 9, 1949

Dear

You will receive from Joe Meyer a letter. At a meeting held in Princeton over the weekend of the 20th of October in which a number of distinguished scientists participated, there was strong sentiment expressed in favor of not holding back any longer with publicly criticizing the Atomic Energy Commission. There was enormous agreement that scientists will have to continue to emphacize the great difficulties which the attitude represented by Senator Hickenlooper puts in the way of a vigorous development of this field. Joe Meyer and I were appointed as a sub-committee of the group to try and draft a statement that will be submitted both to the members of the group and to a number of others that were not present with a view of possibly releasing it some time after November 7. A statement has been drafted and will be communicated to you by Joe Meyer. While I am in full agreement with the statement as such, I have come to the conclusion that for reasons of an overriding consideration, I wishto withdraw from further action and any other action that is likely to bring about a public debate of the issues involved in the near future.

The considerations which lead me to this decision are as follows:

In January, 1946, John J. McCloy, former Assistant Secretary of War, wrote an article saying he was told by the scientists who were responsible for the development of the bomb at Los Alamos during the war, that given two more years of the same intensive effort that went into the development of that bomb, it will be possible to develop a bomb 1000 times more powerful than the Nagasaki bomb. Some time ago, Sumner Pike made a speech in which, referring to McCloy's statement, he said that the two years have past and such bombs we do not have. Among scientists it is, of course, widely known that none of the first-

rate scientists capable of such a development have devoted their full time to this development of bombs in the past four years, and to them it is therefore obvious that there is no contradiction in McCloy's statement, misleading though Summer Pike's statement may be to the general public.

The general public does not know that the progress of our bomb development during the past four years moved along conservative lines and was very slow, but the great majority of the scientixxxfic community knows this. Now that the Russians have exploded a bomb, many of the scientists must ask themselves whether or not they ought to push for taking up bomb development along the lines indicated by John J. McCloy.

A bomb 1000 times more powerful would by blast destroy an area 100 times larger than the Nagasaki bomb. The scientists can be expected to be divided on whether or not--irrespective of what Russia may do--it would be wise to attempt to make such bombs, to demonstrate that they exist, and to build them in quantity. The question will be raised whether even assuming that Russia has such bombs, we would be better off or worse off if we had them also. Beyond that, the question would be raised just where the limit is to xxx end if scientists are permitted to go in the direction of increasing the power of destruction which they might place in the hands of political authorities in an imperfect world. Not only will the scientists be divided on these issues, but many a scientist will be divided even within himself and irrespective of whether or not he will decide to take part in such a development--if there will be such a development--he will remain unproductive because his heart will not be in this work. There is little doubt that ultimately that whether or not such bombs are to be made will have to be made by the American

people. Whether they find a correct answer or not will depend on whenthe question will be publicly raised and in what form it will be put.

Clearly we have to deal here with a political discussion of a first order of magnitude which will have to be made, but it does not have to be made at this moment and for reasons which I shall explain below, it ought not to be made at this moment. It is probable that if there is ordinary pressure on the part of scientists who wish to take up this development, some sort of interim decision is required. A decision that would remain a administrative decision rely on comparatively minor appropriations. The decision to grant those appropriations too is an administrative decision; the decision to refute them would no longer be a political decision which might easily force the Government to make a political decision at this time. Such a political decision could not for long be kept from the public and in that contingency, the issue might become a public issue in the very near future.

I have little doubt that most scientists will not reconcile themselves to an arms race with bombs, that if successfully produced, will transcend ~~xkk~~ what the imagination of the ordinary man can grasp. They do want to see an all-out effort to explore the possibility of a satisfactory settlement.

xxxx

I believe ~~that~~:

1) that there can be no agreement on the control of atomic energy, unless all strategic bombing is eliminated, general limitations are put on all armaments, and all outstanding post-war issues are settled;

2) that such an agreement must of necessity provide for inspection of an all-embracing nature;

3) that even though the varied reasons which Russia had in the past for objecting to extensive inspection may be removed, a general

Russian disinclination against inspection will remain, and that therefore inspection will be acceptable to Russia only if within the broad scope of the agreement she is offered great incentives in other fields.

Because of that doubt, I believe that such a peace settlement can be reached only if our peace offer is generous to a degree which the American public to date would not be willing to underwrite.

If, in the near future, a new approach were made to Russia on such a very broad basis, if the outline of a general peace settlement becomes feasible to the American people so that the American people are in a position to chose between two alternatives, peace along some line presented to them by our Government or an arms race of the type outlined above, the public discussion of the with which we are faced, and the political discussion which we will have to make on deciding for the bomb development, might induce the American people to give the State Department the support which it needs in order to be able to offer a peace settlement that has an reasonable chance of permanence. A public discussion of these same issues that evoke today and come out of a clear sky at a time when our representative and the Russian representative at Lake Success are still playing their own grammaphone records when talking about the control of atomic energy, can, I believe, only cause confusion and offers no guarantee otherwise that the right politically decision will be arrived at.

I think we ought to do our utmost at this time to bring these considerations to the attention of those who are responsible for continuing our foreign policy, and until our policy has a chance to lean in the direction of peace, we should do nothing to provoke a public discussion of the major political decisions. In the meantime, decisions which cannot be postponed ought to be administrative decisions in the

direction of preserving our freedom until such time that a political decision can be made public.

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direction of preserving our freedom until such time that a political decision can be made public.

Dear Leo
I had this typed at
Aberdeen
Joe

The undersigned scientists met for two days to discuss the situation facing the United States by the disclosure of the atomic explosion which occurred recently in Russia.

We have become convinced that the nature of the situation is not correctly understood by the American people. We believe it is the duty of the scientists, whose technical knowledge puts them in possession of the facts, to inform the public, in so far as they are permitted to do so by our present Security legislation, more accurately of these facts.

The present progress in new fields related to the direct use of Atomic Energy in peaceful research or wartime weapons, is scarcely one-tenth of the progress made by us during the war. The Russian progress from 1945 to the present has evidently matched our wartime rate. Scientists all over the world can envisage weapons which exceed in destructive power the present type of Atomic Bomb by approximately the same factor that those Bombs exceed Bombs made of T.N.T. There is no reason, in our estimation, to doubt that Russian scientists have worked towards the production of these more terrible weapons of destruction coincidently with the work which has led them to produce an Atomic Bomb of more conventional type. Our own progress since 1945 in this field has been negligible.

Although our stockpile of Atomic Bombs must exceed that of Russia, there seems to us to be no reason to believe that their production rate does not match ours, which has not been significantly increased since 1945.

The existence of Atomic Bombs makes their use against civilian centers of production the most efficient single weapon of war, although possibly not a decisive one. If the greater weapons, which we fear are possible, can actually be produced, their use against cities would probably be absolutely decisive, and warfare by two sides using such weapons might literally extinguish human civilization, or even life itself.

In view of these prospects it is but trite for us to point out that no future security for civilization can exist without peaceful cooperation between people, and the eventual union of the peoples of the world under one government. We have no desire to exploit the American people to a race in armaments, but we feel that our nation cannot pursue an intelligent and informed foreign policy if the American public is deluded into a sense that our weapons are most certainly far superior to those of any enemy, and that this superiority will last without change in our present progress. There are some who sat with us who, although agreeing with us unanimously as to the facts set forth here, refused to append their names to this statement, since they felt that this statement can only be regarded as a call to success

in an armaments race. We respect their decision.

Those of us who sign this feel it important to inform the public of what we firmly believe to be the truth. We have all agreed that a figure of one-tenth is a conservative statement of our present progress in new fields related to the direct use of Atomic Energy in war as compared to our pre-1945 rate. Some of us estimate the discrepancy to be greater. We are less unanimous in our estimates of the relative importance of various factors in accounting for the change of pace. Obviously the mere cessation of war has played a role.

We are all agreed that the existence of our present exaggerated Secrecy and Security methods have hampered progress. All of us believe our methods should be changed, and some of us believe that this is the most important prerequisite to progress. This does not mean that we are calling for the publication of the blue prints of our factories or our Bomb, but most of us believe that even this ridiculous proposal would be preferable to our present cumbersome method of hampering progress by the extreme restrictions on the dissemination of information within this country.

We are all agreed that the loyalty witch hunts have played an important note in discouraging good workers from entering this field of work. We are all agreed that the loyalty proceedings, as carried out, have been harmful and un-American.

We are all agreed that many or most of the attacks upon the Atomic Energy Commission in Congress have been aimed in the completely wrong direction, and have hampered that Commission from moving in the right direction. We regret exceedingly that the record of the first two years of keeping the Atomic Energy Commission out of partisan politics has not been maintained, and feel that a committee report split entirely on party lines is disgraceful.

We are all agreed that the primary cause of our slow progress lies in the dirth of able scientists working in the field. All of us agree that the Secrecy and Loyalty methods have contributed to this. Some of us would lay the major blame on these factors. Some of us point to a lack of imagination in the councils of the Atomic Energy Committee in attracting good men. Whatever the causes we regard as major, we are all agreed that the atmosphere which has made the scientific and engineering progress of our great University and Industrial Laboratories possible, does not exist in the Laboratories of the Atomic Energy Commission which are responsible for the future development of new fields of direct application of Atomic Energy. Work in this direction by the Laboratories of the great Universities or the Research Laboratories of the major Industries is hampered to the point of prevention by the Security and Secrecy methods.

We are all agreed that cooperation with other nations, such as Canada and England, which is forbidden by our present law, is not only desirable but imperative.

We agree that we ourselves, and our fellow scientists, have been derelict in our duty to our country by not making public earlier, our privately expressed criticisms of our progress. We believe that many scientists may disagree with the wisdom of our statement but we feel that but few would disagree with the truth of the facts we attempt to set forth.

We ask that Congress should set aside its partisan attack upon this problem, and undertake with careful deliberation, and without recriminations to ascertain those conditions under which successful progress can be made. We respectfully offer any help that we as individuals can give in these deliberations.

Form 3806-S (Rev. 2-52)

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POSTMARK

Fee paid 40 cents. *Class postage* 1

Declared value NV Surcharge paid, $_____

Return Receipt fee 7 Spl. Del'y fee 20

Delivery restricted to addressee:

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NOTICE TO SENDER—Enter below name and address of addressee as an identification. Preserve and submit this receipt in case of inquiry or application for indemnity.

Marshall N.E.C.

(Name of addressee) (P. O. and State of address)

A.E.C.

November 11, 1957

Dear Dr. Szilard,

The following letter, dated October 30, 1957, has been received from C. L. Marshall, Director, Div. of Classification, U.S. Atomic Energy Commission: which I have acknowledged,

"Dear Dr. Szilard:

In your letter of August 5, 1957 you requested the declassification of two documents which you identified as a letter from Dr. Teller and a letter from the Manhattan District, asking to reclassify the petition.

We have reviewed the Teller letter and have determined that it need no longer bear any classification. The letter has been declassified and is attached for your files.

The letter from Captain Murray, Manhattan District, is still under study. We will advise you as soon as a final determination has been made."

Kind regards,

L. Mann

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Kind regards,

135 S. La Salle

And 3-1131

THE QUADRANGLE CLUB **No. 3497**

Tobacco:

Cigars - - - - .....

Cigarettes - - - - .....

Tobacco - - - - .....

Box Matches - - - .....

....

Soft Drinks:

Iced Tea - - - - .....

Iced Coffee - - - .....

Iced Juices - - - - .....

Root Beer - - - - .....

Coca-Cola - - - - .....

Ginger Ale - - - - .....

White Rock - - - .....

....

Candy - Gum - - - - .....

Tennis:

Balls - - - - - .....

Court - - - - - .....

From.....M. until.....M.

Name of Guests:

.....

.....

Tax .....

Total .....

Date.....

Signed.....

Nier
Seitz
Maurer
Alvarez
Mc Millan
E. O. Lawrence
Farrington Daniels
Weisskopf
Livingston
Bethe
Karl Cohen
K. Way
Latimer
Hecht
Sachs
Trakowitsch
Sugarman
S. K. Allison
Way
Blaisser
Harry Brown
Hagness
Brobst
Warren Johnson
John Warner
Ed Creutz
Gale Young
Coryell
Bill Libby

Table d'Hote Dinners

Our Food is Home Cooked by Expert Women Cooks

Price of Entree Determines Cost of Dinner

●

Tomato Juice Cocktail
V-8 Cocktail

Grapefruit Juice
Apricot Juice

Fruit Cup
Apple Juice

OR

Consomme Anelli

Minestra Milanaise

	Dinner	Plate
BROILED FRESH LOBSTER TAIL, DRAWN BUTTER	2.00	1.75
GRILLED SUPERIOR LAKE TROUT, LEMON BUTTER	1.55	1.30
FRIEL FILET OF PERCH, TARTAR SAUCE	1.35	1.10
EGG OMELETTE, DICED FRUIT	1.25	1.00
BOILED FRESH BRISKET OF BEEF, HORSERADISH SAUCE	1.60	1.35
BREADED PORK TENDERLOIN, APPLE SAUCE	1.80	1.55
CHICKEN POT PIE, FLAKY CRUST	1.80	1.55
CALF'S LIVER SAUTE, BACON STRIP	1.80	1.55
HALF SPRING CHICKEN, BROILED, ON TOAST	2.25	2.00

Dinner Rolls — Corn Muffins

(Appetizer, Salad or Dessert on the Plate Dinner 15c. additional)

Choice of Two

Snowflake or Baked Potatoes

Fresh Carrots or Buttered Broccoli

Sherbet

Apricot and Cottage Cheese or Head Lettuce, Choice of Dressing

---

Apple Pie — Hot Mince Pie with Brandy Sauce — Windermere Cheese Cake

Kadota Figs — Blenheim Aprciots

Sherbet — Chocolate Sundae — Ice Cream — Fruit Jello

Camembert or Liederkranz Cheese (10c. extra)

Coffee, Tea or Grade "A" Milk

ALL SUBSTITUTIONS 10c. extra

Breakfast Served from 7:00 to 10:00 A. M. - Dinner from 5:30 to 8:00

Sunday Southern Breakfast 8:00 A. M. to 2:00 P. M.

HOTEL WINDERMERE WEST — Thursday, November 3, 1949

Farrington Daniels (B ?)

Ed Creutz (S)

Federation of American Scientists (Sz)

Jake Warner (S)

Wendell Latimere

Bernard Feld (B)

Gale Young

Newson (S)

Felix Bloch (S)

Charles Coryell (B)

Placzek

V. Weiskopf

H. Bethe

Robert Marshak (B)

Robert Wilson (B)

Karl Cohen

R. Nier (B)

John Williams

Critchfield (S)

Robert Sachs (S)

Herb

H. C. Urey

Joe Mayer

Harrison Brown

Thorfin Hogness

Linus Pauling

Fred Seitz

E. P. Wigner

Edward Teller

H. J. Muller

Alvarez

McMillan

Frank Spedding

Stanley Livingston (S)

Kay Way (S)

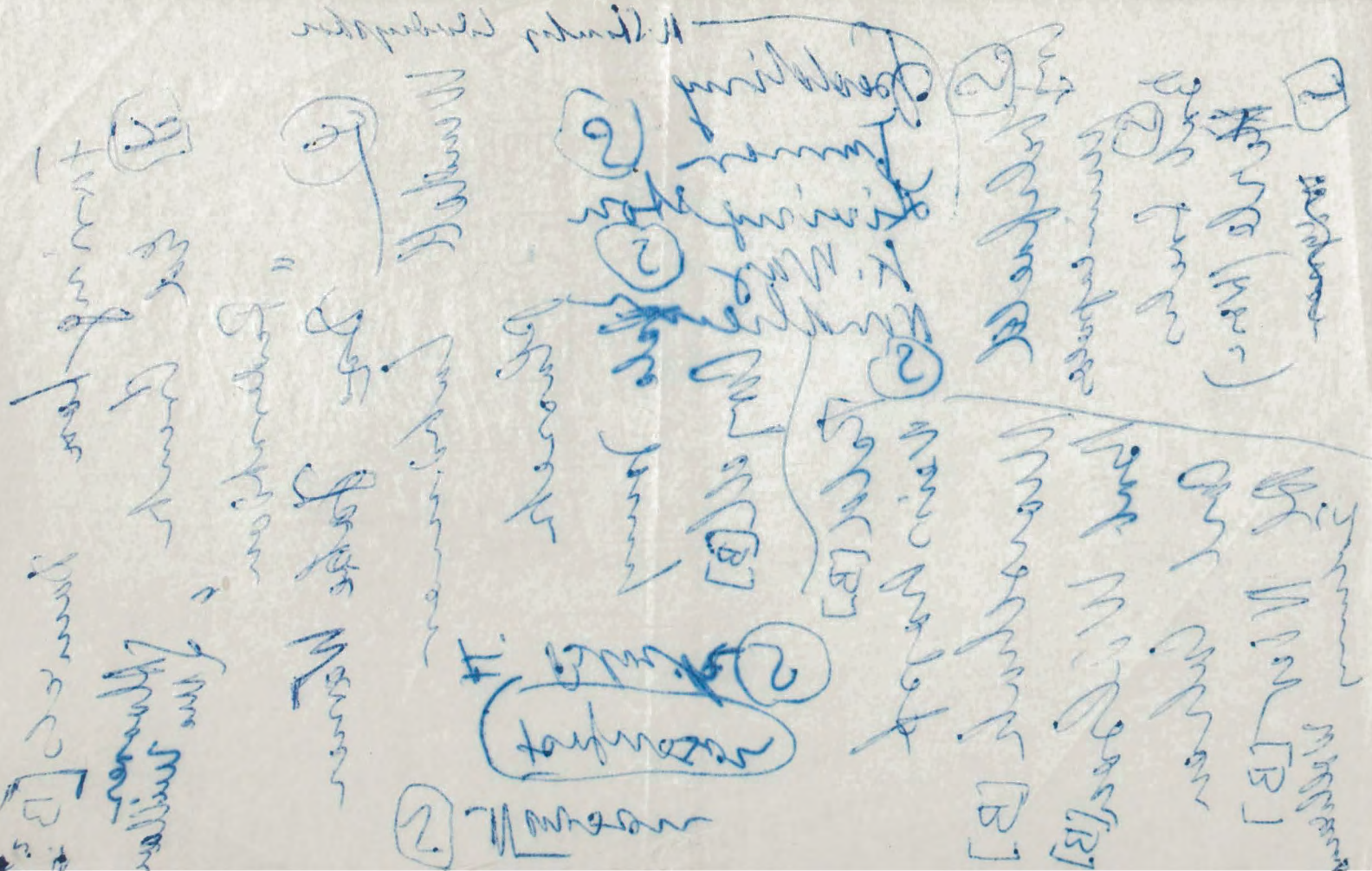
Nordheim

Ever since the Atomic Energy Commission was appointed in the fall of 1946, it has been under Congressional pressure in the direction of greater secrecy. This pressure culminated in Senator Hag charges against the Commission. The Commission was attacked because of the loss of a small quantity of uranium, because of insufficient secrecy, because of insufficient care in selecting its employees from the point of view of loyalty, and because it shipped isotopes abroad to countries which are our allies. The scientific community, with no single voice desenting, supported the Commission against these attacks, and the majority report of the joint Congressional committee of Atomic Energy exonerated the Commission from the charges. We believe that on the basis of the evidence submitted at the hearings, the Commission had to be found not guilty. For a long time now, the scientific community was deeply critical of the performance of the Commission. We have little doubt that criticism would have been voiced earlier if, faced with the unjust attacks against the Commission, the scientists hadn't individually placed restraint upon their public utterances. While these attacks lasted, none of us felt impelled to come forward and to volunteer information that would have been damning to the Commission. It is, however, not possible for us to remain silent any longer; but for various reasons, we believe that the American people are entitled to know the truth about the Atomic Energy Commission. Not that it is possible for the truth to be told short of a conspiracy of scientists in which we must not engage. The truth is that as far as the general development of the field of atomic energy is concerned, the record of the Commission is a very bad one. In these four years, not only have no reactors of any new type been built, not even construction has started on any such reactors. This, and the other failures of the Commission, are the

necessary consequence of the fact that the Commission just did not tackle the job of enlisting scientixxxfic talent. Not only did they fail to encourage the enlisting of fresh talent, they even lost a considerable fraction of the good men whom they inherited from the Manhatten district. There are still a few outstanding men working in this field. They are notable exceptions. They are not in this field because they were encouraged by the Commission; they are in it in spite of lack of encouragememt on the part of the Commission. We call upon all of our colleagues to freely express their xxxxxxxx opinion and substantiate it as well as they can in face of the prevailing secrecy regulations and to commit their finding to ~~come and say it to~~ the chairman of the joint Commission on Atomic Energy, Senator MacNair. If the chairman of the Commission finds that the new evidence warrants a hearing before his committee, the undersigned will appear before the Commission in an open hearing if asked to do so. We have no quarrel with any member of the Commission. Two of them have only recently joined the Commission and cannot be held responsible for the records of the Commission during the last three years of its history. The remaining three, who cannot be exonerated from the responsibility, are good men. We do not look to an improvement by having them replaced. Our quarrel is not with persons; our quarrel is with an attitude. We can expect the members of the Atomic Energy Commission to wish to do a good job on the development of atomic energy, but we cannot expect them to have a passionate desire for the development of this field which many of the scientists engaged inthis work during the war have acquired and which some of them have retained. The Atomic Energy Commission in the past moved along the line of least resistance. It followed the pressure, and the pressure came mostly

for

from Congress. Inevitably, this situation will remain so in the future also unless from here on, the scientific community will serve criticism to the Commission for its short comings. The charges that will be made will be grave charges. They should not be made unless they are substantiated. They cannot be substantiated in press interviews and radio talks. They can be substantiated either in open hearings before Congress or in magazine articles. We are convinced the Bulletin of the Atomic Scientists will be prepared to print such articles, and that every scientist that has a case will be able to present his case in that manner. Once a case is presented, the scientists will be at the disposal of the press. Until this case is presented, the undersigned will withhold further comment.



Farrington Daniels [B?]

(Y) Ed Creutz

{Alvarez & McMillan

(L) "Federation" Jake Warner

Wendell Latimer

(S) Newson

Placzek

H. Sturley Washington

Goldring

Zinn

Livingston

A. Wattenberg

Anderson

(S) Gale Young

Coryell [B]

(S) Smith

Thompson

(S) Kold [B]

Weisskopf

(S) Ehrenfeld

Minneapolis

(S) Bob Sachs

Herb (Worc.)

(S) Lyman

Marshak [B]

Bob Wilson [B]

Carl Cohen

Al Nier [B]

Edmund Williams

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D.C.

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Remarks by Robert F. Bacher,
Member, United States Atomic Energy Commission,
before the American Academy of Arts and Sciences
Boston, Massachusetts, February 9, 1949

THE DEVELOPMENT OF NUCLEAR REACTORS

The development of nuclear reactors is one of the most vital technical jobs in the world today. Upon the outcome of this development may depend man's utilization of some of the world's most important natural resources. These resources properly developed and controlled may contribute greatly to the enrichment of our lives.

Nuclear reactors are machines for the release of energy at a controlled rate so that it can be made to serve men's purposes. These reactors grew out of the wartime work to develop the atomic bomb. Whether or not their development will play a major role in a peaceful world depends at least in part upon the future course of international relations; in particular, it depends upon the effect of these relations upon our national policies and upon the military applications of atomic energy. We must be clear that the development of atomic energy has both important military consequences and great promise of peace-time usefulness and that these two cannot be separated.

Nuclear reactors are important for both purposes. Most nuclear reactors produce fissionable material. If separated in a purified state, this material may be used as the fundamental ingredient of an atomic bomb. But fissionable material may also be used as the nuclear fuel in a reactor which furnishes useful heat or electrical energy. It may in the future be used as the power source for driving ships and perhaps aircraft.

In the fission process within a reactor a nucleus of uranium 235 may, when struck by a low energy neutron suddenly break into two fragments. Several things happen: the fragments are

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ejected with very high velocity and in each individual atomic fission a relatively large amount of energy is released; the fragments are highly radioactive and penetrating radiations are emitted in their decay; during the fission process neutrons of high energy are emitted and these may be utilized, if care is taken, to produce another fission. It is this emission of neutrons in the fission process that gives the possibility of producing the chain reaction essential to the working of a nuclear reactor or of an atomic bomb. The chain reaction must be controlled if it is to be useful in a nuclear reactor. This proves to be possible because a fraction of one per cent of the neutrons set free are sent out by the fragments some time after the fission takes place and this time lag makes a simple control possible.

It has long been known that atomic nuclei could be disintegrated, or to use the vernacular, atoms could be split, with a net energy gain. What is different about the fission process is the chain reaction feature. Neutrons are produced which can themselves produce fissions. But unless one is careful, most of these neutrons will somehow escape and not bring about new fissions. A nuclear reactor must be designed in such a way that the neutrons emitted in the fission process are utilized either to produce new fissions or for some other useful purpose.

Fortunately, there are some elements in nature such as carbon, heavy hydrogen, oxygen, and beryllium which absorb neutrons only very slightly. Since these materials also reflect the neutrons it is possible to use them to prevent neutrons from escaping from a reactor. The neutrons emitted in the fission process have high energy and since these materials reduce the neutron energy in the collisions that produce reflection, they are sometimes called moderators. The loss of energy is important since neutrons of low energy have a larger chance of producing fission in uranium as indeed they do of producing nuclear reactions in general.

The whole reactor must be surrounded by a thick shield to protect personnel from the radiations produced by the active fission products.

The first chain reaction was achieved in a structure built up of blocks of high purity graphite with lumps of uranium and some uranium oxide embedded at proper intervals. The structure was piled up cautiously with a careful watch kept since, as the structure grew in size, it finally reached a critical condition

in which the neutrons emitted by the uranium and properly reflected by the graphite were adequate to sustain the chain reaction. It was soon found that the reaction could easily be controlled by inserting or removing materials which absorbed large numbers of neutrons, and thus slowed or stopped the process.

The energy set free by a chain reaction is liberated very close to the place where each nuclear fission takes place and appears as an intense local heating. The problem of utilizing this energy efficiently is one of the reactor development problems. Either to use this energy or simply to dispose of it, it must be removed by some heat transfer agent. In the reactors built during the war the heat energy was removed by circulating air or water and the heat really was wasted.

These wartime reactors were constructed because they could be used to produce a new element--plutonium. This new element is produced by the action of the reactor neutrons on the main part of the natural uranium which is uranium of mass 238.

Plutonium, like uranium 235, is a fissionable material and can be used for atomic bomb production or as a nuclear fuel in reactors. These two materials have been produced in some quantity and together with uranium 233, which may be produced from thorium in a nuclear reactor, constitute the materials known today which are fissionable with low energy neutrons.

At this point it may appear that all we need to do to produce an atomic bomb is to throw a reactor out of control. The problem of producing a nuclear explosion is, however, not so simple. It is not enough just to bring together an assembly of uranium 235 or plutonium that is slightly super-critical--that is to say, an assembly that will release and retain just a little more than enough neutrons to maintain the chain reaction. In order to bring about a large nuclear explosion, it is necessary to make a highly super-critical assembly of relatively pure fissionable materials. Such an assembly will release and retain for a fraction of a second a great, growing burst of neutrons, and the billions of fissions will liberate great amounts of energy, amounts equivalent to those set free by the detonation of thousands of tons of chemical explosives. The conditions necessary for such an explosion cannot be attained in a nuclear reactor.

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The reactors in operation today are for the most part the result of wartime development, though since the war an important research reactor which operates with high energy neutrons and with plutonium as nuclear fuel has been constructed and put into operation at Los Alamos Laboratory. Another new reactor of more conventional design is nearing completion at the Brookhaven National Laboratory. The reactors built in wartime at Oak Ridge and at the Argonne National Laboratory near Chicago have been used extensively for research and development work, and the Oak Ridge reactor has been used to produce most of the radioisotopes which the Commission provides to hospitals, schools and laboratories here and abroad. So far, almost 5,000 shipments of radioactive isotopes have been made in the United States and nearly 400 shipments have been sent overseas. These radioisotopes are turning out to be invaluable as aids to research in many diverse subjects from metallurgy to biology and medicine. It is becoming increasingly apparent day by day that we have so far only begun to scratch the surface in their usefulness.

The big reactors at Hanford, Washington, built during the war to produce plutonium are in full operation today. Major repairs have been made to them to insure continued operation. New units are now under construction which during the current year should provide additional plutonium production capacity. These reactors all have plutonium production as their objective.

At the end of the war there was a great deal of optimism about nuclear reactors. Many technical people felt that the development of nuclear reactors could take place with great rapidity. But they did not fully understand the difficulties involved. These difficulties are now being overcome, and in fact, we now begin to see our way through most of them.

Most troublesome of these difficulties was the effect of the intense radiations in a nuclear reactor upon the materials of which the reactor was constructed. In addition, there were corrosive effects and difficulties which arose from violent temperature differences and temperature changes. Some of these difficulties had been predicted, but their seriousness was not fully understood until the end of the war. While they caused a certain amount of back-tracking in reactor development, we stand today with a fuller understanding of these effects and with a much better foundation of knowledge on which to build new reactors.

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For the past two years men in various laboratories of the Atomic Energy Commission have been designing new reactors. Their design work has, of course, been backed up by many experiments: Scientists have measured many nuclear constants; they have carried out experiments with near-critical assemblies of fissionable materials and reflecting materials; and they have studied the properties of new material for use in building reactors. This important work on reactor components comprises roughly a third of the reactor development program from a cost standpoint, and of course, is vital to the whole program. On the basis of all this work, construction plans for several new reactors are now being formulated.

Before we examine the specific reactors which are soon to be built let us look back to the fundamental products of the fission process and see how these products may be utilized in nuclear reactors.

We saw that the fission process produces neutrons. These neutrons, if they can be produced in excess, may be utilized either in the production of radioactive isotopes, or in the production of new fissionable material. A reactor designed to give an excess of neutrons may be designed as a producer of radioactive materials or of new fissionable materials. Since we are particularly interested in the production of large quantities of fissionable materials, this will prove to be one of the fundamental goals of reactor development.

Secondly, we recall that the fission process produces energy. This energy appears first of all as energy of motion of the two fission fragments but quickly causes a local heating of the fissionable material. Under suitable conditions, this heat energy may be utilized directly or it may be used to produce electrical energy. Hence, another of the goals of this nation's atomic energy program is to construct a nuclear reactor from which useful energy can be obtained. Such a reactor might be a large stationary unit which could be the energy source, the furnace so to speak, for an electrical generating plant. Again, it might take the form of an energy source for the propulsion of a ship. Of course, the requirements in space and weight and so forth must be taken into account.

Thirdly, we saw that the fission process resulted in the production of highly radioactive fission products. These comprise a large number of elements. They appear as a radioactive contaminant in the fissionable material itself. At the present

moment, these fission products are a considerable headache since they must be removed in the reprocessing of the partially used fissionable material, or fuel, to reclaim it for further use. They are now extracted in large volumes of solution which are cumbersome to handle. A few of these fission products have been separated and used in biological, medical and other work. Perhaps, in the future we shall find better ways of concentrating these radioactive fission products, and they may at that time have other beneficial uses. Today, they are mostly a troublesome by-product which must be handled at considerable expense so as to protect people from the radiations.

Now, to turn to the reactor development program itself: This program includes planning of reactors for actual construction and many studies of reactors and parts of reactors which may reach the construction stage sometime in the future.

After consideration of the designs and proposals which have been made for new reactors, the Commission has come to the conclusion that four new-type reactors should be built in the near future. These will form the backbone of the United States' reactor development program at the present time. They are:

1. A materials testing reactor which, as its name indicates, will be used in the studies of materials to be employed in building reactors.

2. A Navy reactor designed as a land-based prototype of a reactor for use in propelling naval vessels of appropriate types.

3. An experimental "breeder" reactor designed to operate with high energy neutrons. This will be used to explore further the possibilities of breeding--that is, producing more fissionable material than is consumed in the operation of the reactor--and also of power production.

4. An experimental "breeder" reactor designed to operate with neutrons of intermediate energy and to explore their possibilities for breeding, as well as to produce usable power.

The Commission proposes to go ahead with the construction of these four reactors and at the present time does not contemplate the construction of any other major units as part of

the reactor development program in the next year and a half. Plans beyond that time will, of course, be determined by the results of studies now in progress.

The materials testing reactor is a vital part of the reactor development program. The primary purpose of this reactor will be to bombard with neutrons reactor construction materials contained in test pockets. The neutron bombardment is to be of intensity very much greater than ever experienced before even in the large production reactors at Hanford. Today, we are limited in the neutron intensity which we can use. The reactors of the future, we believe, will subject materials to very much more vigorous irradiation. We cannot find out how the materials used in the structure or the cooling systems or shields of reactors will behave until they have been studied intensively in this materials testing reactor. It has been in the process of design at the Oak Ridge National Laboratory for the past two years. Plans for its construction are now being prepared jointly by the Argonne National Laboratory and the Oak Ridge National Laboratory.

The materials testing reactor will also produce a relatively large amount of energy in a small space. Removal of this energy poses one of the central problems in the reactor design, but solving this problem itself is important in the design of reactors of the future. The materials testing reactor will also provide an intense source of neutrons which we hope to use in new physical experiments.

The Navy reactor is now being developed by the Argonne National Laboratory and arrangements have just been completed with the Westinghouse Electric Corporation to carry these designs through to the construction and operation of a reactor which we hope will serve as the land-based prototype for a power source for a naval vessel. The fuel elements of this reactor as well as those of the materials testing reactor will contain uranium enriched in uranium 235. Due to the tremendous energy content of uranium 235, a single charge of the reactor will provide power to propel a ship tens of thousands of miles. After depletion, or partial depletion, the fuel elements will be removed and replaced by new material while the old is reprocessed. Much work remains to be done before this reactor will become a reality. Today, the plans for the land-based unit are not yet finished, but we hope that they will be completed and that actual construction on this unit will be started in about one year.

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The third major unit in the reactor development program is the experimental breeder or fast reactor. This has been under design at the Argonne National Laboratory for the past two years or more. It is unique among the new reactors to be constructed in that it will operate with high energy neutrons. It differs from the fast reactor now in operation at Los Alamos in that it has uranium 235 fuel elements in place of plutonium and it will operate at a very much higher power level.

In addition to the design work which has been carried on at the Argonne National Laboratory, there has been a great amount of experimentation. Many of the actual design features of the reactor have been under test for some time. For example, it seems to be desirable to use a liquid metal to transfer heat from the nuclear reactor. There are many reasons for using a liquid metal, but probably the most important is that one can thereby obtain a high temperature which makes for greater efficiency in the conversion of heat energy into electrical energy. It is also possible to find metals which absorb neutrons only slightly. Absorption is just a loss of the neutrons which might otherwise be used to produce fissionable material or radioisotopes. We hope that the fast reactor will be an important step toward a breeder reactor which operates with high energy neutrons. This reactor will also provide for the conversion of heat energy into electrical energy although the amount of electrical energy which it will produce will most certainly not be very large.

The fourth machine in the program is the intermediate reactor now being designed and planned for construction at the Knolls Atomic Power Laboratory in Schenectady operated by the General Electric Company. This is so named because it operates with neutrons of intermediate energy. This reactor will contain some reflecting material which will lower the neutron energy but not as much of such material as it would contain if it operated with neutrons of low or thermal energy. Up to the present time, no reactor has been built to operate in this intermediate energy region, and our experience is very limited.

As in the case of the fast reactor, the heat energy will be removed from the reactor by circulating a liquid metal. It is planned to utilize the heat carried off by this liquid metal to generate electrical energy. It is also planned to test the possibility of breeding new fissionable material with intermediate energy neutrons. Whether or not such an intermediate reactor will be a successful breeder is now quite unknown. The designs for this unit are now well under way. Preparations at the site at West Milton, New York, about 20 miles north of Schenectady, have been started and it is hoped that construction of the reactor will start during the current year.

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The present reactor development program is built around the design and construction of these four reactors. The Commission wants to get ahead with them as fast as we can.

After a great deal of consideration about how the work on new reactors can be pushed forward in the coming years at the greatest possible speed, the Commission has recently decided to construct a field station for the testing of nuclear reactors under high level operating conditions. This field station will become a major new installation in the next few years. The site for this new installation has not yet been selected but enough prospecting has been done to determine that it will be in the western part of the United States.

This new test station will be essentially a field facility for the Argonne National Laboratory which is the major center of the Commission's nuclear reactor development program. The Oak Ridge National Laboratory, the Knolls Atomic Power Laboratory and the Westinghouse Electric Corporation, as well as other Commission laboratories will also use this station as a field test site.

Work at the field station will be devoted to the final development and proving under actual operating conditions of new types of reactors. How many new reactors will be built at this new site in the next few years will depend upon the whole course of reactor development. At present it is definitely planned to build there two of the four reactors now on the drawing boards--the materials testing reactor and the Navy power reactor. Looking to the long-range development of reactors, it is likely that in the future several additional reactors will be built at this new location, as well. For this reason, many of the same security, safety, and operation requirements that governed the selection of the Hanford site necessarily apply in the selection of the new test site.

While the primary purpose of the new site will be for the testing of new reactors, it is planned that facilities for the chemical processing of reactor fuel elements and the recovery of useful material as well as for the concentration and handling of fission products from the reactors will also be provided there. Some experimental work will be carried out with reactors at the field test station, but laboratory and service facilities are expected to be kept at the minimum needed for operations at the site.

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In addition to these four reactors which are now definitely planned for construction, several others are being studied. Depending upon the outcome of these studies, definite plans for construction of additional units may be formulated in the future.

Probably most exciting of these and also most long range is the development of a nuclear reactor to power an aircraft. During the past two and one-half years a project to study this possibility has been carried out by the Fairchild Engine and Airplane Corporation under the supervision of the Air Forces and in cooperation with the Commission. This project is called the NEPA project which is short for Nuclear Energy for the Propulsion of Aircraft.

Recently at the suggestion of the Research and Development Board of the National Military Establishment, the Commission provided for an extensive review of the whole subject of propulsion of aircraft by a nuclear reactor. This review was conducted under the supervision of the Massachusetts Institute of Technology, and constitutes the most definitive assessment of the possibilities in this field. At the moment, this survey, called the Lexington Project Report, is being studied and its conclusions are being used to formulate new plans for Commission work in this field.

The main part of the reactor development program is built around the construction of units which utilize fissionable material in purified or enriched form as the fuel elements. The production reactors in use at Hanford utilize natural uranium for fuel. One of the questions now under consideration is whether a practical reactor can be constructed using natural uranium for fuel and designed to operate primarily for power production with minimum replacement and reprocessing of fuel elements. Whether or not such a unit is feasible is closely tied to the development work on reactor materials now being carried on as an important part of the reactor development program.

A third new possible type of reactor is in our specialized vocabulary called a homogeneous reactor. All reactors constructed so far have been, except for one small experimental unit, built upon the principle of embedding fuel elements in other materials which are then used for cooling, reflecting, and moderating purposes. For many years the question has been studied and restudied from time to time to see whether it would be feasible and practical to make a reactor in which these elements were all mixed together uniformly--hence, the term "homogeneous reactor."

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We hope that these studies can be carried further since, if they should prove successful, there is the interesting possibility that the nuclear reaction, the removal of energy, and the re-processing of nuclear fuel could all be put together in one extended unit.

Studies are also being carried out on the design of a simplified research reactor. Such a unit designed primarily for research purposes and the training of new technical people in this field we hope can be built on a much more modest cost basis than any of the reactors which we have discussed here.

The question is always raised in reactor development as to how much of the work is devoted to peace-time development and how much is devoted to military applications. While one of the units which the Commission proposes to build is designated primarily as a source of power for a naval vessel, the work on this reactor as well as the work upon the others will apply both to military developments and to peace-time developments. No sharp dividing line between these applications of reactors can be made.

The question is also raised: "Will nuclear power be economical?" It is one of the aims of the reactor development program to answer this question. Today we do not have adequate information to make a sensible estimate. It looks as if it might be possible to develop economical power from nuclear reactors but many improvements and simplifications will be necessary.

Because the weight of fuel required by a nuclear reactor is small, its possible usefulness as an economic source of power may first be demonstrated, if at all, in remote regions which today do not have hydroelectric or steam power available. In terms of competition with other fuels where these are easily available, the economic problem is much more difficult. The answer to the question whether nuclear power will be economically feasible must await the outcome of the reactor development program now gathering headway.

The present reactor development program should tell us whether it is technically feasible in a small-scale plant to produce electrical energy from a nuclear reactor. If the results are favorable, it will then be possible to design a larger scale reactor for the development of electrical energy and in the course of this development it should become clear whether this

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possibility is economically feasible. Within eight to ten years such a unit should be in operation. But for nuclear energy to have any significant impact upon the country as a source of electrical energy would take much longer even granting economic feasibility.

In view of the meagerness of definite information about the long-range future of nuclear reactors, I suppose that each of us is eligible to some opinion. My own feeling is that the possibilities for benefit to man from this development of atomic energy are very great.

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TO: UNITED STATES ATOMIC ENERGY COMMISSION
Washington 25, D.C.

JULIUS TABIN
462 PARK AVE
GLENCOE, ILL.

IN THE MATTER OF THE APPLICATION)
OF)
Glenn T. Seaborg, Joseph W.)
Kennedy, Arthur C. Wahl, and)
Emilio G. Segre, for just)
compensation and/or an award.

AEC DOCKET NO. 7

OFFICE
135 S. LASALLE ST
CHICAGO 3, ILL.
FR-2-7842

NOTICE OF APPEARANCE AND AUTHORIZATION

We, Glenn T. Seaborg, Joseph W. Kennedy, Arthur C. Wahl, and Emilio G. Segre hereby appoint Donald E. Lane, a member of the bar of the District of Columbia, as Counsel in the above-identified proceedings, to represent the applicant (s) and to transact all business with the Commission and its Patent Compensation Board in connection with the application and the proceedings thereon.

You are hereby authorized and requested to send all communications and notices in connection with the above application to said counsel addressed to 1337 G Street, N. W., Washington 5, D. C.

Signed at Berkeley, California on this 13th day of January 1950. (G.T.S. & E.G.S.)

Signed at St. Louis, Missouri on this 19th day of January 1950. (J.W.K. & A.C.W.)

/s/ Joseph W. Kennedy
Joseph W. Kennedy

/s/ Arthur C. Wahl
Arthur C. Wahl

/s/ Glenn T. Seaborg
Glenn T. Seaborg

/s/ Emilio G. Segre
Emilio G. Segre

STATE OF CALIFORNIA)
COUNTY OF ALAMEDA) ss.:

Before me personally appeared Glenn T. Seaborg and Emilio G. Segre known to me as the person (s) described in the above Notice who executed the foregoing Notice in my presence.

seal

/s/ Sonia Mariola
Notary Public

STATE OF MISSOURI)
COUNTY OF ST. LOUIS) ss.
seal

Before me personally appeared Joseph W. Kennedy and Arthur C. Wahl known to me as the persons described in the above Notice who executed the foregoing Notice in my presence on this 19th day of January 1950.

(illegible) /s/ Thornton
Notary Public

seal
My Commission expires 10/20/52

UNITED STATES ATOMIC ENERGY COMMISSION
PATENT COMPENSATION BOARD

Application of GLENN T. SEABORG, JOSEPH W. KENNEDY, ARTHUR C. WAHL, and EMILIO G. SEGRÈ for just compensation and/or an award	AEC DOCKET NO. 7

Glenn T. Seaborg, Joseph W. Kennedy, Arthur C. Wahl, and Emilio G. Segrè, hereinafter referred to as Applicants, hereby jointly apply to the United States Atomic Energy Commission for just compensation and/or an award under Section 11 of the Atomic Energy Act of 1946, approved August 1, 1946, on the basis of the following facts:

1. Each of the above-named Applicants is a citizen of the United States of America.

2. The Applicants have on various dates prior to the sixtieth day after August 1, 1946 filed with the Atomic Energy Commission, through its predecessors, United States Engineer Office, Manhattan District, War Department, and the Uranium Committee, Washington, D. C., certain reports, including, among others, Reports A-22, A-33, A-135, A-136, and CN-1488, identified more fully in Appendix A, disclosing certain inventions made by the Applicants in devices and masses, the preparation of masses and compositions and the chemical separation thereof, said certain inventions having been made prior to the first day of April, 1941.

Date of first contact with U of Cal.

3. The Applicants have upon the request of the Atomic Energy Commission, or its predecessors, executed certain applications for United States Letters Patents relating to their inventions and containing claims directed to said certain inventions made prior to April 1, 1941, and said patent applications include Atomic Energy Commission applications designated OSRD Cases S-52a, S-52b, S-52c, and S-52d, identified more fully in Appendix B, all classified, and possibly other patent applications.

4. Applicants believe that the technical reports mentioned in paragraph 2 and the patent applications mentioned in paragraph 3, or true copies thereof, are now in the possession of the Patent Branch, Atomic Energy Commission, and that in view of security regulations it is unnecessary to attach copies thereof to this application at this time. It is therefore requested that the Patent Branch, Atomic Energy Commission, produce the original or true copies of said reports and applications at the prehearing conference and at the hearing on this application.

5. The Applicants have agreed between themselves that the tangible benefits of any disposition, sale or license of the subject matter of OSRD Cases S-52a, S-52b, S-52c and S-52d and of other cases based thereon, shall be divided in four equal parts among the four Applicants. This agreement was dated June 8, 1945, entitled "An Agreement Concerning Rights to Certain Inventions", and was executed

by each of the present Applicants in September, 1945, and a true copy thereof is annexed hereto as Appendix C.

6. The Applicants, at the request of the Contracting Officer of the United States Engineer Office, Manhattan District, War Department, did execute a classified agreement on September 17, 1945, identified as Contract No. W-28-094-eng-30, wherein it is acknowledged that the four Applicants desired to retain title to certain inventions made after April 1, 1941, as well as prior to April 1, 1941, and the Government agreed to permit the Applicants to retain title to inventions claimed and described in Case S-52. By said agreement, the Government appears to have extracted from the Applicants for the sum of one dollar--

a. A non-exclusive, irrevocable and royalty-free license in and to inventions in masses, compositions and substances and processes and methods of chemical separations thereof made prior to April 1, 1941 and described and claimed in Case S-52.

b. A non-exclusive, irrevocable and royalty-free license to make and use the masses, compositions, and substances and to use the processes and methods described and claimed in Case S-52.

c. An assignment of entire right, title and interest in and to inventions made prior to April 1, 1941 "other than the subject matter incorporated in Case S-52."

A true copy of this contract No. W-28-094-eng-30 dated September 17, 1945 and of Modification No. 1, dated September 21, 1945, is believed to be in the possession of the Patent Branch, Atomic Energy Commission, classified, and it is therefore requested that said Patent Branch produce the original contract or true copies of said contract and modification at the prehearing conference and at the hearing on this application.

7. It is believed that the subject matter of Case S-52 was divided into the four applications noted in Appendix B before filing in the United States Patent Office.

8. Applicants acknowledge that temporary assignments of title in cases S-52a, S-52b, S-52c, and S-52d, to the Government were executed on or about May 26, 1947 and June 4, 1947, for the sole purpose of enabling the Atomic Energy Commission to secure a special handling status for these cases in the United States Patent Office, and that said assignments specify that said title is to revert to the inventors upon the issuance of any patents based on said cases. It is believed that the Patent Branch, Atomic Energy Commission, has possession of these temporary assignments, and said Patent Branch is requested to produce said assignments or true copies thereof at the prehearing conference and at the hearing on this application.

9. At the time Applicants signed the above contract W-28-094-eng-30 and the patent applications, the Atomic Energy Act of 1946 was not in effect.

10. This application for just compensation is based on Section 11, subsection (d) of the Atomic Energy Act of 1946, wherein "the Commission is authorized to purchase, or to take, ---------- and make just compensation for, (1) any invention or discovery which is useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon, or which utilizes or is essential in the utilization of fissionable material or atomic energy, or (2) any patent or patent application covering any such invention or discovery.

11. This application for an award is based on Section 11, subsection (e) (2) (c) of the Atomic Energy Act of 1946, wherein "any person making any invention or discovery useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon who is not entitled to compensation therefor under subsection (a) (compensation for revoked patents) and who has complied with subsection (a) (3) (filed reports) above may make application to the Commission for, and the Commission may grant, an award.

12. In presenting this application for just compensation and/or an award, Applicants have no intention of violating and they do not believe that they or any of them violate the provisions of Section 283 of Title 18 USC

(formerly Section 109 of the Criminal Code), or of Section 12c of the Atomic Energy Act of 1946, or of Section 1498 of Title 28 USC, relating to suits in the United States Court of Claims, by virtue of the status of some of the Applicants as member of the General Advisory Committee or other committees, or as consultant to specific activities directed by contractors to the Atomic Energy Commission. At the present time, Glenn T. Seaborg is a member of the General Advisory Committee, Joseph W. Kennedy is a member of the Reactor Safeguard Committee and a consultant to Associated Universities, Inc., and Emilio G. Segrè is an expert consultant to the University of California with respect to Contract W-7405 Eng. 36. The status of each of these three Applicants designated above is of a temporary character in which compensation is to be paid to them at perdiem rates if and when their presence and advice is requested.

13. In conformance with the provisions of Title 11, Chapter 1, Part 80, General Rules of Procedure on Applications for the Determination of Reasonable Royalty Fee, Just Compensation, or the Grant of an Award for Patents, Inventions or Discoveries, Applicants state:

(a) Their post office addresses are as follows:

Dr. Glenn T. Seaborg, Radiation Laboratory, University of California, Berkeley 4, California
Dr. Joseph W. Kennedy, Dept. of Chemistry, Washington University, St. Louis 5, Missouri
Dr. Arthur C. Wahl, Dept. of Chemistry, Washington University, St. Louis 5, Missouri
Dr. Emilio G. Segrè, Radiation Laboratory, University of California, Berkeley 4, California.

Applicants elect to be represented by counsel, and request entry of the appearance of Donald E. Lane, 1331 G Street, N. W., Washington 5, D. C., as counsel for Applicants.

(b) The Applicants each claim an undivided one-fourth interest in inventions and discoveries upon which this application is based, as evidenced by the agreement noted in paragraph 5 above, and know of no other persons or parties having any valid interest therein.

(c) The essential facts on which this application is based include those stated above in paragraphs 1-9 inclusive, and the following facts:

(1) Applicants believe no patents have been allowed to be issued on their inventions either in the United States or foreign countries.

(2) Three of the Applicants are inventors named in applications for United States Letters Patents identified as OSRD Cases S-52a, S-52b, S-52c, and S-52d, and possibly others.

(3) Applicants have filed reports on their inventions as identified in paragraph 2 above.

(4) Applicants state that the dates of the inventions concerned are prior to April 1, 1941, that their discovery of the element plutonium and their early work thereon took place during December, 1940, and January, February, and March, 1941, that their demonstration of the slow neutron fissionability of Pu^{239} took place on March 28, 1941.

(5) Applicants state that their inventions made prior to April 1, 1941 were not developed through federally-financed research, and state that they believe the utility, novelty, and importance of their said inventions were most valuable to the successful completion of the Manhattan Project, and that many millions of dollars of research expense and many thousands of man-hours time was saved as a result of their disclosure of said certain inventions to the predecessors of the Atomic Energy Commission.

(6) Applicants believe that the principles of their early inventions are being widely used by the Atomic Energy Commission in its operations at the various AEC installations and facilities in the United States.

(7) The Applicants are unable to determine or even estimate the actual dollar cost of developing the inventions and discoveries here concerned, since it is impossible to ascertain the actual costs of their respective educations, the costs of the various laboratory equipment available for the use of the inventors, or the money value of the months and years of careful thought and study given by the Applicants to the specific problems solved. The Applicants believe that the dollar value of true inventions must be determined by the effect of the inventions on further research and on humanity. Applicants have no knowledge of the actual Manhattan District cost of preparing and filing patent applications on the OSRD S-52a, S-52b, S-52c, S-52d cases, and others.

(8) The Applicants hereby jointly seek the sum of five hundred thousand dollars as just compensation and/or an award for their inventions made prior to April 1, 1941. The Applicants are unconcerned at this time whether this total sum is designated just compensation or an award or both, but firmly believe that they are entitled to a sum of this magnitude in view of the tremendous importance of their discoveries in directing and leading the way to the successful completion of the Manhattan Project. The Applicants having agreed to divide the proceeds from this application into four equal parts hereby request that payment be made in periodic payments in the amount of thirty-one thousand two hundred and fifty dollars ($31,250.00) per year to each applicant for each of the next four years.

(9) In return for the payment of just compensation and/or an award as specified in paragraph (8) above, the Applicants will agree to assign their entire right, title and interest in said certain inventions made prior to April 1, 1941 to the Government of the United States, as represented by the United States Atomic Energy Commission.

14. The Applicants believe that their inventions made prior to April 1, 1941 are covered by said certain patent applications mentioned in paragraph 3; that they own equitable title in and to said applications; that there is valuable patentable subject matter presented in said applications as evidenced by the numerous broad and specific patent claims

included therein by patent counsel to the Atomic Energy Commission and its predecessor, Manhattan District; that the enactment of the Atomic Energy Act of 1946 has to date delayed the issuance of patents on said applications and hence prevented Applicants from realizing any money return on their inventions made prior to April 1, 1941; and that hence the Applicants are entitled to just compensation and/or an award for patent applications executed and reports submitted.

Respectfully submitted,

Glenn T. Seaborg

Glenn T. Seaborg

Joseph W. Kennedy

Joseph W. Kennedy

Arthur C. Wahl

Arthur C. Wahl

Emilio G. Segrè

Emilio G. Segrè

STATE OF California)
COUNTY OF Alameda) ss

Before me personally appeared GLENN T. SEABORG, this 19 day of December, 1949, to me known to be the person described in the foregoing Application, who, being duly sworn, signed the said Application in my presence, and made oath before me that he has read the same and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and as to those matters he believes them to be true.

Vera L. Stevens

Notary Public

MY COMMISSION EXPIRES FEB 3, 1951

APPENDIX A

1. Report A-22

   "Fission of 94^{239} with Fast Neutrons"
   by Glenn T. Seaborg and Emilio G. Segrè
   dated July 24, 1941

   Reports inventions made at Berkeley, California and acknowledges the assistance of Arthur C.Wahl.

2. Report A-33

   "Properties of 94^{239}"
   by Joseph W. Kennedy, Glenn T. Seaborg, Emilio G. Segrè and Arthur C. Wahl
   dated May 29, 1941

   Reports inventions made at Berkeley, fission of 94^{239} with slow neutrons.

3. Report A-135

   "The Chemical Properties of Elements 94 and 93"
   by Glenn T. Seaborg and Arthur C. Wahl
   dated March 19, 1942

   Submitted originally to Uranium Committee, Washington, D. C., March 21, 1942.

4. Report A-136

   "Production and Properties of 50-year Element 94"
   by Glenn T. Seaborg, Arthur C. Wahl, and Joseph W. Kennedy
   dated March 20, 1942

   Submitted originally to Uranium Committee, Washington, D. C., March 21, 1942.

5. Report CN-1488

   a. "Radioactive Element 94 from Deuterons on Uranium"
      by Glenn T. Seaborg, E. M. McMillan, Joseph W. Kennedy, and Arthur C. Wahl
      dated January 28, 1941

   b. "Radioactive Element 94 from Deuterons on Uranium"
      by Glenn T. Seaborg, Arthur C. Wahl, and Joseph W. Kennedy
      dated March 7, 1941.

   c. "Radioactive Element 94"
      by Glenn T. Seaborg, E. M. McMillan, Arthur C. Wahl and Joseph W. Kennedy
      Submitted September 19, 1941
      Refers to experiments made in December, 1940 and January-February, 1941.

STATE OF Missouri)
COUNTY OF St Louis) : ss

Before me personally appeared JOSEPH W. KENNEDY, this 30th day of December, 1949, to me known to be the person described in the foregoing Application, who, being duly sworn, signed the said Application in my presence, and made oath before me that he has read the same and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and as to those matters he believes them to be true.

My Commission Expires 10/20/52

Notary Public

STATE OF Missouri)
COUNTY OF St Louis) : ss

Before me personally appeared ARTHUR C. WAHL, this 30th day of December, 1949, to me known to be the person described in the foregoing Application, who, being duly sworn, signed the said Application in my presence, and made oath before me that he has read the same and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and as to those matters he believes them to be true.

My Commission Expires 10/20/52

Notary Public

STATE OF California)
COUNTY OF Alameda) : ss

Before me personally appeared EMILIO G. SEGRÈ, this 19th day of December, 1949, to me known to be the person described in the foregoing Application, who, being duly sworn, signed the said Application in my presence, and made oath before me that he has read the same and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and as to those matters he believes them to be true.

MY COMMISSION EXPIRES AUG. 27, 1953

Notary Public

APPENDIX B

1. Case S-52a

   Patent Application S.N. 637,484, filed December 27, 1945, 23 claims
   Glenn T. Seaborg, Joseph W. Kennedy and Arthur C. Wahl
   "Transuranic Element, Compositions thereof and Methods for Producing, Separating and Purifying Same"

2. Case S-52b

   Patent Application S.N. 637,485, filed December 27, 1945, 128 claims
   Glenn T. Seaborg
   "Transuranic Element, Composition thereof and Methods for Producing, Separating and Purifying Same"

   It is understood that a divisional application, S.N. 750,175, was filed May 28, 1947.

3. Case S-52c

   Patent Application S.N. 637,486, filed December 27, 1945, 6 claims
   Joseph W. Kennedy and Arthur C. Wahl
   "Transuranic Element, Composition thereof and Methods for Producing, Separating and Purifying Same"

4. Case S-52d

   Patent Application S.N. 637,487, filed December 27, 1945, 33 claims
   Arthur C. Wahl
   "Transuranic Element, Composition thereof and Methods of Producing, Separating and purifying Same"

APPENDIX C

June 8, 1945

AN AGREEMENT CONCERNING RIGHTS TO CERTAIN INVENTIONS

1. The four persons, E. G. Segrè, G. T. Seaborg, A. C. Wahl, J. W. Kennedy, hereinafter referred to as the inventors, are each involved as inventors in at least one of the inventions which are described in proposed applications presently identified as OSRD cases S-52 and S-61, concerning which negotiations are in progress between the inventors and representatives of the United States Government. The inventors have reached the following agreement between themselves, which agreement establishes rights between themselves.

2. The subjedt inventions of the cases presently identified as OSRD cases S-52 and S-61 may be eventually filed as two or more cases. This agreement is applicable to all such cases so filed, and as cases are filed under this agreement copies will be attached to this document. In the meantime reference should be made to obsolete drafts of cases S-52 and S-61 and also to a document entitled "Divisible Subject Matter of case S-52." These documents are currently attached to the original copy of this agreement in the hands of J. W. Kennedy.

3. No disposition, sale or license of these cases shall be entered into now or in the future except in accordance with an affirmative vote of a majority of the said four inventors still alive and of sound mind. This right of vote of the inventors is not transferable and shall terminate on death, with the exception that in case of the death or mental disability of all four inventors dispositions, sale or license of these cases shall be decided by the inventors' heirs or devisees, one vote being assigned to the heirs or devisees of each inventor.

4. The tangible benefits of any disposition, sale or license of these cases shall be divided in four equal parts among the said four inventors. This right to benefits is transferable and shall be inherited by the inventors' heirs or devisees.

5. Any one of the four inventors can require that a vote be taken by written proposal addressed and sent by registered mail to the last known address of the other inventors with a request that the mail be forwarded.

/s/ Sept. 12, 1945
E. G. Segrè

/s/ Sept. 17, 1945
G. T. Seaborg

/s/ Sept. 11, 1945
A. C. Wahl

/s/ Sept. 10, 1945
J. W. Kennedy