ISOTOPES 3 VOL. 2

Vol. 1 Correspondence beginning with 7-6-64 to 5-11-65
Vol. 2 Correspondence beginning with 5-12-65 to

Isotopes 3 Vol. 2

No.	Date	To	From	Class	Pgs.	No.	To	From	Class.
1	6-11-65	AEC 398/22 Export of Radioisotopes Abroad	vee						
2	7-23-65	AEC 994/26 Fission Products Pricing	et						
3	8-10-65	Isotopes & Radiation Currie, Lauchlin M.	USE et						
4	9-13-65	AEC 398/23 Medical Tribune Radioisotopes in Medicine	et						

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UNITED STATES GOVERNMENT

Memorandum

TO : File

DATE: June 24, 1966

FROM : W. B. McCool, Secretary

Original signed W. B. McCool

SUBJECT: AEC 1150/3 - PRODUCTION OF ADDITIONAL CURIUM-244

SECY:JCH

1. At Information Meeting 595 on June 17, 1966, the Commissioners approved the proposed extension of the Cm-244 production program from 3 kg to 4.5 kg as recommended in Mr. Baranowski's June 10 memorandum, circulated as AEC 1150/3.

2. The Commissioners noted that staff, in discussions with the Joint Committee staff, would describe the additional production in the context of the isotopes development program.

3. It is our understanding that the Division of Production is taking the required action, and that staff discussions with the Joint Committee staff were held on June 23, 1966.

cc:
Commissioners
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for Plans & Prod.
Asst. Gen. Mgr. for Reactors
Asst. Gen. Mgr. for R&D
General Counsel
Director, Inspection
Director, Isotopes Development
Director, Military Application
Director, Production
Director, Space Nuclear Systems

Cy filed: Materials - Curium

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6-24-66

Isotope - 3

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UNITED STATES GOVERNMENT

Memorandum

Copy - Germantown

TO : George F. Quinn
Asst. Gen. Mgr. for Plans & Prod.

DATE: May 31, 1966

FROM : W. B. McCool, Secretary Original signed W. B. McCool

SUBJECT: POSSIBLE REQUIREMENTS FOR AMERICIUM 241

SECY: JCH

1. You will recall that at the Meeting with the Steering Group of the Advisory Committee on Isotopes and Radiation Development held on May 24, 1966, the Chairman noted the importance of keeping in mind possible requirements for Americium 241.

2. The General Manager has directed you to take the required action.

cc:
Commissioners
General Manager
Deputy General Manager
Assistant General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for R&D
Asst. Gen. Mgr. for Reactors
General Counsel
Dir., Isotopes Development

Copy filed, Materials 3

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5-31-66

Isotopes-3

MAY 26 1966

Mr. H. E. Felt, General Manager
Nuclear Programs
Martin Company
Baltimore, Maryland, 21203

Dear Elliott:

The AEC contract AT(30-1)-3062, "Strontium 90 Fuel Development and Processing," with your company will be completed in the near future. This brings to an end a very significant phase of the AEC radioisotope development program and we commend the performance of the Martin Company throughout this project. Your activities under this contract have led to an AEC agreement with Isochem which will provide commercial capabilities for fission product source fabrication. The importance of your development of strontium titanate is attested by the fact that this compound remains as the basic form for strontium 90 isotopic fuel applications. Your establishment at Quehanna of the first commercially licensed operation of strontium 90 process facilities and the production of kilocuries of strontium titanate were important contributions. In addition, we would like to recognize your development of systematic methods for the analysis of hazards associated with both terrestrial and aerospace applications of isotopic fuels under this contract. Again, it gives us great pleasure to take this opportunity to commend your organization for its fine work under this contract.

Sincerely yours,

E. E. Fowler, Director
Division of Isotopes Development

bcc: W. B. McCool, SECY
E. E. Fowler, DID

DID:P&M	DID:P&M	DID:DIR
EISTER:lz	POWERS	FOWLER
5-26-66	5- -66	5- -66

aec 994/30

5-26-66

Do atoms-3

S. R. Sapirie, Manager
Oak Ridge Operations Office

MAY 26 1966

E. E. Fowler, Director
Division of Isotopes Development, HQ

CONTRACT NO. AT(30-1)-3062, "STRONTIUM 90 FUEL DEVELOPMENT AND PROCESSING"

It is requested that action be taken to terminate the subject Martin contract at minimum cost to the AEC. The development program tasks should be completed in FY 1966 according to the authorized scope of work. The inventory activities in 1967 should be modified to process the feed now at Quehanna to the appropriate form for shipment to Oak Ridge National Laboratory, and to perform necessary decontamination work to satisfy the AEC commitment for withdrawal from the Quehanna facility. Arrangements should be made to transfer the strontium 90 inventory from Quehanna to Oak Ridge National Laboratory.

cc: W. B. McCool, SECY

aec 994/30

5-26-66

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5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : Frank P. Baranowski, Director
Division of Production

DATE: May 19, 1966

FROM : W. B. McCool, Secretary Original signed W. B. McCool

SUBJECT: AEC 1219 - LONG RANGE PLANNING FOR PRODUCTION REACTOR SITES

SECY:GF

1. At Meeting 2192 on May 17, 1966, the Commission:

a. Approved the general direction of the development programs presented in paragraphs 8 and 9 of AEC 1219;

b. Noted that the R&D programs will be reexamined and developed in more detail in cooperation with Richland and Savannah River;

c. Noted that the detailed programs will be periodically revised to fit changing circumstances;

d. Noted that the DOD will be advised of AEC's plan to utilize production reactor capacity on a long term basis to satisfy non-weapons as well as weapons demands;

e. Noted that letters will be prepared to the JCAE and the BOB alerting them to the plan to diversify SR and RL operations; and

f. Noted that no press release is planned.

2. The letters to the BOB and the JCAE should be submitted for Commission review.

3. The Commission noted that a White Paper on isotopes requirements is in preparation. (See also Secretary's April 22, 1966 memo to File.)

4. The General Manager has directed you to take the action required by the above decision and request. It is our understanding that your office will prepare the correspondence to the JCAE and the BOB. Copies of these letters together with other pertinent correspondence should be provided the Office of the Secretary.

cc:
Commissioners
General Manager
Dep. General Mgr.
Asst. Gen. Mgr.
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for PEP
General Counsel
Director, Military Application
Controller
Director, Congressional Relations

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Copy filed PL B.L. 7- Production Reactors

5-19-66

Industrial Nucleonics Corporation / AccuRay®

650 ACKERMAN ROAD • COLUMBUS, OHIO 432

Isotopes 5 3

May 17, 1966

Dr. Glenn T. Seaborg, Chairman
Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. Seaborg:

I certainly appreciated the opportunity to talk with you yesterday. We at Industrial Nucleonics genuinely feel that the radioisotopes segment can be the most rapidly growing part of the peace-time atomic energy field. By blending several technologies together, we have gotten results undreamed of several years ago.

I have jotted down on the attached sheets some of the highly useful characteristics of americium-241 and several applications. The rapid utilization of this radioisotope is somewhat dependent upon its price, however.

An extremely interesting and current application of radioisotopes is fuel gauging in the newer, larger aircraft. In aircraft such as the C-5A, the wings are so long that when loaded with fuel they sag. Hence, conventional electric gauges are not accurate. The enclosed booklet summarizes the team approach that will lead to a successful radioisotope aircraft fuel gauge. Incidentally, one of the "byproducts" of this program would be the development of a reliable, low priced, solid-state gamma radiation detector.

Thanks again for the opportunity to discuss with you and the other members of the Commission and your staff the many challenging opportunities facing the nuclear industry.

My best regards to you,

H. R. Chope

H. Roy Chope
Executive Vice-President

hrc/mw

Enc:

5-17-66

AMERICIUM-241

Reasons for Its Extreme Usefulness

- Single energy

- Good energy range for a host of applications (see attached)

- Long half-life (462 years)

- Precisely known energy for systems depending upon energy discrimination

- The 60 kev energy of the americium gamma photons is particularly useful in ranging and direction finding applications. It has been found that the energy from 50 kev to 100 kev is the most favorable from the viewpoint of buildup in air.

AMERICIUM-241

Applications

Industrial

- Fluid density gauges
- Steel strip measurements (in place of broadband bremsstrahlung radiation)
- Chemical analyzers (of the multi-energy type with americium-241 as the reference standard)
- Quality gauges (such as steam quality)
- Gauging of vapor-liquid mixtures in the chemical industry

Aerospace

- Helicopter formation keeping system (with time-modulated americium-241 source)
- Aircraft fuel gauging (in which scattered radiation is discriminated "against")
- Nucleonics communications
- Security sentinel equipment
- Nucleonic landing systems

WU INCOMING

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U.S. ATOMIC ENERGY COMM
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CHAIRMAN GLENN T. SEABORG,

UNITED STATES ATOMIC ENERGY COMMISSION WASHDC

I AM PLEASED TO INFORM YOU THAT SIGNIFICANT EXPANSIONS OF WISCONSIN ELECTRIC UTILITIES WERE ANNOUNCED TODAY. THE EXPANSIONS, REPRESENTING A TOTAL NEW INVESTMENT OF $126.8 MILLION ARE: WISCONSIN ELECTRIC POWER CO $60 MILLION POINT BEACH NUCLEAR PLANT AND $20 MILLION EXPANSION IN MILWAUKEE; WISCONSIN POWER AND LIGHT COMPANY $46.8 MILLION 300,000 KW GENERATING PLANT PLUS 50 MILES OF 345,000 VOLT LINE. WE ARE READY WHEN YOU ARE READY

WARREN P KNOWLES GOVERNOR OF WISCONSIN

814P

USAEC HQS GTWN

WU INCOMING

Isotopes - 3

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UNITED STATES GOVERNMENT

GT RECORDS[1]

Memorandum

TO : E. Eugene Fowler, Director
Division of Isotopes Development

DATE: May 13, 1966

FROM : W. B. McCool, Secretary Original signed W. B. McCool

SUBJECT: AEC 994/30 - QUEHANNA FACILITY STRONTIUM-90 OPERATIONS

SECY:AJ

1. At Meeting 2191 on May 11, 1966, the Commission agreed that Martin-Marietta should be informed that AEC does not contemplate operating Quehanna in FY 1967. The Commission requested that in discussions with Martin regarding interim placement of Quehanna personnel at Richland and Oak Ridge, staff should be responsive to suggestions of possible AEC training assistance contributions.

2. The General Manager has directed you to take the action required by the above decision and request. Copies of all pertinent correspondence should be provided the Office of the Secretary.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for R&D
Asst. Gen. Mgr. for Operations
Asst. Gen. Mgr. for P&P
Asst. Gen. Mgr. for Reactors
Director, Contracts
Director, Industrial Participation
Controller
General Counsel

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5-13-66

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May 9, 1966

AEC 994/31

COPY NO. 23

ATOMIC ENERGY COMMISSION

INFORMATION ITEM

DIVISION OF ISOTOPES DEVELOPMENT ACTIVITIES ON WITHDRAWN ISOTOPES

Note by the Secretary

In response to a Commission request at Meeting 2085 on February 18, 1965, the General Manager has requested that the attached memorandum of May 5, 1966 from the Director of Isotopes Development, with attachment, be circulated for the information of the Commission.

W. B. McCool

Secretary

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5-9-66

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MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : R. E. Hollingsworth, General Manager DATE: May 5, 1966

THRU : S. G. English, AGMRD

FROM : E. E. Fowler, Director
Division of Isotopes Development

SUBJECT: DIVISION OF ISOTOPES DEVELOPMENT ACTIVITIES ON WITHDRAWN ISOTOPES

Attached is a report on the work performed at Oak Ridge National Laboratory during the period March through December 1965, pertaining to radioisotopes which the Atomic Energy Commission has withdrawn from commercial distribution. This report is being submitted in accordance with the requirement established by the Commission in its approval of AEC 994/21, "Transfer of Commercial AEC Radioisotope Production and Distribution Activities to Private Industry."

This work on selected radioisotopes was performed to determine alternate methods of production to improve product purity and specific activity to meet research needs. The results of the work will be published in the open literature. Approximately $70,000 was expended on the total effort described in the report.

The Oak Ridge National Laboratory has been instructed that any new work on withdrawn isotopes may be undertaken only with the formal concurrence of the Division of Isotopes Development. This procedure is designed to assure there is no conflict with activities of private industry.

Attachment:
DID Activities on Withdrawn Isotopes

DIVISION OF ISOTOPES DEVELOPMENT ACTIVITIES ON WITHDRAWN ISOTOPES

During the past year, Oak Ridge National Laboratory has performed a limited amount of production technology development on radioisotopes from which the Atomic Energy Commission has withdrawn. This work involved the following cyclotron products: chromium 51, iron 55, cobalt 58, iron 59, zinc 65, selenium 75, strontium 85, and tin 113. Many of these isotopes are produced by neutron irradiation and contain impurities which limit their use. Techniques for improving product purity and yield by cyclotron bombardment of suitable target materials and subsequent chemical separations were developed.

A summary of the ORNL efforts follows:

Chromium 51 - This isotope is presently produced by the one-year neutron irradiation of chromium enriched to 90% chromium 50. The product, chromium 51, has a specific activity of 1300 Ci/g and is contaminated with iron 59 and cobalt 60. Chromium 51 can be produced in a cyclotron at a rate of 120 mc/hr. by the $^{51}V(p,n)^{51}Cr$ reaction. Three man-months of effort were spent on cyclotron target improvement and product technology in order to increase the specific activity and purity of the chromium 51.

Iron 55 - Iron 55 is produced by neutron irradiation of 90% enriched iron 54. Irradiation for three years results in a product which has a specific activity of 50 Ci/g. This product is contaminated with iron 59 and cobalt 60. Cyclotron bombardment to produce iron 55 by the $^{55}Mn(p,n)^{55}Fe$ reaction was studied to increase the purity and specific activity of the product. This task received four man-months of effort.

Cobalt 58 - Cobalt 58 with no detectable cobalt 60 has been produced by the $^{58}Ni(n,p)^{58}Co$ reaction. Three man-months were spent on this work.

Iron 59 - Neutron irradiation of 85% iron 58 is the present technique for production of this isotope. This process results in a product contaminated with cobalt 60 and manganese 54. Details for producing iron 59 by the $^{59}Co(n,p)^{59}Fe$ reaction have been completed and required one man-month of effort.

Zinc 65 - Zinc 65 is produced by neutron irradiation of natural zinc. This process is time consuming (three years) and the product is of very low specific activity (10 Ci/g). Cyclotron production by the $^{65}Cu(p,n)^{65}Zn$ reaction produces 23 mc/hr. This program has been completed and required less than one man-month of effort.

Selenium 75 - One man-month was spent on developing the parameters necessary to produce selenium 75 by $^{75}As(p,n)^{75}Se$ in the cyclotron. The product, selenium 75, is of a purity essential for biological tracer work.

Strontium 85 - This isotope is currently produced by neutron irradiation of 60% enriched strontium 84 for six months. Two man-months were spent developing techniques for cyclotron production by $^{85}Rb(p,n)^{85}Sr$ reactions. Chemical separation schemes were developed for this production method.

Tin 113 - There is no known method for producing this isotope in a carrier-free state. Neutron irradiation of natural tin produces extremely low purity product. Five man-months were spent to complete the development of technology for cyclotron production of tin 113 by the $^{113}In(p,n)^{113}Sn$ and $^{112}Sn(n,\gamma)^{113}Sn$ reactions.

Isotopes 3-

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May 3, 1966

AEC 994/30

COPY NO. 70

ATOMIC ENERGY COMMISSION

QUEHANNA FACILITY STRONTIUM 90 OPERATIONS

(DISCUSSION PAPER)

Note by the Secretary

The General Manager has requested that the attached report by the Director, Division of Isotopes Development be circulated for discussion by the Commission at an early date.

W. B. McCool
Secretary

AEC 994/30

DISTRIBUTION	COPY NO.
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5-3-66

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ATOMIC ENERGY COMMISSION

QUEHANNA FACILITY STRONTIUM 90 OPERATIONS

(DISCUSSION PAPER)

Report to the General Manager by the
Director, Division of Isotopes Development

THE PROBLEM

1. To consider continuation of strontium 90 operations at the Martin-Marietta Quehanna facility in FY 1967.

BACKGROUND AND DISCUSSION

2. At Meeting 2098 on April 6, 1965, the Commission considered AEC 994/24, "Strontium 90 Production Planning." This paper pointed out that there was no requirement to operate the Quehanna facility in FY 1966 for processing of strontium titanate, but that termination of Quehanna operations could have an adverse effect on negotiations with Martin Co-U.S. Rubber Co., related to operation of the Hanford 200 Area and the private construction and operation of the Fission Products Conversion and Encapsulation Plant (FPCE) at Richland, Washington.

3. At Meeting 2098 the Commission (a) agreed to continue strontium 90 production at the Quehanna facility in FY 1966 at the lowest reasonable operating level, and (b) directed that the future operating level of the Quehanna facility was to be treated as a separate matter from the negotiations then in progress with Martin-U.S. Rubber Co. for construction and operation of the FPCE Plant. This latter directive was clearly communicated to Martin-U.S. Rubber and was fully understood by them.

4. Accordingly, the Quehanna facility is being operated in FY 1966 at a level of $840,000. This was determined to be the

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lowest reasonable operating level, in consideration of the strontium titanate production rate and the fact that this is a non-interruptable process and therefore requires multi-shift operations. The AEC contract with Isochem, Inc. (the Martin-U.S. Rubber Co. joint venture) for the FPCE, which was executed on October 6, 1965, contains no contractual commitments respecting future continued operation of the Quehanna facility. There were no other understandings, expressed or implied, between the AEC negotiating team and Isochem concerning future Quehanna operations. Isochem is committed to have the FPCE commercially operational within 36 months of date of contract. Provision is made in the contract for possible time extension in the event of delays which are occasioned through no fault of their own. Isochem has contracted with Burns & Roe for the plant design and with Martin-Marietta for equipment design and procurement. Both efforts are in progress. Isochem expects to submit its construction permit application to the AEC in May 1966.

5. On December 15, 1965, Martin-Marietta met with our staff for the purpose of presenting proposals for continued operation of the Quehanna facility in FY 1967. In substance, Martin-Marietta's position was as follows:

> a. In view of the available strontium titanate inventories, they saw no need for operation of Quehanna in FY 1967 for the processing of strontium titanate. They indicated they have firm requirements for 2.215 megacuries of strontium titanate over the next two years. They did not, however, have written commitments for these "firm" requirements. Martin-Marietta stated further that their market analyses indicate the possibility of a requirement for an additional three or more megacuries of strontium titanate within the next five years. Therefore, from their point of view the existing inventory of strontium titanate at Quehanna and Oak Ridge National Laboratory, which totals more than four megacuries, is adequate to meet the "firm" and possible requirements until the Isochem FPCE Plant becomes operational at the end of calendar year 1968. (We have no information which would indicate Martin's estimates are inaccurate.)

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b. For purposes of retention and training of personnel to be used to staff the FPCE, Martin-Marietta recommended that the AEC operate Quehanna in FY 1967, at a level of approximately $840,000, as a strontium fuel form encapsulation facility. On the basis of their statement of "firm" requirements, Quehanna would encapsulate about 20 capsules in FY 1967. Accordingly, the unit encapsulation cost would be approximately $42,000 per capsule. Martin recognized that such a cost would be prohibitive, particularly considering that with a nominal 100,000 curie source, the fuel, itself, would cost only $20,000. They recommended that the Commission subsidize the Quehanna encapsulation costs, to the extent of approximately $700,000, in order to reduce the encapsulation cost to the user to a reasonable level. (Note: These recommendations by Martin were subsequently modified in later meetings discussed below.)

c. Martin-Marietta recognized there was no contractual commitment to Isochem to operate the Quehanna facility. They contended, however, that the AEC has a "moral obligation" to operate Quehanna until the Isochem FPCE Plant becomes operational. This contention is based upon Isochem's plan to utilize existing personnel at Quehanna and to train additional personnel there for its FPCE operations. This plan was mentioned in the Martin-U.S. Rubber FPCE proposal; however, the proposal was not conditioned or qualified in any way on continued operation of Quehanna. It was not until the subsequent FPCE contract negotiations that Martin-U.S. Rubber sought a commitment from AEC for Quehanna continued operation. It was this request which occasioned the submission of AEC 994/24 to the Commission.

d. Martin-Marietta's lease with Pennsylvania State University for use of Quehanna provides that the facility must be decontaminated to levels consistent with AEC's health and safety regulations prior to being returned to the University. The AEC contract with Martin provides that the Commission will reimburse the company for the cost of such restoration. Martin indicated it would take nine months to decontaminate and otherwise restore the Quehanna facility at a cost of approximately $570,000. Should Martin be instructed at this time to begin close-out, FY 1966 funds in the amount of approximately $210,000 would be available from the current contract for this purpose. Additional funds earmarked for Quehanna close-out are provided for in the FY 1967 budget and would be sufficient to accommodate the remainder of the close-out costs.

6. On January 21, 1966, the staff met with top management of Martin and Isochem to further explore this matter. Managements views are set forth in letters dated January 21 and February 3 from Isochem (Appendices "B" and "C") and a letter dated February 2 from Martin (Appendix "D"). In summary, Isochem stated:

a. Their planning for having trained people for the FPCE assumed Quehanna would be in routine operation at least through FY 1967, followed by nine months of operations for decontamination and restoration in FY 1968.

b. There are no practical alternatives to continued operation of Quehanna which would allow retention of present personnel and timely training of required additional personnel.

c. Premature termination of Quehanna operations could result in a delay of six to eight months in initiation of FPCE commercial operation.

d. If the FPCE Plant is delayed, a corresponding delay in the entire waste management program could be the result.

With respect to the last point, the Manager, RLOO, has advised informally and the Production Division concurs there would be no adverse effect on the waste management program even if the FPCE were delayed a year or two. In connection with item "b", it should be pointed out that costs associated with assignment and training of new personnel at Quehanna for future operation of FPCE would be borne by Isochem, and would not be charged to the AEC contract.

7. A further meeting was held with Martin management on March 16, 1966 to define in greater detail Quehanna costs and useful areas of effort. The following additional information was developed:

a. Martin stated (and we concur) that the minimum feasible operating level for Quehanna in FY 1967 would be $550,000, representing a reduction of $290,000 from the FY 1966 level. The source of these reductions is indicated in the following table:

	Present Level	Proposed Level	Reduction
Lease charge*	$136,000	$104,000	$ 32,000
Facility maintenance and indirect costs	199,000	136,000	63,000
Direct costs	505,000	310,000	195,000
Total	$840,000	$550,000	$290,000

*See Appendix "E" - February 21, 1966 letter from N. Elliott Felt, Jr., Martin-Marietta.

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b. Martin also stated it was not prepared to contribute company funds toward the operation of the facility in order to further reduce costs to AEC. Martin indicated that they had previously invested $200,000 company money to make structural modifications to the facility and that these dollars are not recoverable nor reimbursible under the AEC contract. In response to a further inquiry on April 1, 1966, Martin modified its position in this regard. They stated they would not confirm in writing their unwillingness to contribute funds. They countered by indicating that if the AEC formally requested that Martin contribute a specified sum of money they would take the matter up with their Board of Directors. It was stated further that they most likely would look to Isochem to provide the funds rather than Martin itself. A similar query to Isochem of the same date elicited the response that they too would not document their unwillingness to contribute funds. They countered in the same manner as Martin, i.e., they would consider a specific formal request from the AEC with their Board of Directors. Along the same lines, Pennsylvania State University also was contacted on April 1 to explore the possibility of a further reduction in the lease charge. Penn State expressed the view that they already had made a substantial and generous reduction in the lease, that they were not realizing any profit on the arrangement, and that they did not consider it appropriate to provide to AEC the details of the cost elements which made up the total lease charge.

c. Martin volunteered that in FY 1967 they could begin decontamination of the facility. To the extent this was accomplished, AEC obligations in FY 1968 for this purpose would be commensurately reduced. The maximum AEC obligation for this purpose, which would have to be provided in the FY 1968 budget, would be $570,000.

d. It was further established that at the end of FY 1966 there would still remain at Quehanna approximately 150,000 curies of unprocessed strontium nitrate feed stocks. Accordingly, during FY 1967 processing of this material into strontium titanate could be completed.

8. Our observations regarding continued operation of Quehanna during FY 1967 are that:

a. There is no practical requirement to operate Quehanna in FY 1967 for the routine processing of strontium titanate. In the event presently unanticipated requirements develop which would deplete the existing strontium titanate inventory, it would be more economical to produce additional quantities at the ORNL Fission Products Development Laboratory (FPDL). There are on hand, at ORNL, quantities of purified strontium 90 in solution

which could be utilized for this purpose, and additional quantities can readily be obtained from Hanford, if needed. The FPDL has the capacity to process two megacuries per year of titanate. This capacity, together with existing inventories is more than sufficient to meet requirements projected by RDT for the SNAP 21 and SNAP 23 programs. Moreover, it is considered that FPDL strontium titanate processing capability is adequate to meet any other requirements which reasonably could be expected to develop prior to operational availability of the FPCE.

b. Unit encapsulation costs at ORNL would be approximately $4500 per capsule. This cost is independent of the number of capsules fabricated. This contrasts sharply with the previously mentioned $27,500 per capsule at Quehanna (based on a $550,000 annual operating level). This large cost differential (and the independence of unit cost at FPDL from the total number of capsules fabricated) reflects the fact that FPDL's operating costs are prorated over a number of different activities; whereas, all of the Quehanna operating costs would be chargeable to fuel encapsulation if it were operated solely for this purpose. FPDL encapsulation capability also is adequate to meet any requirements which reasonably can be anticipated prior to commercial operation of the FPCE. Of course, if Quehanna operating costs were prorated over several activities, such as facility decontamination, completion of strontium titanate processing and fuel capsule fabrication, then the previously mentioned $27,500 cost per capsule might be reduced. The extent of this reduction, if any, is not readily definable since it would depend on the relative level of effort among the three functions. The respective levels of effort are not predictable at this time since one cannot accurately forecast the fuel encapsulation requirements which will actually materialize.

c. We have explored the feasibility of having the Quehanna personnel assigned either to Richland or Oak Ridge in order to maintain the present cadre and provide training to additional necessary personnel. Richland Operations Office, along with Isochem, has advised that the type of activities in which these personnel might engage at Hanford are not compatible with their maintaining proficiency and obtaining training essential for the FPCE. Additionally, both Isochem and RLOO indicate the labor agreements at Hanford are such that the Quehanna people necessarily would be the first to be discharged in the event of a reduction in force. The Division of Labor Relations concurs in this latter point. We have established that the Quehanna personnel could be accommodated at the Oak Ridge FPDL under the AEC work participation program. Isochem states they do not consider this a satisfactory solution because the activities and working conditions at the FPDL are not consistent with those which would be encountered in their privately operated facility, particularly as regards the health and safety regulations to which a private

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commercial licensee must adhere. Moreover, Isochem states that under the work participation arrangement the cost to the company for maintaining their personnel at the FPDL for one year would be approximately $225,000. Isochem states they cannot accommodate this cost. It is noted that Martin has expressed high confidence that it will not experience significant loss of Quehanna personnel through attrition or lack of interest in transferring to Hanford prior to the operational availability of the FPCE.

d. As noted earlier, Isochem indicated a possible 6 to 8 months delay in initiation of FPCE commercial operations if Quehanna were not operated in FY 1967. Such slippage would have detrimental, although not critical, consequences. Present planning for the FPDL is based on discontinuing distribution of the principal fission products at the end of CY 1968 and commensurately increasing the facility's research and development functions. FPCE slippage might require continuation of FPDL operations for routine distribution of these products. The period during which AEC would be required to distribute fission products at "subsidized" prices (AEC 994/26 Fission Product Pricing) would similarly be extended. As noted earlier in this paper, however, AEC would be capable of meeting known requirements and those which can reasonably be anticipated. This would be true even if the FPCE were delayed. (Note: While Isochem technically might be in default of its contract with AEC if it slipped the FPCE schedule more than 3 months solely on the basis of termination of Quehanna operations, whether AEC would decide to exercise its right of termination would depend on the circumstances prevailing at that time.)

e. Should AEC determine to support Quehanna during FY 1967, funds in the amount of $500,000, originally intended for Quehanna closeout operations, are included in the AEC FY 1967 radioisotope inventory account budget and could be applied toward this purpose. The necessary additional $50,000 to meet the minimum operating level could be provided from the inventory accounts. In this event we would plan to utilize the facility for (i) initiation of decontamination operations, (ii) completing processing of remaining feed stocks into strontium titanate, and (iii) accommodating strontium 90 fuel encapsulation requirements to the extent these materialize. The latter activity would have the advantage of relieving the routine encapsulation requirements at the FPDL and thus release the facility for increased research and development activities. It must be recognized, however, that it would not be practical to charge users more than about $6,000 per capsule. The difference, if any, between this and actual cost of Quehanna thus would have to be absorbed by AEC.

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CONCLUSIONS

9. On the basis of the foregoing we have reached the following conclusions:

a. AEC has made no commitments of any kind to continue to support Quehanna operations.

b. The FPDL possesses the capability to produce additional quantities of strontium titanate, and accommodate all known and reasonably anticipated fuel encapsulation requirements prior to and beyond the scheduled date for operational availability of the FPCE.

c. Interim placement of Quehanna personnel at Richland is not a practical alternative to continued operation of Quehanna.

d. Placement of these personnel at the FPDL is feasible from the AEC's viewpoint but is not considered by Isochem to be a practical alternative to Quehanna operation.

e. Slippage of the FPCE schedule resulting from termination of Quehanna operations could have detrimental consequences to the AEC in its fission product distribution and isotopes research and development programs.

f. The Quehanna facility could be utilized in FY 1967 at a cost of $550,000 for the year for initial decontamination operations, completion of strontium titanate processing and, to the extent requirements materialize, strontium fuel encapsulation; however, it is anticipated that costs of the latter greatly would exceed those which are achievable at the FPDL. In this event, AEC would have to absorb the difference between actual cost and the reasonable price of approximately $6,000 per capsule which as a practical matter, could be charged users.

g. Funds in the amount of $500,000 are available in the FY 1967 radioisotope inventory account budget to support Quehanna operation in FY 1967 should AEC determine to do so. The necessary additional $50,000 to meet the minimum operating level could be provided from the inventory account.

h. Depending on the progress of decontamination operations in FY 1967, funding in an amount up to $570,000 would have to be provided in the FY 1968 inventory account budget for closeout operations should Quehanna be operated in FY 1967 for the purposes set forth in this paper.

i. Martin and Isochem have not completely closed the door on the possibility of company contributions toward Quehanna operating costs in FY 1967. They indicate, however, they would consider this only upon a specific formal request from the Commission and would not make a voluntary offer.

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LIST OF ENCLOSURES

APPENDIX "A"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D. C.

April 15, 1966

MEMORANDUM

TO : R. E. Hollingsworth, General Manager

THRU : S. G. English, Assistant General Manager for Research and Development

FROM : E. E. Fowler, Director
Division of Isotopes Development

SUBJECT: QUEHANNA FACILITY STRONTIUM 90 OPERATIONS

The discussion of the problem as presented in this paper has the concurrence of the Divisions of Contracts, Production, Reactor Development and Technology and Labor Relations, as well as the Offices of the General Counsel and Economic Impact and Conversion. The Division of Space Nuclear Systems states it has no programmatic interest in whether or not Quehanna operations are continued. The Office of the Controller does not believe the Discussion Paper presents any additional evidence to support a change from the previous decision to close down the Quehanna operation which was made in approving the FY 1967 budget estimates now before Congress. The Division of Industrial Participation also concurs with the discussion of the problem as presented, but proposes that the Commission request, as an initial negotiating position, that Martin and/or Isochem together with Penn State University provide $275,000 toward the projected $550,000 operating cost in FY 1967. DIP further suggests that the Commission be prepared, however, to accept a contribution of $200,000 or approximately 35% toward these costs as a minimum. Failing this, DIP recommends that the Commission not support Quehanna operations in FY 1967 other than for decontamination of the facility. Considering the advantages to Martin/-Isochem if Quehanna were operated in FY 1967 and the marginal utility of the facility to AEC, the Division of Isotopes Development is of the view that an AEC determination to continue Quehanna operations in FY 1967 should be predicated upon a significant financial contribution toward its operating costs by the companies. Accordingly, we believe a contribution of $200,000 would be appropriate, particularly since this appears to approximate the cost which would be incurred by the companies to retain present Quehanna personnel for future assignment to FPCE should Quehanna operations be discontinued at this time.

APPENDIX "B"

ISOCHEM, INC.
RICHLAND, WASHINGTON 99352

January 21, 1966

Mr. Eugene Fowler
Director
Division of Isotopes Development
U.S. Atomic Energy Commission
Washington, D. C.

SUBJECT: Continuation of Quehanna Production Operations

Dear Mr. Fowler:

Isochem planning for having trained people for FPCE operations has been based on the assumptions:

1. That Quehanna would operate at least through June 1967.

2. That Isochem would transfer about 15 people (8 operators, 4 shift supervisors and 3 technical people) from Quehanna to this location.

3. That we would train about 12 additional new operators, preferably recruited from the Tri Cities area, for about three to four months each at Quehanna.

The Isochem time table indicates these people will be needed here about August to September of 1967. This will allow for six months "cold shake-down" and six months of "hot shake-down" runs before start of commercial operations in October 1968.

With the above schedule there would be not only the 15 people who have had several years' experience working together as a team, but twelve people who have had several months' experience working under actual "hot" conditions.

If Quehanna shuts down sometime this year, three adverse situations will be encountered:

1. There is a high probability Isochem would lose some of the 15 people now slated to be transferred here.

2. There would be a period of at least a year when these people are not actually working under production operation conditions. They would undoubtedly lose some of their skills and require a period of re-training.

3. There would be no opportunity to train the 12 new people.

If we have to delay re-training of the transferred people and training of all new-hires until our facilities are available, there is doubt that we would have a team of sufficient experience to qualify for an operating license by October 1968. It is estimated that this delay could run to as much as six to eight months. If the FPCE Plant is not ready to accept production from the B Plant, a corresponding delay in the entire waste management program could be the result.

Even when a license is granted, having operators with little hot cell experience or those who have been away from this type of work for some time will increase the chances of accidental spills or operational errors.

The continued operation of the Quehanna facility is, clearly in the best interests of both Isochem and the Atomic Energy Commission. We are, therefore, requesting that "hot" operations be continued at Quehanna at least through June 1967, prior to initiation of facility clean-up. It is our opinion that continuation of Quehanna operations at a reduced level through this period will permit an orderly shutdown of that operation and transition to the FPCE operations.

Isochem is also committed to the development of a significant market for strontium products. We have agreed to invest private funds to accomplish this and are currently proceeding in this endeavor. We must be able to assure potential customers that sufficient quantities will be available within the time schedule commensurate with their requirements. If Quehanna is not operating during the period between now and the fall of 1968, fulfillment of these development market requirements will fall entirely on the production capabilities of Government-operated facilities.

Isochem is similarly committed to major expansion of the cesium and cerium markets, and the burden of fulfilling these growing requirements falls entirely upon the Oak Ridge National Laboratories facilities during this transitional period. We feel, therefore, that loss of the capacity and flexibility afforded by the Quehanna facility would adversely affect the assurance of a timely supply of isotope products.

The Martin Company has recently presented to the AEC a forecast of the strontium market as it relates to its low-cost generator systems. We feel that this is a reasonable, but conservative, forecast. Total strontium requirements, anticipating the entrance of other firms in the generator field and other types of strontium utilization, should develop even more rapidly.

The Martin Company has suggested that the operating program at Quehanna during Fiscal Year 1967 could most effectively be based upon the following considerations:

1. The encapsulation of strontium titanate for generator utilizations, both for Government and commercial customers.

2. The production of titanate fuel in the event market demand is greater than forecast.

3. Pilot plant operations for other strontium fuel forms, principally the oxide.

An operating program based upon one or more of these considerations would be compatible with Isochem's training requirements. The Martin Company has expressed its willingness to work with the Atomic Energy Commission to develop a program to accomplish any or all of the above activities at minimum cost.

Sincerely yours,

/s/ J. N. Judy

President - ISOCHEM INC.

APPENDIX "C"

ISOCHEM, INC.
RICHLAND, WASHINGTON 99352

February 3, 1966

Mr. Eugene Fowler
Director
Division of Isotopes Development
U.S. Atomic Energy Commission
Washington, D. C.

SUBJECT: Continuation of Quehanna Production Operations
Supplement to my letter to you of January 21, 1966

Dear Mr. Fowler:

Mr. J. E. Machurek has suggested I list the alternatives for training people for our FPCE Plant and keeping the 15 people we propose to transfer in the case that Quehanna is shut down before June 30, 1967.

We see no adequate way to get the new people trained. It is possible that arrangements could be made for them to work for a period of time at Battelle Northwest, Oak Ridge or some other Atomic Energy Commission Facility, but this would be far from satisfactory. Under these conditions, the men would be working with installations in hot cells and would gain some proficiency in manipulator operations, but would be working under research conditions and would have no exposure to production oriented types of operations. We feel this type of experience is far below the minimum the men should have before we start our hot shake-down run.

As far as the trained people we will transfer, there are at least two routes that could be followed:

1. They could be used at Hanford in the 200 Area if attrition provides room for them.

2. They could be sent to another A.E.C. Facility on an interim basis.

Each of these alternatives has the disadvantage of breaking up the team, risks the loss of the people, and gets them away from hot cell production work for a long period of time.

The first alternative presents another very serious problem. The 8 operators would have to move into jobs that are in the 200 Area bargaining unit. The only jobs available would be those having the lowest rating and, with no seniority, they would be the first people terminated in case of a reduction in force.

If you have any further questions, please feel free to call on me.

Very truly yours,

/s/ J. N. Judy

J. N. Judy
President - Isochem Inc.

APPENDIX "D"

MARTIN COMPANY
BALTIMORE, MARYLAND

February 2, 1966

Mr. E. Eugene Fowler
Division of Isotopes Development
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Fowler:

As indicated in our meeting at the AEC Headquarters on Friday, January 14, 1966, we have examined the possibility of operating our Quehanna facility at a level substantially below that which is required to fulfill our current contractual commitments. At this time it appears that we could reduce the annual expenditures from approximately $840,000 to somewhere between $550,000 and $600,000. The precise determination would be developed when we have had an opportunity to explore the specific desires of the Commission. At present, our estimate of this minimum operating cost is based upon the following assumptions:

1. The operational status of the facility at the end of the FY '66 will be such that only minimal Baltimore engineering and manufacturing support services will be required during FY '67.

2. The FY '67 production and operating requirements will permit scheduling of principal work on a five day, daylight shift basis with a consequent reduction in night and weekend shift personnel requirements.

3. The requirements for materials, subcontracted services, waste handling, and waste shipments will be significantly reduced in accordance with the above assumptions regarding reduction of operations.

As we have indicated previously, a reduction to the above level of operations during FY '67 is compatible with a gradual and orderly termination of the Commission's program at Quehanna. During FY '68, we would then further reduce the Quehanna operation to the level required for facility decontamination and cleanup. As indicated in a recent letter from Dr. Judy, the President of Isochem Incorporated, the above gradual closeout process would be compatible with Isochem's need for trained personnel for the Hanford FPCE plant.

In order to further reduce the Commission's expenditures at Quehanna, we are investigating the possibility of obtaining a reduction in the lease cost. After several conversations with the authorities at Penn State University, they have agreed to re-examine their costs for operating the Quehanna facilities. They anticipate that this examination will take approximately two weeks. At that time they will meet with us to discuss the possibility of a modification to the current lease.

We would be pleased to meet with you or your representative in the near future to discuss implementation of the above program.

Yours very truly,

/s/ N. Elliott Felt, Jr.

N. Elliott Felt, Jr.

APPENDIX "E"

MARTIN COMPANY
BALTIMORE, MARYLAND

February 21, 1966

Mr. Eugene Fowler, Director
Division of Isotopes Development
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Fowler:

As indicated in our telephone conversation of 16 February 1966, Pennsylvania State University has been re-examining their position relative to the lease cost at Quehanna.

By letter of 17 February 1966 (enclosed), Mr. McKay Donkin, Vice President and Treasurer of Pennsylvania State University, has informed me that they will modify the terms of the Quehanna lease to reduce the annual rental from the present level of approximately $136,000 to approximately $104,000. However, this reduction is based in part upon the assumptions that the Martin Company would assume all responsibility for guard service and for janitorial service. Since you expressed a desire for an early report on the status of these negotiations, I have not thought it desirable to delay this letter while we investigated the costs of our furnishing the above services. However, it would appear reasonable that they could be procured for the order of $10,000 per year which would result in a net reduction in operating costs of at least $22,000 per year.

I hope that the above information will be of assistance in presenting your recommendations for continuation of the Quehanna operation to the Commission. If I can be of any further assistance, please call me at your convenience.

Sincerely,

/s/ N. Elliott Felt, Jr.

N. Elliott Felt, Jr.

THE PENNSYLVANIA STATE UNIVERSITY
208 OLD MAIN
UNIVERSITY PARK, PENNSYLVANIA

February 17, 1966

Mr. N. Elliott Felt, Jr.
General Manager
Nuclear Program
Martin Company
Mail Number 802
Baltimore, Maryland 21203

Dear Mr. Felt:

This will confirm the offer made by Roy Wilkinson, Jr., Esquire, of Love and Wilkinson, Bellefonte, Pennsylvania, Attorneys for the University, to modify the terms in the lease your company has on the University reactor facilities at Quehanna for the period in the two one-year options you now hold as follows:

1. The annual rental for each of the two one-year periods would be $103,888.00.

2. Martin Company would assume all responsibility for guard services.

3. Martin Company would release the University from any responsibility to furnish janitor services.

It is my understanding that this letter will accompany a proposal you will submit to the Atomic Energy Commission. This offer will remain open for a reasonable time for the AEC to respond to your proposal. If this offer is accepted, our respective legal counsel will prepare appropriate documents to modify the options you now hold in accordance with the above offer.

Yours very truly,

/s/ McKay Donkin

McKay Donkin
Vice President and Treasurer

Isotopes - 3

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

April 26, 1966

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

THROUGH GENERAL MANAGER APR 27 1966

SUBJECT: THULIUM 170 AND THULIUM 171 STATUS SUMMARY

On April 8, 1966, Mr. Justin Bloom and Dr. James Powers, Division of Isotopes Development, met with Mr. Sterling Cole, Dr. Joseph J. Fitzgerald, Sanders Associates/Cambridge Nuclear Corporation, and Mr. Ted Johnson, Thermo Electron Engineering Corporation, to brief them on our present views and plans regarding the thulium isotopes. A summary report of the information presented at the briefing is attached.

E. E. Fowler, Director
Division of Isotopes Development

Attachment:
Summary Report on Thulium Isotopes

bcc: General Manager - 2 w/attachment
Secretary - 2 w/attachment
AGM - 1 w/attachment
DGM - 1 w/attachment
AGMRD - 1 w/attachment
Rupp, ORNL - 1 w/attachment
Director, P - 1 w/attachment
Director, RD&T - 1 w/attachment
Director, SNS - 1 w/attachment
Director, DID - 1 w/attachment
Chief, RT&A Br. - 1 w/attachment
Chief, IP&M Br. - 1 w/attachment

Info mtg 5/7

DID:IP&M DID:D AGMRD DGM GM
POWERS:esm FOWLER
4-26-66

4-26-66

SUMMARY REPORT ON THULIUM ISOTOPES

I. Thulium 170 and Thulium 171 Characteristics

Thulium isotopes (Tm-170 and Tm-171) have some advantageous characteristics. Thulium 170 has a good power density (8-12w/cc) and reactor production would appear to be relatively straightforward. Thulium 171 is attractive primarily because of its radiation characteristics. The biological hazard is low and a high temperature fuel form has been identified for both isotopes (Tm_2O_3).

The disadvantages of these isotopes for power application are substantial, however. While the half-life of thulium 170 is comparable to polonium 210, the power density is substantially lower, e.g., 8-12w/cc for Tm-170 vs. 800 to 850w/cc for rare earth polonium compounds. Product power density specifications for both isotopes are quite uncertain at this time. Additional Tm-170 and Tm-171 data is contained in the attached tables.

II. Potential Availability

Review of target material availability with industry sources indicates the present availability of natural thulium to be 100 to 200 pounds per year at $2,000 per pound. The potential supply of thulium has been projected to be 4,000 pounds per year, beginning in 1967; however, costs beyond 1966 have not been quoted by industrial suppliers. Based on the estimated availability of 4,000 pounds of natural thulium per year, the projected availability of Tm-170, at reactor discharge, would be three megawatts per year, with no Tm-171 production. This output assumes a Tm-170 specific power of 1.5 watts per gram of thulium oxide and does not take into account the time involved in the post-irradiation processing and encapsulation. If the annual supply of natural thulium were used to produce thulium 171, of 0.2 watts per gram activity, the projected supply of Tm-171 would be 60 kilowatts per year at reactor discharge.

III. Production Modes

The greatest obstacle in considering thulium 171 is determination of the production method. However, preliminary considerations of reactor flux, irradiation time, and subsequent processing necessary to obtain this isotope in large quantities and with reasonable specific power, i.e., 0.2 watt/gram, indicate that production methods may be complicated and expensive.

Three modes of reactor production of Tm-171 have been proposed. They are: (1) neutron irradiation of monoisotopic natural Tm-169, (2) neutron irradiation of enriched Er-170, and (3) irradiation of natural erbium. Preliminary calculations with incomplete data suggest that Tm-171 can be made from natural thulium in an effective reactor flux of 1 or 2 x 10^{15} n/cm^2 sec., and in a ratio of 10^6 with respect to Tm-170. Figures 1 and 2 show calculated yields

and irradiation times, respectively, for reactor production of Tm-171. Since such fluxes are available and Tm-171 has such decided advantages in biological applications, it is advisable to proceed further to determine the required nuclear data and to investigate more fully the production potential of Tm-171.

IV. Conclusions

The Division of Isotopes Development has reviewed the current status of the thulium 170 and thulium 171 technology, and has work in progress to establish more definitively the technical aspects of thulium and its availability. This work includes:

A. Theoretical Studies of the Possible Routes to Thulium 171.

1. Reactor irradiation of natural thulium 169.

2. Reactor irradiation of natural erbium.

3. Reactor irradiation of separated erbium 170.

In order to determine the expected yields as a function of flux, irradiation time, and product specification, some work has been initiated in this area and results look encouraging for thulium 169 irradiation. The effect of cycling the natural or enriched erbium target through irradiation, chemical separation, and re-irradiation, will also be considered.

B. Experimental Determination of Required Nuclear Data.

1. Capture cross section of thulium 171. This cross section, which is unknown, affects the yield and purity of thulium 171 for all methods of production given above.

2. Resonance absorption cross sections for all the isotopes involved. At present, no data is available and these values are of importance not only in estimating the yield, but in selecting the optimum reactor facility for production.

The program is defined in terms of thulium 171, but will also be applicable to thulium 170. As a result of this work, which is to be completed in early FY 1967, it will be possible to decide whether the program should be expanded to consider in detail the practical factors and economics of the production of Tm-171, as well as the need to initiate a deliberate fuel development effort for thulium. In the event of a positive decision, the second phase of the program would be initiated and consideration given to inviting industrial participation. Mr. Cole and his associates were informed that if a second phase effort is initiated in FY 1967, approximately $100,000 would be expended for this purpose.

Thulium 170

Half-life	- 127 days
Radiation	- 0.96 Mev beta 0.084 Mev gamma
Candidate Fuel Form	- Tm_2O_3
Melting Point	- 2300°C
Density	- 7.7 g/cc
Specific Power	- 1.2 to 2.5 watts/gram from production experiments conducted at the Savannah River Plant. (a) 1.2 w_t/g has been obtained in Cm-244-producing loadings. (b) 2.5 w_t/g has been obtained in the high flux loadings.
Power Density	- 9.2 w_t/cc 18.8 w_t/cc
Estimated Availability	- Megawatt quantities per year.

Advantages of Tm-170

- Availability of feed material
- Low cost
- Small amount of post-irradiation processing necessary
- Low biological hazard
- Minor shielding
- Thermally stable fuel form (Tm_2O_3)

Disadvantages of Tm-170

- Short half-life
- Undeveloped technology
- Low power density

ATTACHMENT A

Thulium 170 has been suggested for missions for which polonium 210 is now a candidate. The following table compares properties of these two isotopes:

	Thulium 170	Polonium 210
Half-life	127 days	138 days
Radiation	beta, gamma	alpha
Fuel form	Tm_2O_3	Rare earth polonide
Melting point	2300°C	1500 - 2000°C
Power density	10 w_t/cc	400 w_t/cc*
Biological hazard (MPC)	$10^{-8}/\mu$ Ci/cc	$2 \times 10^{-9}/\mu$ Ci/cc
Shielding (Relative wt.)	4 to 8	one

* Assumes 50% void volume for helium pressure buildup.

ATTACHMENT A

Thulium 171

Half-life	- 1.9 years
Radiation	- 0.103 Mev beta (98%)
	0.030 Mev beta (2%)
	0.0667 Mev gamma
Candidate Fuel Form	- Tm_2O_3
Melting Point	- 2300°C
Density	- 7.7 g/cc
Specific Power	- 0.2 w_t/g (calculated)
Power Density	- 1.7 w_t/cc (calculated)

Thulium 171 has not been produced in any significant quantities in the AEC reactors. The estimated availability of this isotope, based on production from thulium 169, is tens of kilowatts per year.

Advantages of Tm-171

- Low penetrating radiation field
- Adequate power density for thermoelectric applications
- Low biological hazard
- Thermally stable fuel form

Disadvantages of Tm-171

- High unit costs
- Limited availability of feed material
- Long irradiation times
- Insufficient knowledge of reactor production schemes.

ATTACHMENT B

The following table compares some of the properties of Tm-171 with Pu-238:

	Thulium 171	Plutonium 238
Half-life	1.9 years	87.4 years
Radiation	beta	alpha
Fuel form	Tm_2O_3	PuO_2
Melting point	2300°C	2200°C
Power density	1.52 w_t/cc (calcul.)	2 w_t/cc 1/
Biological hazard (MPC)	10^{-7}/μ Ci/cc	2 x 10^{-12}/μ Ci/cm^3 2/
Shielding	Minor	Minor

1/ Based on 50% void volume for helium pressure buildup

2/ Based on soluble form of plutonium 238

ATTACHMENT B

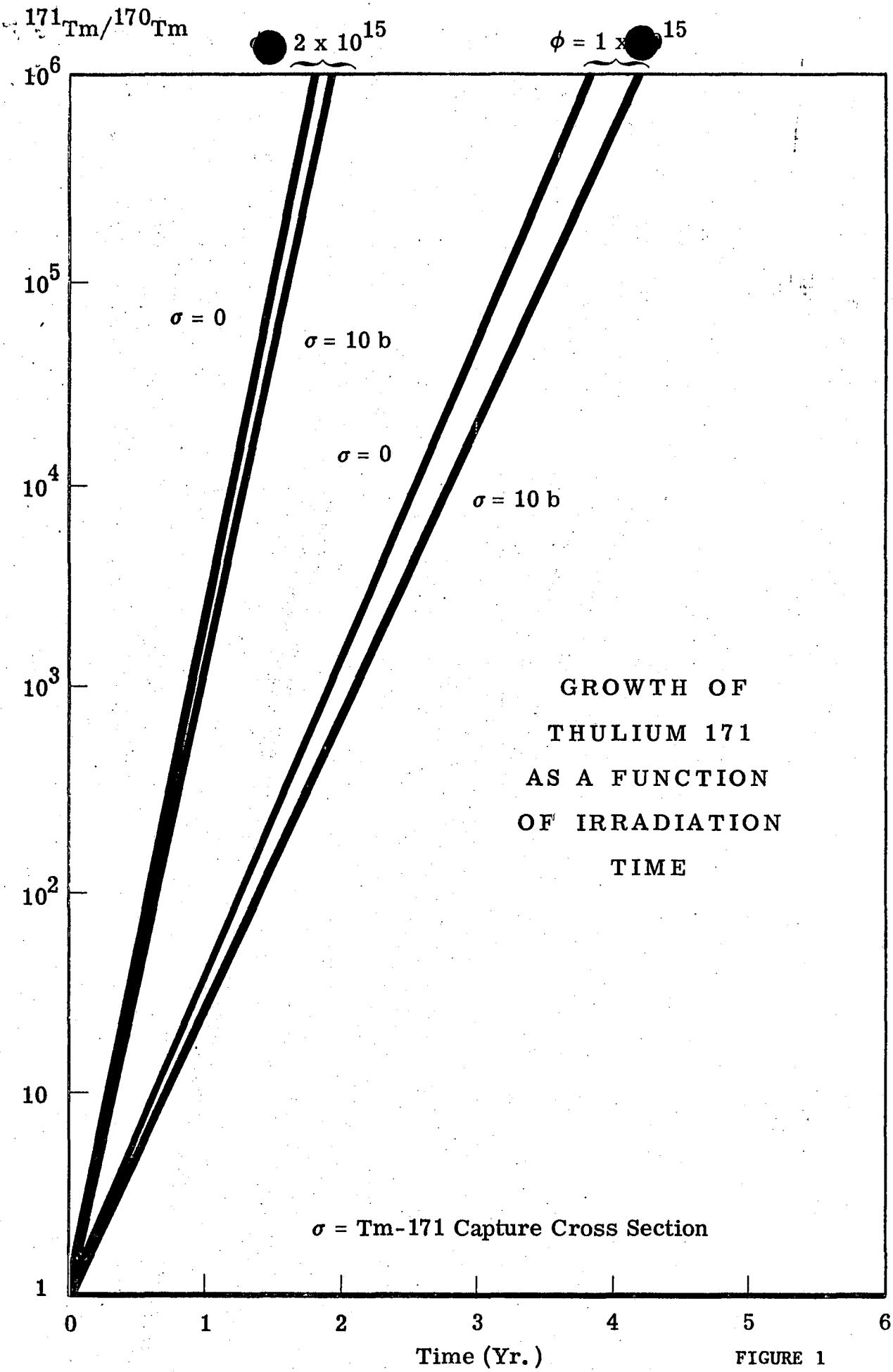
$^{171}Tm/^{170}Tm$
10^6
10^5
10^4
10^3
10^2
10
1
ϕ = 2 x 10^{15}
ϕ = 1 x 10^{15}
σ = 0
σ = 10 b
σ = 0
σ = 10 b
GROWTH OF
THULIUM 171
AS A FUNCTION
OF IRRADIATION
TIME
σ = Tm-171 Capture Cross Section
0
1
2
3
4
5
6
Time (Yr.)

FIGURE 1

YIELD OF THULIUM 171 AS A FUNCTION OF THULIUM CONTENT

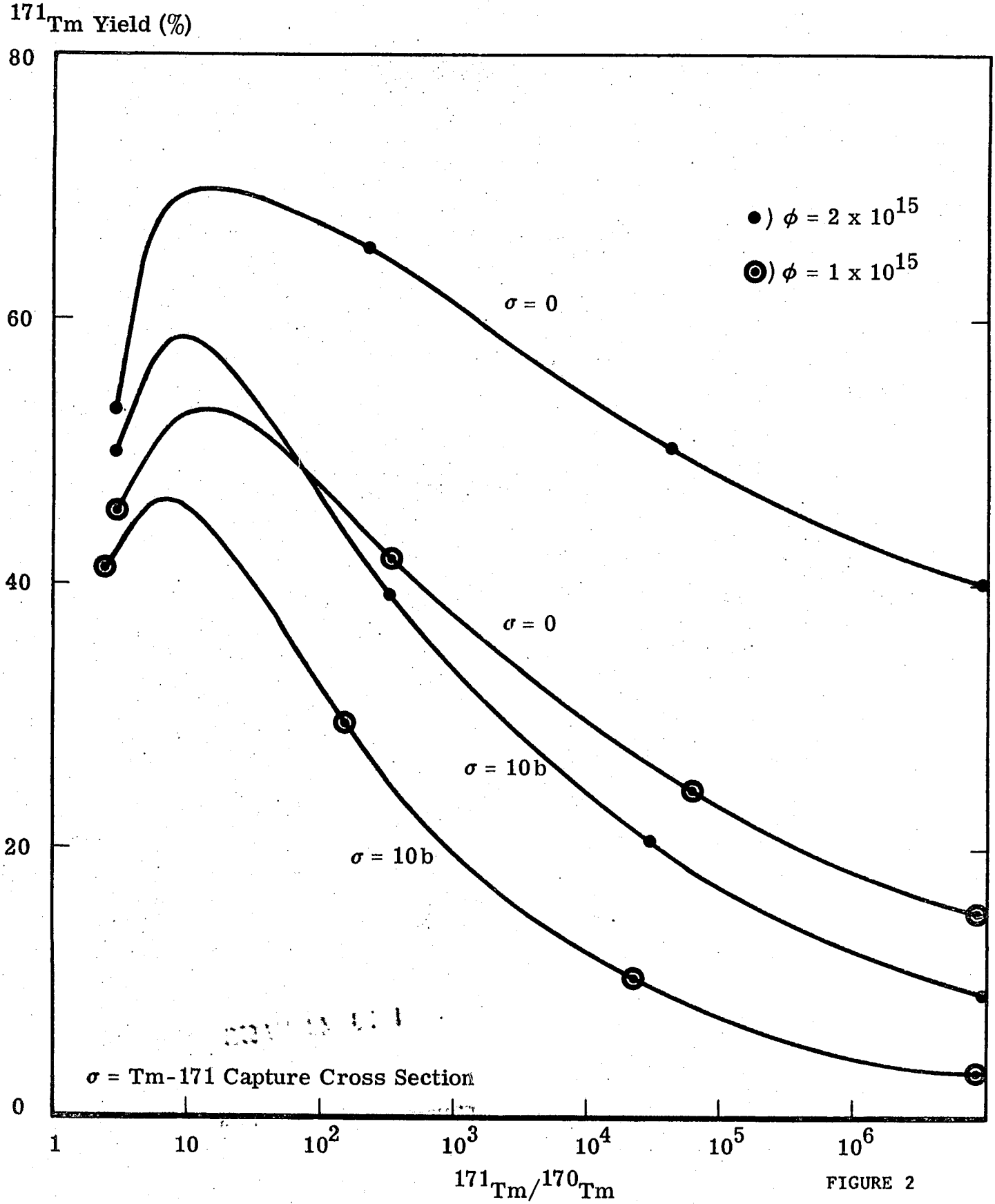

FIGURE 2

Isotopes-3

APR 25 1966

mr

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conway:

With reference to your letter of March 30, 1966, enclosed are copies of the seventeen letters we have now received commenting on our planned withdrawal from the routine production and distribution of 19 radioisotopes as published in the Federal Register on January 26 and April 2, 1966. (Copies of the Federal Register notices were previously furnished you.) As you requested, we are also enclosing a brief summary of these letters. These seventeen comments were from fourteen organizations that may be classified as follows: universities-7; private individuals-2; industrial user-1; medical laboratory-1; Federal Agency-1; and commercial producers-1. The Commission concluded that these comments were not of such substance as to require changes in the proposed withdrawal. Two objections which appear to have the most significance are discussed below.

Some of those submitting comments felt that the quality of the Nuclear Science and Engineering Corporation (NSEC) material was too low in specific activity to be useful in their research programs. Other commercial groups, however, are using higher flux reactors than NSEC, and therefore they are producing and offering for sale a higher specific activity product. As noted in our letter of March 30, 1966, the withdrawal procedures provide that AEC will continue to meet requirements to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not available commercially. Our experience with past withdrawal actions had shown that the volume of requirements for such high quality material has been extremely small.

Others submitting comments registered their belief that commercial prices would be much higher than ORNL. However, these groups had not taken into account the fact that NSEC has a lower handling charge per shipment ($10 vs. $25 for ORNL) and a smaller minimum order charge ($5 vs. $25 to $50 at ORNL). When these are considered NSEC prices are lower in every instance.

4-25-66

A professor at the University of Colorado submitted three separate letters of comment. Enclosed is a copy of a letter dated April 1, 1966, which we sent to Senator Gordon Allott of Colorado in response to an inquiry regarding objections raised in one of the three letters. An identical response was also sent to Senator Peter H. Dominick of Colorado.

For your information, we are enclosing a list of "Major Commercial Distributors of Processed Radioisotopes in the U. S." These groups are privately producing and/or selling one or more of the materials from which we have withdrawn.

Sincerely yours,

Signed:
John V. Vinciguerra

for General Manager

Attachments:
Attachment "A" - Summary of Comments
Attachment "B" - Comments (17)
Attachment "C" - List of Commercial Suppliers
Attachment "D" - Cy. Sen. Allott's ltr. - file in date order 4-1-66

Distribution: Chairman (2)
Sec'y. (2)
Commission (3)
Cong. Lias. (2)
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CONG.LIAS 4/ /66

DID:D Fowler 4/ /66

AGC 4/ /66

AGMRD 4/ /66

AGM 4/ /66

DGM 4/ /66

GM 4/ /66

Isotopes

5

GENERAL RADIOISOTOPE PROCESSING COMPANY

3000 SAN RAMON VALLEY BLVD. ☆ SAN RAMON, CALIFORNIA 94583

TELEPHONE 415-837-5424

April 19, 1966

Glenn T. Seaborg
Chairman
U.S. Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Seaborg:

Is it not time for the AEC to make it possible for private companies to purchase small amounts of Californium? This would provide private educational institutions, for example, with an opportunity to perform neutron experiments at an extremely low cost.

Could the AEC not make minuscule quantities available to private companies, who in turn would fabricate very small sealed Californium sources for the educational market.

Yours truly,

Humphrey Ireland

Humphrey Ireland
President

HI/1

4-19-66

DATE:

INDEX: Isotopes 3

~~MR&A 9-2 Military Requirements~~

~~PLB&L 7 Savannah River~~

~~PLB&L 7 Hanford Reactors~~

TO:

FROM:

SUMMARY: AEC 1219 - LONG RANGE PLANNING FOR/#PRODUCTION REACTOR SITES
To consider a long-range program plan for the production sites and supporting five-year process devel. program, by reducing weapons demand and increasing non-weapons demand for reactor produced isotopes - this will be developed in detail with Richland and Savannah River.

FILED: PLB&L 7 Production Reactors

INDEXER: date of paper: 4-19-66

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

FORM AEC-204

★ U. S. GOVERNMENT PRINTING OFFICE: 1949 - 833163

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Copy - Germantown

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27
5010-107

UNITED STATES GOVERNMENT

Reference & Reproduction Branch

Memorandum

TO : File

DATE: April 5, 1966
(Revised April 22, 1966)

FROM : Original signed W. B. McCool
W. B. McCool, Secretary

SUBJECT:

"WHITE PAPER" ON ISOTOPE PRODUCTION REQUIREMENTS

SECY:ICB

1. During discussion of AEC 853/16 - Pu-238 Production Program, at Meeting 2182 on March 25, 1966, the Chairman suggested that staff consider the desirability of an "AEC White Paper" on future isotope production requirements.

2. We understand that the Division of Isotopes Development is taking the required action.

cc:
Commissioners
General Manager
Deputy General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for P&P
Asst. Gen. Mgr. for Reactors
Asst. Gen. Mgr. for R&D
Director, Military Application
General Counsel
Director, Production
Director, Space Nuclear Systems
Director, OA&F
Controller
Director, Isotopes Development
Director, Industrial Participation

Copy sent: Materials-Plutonium

~~OFFICIAL USE ONLY~~

4-5-66

AEC 994/29

April 4, 1966

COPY NO. 74

AEC 994/29

ATOMIC ENERGY COMMISSION

PROPOSED RADIOISOTOPE PRICE CHANGES

Note by the Secretary

The Executive Assistant General Manager has requested that the attached memorandum of March 28, 1966, from the Director, Division of Isotopes Development, with attachments, be circulated for the information of the Commission.

W. B. McCool
Secretary

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4-4-66

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : R. E. Hollingsworth, General Manager
THRU : S. C. English, Assistant General Manager for Research and Development
FROM : E. E. Fowler, Director
Division of Isotopes Development

DATE: March 28, 1966

SUBJECT: PROPOSED RADIOISOTOPE PRICE CHANGES

As a result of our review of radioisotope cost and price experience for FY-1965, and in accordance with Manual Chapter 1701, we are planning to increase prices for 13 items as identified in Attachment "A". All of these products are currently being supplied by ORNL. You will note that 12 of these are minor miscellaneous processed materials having very modest sales.

In accordance with the procedure set forth in the Federal Register Statement of Policy of March 9, 1965, we will provide a 30 day prior public notice of these price changes. We plan to issue the public announcement April 1 with the new prices becoming effective 30 days later on May 1, 1966.

The Division of Industrial Participation and the Office of the Controller concur in these price changes (Attachment "A"). The Office of the General Counsel has no legal objection. The Division of Public Information concurs in the proposed public announcement (Attachment "B"). The Office of Congressional Relations concurs in the draft letter to the JCAE (Attachment "C").

Attachment "A" - Table of proposed radioisotope price changes
Attachment "B" - Proposed public announcement
Attachment "C" - Draft letter to the JCAE

Approved:

R. E. Hollingsworth
General Manager

3/29/66
Date

RADIOISOTOPE PRICE CHANGES
(from ORNL)

Radioisotope	FY 1965 Revenue	Loss	mc	Shipments	Current Price	Proposed Price
1. Cobalt-60, processed solution	$3,355	($3,207)	1,295	106	0-1,000 mc - $2.00/mc over 1,000 mc - $1.00/mc $25.00 minimum order	$4.00/mc $25.00 minimum order
2. Europium-152-154	$995	($959)	95	18	0-100 mc - $10.00/mc 101-1,000 mc - $ 5.00/mc over 1,000 mc - $ 1.00/mc $25.00 minimum order	$20.00/mc $25.00 minimum order
3. Hafnium-181	$844	($793)	342	32	0-500 mc - $1.50/mc over 500 mc -$0.50/mc $25.00 minimum order	$3.00/mc $25.00 minimum order
4. Indium-114	$950	($893)	157	32	0-250 mc - $5.00/mc over 250 mc - $3.00/mc $25.00 minimum order	$10.00/mc $25.00 minimum order
5. Iridium 194	none	none	none	none	$4.00/mc $25.00 minimum order	$8.00/mc $25.00 minimum order
6. Iron 55, 59	$490	($463)	14	8	$35.00/mc of iron 59 $25.00 minimum order	$70.00/mc of iron 59 $25.00 minimum order
7. Osmium 191	$231	($231)	22	7	0-25 mc - $10.00/mc over 25 mc - $ 7.50/mc $25.00 minimum order	$20.00/mc $25.00 minimum order
8. Rubidium 86	$6,262	($6,017)	10,194	276	0-500 mc - $0.30/mc over 500 mc - $0.15/mc $25.00 minimum order	$0.60/mc $25.00 minimum order
9. Scandium 46	$1,251	($1,190)	2,275	52	0- 100 mc - $1.00/mc 101-1,000 mc - $0.20/mc over 1,000 mc - $0.15/mc $25.00 minimum order	$2.00/mc $25.00 minimum order

Attachment "A"

RADIOISOTOPE PRICE CHANGES - contd.

Radioisotope	FY 1965 Revenue	Loss	mc	Shipments	Current Price	Proposed Price
10. Tantalum 182	$1,325	($1,256)	258	32	0- 25 mc - $5.00 mc over 25 mc - $3.00/mc $25.00 minimum order	$10.00/mc $25.00 minimum order
11. Tungsten 185	$868	($826)	188	23	0- 50 mc - $4.00/mc over 50 mc - $2.50/mc $25.00 minimum order	$8.00/mc $25.00 minimum order
12. Yttrium 90	$2,587	($2,480)	859	18	$3.00/mc $25.00 minimum order	$6.00/mc $25.00 minimum order
13. Tritium Targets (Hydrogen 3)	$11,825	($4,080)	-	71	$165.00 per standard catalog target plus $2.00/c of tritium or fraction thereof. Other targets charged at full cost recovery price	$225.00 per standard catalog target plus catalog cost of tritium at: 0-1,000 c - $2.00/c 1,001-10,000 c- $1.50/c over 10,000 c- $1.00/c other targets charged at full cost recovery price

ATTACHMENT "B"

AEC GIVES ADVANCE NOTICE OF CHANGES IN
RADIOISOTOPE PRICES

The Atomic Energy Commission will increase prices of thirteen radioisotopes effective May 1, 1966.

The price increases are designed to recover full costs of radioisotope production and distribution. The thirteen radioisotopes for which prices will be increased are: cobalt 60 solution, europium-152, hafnium-181, indium-114, iridium-194, iron-55-59, osmium-191, rubidium-86, scandium-46, tantalum-182, tungsten-185, yttrium-90, and tritium (hydrogen-3) targets.

These radioisotopes are used industrially, and in biomedical or other research. The advance notice is in keeping with a procedure published by the AEC in the Federal Register, March 9, 1965.

Copies of the revised price schedule may be obtained from E. E. Beauchamp, Oak Ridge National Laboratory, Isotopes Sales Department, Isotopes Development Center, P.O. Box X, Oak Ridge, Tennessee 37830.

ATTACHMENT "C"

DRAFT LETTER TO THE JOINT COMMITTEE ON ATOMIC ENERGY

1. Effective May 1, 1966, the Atomic Energy Commission will increase prices of thirteen radioisotopes that are currently being supplied by ORNL. Based on FY 1965 experience the price increases are designed to recover full costs of radioisotope production and distribution.

2. Attached for your information are copies of a summary table, "Radioisotope Price Changes" and of the proposed public announcement which we plan to release shortly. You will note in the summary table that the requirements for these materials have been very modest.

Enclosures:
1. Table
2. Proposed Public Announcement

NOTE: Table to JCAE will not include FY 65 revenue and loss column shown in Attachment "A".

Isotopes - 3

APR 1 1966

Honorable Gordon Allott
United States Senate

Dear Senator Allott:

This is in reply to your letter of March 18, 1966, regarding views expressed to Mr. W. B. McCool, Secretary, USAEC, by Professor Albert A. Bartlett, University of Colorado, by his letter of March 11, 1966, a copy of which he forwarded to your office. Professor Bartlett was protesting the proposed AEC withdrawal from the production and distribution of 19 radioisotopes on the basis that private prices for these materials would be significantly higher than those being charged by the AEC. We had received an earlier letter, dated February 15, 1966, from Professor Bartlett on this subject and subsequently discussed this matter with him by telephone. As a consequence, we received a further letter from Professor Bartlett, dated March 22, 1966, a copy of which he also provided your office, in which he acknowledged that the data upon which he had based his protest was inaccurate and that the proposed private prices would, in fact, be lower than those being charged by the AEC. Professor Bartlett did have other questions however, which are discussed below.

1) Professor Bartlett questioned whether the private prices for these 19 radioisotopes would stay at their lower level once the AEC discontinued production and distribution. We would point out, first of all, that private competition exists in the production and distribution of most of the radioisotopes in question. We have reason to believe that such competition will develop for all of the items. We would anticipate therefore that normal competitive forces will preclude any unwarranted increases in private prices. In any case, the AEC could resume production and distribution of these radioisotopes if an undesirable situation should arise in the private price structure.

2) Professor Bartlett also questioned how commercial firms could charge lower prices than AEC for these radioisotopes. Private suppliers usually establish facilities and equipment and assign manpower just sufficient to produce and distribute the limited number of radioisotopes which they market. The AEC, on the other hand, must maintain equipment, facilities and personnel adequate to meet all of the country's needs for radioisotopes which are not yet being accommodated by private industry. Thus the AEC still distributes

99-1-4

over 100 radioisotope products. Most of these are very low volume items which, nevertheless, are of critical importance, especially in research. As a consequence of maintaining ourselves in readiness to meet these needs, we must bear higher overhead and other costs than would be necessary in a purely commercial operation. It is this difference which accounts for the ability of private suppliers to charge lower prices in many cases than AEC.

3) Professor Bartlett further inquired whether it is in the best interest of the people of the United States for the AEC to withdraw the services that our Oak Ridge facilities were designed to accommodate. It has been a long standing AEC policy not to compete with private sources of supply of materials and services. In implementing this policy, however, we have been careful to assure that the public interest is adequately protected. In connection with radioisotopes particularly, we published in the Federal Register in March 1965 a statement of "Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry". A copy of this statement is enclosed for your information. As you will note, the statement establishes guidelines subject to which the AEC will consider withdrawing from the production and distribution of particular radioisotopes. In general, these guidelines provide that there must be a demonstrable private capability to provide the radioisotopes in the quantity and quality which the market requires, that there normally should be effective competition in the supply of these materials and that the private prices must be reasonable. Even after we withdraw from a particular radioisotope in accordance with these guidelines, we make provision for continuing to meet requirements when the purchaser certifies in writing that the material he needs is of a special or unusual quality not commercially available. We would also like to point out that our Oak Ridge facilities are designed for the conduct of research and development on radioisotope production methods as well as for routine production and distribution of these materials. To the extent we are able to withdraw from the latter activity because of private capability to perform this function, we are able to increase our research and development efforts. This, of course, is to the benefit of the country because it leads to the availability of new and improved radioisotopes for use in medicine, science, industry and agriculture.

We are also enclosing for your information a public announcement and Federal Register notice dated January 25 and January 26, 1966, respectively in which the Commission indicated its intent to withdraw from the routine production and distribution of the 19 radioisotopes subject to receipt of public comment. Having evaluated

APR 1 1966

the public comments received, we have determined they were not of such substance to require changes in our proposed withdrawal action. Accordingly, the Commission will withdraw from production and distribution of the 19 radioisotopes effective May 1, 1966. Copies of our public announcement of March 31 and Federal Register notice of April 1 to this effect are enclosed.

We trust the foregoing adequately responds to your inquiry. Should you desire further information, we will, of course, be pleased to provide it.

Sincerely yours,

E. E. Fowler, Director
Division of Isotopes Development

Enclosures:
1. F. R. Statement of Policy, dtd. 3/9/65
2. Public Announcement, dtd. 1/25/66
3. Federal Register notice, dtd. 1/26/66
4. Public Announcement, 3/31/66
5. Federal Register Notice, dtd. 4/1/66

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3/31/66

Isotopes - 3

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

APR 1 1966

Honorable Peter H. Dominick
United States Senate

Dear Senator Dominick:

This is in reply to your letter of March 16, 1966, regarding views expressed to Mr. W. B. McCool, Secretary, USAEC, by Professor Albert A. Bartlett, University of Colorado, by his letter of March 11, 1966, a copy of which he forwarded to your office. Professor Bartlett was protesting the proposed AEC withdrawal from the production and distribution of 19 radioisotopes on the basis that private prices for these materials would be significantly higher than those being charged by the AEC. We had received an earlier letter, dated February 15, 1966, from Professor Bartlett on this subject and subsequently discussed this matter with him by telephone. As a consequence, we received a further letter from Professor Bartlett, dated March 22, 1966, a copy of which he also provided your office, in which he acknowledged that the data upon which he had based his protest was inaccurate and that the proposed private prices would, in fact, be lower than those being charged by the AEC. Professor Bartlett did have other questions however, which are discussed below.

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4-1-66

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E. E. Fowler, Director
Division of Isotopes Development

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4. Public Announcement, 3/31/66
5. Federal Register notice, dtd. 4/1/66

(Reprinted from the *Federal Register*, March 9, 1965)

ATOMIC ENERGY COMMISSION

POLICIES AND PROCEDURES FOR TRANSFER OF COMMERCIAL RADIOISOTOPE PRODUCTION AND DISTRIBUTION TO PRIVATE INDUSTRY

Statement of Policy

Since 1946, the United States Atomic Energy Commission has produced radioisotopes in its own facilities and distributed them for governmental and private use. In recent years, private facilities have become available which are capable of producing and processing some of these radioisotopes. The Commission's policy is to refrain from competing with private sources of materials when they are reasonably available commercially. Accordingly, over the past years the Commission has discontinued production and distribution of selected types, quantities and qualities of radioisotopes and related services as these have become available from private sources.

There is currently a rapidly growing industrial interest in undertaking private production and distribution of increasing numbers of radioisotopes presently being distributed by the Commission. It therefore wishes to reaffirm its policy to transfer its commercial radioisotope production and distribution activities to private industry as rapidly as possible consistent with the national interest. To provide for the orderly transfer to private operation, the Commission developed proposed policies and procedures for effecting such transfer. On September 16, 1964, the Commission published in the FEDERAL REGISTER a request for public comment on the proposed policies and procedures.

Interested persons were requested to direct their comments to the Secretary, United States Atomic Energy Commission, Washington, D.C., 20545, within 60 days from that date. The Commission has now adopted policies and procedures for the transfer of commercial AEC radioisotope production and distribution activities to private industry, effective immediately upon the publication of this notice in the FEDERAL REGISTER.

POLICIES AND PROCEDURES FOR TRANSFER OF COMMERCIAL AEC RADIOISOTOPE PRODUCTION AND DISTRIBUTION ACTIVITIES TO PRIVATE INDUSTRY

The policies and procedures encompass:

a. The establishment of guidelines governing AEC withdrawal from production and distribution of particular radioisotopes, either voluntarily or upon petition of a private organization.

b. The establishment of a petition procedure by which private organizations may formally request AEC withdrawal from the production and distribution of particular radioisotopes.

c. The application of AEC radioisotope pricing policy.

d. The AEC position with respect to its conduct of radioisotope production technology research and development on those radioisotopes from which it has withdrawn from production and distribution.

Withdrawal guidelines. 1. The AEC will voluntarily withdraw from the commercial production and distribution of particular radioisotopes whenever it determines that such radioisotopes are reasonably available from commercial sources.

2. The AEC will withdraw from the commercial production and distribution of particular radioisotopes on petition from a private organization based upon a demonstrable private capability and encompassing the following but recognizing that all these factors need not be completely satisfied:

a. There is effective competition in the production and distribution of the radioisotopes in question; however, a single source of supply under certain conditions may be acceptable (e.g., very limited market). Foreign producers will be accepted in determining effective competition provided they are actively marketing the radioisotopes in the U.S.

b. There is assurance that the private producers will not discontinue the venture in a manner that would adversely affect the public interest, to the extent resumption of production by AEC would involve a significant delay.

c. The proposed private radioisotope prices are reasonable and consistent with encouragement of research and development and use.

Government isotope requirements. It is the Atomic Energy Commission's policy to obtain radioisotopes from commercial sources where it has formally withdrawn from the production and distribution of those radioisotopes. However, the AEC maintains the right to produce an isotope for Government use in those circumstances where the Government is a substantial user, or the use is of special programmatic interest to the AEC, and, where procurement from industry would result in significantly higher cost to the Government.

Filing a petition. 1. An organization requesting that the AEC withdraw from the production and distribution of a particular radioisotope may submit a formal petition to this effect. Such a petition should contain sufficient evidence to demonstrate adequate technical, financial and managerial resources, as well as seriousness of intent.

2. The petition should include:

a. Product specifications to show evidence of their comparability to AEC products or adequacy to meet user demands.

b. Estimate of current demand. (The petitioner's production capabilities in conjunction with that of other suppliers should be adequate to meet this demand.)

c. The petitioning organization's production, processing and distribution capability, including identification of the production facilities (e.g., nuclear reactors and/or cyclotrons) available to it and the extent of commitment upon them in relation to market requirements.

d. Price schedule.

e. Delivery schedule.

f. Proposed date of AEC withdrawal.

The AEC may request additional information if the above information is inadequate for AEC to make a finding.

3. Upon making a finding favorable to the petition, the AEC will publish for public comment:

a. The private organization's petition or a summary thereof, exclusive of company confidential information, and will designate the place where a copy of the petition, exclusive of company confidential information, may be seen. (The petitioner should identify those portions of his petition which contain company confidential information; however, the information published must be sufficient to permit meaningful public comment.)

b. A notice of AEC's intent to withdraw. AEC will make a final decision on the withdrawal petition upon receipt and evaluation of public comment.

4. Upon making an unfavorable decision on a petition, either prior to or subsequent to receipt of public comment, AEC will inform the petitioning organization of the reasons for its decision.

5. When AEC determines to withdraw voluntarily from the commercial production and distribution of particular radioisotopes, it will similarly publish a notice of such intent for public comment.

AEC radioisotope prices. 1. AEC radioisotope prices will be established to provide reasonable compensation to the Government (which ordinarily will be the higher of AEC full cost recovery or reasonable commercial rates) unless this would significantly interfere with (a) research and development and use or (b) encouragement of private sources of supply. In individual cases, if (a) and (b) cannot be equally accommodated, greater weight will be given to encouragement of research and development and use.

2. The AEC will publish a 30 day prior notice of proposed price changes, including the reasons for the proposed changes.

3. The AEC will not change the price of a radioisotope during the period it is reviewing a petition for AEC withdrawal from production and distribution of that isotope.

AEC radioisotope production technology research. 1. AEC will place the conduct of radioisotope production technology research and development it deems necessary to be carried out with groups most qualified to perform such work, whether these be AEC facilities or private organizations.

2. AEC will conduct or support production technology research and development on radioisotopes from which it has withdrawn as it deems necessary, but only to the extent that AEC has satisfied itself that industry is unable, is unwilling or simply is not carrying out such work adequately or where it determines that direct AEC effort is necessary in the interest of the atomic energy program.

(Sec. 161, 68 Stat. 948; 42 U.S.C. 2201)

Dated at Washington, D.C., this 2d day of March 1965.

For the Atomic Energy Commission.

W. B. McCOOL,
Secretary.

[F.R. Doc. 65-2382; Filed, Mar. 8, 1965; 8:46 a.m.]

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. J-17
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Tuesday, January 25, 1966)

AEC PROPOSES TO WITHDRAW FROM ROUTINE PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission proposes to withdraw from the routine production and distribution of 19 radioisotopes -- antimony-124, arsenic-76, arsenic-77, bromine-82, cadmium-109, cadmium-115, cadmium-115m, copper-64, gold-198, gold-199, lanthanum-140, mercury-197, mercury-203, molybdenum-99, phosphorus-32, potassium-42, silver-110m, sodium-24, and sulfur-35-P-1. Interested persons will have thirty days in which to submit written comments for consideration by the Commission before it takes final action.

The Commission's procedures for transfer of its routine radioisotope production and distribution activities to industry were adopted formally in March, 1965. As in the case of past withdrawals, the AEC will continue to meet requirements to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

The 19 radiosiotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by Union Carbide Corporation. They are used principally in research and medical diagnosis or therapy. During fiscal 1965 the AEC business volume for these products amounted to a total of $231,485, consisting of 114,334 millicuries of radioactivity in 4,012 shipments.

Copies of the petitions from industry requesting that the Commission withdraw from production and distribution of the named radioisotopes are on file at the Commission's Public Document Room at 1717 H Street NW, Washington, D.C. Written comments should be sent to the Secretary, U.S. Atomic Energy Commission, Washington, D.C. 20545, within thirty days of publication in the Federal Register tomorrow. A copy of the Federal Register notice is attached.

#

1/25/66

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

Petitions for AEC Withdrawal from Production and Distribution of Certain Radioisotopes

Nuclear Science & Engineering Corporation ("NSEC") has submitted petitions dated October 6, November 1, and November 12, 1965, requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

NSEC's petitions contain data sheets of product specifications and delivery schedules and include a comparison of proposed NSEC prices with prices currently being charged by the Commission for the same radioisotopes.

The Commission has carefully considered the petitions and is now proposing to withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

In accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the following factors:

1. For each of the nineteen radioisotopes, either there exists effective competition or else the market is very limited and may be served satisfactorily by a single supplier.
2. If private production of any of the nineteen radioisotopes were discontinued, the AEC could resume production without significant delay. In this connection, it is noted that each of the three petitions filed by NSEC contains the statement: "In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest."
3. The radioisotope prices proposed by NSEC are reasonable and consistent with encouragement of research and development and use, since the proposed prices are lower than current AEC prices if handling charges and minimum order prices are considered.

A copy of each of the three petitions filed by NSEC, exclusive of company confidential information, is available for inspection at the Commission's Public Docket Room at 1717 H Street, N. W., Washington, D. C., and copies may be obtained by addressing a request to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545.

All interested persons who desire to submit written comments for

consideration in connection with the Commission's proposed actions on the NSEC petitions should send them to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545 within thirty days after publication of this notice in the FEDERAL REGISTER. Comments received after that period will be considered if it is practicable to do so, but assurance of consideration cannot be given except as to comments filed within the period specified.

The Commission will make a final decision on the petitions following receipt and evaluation of public comments.

Dated at Washington, D.C. this 14th day of January 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

AEC TO WITHDRAW FROM PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission will withdraw from the routine production and distribution of nineteen radioisotopes--antimony 124, arsenic 76, arsenic 77, bromine 82, cadmium 109, cadmium 115, cadmium 115m, copper 64, gold 198, gold 199, lanthanum 140, mercury 197, mercury 203, molybdenum 99, phosphorus 32, potassium 42, silver 110m, sodium 24, and sulfur 35-P-1--effective May 1, 1966. This is in accordance with the Commission's formal policy, adopted in March 1965, for transfer of routine radioisotope production and distribution activities to industry as rapidly as possible consistent with the national interest.

The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

These radioisotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by the Union Carbide Corporation. The nineteen radioisotopes are used principally in physical and biological research and in medical diagnosis and therapy.

Private organizations are producing the nineteen radioisotopes in sufficient quantities to meet ordinary commercial demands. Prices published by the producers are believed to be reasonable. Additional information on the availability of these materials may be obtained from commercial suppliers of radioisotopes.

#

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

AEC Withdrawal from Production and
Distribution of Certain Radioisotopes

On January 26, 1966, the Commission published in the FEDERAL REGISTER (31 F.R. 1015) a notice that petitions had been submitted by Nuclear Science & Engineering Corporation ("NSEC") requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

That notice stated that the Commission is proposing to withdraw from routine production and distribution of these nineteen radioisotopes and requested interested persons to submit written comments within thirty days for consideration in connection with the Commission's proposed actions on the NSEC petitions.

The notice also stated that, in accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the

production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the requirements of the withdrawal guidelines set forth in the Commission's Statement of Policy.

The Commission has evaluated all of the comments received in response to the January 26, 1966, notice, and has made a final decision on the withdrawal petitions. Effective thirty days from the date of publication of this notice in the FEDERAL REGISTER, the Commission will withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

Dated at _____ this _____ day of _____ 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Isotopes-3

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. J-80
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Friday, April 1, 1966)

AEC GIVES ADVANCE NOTICE OF CHANGES IN RADIOISOTOPE PRICES

The Atomic Energy Commission will increase prices of thirteen radioisotopes effective on May 1, 1966. The price increases are necessary to recover full costs of radioisotope production and distribution.

The thirteen radioisotopes for which prices will be increased are: cobalt-60 solution, europium-152, hafnium-181, indium-114, iridium-194, iron-55 -59 (in combination), osmium-191, rubidium-86, scandium-46, tantalum-182, tungsten-185, yttrium-90, and tritium (hydrogen-3) targets.

These radioisotopes are used industrially, and in biomedical or other research. The advance notice is in keeping with a procedure published by the AEC in the Federal Register, March 9, 1965.

Copies of the revised price schedule may be obtained from E. E. Beauchamp, Oak Ridge National Laboratory, Isotopes Sales Department, Isotopes Development Center, P. O. Box X, Oak Ridge, Tennessee 37830.

#

(NOTE TO EDITORS AND CORRESPONDENTS: This information also is being issued by the Commission's Operations Office in Oak Ridge, Tenn.)

4/1/66

4-1-66

Isotopes – 3

APR 1 1966

Honorable Gordon Allott
United States Senate

Dear Senator Allott:

This is in reply to your letter of March 18, 1966, regarding views expressed to Mr. W. B. McCool, Secretary, USAEC, by Professor Albert A. Bartlett, University of Colorado, by his letter of March 11, 1966, a copy of which he forwarded to your office. Professor Bartlett was protesting the proposed AEC withdrawal from the production and distribution of 19 radioisotopes on the basis that private prices for these materials would be significantly higher than those being charged by the AEC. We had received an earlier letter, dated February 13, 1966, from Professor Bartlett on this subject and subsequently discussed this matter with him by telephone. As a consequence, we received a further letter from Professor Bartlett, dated March 22, 1966, a copy of which he also provided your office, in which he acknowledged that the data upon which he had based his protest was inaccurate and that the proposed private prices would, in fact, be lower than those being charged by the AEC. Professor Bartlett did have other questions however, which are discussed below.

1) Professor Bartlett questioned whether the private prices for these 19 radioisotopes would stay at their lower level once the AEC discontinued production and distribution. We would point out, first of all, that private competition exists in the production and distribution of most of the radioisotopes in question. We have reason to believe that such competition will develop for all of the items. We would anticipate therefore that normal competitive forces will preclude any unwarranted increases in private prices. In any case, the AEC could resume production and distribution of these radioisotopes if an undesirable situation should arise in the private price structure.

2) Professor Bartlett also questioned how commercial firms could charge lower prices than AEC for these radioisotopes. Private suppliers usually establish facilities and equipment and assign manpower just sufficient to produce and distribute the limited number of radioisotopes which they market. The AEC, on the other hand, must maintain equipment, facilities and personnel adequate to meet all of the country's needs for radioisotopes which are not yet being accommodated by private industry. Thus the AEC still distributes

9-1-66

over 100 radioisotope products. Most of these are very low volume items which, nevertheless, are of critical importance, especially in research. As a consequence of maintaining ourselves in readiness to meet these needs, we must bear higher overhead and other costs than would be necessary in a purely commercial operation. It is this difference which accounts for the ability of private suppliers to charge lower prices in many cases than AEC.

3) Professor Bartlett further inquired whether it is in the best interest of the people of the United States for the AEC to withdraw the services that our Oak Ridge facilities were designed to accommodate. It has been a long standing AEC policy not to compete with private sources of supply of materials and services. In implementing this policy, however, we have been careful to assure that the public interest is adequately protected. In connection with radioisotopes particularly, we published in the Federal Register in March 1965 a statement of "Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry". A copy of this statement is enclosed for your information. As you will note, the statement establishes guidelines subject to which the AEC will consider withdrawing from the production and distribution of particular radioisotopes. In general, these guidelines provide that there must be a demonstrable private capability to provide the radioisotopes in the quantity and quality which the market requires, that there normally should be effective competition in the supply of these materials and that the private prices must be reasonable. Even after we withdraw from a particular radioisotope in accordance with these guidelines, we make provision for continuing to meet requirements when the purchaser certifies in writing that the material he needs is of a special or unusual quality not commercially available. We would also like to point out that our Oak Ridge facilities are designed for the conduct of research and development on radioisotope production methods as well as for routine production and distribution of these materials. To the extent we are able to withdraw from the latter activity because of private capability to perform this function, we are able to increase our research and development efforts. This, of course, is to the benefit of the country because it leads to the availability of new and improved radioisotopes for use in medicine, science, industry and agriculture.

We are also enclosing for your information a public announcement and Federal Register notice dated January 25 and January 26, 1966, respectively in which the Commission indicated its intent to withdraw from the routine production and distribution of the 19 radioisotopes subject to receipt of public comment. Having evaluated

the public comments received, we have determined they were not of such substance to require changes in our proposed withdrawal action. Accordingly, the Commission will withdraw from production and distribution of the 19 radioisotopes effective May 1, 1966. Copies of our public announcement of March 31 and Federal Register notice of April 1 to this effect are enclosed.

We trust the foregoing adequately responds to your inquiry. Should you desire further information, we will, of course, be pleased to provide it.

Sincerely yours,

E. E. Fowler, Director
Division of Isotopes Development

Enclosures:
1. F. E. Statement of Policy, dtd. 3/9/65
2. Public Announcement, dtd. 1/25/66
3. Federal Register notice, dtd. 1/26/66
4. Public Announcement, 3/31/66
5. Federal Register Notice, dtd. 4/1/66

Distribution:
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MACHUREK:mma Fowler
3/31/66

Gotrax - 3

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. J-79
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Thursday, March 31, 1966)

B-425

Copy - Germantown

AEC TO WITHDRAW FROM PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission will withdraw from the routine production and distribution of nineteen radioisotopes--antimony-124, arsenic-76, arsenic-77, bromine-82, cadmium-109, cadmium-115, cadmium-115m, copper-64, gold-198, gold-199, lanthanum-140, mercury-197, mercury-203, molybdenum-99, phosphorus-32, potassium-42, silver-110m, sodium-24, and sulfur-35-P-1--effective May 1, 1966. This is in accordance with the Commission's formal policy, adopted in March 1965, for transfer of routine radioisotope production and distribution activities to industry as rapidly as possible consistent with the national interest.

The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

These radioisotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by the Union Carbide Corporation. The nineteen radioisotopes are used principally in physical and biological research and in medical diagnosis and therapy.

Private organizations are producing the nineteen radioisotopes in sufficient quantities to meet ordinary commercial demands. Prices published by the producers are believed to be reasonable. Additional information on the availability of these materials may be obtained from commercial suppliers of radioisotopes.

#

(NOTE TO EDITORS AND CORRESPONDENTS: This information also is being issued by the Commission's Operations Office in Oak Ridge, Tenn.)

3/31/66
994/28

3-31-66

Isotopes-3

March 31, 1966

Dr. John C. Brantley, President
Nuclear Science & Engineering Corp.
P.O. Box 10901
Pittsburgh, Pennsylvania 15236

Dear Cal:

With reference to NSEC petitions dated October 6, November 1, and November 12, 1965, I am pleased to inform you that they were approved by the Commission this week. Attached for your information are copies of the proposed Federal Register notice and public announcement. The announcement will be published tomorrow in the Federal Register.

Our withdrawal from the routine production and distribution of these 19 radioisotopes will become effective May 1, 1966. The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

Sincerely yours,

E. E. Fowler, Director
Division of Isotopes Development

Enclosures:
1. Proposed Federal Register notice
2. Proposed Public Announcement

cc: J. Hoyle, SEC (2 cys.)

AEC 994/27
AEC 994/28
Info Mtgs 5-45
5-72

DID:ADFSE	DIDKEELIADFSE	DID:D
MADDOX:mma	Macherek	Fowler
3/31/66	3/ /66	3/ /66

3-31-66

Isotopes -3

MAR 3 0 1966

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. David C. Eberhart, Director
Office of the Federal Register
National Archives & Record Service
Washington 25, D. C.

Dear Mr. Eberhart:

Attached for publication in the Federal Register are an original and two certified copies of a document entitled:

Nuclear Science & Engineering Corporation
AEC Withdrawal from Production and
Distribution of Certain Radioisotopes

Please handle as schedule I to be published no later than Friday, April 1, 1966.

Publication of the above document at the earliest possible date would be appreciated.

Sincerely yours,

Original signed
W. B. McCool

W. B. McCool
Secretary to the Commission

Enclosures:
Original and 2 cert. cys.

cc: Docket Clerk (Dir. of Reg.)
Wm. Hughes (PI)
Legal Files (OGC)
Law Library (OGC)
Congressional Liaison
D. C. Files (SECY)
✓Germantown Files (SECY)
Public Proceedings Br. (SECY)
Contracts
John Maddox

AEC 994/27

3-30-66

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

AEC Withdrawal from Production and
Distribution of Certain Radioisotopes

On January 26, 1966, the Commission published in the FEDERAL REGISTER (31 F.R. 1015) a notice that petitions had been submitted by Nuclear Science & Engineering Corporation (NSEC) requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24/
Sulfur-35-P-1

That notice stated that the Commission is proposing to withdraw from routine production and distribution of these nineteen radioisotopes and requested interested persons to submit written comments within thirty days for consideration in connection with the Commission's proposed actions on the NSEC petitions.

The notice also stated that, in accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the

production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the requirements of the withdrawal guidelines set forth in the Commission's Statement of Policy.

The Commission has evaluated all of the comments received in response to the January 26, 1966, notice, and has made a final decision on the withdrawal petitions. Effective thirty days from the date of publication of this notice in the FEDERAL REGISTER, the Commission will withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

Dated at Washington, D. C. this 30th day of March 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Do Copies -3

Congress of the United States

JOINT COMMITTEE ON ATOMIC ENERGY

March 30, 1966

Mr. Robert E. Hollingsworth
General Manager
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Hollingsworth:

Reference is made to your March 30 letter concerning plans to withdraw from the production and distribution of nineteen radioisotopes. Please supply the Committee with the fifteen comments which were received from individuals concerning the planned withdrawal.

Also supply the Committee with any summaries of the comments that may have been prepared.

Thank you for your cooperation.

Sincerely yours,

John T. Conway

John T. Conway
Executive Director

W-50-66

Isotope-3

W. B. McCool
Secretary

March 29, 1966

E. E. Fowler, Director
Division of Isotopes Development

AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

Please arrange to have the attached notice on the above subject published in the Federal Register April 1, 1966. At Information Meeting No. 572 on March 28, 1966, the Commission approved the recommendation in AEC 901/143, subject as above, that the AEC publish such a notice.

Attachment:
Federal Register Notice

bcc: J. E. Machurek, DID
J. Maddox, DID
C. Farbstein, OGC

DID:ADP&E	DID:ADP&E	DID:D	OGC
MADDOX:mma	Machurek	Fowler	Farbstein
3/29/66	3/ /66	3/ /66	3/ /66

3-29-66

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

AEC Withdrawal from Production and Distribution of Certain Radioisotopes

On January 26, 1966, the Commission published in the FEDERAL REGISTER (31 F.R. 1015) a notice that petitions had been submitted by Nuclear Science & Engineering Corporation ("NSEC") requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
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Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

That notice stated that the Commission is proposing to withdraw from routine production and distribution of these nineteen radioisotopes and requested interested persons to submit written comments within thirty days for consideration in connection with the Commission's proposed actions on the NSEC petitions.

The notice also stated that, in accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the

production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the requirements of the withdrawal guidelines set forth in the Commission's Statement of Policy.

The Commission has evaluated all of the comments received in response to the January 26, 1966, notice, and has made a final decision on the withdrawal petitions. Effective thirty days from the date of publication of this notice in the FEDERAL REGISTER, the Commission will withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

Dated at _____ this _____ day of _____ 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Mr. John T. Conney
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conney:

On January 20, 1956, we advised you of the Commission's plans to publish for public comment a notice of AEC intent to withdraw from routine production and distribution of 19 radioisotopes. At that time, we transmitted for your information copies of the Nuclear Science and Engineering Corporation's petitions, our public announcement, and the Federal Register notice.

Publication took place on January 26, 1956, and interested persons were requested to comment within 30 days. Fifteen comments were received from individuals representing 13 organizations. The Commission has concluded that these comments were not of such substance as to require changes in the proposed withdrawal. Accordingly, the Commission will withdraw from the routine production and distribution of these 19 radioisotopes, effective May 1, 1956. The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

Attached for your information are copies of the proposed Federal Register notice and public announcement which we plan to release simultaneously with publication in the Federal Register.

Sincerely yours,

General Manager

Enclosures:
1. Proposed Federal Register Notice - This is same as attached to McCool memo.
2. Proposed Public Announcement

GM:DMAE	DCM:D	AGMRD	AGM	GM	CORR.LIAI.
MACMILLAN:mm	Fowler				
3/2/56	3/ /56	3/ /56	3/ /56	3/ /56	3/ /56

AEC TO WITHDRAW FROM PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission will withdraw from the routine production and distribution of nineteen radioisotopes--antimony 124, arsenic 76, arsenic 77, bromine 82, cadmium 109, cadmium 115, cadmium 115m, copper 64, gold 198, gold 199, lanthanum 140, mercury 197, mercury 203, molybdenum 99, phosphorus 32, potassium 42, silver 110m, sodium 24, and sulfur 35-P-1--effective May 1, 1966. This is in accordance with the Commission's formal policy, adopted in March 1965, for transfer of routine radioisotope production and distribution activities to industry as rapidly as possible consistent with the national interest.

The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

These radioisotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by the Union Carbide Corporation. The nineteen radioisotopes are used principally in physical and biological research and in medical diagnosis and therapy.

Private organizations are producing the nineteen radioisotopes in sufficient quantities to meet ordinary commercial demands. Prices published by the producers are believed to be reasonable. Additional information on the availability of these materials may be obtained from commercial suppliers of radioisotopes.

#

ATTACHMENT

Isotopes
Copy - Germantown

~~OFFICIAL USE ONLY~~

Reference & Reproduction Branch

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

UNITED STATES GOVERNMENT

Memorandum

TO : File

DATE: March 29, 1966

FROM : W. B. McCool, Secretary

SUBJECT: AEC 994/28 AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF RADIOISOTOPES

SECY:JCH

1. At Information Meeting 572 on March 28, 1966, the Commissioners approved the announcement of AEC withdrawal from the production and distribution of 19 radioisotopes and publication of the proposed Notice in the Federal Register as discussed and recommended in Mr. Fowler's March 23, 1966 memorandum, circulated as AEC 994/28.

2. It is our understanding the Division of Isotopes Development is taking the required action.

cc:
Commissioners
General Manager
Deputy General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for Plans & Prod.
Asst. Gen. Mgr. for R&D
General Counsel
Dir., Indust. Participation
Dir., Inspection
Dir., Isotopes Development
Dir., Operations Analysis & Forecasting
Dir., Public Information
Dir., Congr. Relations
Controller

3-29-66

UNCLASSIFIED

~~OFFICIAL USE ONLY~~

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

Isotopes -3

UNITED STATES GOVERNMENT

Memorandum

TO : W. B. McCool, Secretary

DATE: March 29, 1966

FROM : Stanley T. Robinson, Jr.
Chief, Public Proceedings Branch

SUBJECT: LETTER FROM BARTLETT RE WITHDRAWAL OF 19 RADIOISOTOPES

Attached for your information is a copy of a letter from Mr. Bartlett.

As you will remember, on March 23, 1966 you signed two letters to Senators Allott and Dominick regarding their receipt of certain objections from Mr. Bartlett. At that time I informed you that the Division of Isotopes Development had contacted Mr. Bartlett informing him of his error and that he had apologized, further stating that he would write a letter.

The attached letter has been acknowledged and both Isotopes Development and Congressional furnished copies.

3-29-66

PETITION RULE PR 10 CF

Withdrawal of Radi
isot

UNIVERSITY OF COLORADO
BOULDER, COLORADO 80304

DEPARTMENT OF PHYSICS AND ASTROPHYSICS

March 22, 1966

Mr. W. B. McCool, Secretary
U. S. Atomic Energy Commission
Washington, D. C.

Dear Mr. McCool,

I wish to apologize for the misinformation that was the basis for my letter to you of March 11 protesting the withdrawal of 19 isotopes from routine production at Oak Ridge. I have been contacted by Mr. John N. Maddox of the Division of Isotope Development of the A.E.C. and he explained the costs in considerably more detail than was given in the announcements.

The real difference in the costs lies not in the catalog prices, which are approximately correct (but slightly out of date) as I observed, but in the minimum charges of approximately $50 per order which is always charged at Oak Ridge. The private companies apparently have much lower minimum charges than Oak Ridge has, and this is the basis for the suggestion in the petitions that the net cost would be lower if these isotopes are supplied by private companies than if they are supplied by Oak Ridge.

This leaves the following questions that are of some concern to me.

1) Will the private prices stay at their apparently lower level once Oak Ridge has stopped production?

2) How can private suppliers give products at a lower cost than Oak Ridge can give them? I had the impression that these isotope production facilities at Oak Ridge were designed to give just this service to the research actifities of the country, and now it appears that they are too large to function economically, and tax paying private suppliers can do a better job. I still don't fully appreciate how this can be true.

3) In view of the enormous investment the people of the United States have in the Oak Ridge Isotope production facilities, is it in the best interest of the people to withdraw the services that these facilities were designed to serve?

A single experience has already indicated that on an isotope that was withdrawn from Oak Ridge production some time ago, our Purchasing Department had to shop around to several suppliers, and the price they finally had to pay was approximately 20 times higher than what we were used to paying when we purchased materiallfrom Oak Ridge.

I apologize again that I was incorrect in the main argument of my letter of the 11th.

Sincerely yours,

Albert A. Bartlett

Albert A. Bartlett
Professor

cc. Senator Allott
Senator Dominick
Rep. McVicker
Mr. Maddox

OFFICIAL USE ONLY

March 25, 1966

AEC 994/28

COPY NO. 22

ATOMIC ENERGY COMMISSION

INFORMATION MEETING ITEM

AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF RADIOISOTOPES

Note by the Secretary

The General Manager has requested that the attached memorandum dated March 23, 1966 from the Director of Isotopes Development, with attachments, be circulated for consideration by the Commission at the Information Meeting scheduled for Monday, March 28, 1966.

W. B. McCool

Secretary

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OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : R. E. Hollingsworth, General Manager
THRU: S. G. English, Assistant General Manager for Research and Development

DATE: MAR 2 3 1966

FROM : E. E. Fowler, Director
Division of Isotopes Development

SUBJECT: AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

At Information Meeting #545 on December 22, 1965, the Commission approved the recommendations of AEC 994/27 that AEC publish for public comment its intent to withdraw from the routine production and distribution of 19 radioisotopes. The Commission's announcement was issued on January 25, 1966, and was published in the Federal Register January 26, 1966, allowing 30 days for receipt of public comments.

To assure full notification of interested parties, approximately 9,000 copies of the announcement and Federal Register notice were distributed to radioisotope users and those on the AEC's public announcement mailing list. There are over 800 customers of radioisotopes and associated services and products from Commission laboratories and copies were sent to each. However, only 15 comments (see summaries in Attachment "A") were received from individuals representing 13 organizations. The responses from these organizations may be classified as follows: Universities - 7; Individuals - 2; Industrial users - 1; Medical laboratory - 1; Federal Agency - 1; and Commercial producer - 1.

Below is a discussion of the comments received:

Five comments were in favor of the withdrawal. Two universities and one medical laboratory were totally opposed to even the basic policy of AEC withdrawal in favor of private producers. However, Commission policy in this regard was established by AEC 994/20 and AEC 994/21 leading to the adoption of the "Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry." This Statement of Policy was published in the Federal Register March 9, 1965.

The Federal Agency and two universities strongly pointed out the inadequacy of NSEC's Cu^{64} and K^{42} for their research programs due to the specific activity being too low. Other commercial groups producing this isotope (Isoserve, Abbott, and Union Carbide, Tuxedo) are actually using higher flux reactors than NSEC, and therefore producing and offering for sale a higher specific activity product. It is noted that the withdrawal procedures provide that AEC will continue to meet requirements to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not available commercially. Our experience with past withdrawal actions has shown that the volume of requirements for such high quality material has been extremely small.

Three universities stated it was a real convenience to turn to a single supplier, as in the past, and expressed concern that a proliferation of suppliers would lead to confusion and difficulty in searching out and ordering a given isotope in the future. They suggested the AEC continue to act as a "clearing house" or "single source" for radioisotope availability information.. They further stated it would be extremely helpful to list in the ORNL catalog references to private suppliers of withdrawn items including their product specifications. DID does maintain information concerning radioisotopes available from all producers. A concerted liaison effort is made with all commercial suppliers to keep this information up to date in order to answer numerous inquiries and assist users, both domestic and foreign, in locating appropriate suppliers of the required radioisotope. THE ISOTOPE INDEX - 7th edition and the INTERNATIONAL DIRECTORY OF ISOTOPES - 3rd edition are two independent publications showing the availability, and product specifications of all radioisotopes offered by about eighty world-wide suppliers. NUCLEONICS' annual INTERNATIONAL BUYERS' GUIDE - 16th edition is also useful but on a much more limited basis. All three publications are revised either annually or periodically.

Three universities registered their belief that commercial prices would be much higher than ORNL. However, these groups had not taken into account the fact that NSEC has a lower handling charge per shipment ($10 vs. $25 for ORNL) and a smaller minimum isotope charge ($8 vs. $25 to $50 at ORNL). When these are considered NSEC prices are lower in every instance, Based on past withdrawal actions, we feel that commercial prices may even be reduced further, especially for those with enough volume of business to justify strong competition.

One industrial user filed an objection if the quality of commercially supplied Cd^{109} being offered is not free of Cd^{115}. In addition to NSEC at least one other commercial supplier is producing Cd^{109} and, of course, upon written certification by the user ORNL will continue to supply a customer's high quality requirements. One university gave their impression that industry was not doing a good job in the matter of isotope distribution. This group had received sources in contaminated containers and packing materials. Sometimes the sources were not prepared correctly and delivery was slow. We feel that as the market grows and competition increases these conditions will improve.

It is concluded that the comments received in response to the Federal Register notice and the public announcement are not of such substance as to require changes in the proposed withdrawal from the routine production and distribution of the nineteen radioisotopes. It is recommended that the AEC issue the proposed public announcement (Attachment "B") and publish its final decision in the Federal Register (Attachment "C") to become effective thirty days from the date of publication. The Joint Committee will be notified (Attachment "D").

The Division of Industrial Participation and the Offices of the General Counsel and Controller concur in our conclusion and recommendation. The Division of Public Information concurs in the proposed public announcement. The Office of Congressional Relations concurs in the draft letter to the JCAE.

Attachment "A": Summary of Comments Received
Attachment "B": Proposed Public Announcement
Attachment "C": Proposed Federal Register Notice
Attachment "D": Draft Letter to JCAE

Approved:

_____
General Manager

_____
Date

Summary of Comments Received on Proposed Withdrawal
From Routine Production and Sale of Nineteen Radioisotopes
(Published in Federal Register 1/26/66)
(AEC Public Announcement J-17 dated 1/25/66)

	Date of Letter	Name and Address	Comment
1.	2/4/66	University of Minnesota Medical School Minneapolis, Minnesota 55455 Victor Lorber Dept. of Physiology	NSEC supplies (according to their catalog) K^{42} at only about 1/10 the specific activity of ORNL. Presently only one other supplier with a specific activity suitably high but since they are located on the East Coast has difficulty meeting delivery schedules for Minnesota. With short half-life isotopes such as K^{42} this is a very important consideration. Consequently, withdrawal of ORNL would have grave consequences for their present work, and respectfully requests that this not be done.
2.	2/8/66	University of Pittsburgh Wherrett Lab. of Nuclear Chem. Pittsburgh, Pa. 15213 Robert L. Wolke Associate Professor Dept. of Chemistry	In agreement with the AEC policy of withdrawal in favor of private suppliers. Convenient to turn to a single supplier in the past and concerned that a proliferation of suppliers would lead to confusion and difficulty in searching out and ordering a given isotope in the future. AEC could continue to act as a Clearinghouse for radioisotope availability information. Suggests continuin to list all radioisotopes (including specifications) in ORNL catalog, but with references to private suppliers of withdrawn items. Any mechanism by which a user could continue to consult a single source of information on availability would be extremely helpful.
3.	2/9/66	Thomas F. McCauley E. 604 Mission Ave. Spokane, Washington 99202	Transfer of these operations to private industry has his most hearty approval.
4.	2/10/66	Clinical Laboratories 2010 Fifth Avenue Bay City, Michigan W. G. Gamble, Jr., M.D.	It would be a great mistake at this point to turn this over to private industr without very adequate controls. Afraid industrial people would exploit with having good guidelines and regulations. Definitely against discontinuing th 19 radioisotopes and transferring these to private industries, without adequat controls.
5.	2/10/66	Vanderbilt University School of Medicine Nashville, Tenn. 37203 Leon Hurwitz, PhD Assoc. Prof. of Pharmacology Allan D. Bass, M.D. Professor & Chairman Dept. of Pharmacology	Request you consider carefully the discontinuation of K^{42} production. Entire research program, supported by NIH, is dependent upon this short half-life isotope being readily available. Special attention should be given to the rapidity of transportation and whether industrial price will impair our presen budgetary allotments from NIH for this research project. Have been purchasing weekly shipments for several years from ORNL and with the excellent service we have encountered, we sincerely hope this service will be made available in the future.

Attachment "A"

	Date of Letter	Name and Address	Comment
6.	2/15/66	St. Louis University School of Medicine 1402 S. Grand Blvd. St. Louis, Missouri 63104 J. Wendell Davis Assoc. Professor Dept. of Biochemistry	Have no comments concerning this move except to request that a list of sources of these radioisotopes among private industry be circulated to persons on the mailing list of ORNL. Particularly interested at present in knowing who will provide P^{32} and S^{35} for research purposes.
7.	2/15/66	University of Colorado Dept. of Physics & Astrophysics Boulder, Colorado 80304 Albert A. Bartlett Professor of Physics (Same commentator as #15)	Representing only himself and not University of Colorado. Registers the strongest kind of a protest against the AEC's withdrawing production of these isotopes. Already experienced great difficulty in routinely obtaining small sources of Co^{60} from commercial firms. Expects similar difficulty with mercury 197. Thinks this is a very great step backwards and will be hampering the development and use of radioisotopes throughout the country by scattering the production out to a number of different private corporations. In a few years may find the cost higher. An enormous service to research to have a central catalogue, such as ORNL's, from which one can order with confidence rather than a large number of scattered distributors who come and go in the business and are not able to supply things as effectively as ORNL. Requested his protest be recorded and his sincere hope that this transfer and withdrawal of these 19 radioisotopes will not take place.
8.	2/16/66	Lane Wells A Division of Dresser Industries P. O. Box 1407 Houston, Texas 77001 A. E. Caswell, Jr. Staff Health Physicist	Sent copy of their letter of February 4, 1966, letter to NSEC on whether NSEC supplied Cd^{109} free of Cd^{115}. Lane Wells had not yet received a reply from NSEC. Filed an objection to withdrawal if clean Cd^{109} will not be available from commercial suppliers.
9.	2/18/66	U.S. Dept. of Agriculture Agric. Research Service Soil & Water Cons. Res. Div. Plant, Soil & Nutrition Lab. Ithaca, New York 14850 Darrell Van Campen Research Biochemist (Same organization as #11)	Their extensive research program on copper nutrition of animals depends entirely upon the availability of copper-64 of high specific activity. ORNL's material is 40 to 50 c/g at time of shipping and delivered to them within about one half-life assay or at least 15 c/g at time of receipt. Portions of research would be seriously curtailed if unable to obtain Cu^{64} at least 10 c/g at time of receipt. Only domestic supplier they have been able to locate (NSEC) listed 6 c/g material in catalog. Requested ORNL continue to produce Cu^{64} until a domestic source for material with specific activity similar to that produced by ORNL is available.

Attachment #4

	Date of Letter	Name and Address	Comment
10.	2/19/66	Kansas State University Dept. of Physics Physical Science Bldg. Manhattan, Kansas 66504 C. E. Mandeville Professor of Physics	Expressed a feeling of opposition to the withdrawal petition. Experience has shown that radioactive sources supplied by industry are sometimes in contamin containers or are surrounded by contaminated packing materials, sometimes not correctly prepared, delivery time is sometimes long. A strong advocate of private enterprise but general impression is that industry is not doing a goc job in the matter of isotope distribution. Strongly recommended that the tas of distribution of all radioisotopes be returned to the USAEC.
11.	2/21/66	U.S. Dept. of Agriculture Agric. Research Service Soil & Water Cons. Res. Div. Plant, Soil & Nutrition Lab. Ithaca, N.Y. 14850 Joseph F. Hodgson Soil Scientist (Same organization as #9)	Their isotopic dilution techniques are dependent on a high-specific activity Cu^{64}. ORNL has been supplying Cu^{64} of nearly 60 c/g at the time of assay. 25 c/g is about the lowest value can conveniently use and very few shipmen have fallen below this. NSEC, to date the only domestic supplier they have b able to locate, quote 6 c/g. This material would seriously jeopardize the validity of results. Hoped AEC would reconsider decision to discontinue pro- duction of Cu^{64} until a domestic supplier can provide with a specific activit comparable to ORNL.
12.	2/23/66	Union Carbide Corporation Sterling Forest Res. Center P. O. Box 324 Tuxedo, New York 10987 P. M. Stier Manager - Nucleonics	Pleased with this proposal and urges the AEC to complete the withdrawal as sc as practical. Carbide has been a major producer and distributor of radioisot since 1961 at its privately-owned reactor facility. In routine production of of the 19 proposed for withdrawal. Gold-198, mercury-197, mercury-203, molybdenum-99, phosphorus-32 and sulfur-35-P-1 are offered as processed mater available immediately from stock. Makes weekly shipments of bromine-82, copper-64, potassium-42, and sodium-24 as unprocessed material for other com- panies who specialize in the distribution of these short-lived materials. Th ten account for 93% of the FY 1965 ORNL shipments of the 19 radioisotopes. Changes are being made in Carbide handling charges and minimum product charge of processed radioisotopes so that delivered prices will be equal to or lo than current AEC prices. In agreement with the proposed withdrawal and wi continue to provide a share of this service as a private supplier.
13.	2/23/66	Phillip A. Demers 11014 Cactus Lane Dallas, Texas	Congratulation on your move to transfer 19 radioisotopes to private industry.

	Date of Letter	Name and Address	Comment
14.	3/1/66	Wilmington College Wilmington, Ohio 45177 Harry H. Johnston Chairman, Biology Dept.	It is becoming more expensive and more difficult to obtain isotopes for teaching purposes. The cost from private companies would become prohibiti to use many isotopes in courses. A reasonable plan would be one like that taken by the National Culture Collection in making available those isotope that could be used in teaching-P^{32}, Co^{60}, Ra DEF, etc. Understands proces isotopes is not inexpensive but feels that to make maximum use of isotop for teaching, they must be available at a reasonable cost.
15.	3/11/66	University of Colorado Department of Physics and Astrophysics Boulder, Colorado 80304 Albert A. Bartlett Professor of Physics Nuclear Physics Laboratory (Same commentator as #7)	Registers the strongest kind of protest against the entire withdrawal. Based on his calculations, states that NSEC prices are higher than ORNL by factors varying from 1.2 to 75 with an average of 9.22. He therefore estimates that the public might expect to have to pay 1.9 million dollars more for these 19 radioisotopes than they did from ORNL. His experience with past withdrawals has been (1) the price has gone up, and (2) his purchasi department has to canvass a number of potential suppliers. Amount of research will seriously decline because of added confusion. In order to get reliable shipments one has to import from other governmental sources in either Canada, Great Britain or France.

ATTACHMENT "B"

AEC TO WITHDRAW FROM
PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission will withdraw from the routine production and distribution of nineteen radioisotopes--antimony 124, arsenic 76, arsenic 77, bromine 82, cadmium 109, cadmium 115, cadmium 115m, copper 64, gold 198, gold 199, lanthanum 140, mercury 197, mercury 203, molybdenum 99, phosphorus 32, potassium 42, silver 110m, sodium 24, and sulfur 35-P-1--effective May 1, 1966. This is in accordance with the Commission's formal policy, adopted in March 1965, for transfer of routine radioisotope production and distribution activities to industry as rapidly as possible consistent with the national interest.

The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

These radioisotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by the Union Carbide Corporation. The nineteen radioisotopes are used principally in physical and biological research and in medical diagnosis and therapy.

Private organizations are producing the nineteen radioisotopes in sufficient quantities to meet ordinary commercial demands. Prices published by the producers are believed to be reasonable. Additional information on the availability of these materials may be obtained from commercial suppliers of radioisotopes.

#

ATTACHMENT "C"

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

AEC Withdrawal from Production and
Distribution of Certain Radioisotopes

On January 26, 1966, the Commission published in the FEDERAL REGISTER (31 F.R. 1015) a notice that petitions had been submitted by Nuclear Science & Engineering Corporation ("NSEC") requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

That notice stated that the Commission is proposing to withdraw from routine production and distribution of these nineteen radioisotopes and requested interested persons to submit written comments within thirty days for consideration in connection with the Commission's proposed actions on the NSEC petitions.

The notice also stated that, in accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the

production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the requirements of the withdrawal guidelines set forth in the Commission's Statement of Policy.

The Commission has evaluated all of the comments received in response to the January 26, 1966, notice, and has made a final decision on the withdrawal petitions. Effective thirty days from the date of publication of this notice in the FEDERAL REGISTER, the Commission will withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

Dated at _____ this _____ day of _____ 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Attachment "C"

ATTACHMENT "D"

DRAFT LETTER TO THE JOINT COMMITTEE ON ATOMIC ENERGY

1. On January 20, 1966, we advised you of the Commission's plans to publish for public comment a notice of AEC intent to withdraw from routine production and distribution of 19 radioisotopes. At that time, we transmitted for your information copies of the Nuclear Science and Engineering Corporation's petitions, our public announcement, and the Federal Register notice.

2. Publication took place on January 26, 1966, and interested persons were requested to comment within 30 days. Fifteen comments were received from individuals representing 13 organizations. The Commission has concluded that these comments were not of such substance as to require changes in the proposed withdrawal. Accordingly, the Commission will withdraw from the routine production and distribution of these 19 radioisotopes, effective May 1, 1966. The AEC will continue to meet requirements to the extent that the purchaser certifies in writing that the material he needs is of a technical quality not commercially available.

3. Attached for your information are copies of the proposed Federal Register notice and public announcement which we plan to release simultaneously with publication in the Federal Register.

Enclosures:

1. Proposed Federal Register Notice
2. Proposed Public Announcement

DATE:

INDEX: Isotopes 3

TO:

FROM:

SUMMARY: AEC 1192/14 - FORECAST RADIOISOTOPE DEMANDS STUDY
This is in response to a request for information on the proposed contract award to the Rand Corp for a "Forecast Radioisotope Demands Study".

FILED: Contracts 9

INDEXER: date of paper: 3-2-66

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

3-2-66

Isotopes 3

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Reference & Reproduction Branch

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27
5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : E. Eugene Fowler, Director
Division of Isotopes Development

DATE: January 28, 1966

FROM : W. B. McCool, Secretary Original signed
W. B. McCool

SUBJECT: AEC 1209 - COOPERATIVE AEC-INDUSTRY ISOTOPES AND RADIATION DEVELOPMENT PROGRAM

SECY:ICB

1. At Meeting 2173 on January 25, 1966, the Commission:

a. Approved the solicitation of industrial interest in jointly financed AEC-Industry cooperative development projects in accordance with Appendix "E" to AEC 1209;

b. Approved the ground rules for jointly financed AEC-Industry isotopes and radiation projects as set forth in Appendix "C" to AEC 1209;

c. Noted that staff was free at its discretion to discuss as possibilities the procedures for granting of patent and other rights to participating organizations as set forth in Part II of Appendix "D" to AEC 1209, with respondents to the solicitation. It was emphasized, however, that Part II of Appendix "D" to AEC 1209, constitutes tentative views of the staff, which have not been approved by the Commission. After discussions have been held with respondents, and positions identified, formal presentation will be made to the Commission;

d. Noted that specific Commission approval will be obtained prior to soliciting firm proposals with respect to projects chosen for cooperative efforts and for types of assistance other than those specifically identified in Appendix "C" to AEC 1209;

e. Noted that the BOB and the JCAE will be informed of this action by letter such as Appendix "G" to AEC 1209;

f. Noted that funds for this program will be provided through the normal budgetary process; and

g. Noted that a public announcement will be made such as set forth in Appendix "H" to AEC 1209.

1-28-66

Copy filed. Originals - 6. Tech. Dept.

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2. As you will recall, Commissioner Ramey requested the proposed procedures for granting patent rights be discussed with the Joint Committee staff.

3. The General Manager has directed you to take the action required by the above decision and request. It is our understanding that your office will prepare the correspondence to the JCAE and the BOB. Copies of these letters together with other pertinent correspondence should be provided the Office of the Secretary.

cc:
Chairman
Commissioner Ramey
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for R&D
General Counsel
Dir., Congr. Relations
Dir., Industrial Participation
Dir., Public Information
Controller

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. J-17
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Tuesday, January 25, 1966)

AEC PROPOSES TO WITHDRAW FROM ROUTINE PRODUCTION AND SALE OF NINETEEN RADIOISOTOPES

The Atomic Energy Commission proposes to withdraw from the routine production and distribution of 19 radioisotopes -- antimony-124, arsenic-76, arsenic-77, bromine-82, cadmium-109, cadmium-115, cadmium-115m, copper-64, gold-198, gold-199, lanthanum-140, mercury-197, mercury-203, molybdenum-99, phosphorus-32, potassium-42, silver-110m, sodium-24, and sulfur-35-P-1. Interested persons will have thirty days in which to submit written comments for consideration by the Commission before it takes final action.

The Commission's procedures for transfer of its routine radioisotope production and distribution activities to industry were adopted formally in March, 1965. As in the case of past withdrawals, the AEC will continue to meet requirements to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

The 19 radiosiotopes are now produced and distributed through the AEC's Oak Ridge (Tennessee) National Laboratory, operated for the Commission by Union Carbide Corporation. They are used principally in research and medical diagnosis or therapy. During fiscal 1965 the AEC business volume for these products amounted to a total of $231,485, consisting of 114,334 millicuries of radioactivity in 4,012 shipments.

Copies of the petitions from industry requesting that the Commission withdraw from production and distribution of the named radioisotopes are on file at the Commission's Public Document Room at 1717 H Street NW, Washington, D.C. Written comments should be sent to the Secretary, U.S. Atomic Energy Commission, Washington, D.C. 20545, within thirty days of publication in the Federal Register tomorrow. A copy of the Federal Register notice is attached.

#

1/25/66
AEC 994/27

59-54-1

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

Petitions for AEC Withdrawal from Production and Distribution of Certain Radioisotopes

Nuclear Science & Engineering Corporation ("NSEC") has submitted petitions dated October 6, November 1, and November 12, 1965, requesting that the AEC withdraw from production and distribution of the following nineteen radioisotopes:

Antimony-124
Arsenic-76
Arsenic-77
Bromine-82
Cadmium-109
Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

NSEC's petitions contain data sheets of product specifications and delivery schedules and include a comparison of proposed NSEC prices with prices currently being charged by the Commission for the same radioisotopes.

The Commission has carefully considered the petitions and is now proposing to withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

In accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the following factors:

1. For each of the nineteen radioisotopes, either there exists effective competition or else the market is very limited and may be served satisfactorily by a single supplier.

2. If private production of any of the nineteen radioisotopes were discontinued, the AEC could resume production without significant delay. In this connection, it is noted that each of the three petitions filed by NSEC contains the statement: "In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest."

3. The radioisotope prices proposed by NSEC are reasonable and consistent with encouragement of research and development and use, since the proposed prices are lower than current AEC prices if handling charges and minimum order prices are considered.

A copy of each of the three petitions filed by NSEC, exclusive of company confidential information, is available for inspection at the Commission's Public Docket Room at 1717 H Street, N. W., Washington, D. C., and copies may be obtained by addressing a request to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545.

All interested persons who desire to submit written comments for

consideration in connection with the Commission's proposed actions on the NSEC petitions should send them to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545 within thirty days after publication of this notice in the FEDERAL REGISTER. Comments received after that period will be considered if it is practicable to do so, but assurance of consideration cannot be given except as to comments filed within the period specified.

The Commission will make a final decision on the petitions following receipt and evaluation of public comments.

Dated at Washington, D.C. this 14th day of January 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Isotopes-3

JAN 20 1966

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. David C. Eberhart, Director
Office of the Federal Register
National Archives & Record Service
Washington 25, D. C.

Dear Mr. Eberhart:

Attached for publication in the Federal Register are an original and two certified copies of a document entitled:

NUCLEAR SCIENCE & ENGINEERING CORPORATION

Petitions for AEC Withdrawal from Production and Distribution of Certain Radioisotopes

Publication of the above document at the earliest possible date would be appreciated.

Sincerely yours,

Signed W. B. McCool

W. B. McCool
Secretary to the Commission

Enclosures:
Original and 2 cert. cys.

cc: Docket Clerk (Dir. of Reg.)
Wm. Hughes (PI)
Legal Files (OGC)
Law Library (OGC)
Congressional Liaison
D. C. Files (SECY)
Germantown Files (SECY) ✓
Public Proceedings Br. (SECY)
Contracts

1-20-66

ATOMIC ENERGY COMMISSION

NUCLEAR SCIENCE & ENGINEERING CORPORATION

Petitions for AEC Withdrawal from Production and Distribution of Certain Radioisotopes

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Cadmium-115
Cadmium-115m
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Mercury-203
Molybdenum-99
Phosphorous-32
Potassium-42
Silver-110m
Sodium-24
Sulfur-35-P-1

NSEC's petitions contain data sheets of product specifications and delivery schedules and include a comparison of proposed NSEC prices with prices currently being charged by the Commission for the same radioisotopes.

The Commission has carefully considered the petitions and is now proposing to withdraw from routine production and distribution of the nineteen radioisotopes listed above. The AEC will continue to meet requirements for these radioisotopes to the extent that the purchaser certifies in writing that he requires material of a technical quality which is not commercially available.

In accordance with the Commission's Statement of Policy published on March 9, 1965, in the FEDERAL REGISTER (30 F.R. 3247), the Commission has found that a demonstrable private capability exists for the production and distribution of these radioisotopes and that the NSEC petitions otherwise encompass the following factors:

1. For each of the nineteen radioisotopes, either there exists effective competition or else the market is very limited and may be served satisfactorily by a single supplier.

2. If private production of any of the nineteen radioisotopes were discontinued, the AEC could resume production without significant delay. In this connection, it is noted that each of the three petitions filed by NSEC contains the statement: "In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest."

3. The radioisotope prices proposed by NSEC are reasonable and consistent with encouragement of research and development and use, since the proposed prices are lower than current AEC prices if handling charges and minimum order prices are considered.

A copy of each of the three petitions filed by NSEC, exclusive of company confidential information, is available for inspection at the Commission's Public Docket Room at 1717 H Street, N. W., Washington, D. C., and copies may be obtained by addressing a request to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545.

All interested persons who desire to submit written comments for

consideration in connection with the Commission's proposed actions on the NSEC petitions should send them to the Secretary, U. S. Atomic Energy Commission, Washington, D. C. 20545 within thirty days after publication of this notice in the FEDERAL REGISTER. Comments received after that period will be considered if it is practicable to do so, but assurance of consideration cannot be given except as to comments filed within the period specified.

The Commission will make a final decision on the petitions following receipt and evaluation of public comments.

Dated at Washington, D.C. this 14th day of January 1966.

FOR THE ATOMIC ENERGY COMMISSION

W. B. McCool
Secretary

Isotopes - 3
Distr & Transfer

JAN 2 0 1966

Secy

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conway:

Attached for your information are copies of three formal petitions received from the Nuclear Science and Engineering Corporation (NSEC) requesting AEC withdraw from routine production and distribution of 19 radioisotopes. These petitions were submitted in accordance with the AEC's "Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry" which were published in the Federal Register March 9, 1965. (See attached copy).

We are planning to publish in the Federal Register for public comment a 30 day notice of AEC intent to withdraw from routine production and distribution of these radioisotopes. Copies of NSEC petitions will be made available to all interested parties.

There is also attached a copy of a public announcement on this matter which we plan to release simultaneously with publication in the Federal Register.

Sincerely yours,

(Signed) S. G. English

For Assistant General Manager
for Research and Development

AEC 994/27
AEC Info Mtg 5-45

DID:ADP&E
MADDOX
1/13/66

Enclosures:
1. NSEC petitions (3)
2. Federal Register Statement of Policy-3/9/65
3. Proposed Federal Register Notice
4. Proposed Public Announcement

OGC
1/ /66

OFFICE ▶	DID:ADP&E	DID:D	AGMRD	AGM	GM	CONG.LIAS.
SURNAME ▶	MACHUREK:mma	Fowler				
DATE ▶	1/13/66	1/ /66	1/ /66	1/ /66	1/ /66	1/ /66

1-20-66

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62701-3

Isotopes — 3
Distr + Transfer

December 28, 1965

CORRECTION NOTICE

COPY NO. 23

ATOMIC ENERGY COMMISSION

CORRECTION TO AEC 994/27 - AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

Note by the Secretary

done

The attached revised page 22 of the subject paper contains a footnote which was inserted at the request of the Director, Division of Isotopes Development.

W. B. McCool

Secretary

DISTRIBUTION	COPY NO.
Secretary	1,22-27
Commissioners	2-6,28-31
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Exec. Asst. to GM	11 - 12
Asst. GM for Plans & Prod.	13
Asst. GM for R&D	14
General Counsel	15
Congr. Relations	16
Controller	17
Industrial Participation	18
Inspection	19
Isotopes Development	20
Operations Analysis	21

12-28-65

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

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Isotopes - 3

UNITED STATES GOVERNMENT

Memorandum

Reference & Reproduction Branch

TO : File

DATE: December 23, 1965

FROM : W. B. McCool, Secretary

SUBJECT: AEC 994/27 - AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

SECY: ICB

1. At Information Meeting 545 on December 22, 1965, the Commission approved the recommendations in AEC 994/27.

2. It is our understanding the Division of Isotopes Development is taking the required action.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for Plans & Prod.
Asst. Gen. Mgr. for Research & Dev.
General Counsel
Director, Congr. Relations
Director, Industrial Participation
Director, Isotopes Development
Controller

12-23-65

~~OFFICIAL USE ONLY~~

OFFICIAL USE ONLY

December 17, 1965

AEC 994/27

COPY NO. 23

ATOMIC ENERGY COMMISSION

INFORMATION MEETING ITEM

AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

Note by the Secretary

The General Manager has requested that the attached December 13, 1965 memorandum from the Director, Division of Isotopes Development, with attachments, be circulated for consideration by the Commission at an early Information Meeting.

W. B. McCool

Secretary

DISTRIBUTION	COPY NO.
Secretary	1,22-27
Commissioners	2-6,28-31
General Manager	7 - 8
Deputy Gen. Mgr.	9
Asst. Gen. Mgr.	10
Exec. Asst. to GM	11 - 12
Asst. GM for Plans & Prod.	13
Asst. GM for R&D	14
General Counsel	15
Congr. Relations	16
Controller	17
Industrial Participation	18
Inspection	19
Isotopes Development	20
Operations Analysis	21

12-17-65

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

UNITED STATES GOVERNMENT

Memorandum

TO : R. E. Hollingsworth, General Manager
THRU : S. G. English, Assistant General Manager for Research and Development
FROM : E. E. Fowler, Acting Director Division of Isotopes Development

DATE: DEC 13 1965

SUBJECT: AEC WITHDRAWAL FROM PRODUCTION AND DISTRIBUTION OF 19 RADIOISOTOPES

At Meeting #2085 on February 18, 1965, during consideration of AEC 994/21 the Commission approved the AEC's "Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry", which were made effective immediately upon publication in the Federal Register March 9, 1965, (Attachment "A"). Pursuant to these procedures Nuclear Science and Engineering, Corp. has submitted 3 formal petitions requesting AEC withdrawal from routine production and distribution of reactor-made antimony-124, arsenic-76, arsenic-77, bromine-82, cadmium-109, cadmium-115, cadmium-115m, copper-64, gold-198, gold-199, lanthanum-140, mercury-197, mercury-203, molybdenum-99, phosphorus-32, potassium-42, silver-110m, sodium-24, sulfur-35. These correspond to the 19 ORNL catalog items, Sb-124-P, As-76-P, As-77-P, Br-82-P, Cd-109-P, Cd-115-P, Cd-115m-P, Cu-64-P, Au-198-P, Au-199-P, La-140-P, Hg-197-P, Hg-203-P, Mo-99-P, P-32-P-2, K-42-P, Ag-110-P, Na-24-P and S-35-P-1. ORNL sales volume for these items is set forth in Table I.

It is recommended that the AEC publish in the Federal Register for public comment a 30 day notice of its intent to withdraw from routine production and distribution of these radioisotopes together with copies of NSEC's petitions. A demonstrable private capability exists, and the petitions otherwise encompass AEC's withdrawal guidelines, as follows:

1. The criterion of prices which are reasonable and consistent with encouragement of research and development and use has been met since NSEC's prices are lower than current AEC prices if handling charges and minimum order prices are considered.

2. Although effective competition does not exist in all cases, the market for those radioisotopes for which there is no competition is small enough presently to be served by a single supplier.

3. AEC could resume providing these radioisotopes, if required, in a timely manner; however, it should be noted that NSEC stated that "In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest."

If you approve of the recommended action, we will notify NSEC that the Commission will publish the Federal Register announcement as soon as

practical. We will transmit to you a summary of any public comments that might be received along with a recommended final course of action.

Attachment "A" - Federal Register Statement of Policy
Attachment "B" - Formal petitions from NSEC
Attachment "C" - Draft Letter to the JCAE
Table I - ORNL Sales Volume

Approved:

_____
General Manager

_____
Date

(Reprinted from the *Federal Register*, March 9, 1965)

ATOMIC ENERGY COMMISSION

POLICIES AND PROCEDURES FOR TRANSFER OF COMMERCIAL RADIOISOTOPE PRODUCTION AND DISTRIBUTION TO PRIVATE INDUSTRY

Statement of Policy

Since 1946, the United States Atomic Energy Commission has produced radioisotopes in its own facilities and distributed them for governmental and private use. In recent years, private facilities have become available which are capable of producing and processing some of these radioisotopes. The Commission's policy is to refrain from competing with private sources of materials when they are reasonably available commercially. Accordingly, over the past years the Commission has discontinued production and distribution of selected types, quantities and qualities of radioisotopes and related services as these have become available from private sources.

There is currently a rapidly growing industrial interest in undertaking private production and distribution of increasing numbers of radioisotopes presently being distributed by the Commission. It therefore wishes to reaffirm its policy to transfer its commercial radioisotope production and distribution activities to private industry as rapidly as possible consistent with the national interest. To provide for the orderly transfer to private operation, the Commission developed proposed policies and procedures for effecting such transfer. On September 16, 1964, the Commission published in the FEDERAL REGISTER a request for public comment on the proposed policies and procedures.

Interested persons were requested to direct their comments to the Secretary, United States Atomic Energy Commission, Washington, D.C., 20545, within 60 days from that date. The Commission has now adopted policies and procedures for the transfer of commercial AEC radioisotope production and distribution activities to private industry, effective immediately upon the publication of this notice in the FEDERAL REGISTER.

POLICIES AND PROCEDURES FOR TRANSFER OF COMMERCIAL AEC RADIOISOTOPE PRODUCTION AND DISTRIBUTION ACTIVITIES TO PRIVATE INDUSTRY

The policies and procedures encompass:

a. The establishment of guidelines governing AEC withdrawal from production and distribution of particular radioisotopes, either voluntarily or upon petition of a private organization.

b. The establishment of a petition procedure by which private organizations may formally request AEC withdrawal from the production and distribution of particular radioisotopes.

c. The application of AEC radioisotope pricing policy.

d. The AEC position with respect to its conduct of radioisotope production technology research and development on those radioisotopes from which it has withdrawn from production and distribution.

Withdrawal guidelines. 1. The AEC will voluntarily withdraw from the commercial production and distribution of particular radioisotopes whenever it determines that such radioisotopes are reasonably available from commercial sources.

2. The AEC will withdraw from the commercial production and distribution of particular radioisotopes on petition from a private organization based upon a demonstrable private capability and encompassing the following but recognizing that all these factors need not be completely satisfied:

a. There is effective competition in the production and distribution of the radioisotopes in question; however, a single source of supply under certain conditions may be acceptable (e.g., very limited market). Foreign producers will be accepted in determining effective competition provided they are actively marketing the radioisotopes in the U.S.

b. There is assurance that the private producers will not discontinue the venture in a manner that would adversely affect the public interest, to the extent resumption of production by AEC would involve a significant delay.

c. The proposed private radioisotope prices are reasonable and consistent with encouragement of research and development and use.

Government isotope requirements. It is the Atomic Energy Commission's policy to obtain radioisotopes from commercial sources where it has formally withdrawn from the production and distribution of those radioisotopes. However, the AEC maintains the right to produce an isotope for Government use in those circumstances where the Government is a substantial user, or the use is of special programmatic interest to the AEC, and, where procurement from industry would result in significantly higher cost to the Government.

Filing a petition. 1. An organization requesting that the AEC withdraw from the production and distribution of a particular radioisotope may submit a formal petition to this effect. Such a petition should contain sufficient evidence to demonstrate adequate technical, financial and managerial resources, as well as seriousness of intent.

2. The petition should include:

a. Product specifications to show evidence of their comparability to AEC products or adequacy to meet user demands.

b. Estimate of current demand. (The petitioner's production capabilities in conjunction with that of other suppliers should be adequate to meet this demand.)

c. The petitioning organization's production, processing and distribution capability, including identification of the production facilities (e.g., nuclear reactors and/or cyclotrons) available to it and the extent of commitment upon them in relation to market requirements.

d. Price schedule.

e. Delivery schedule.

f. Proposed date of AEC withdrawal.

The AEC may request additional information if the above information is inadequate for AEC to make a finding.

3. Upon making a finding favorable to the petition, the AEC will publish for public comment:

a. The private organization's petition or a summary thereof, exclusive of company confidential information, and will designate the place where a copy of the petition, exclusive of company confidential information, may be seen. (The petitioner should identify those portions of his petition which contain company confidential information; however, the information published must be sufficient to permit meaningful public comment.)

b. A notice of AEC's intent to withdraw. AEC will make a final decision on the withdrawal petition upon receipt and evaluation of public comment.

4. Upon making an unfavorable decision on a petition, either prior to or subsequent to receipt of public comment, AEC will inform the petitioning organization of the reasons for its decision.

5. When AEC determines to withdraw voluntarily from the commercial production and distribution of particular radioisotopes, it will similarly publish a notice of such intent for public comment.

AEC radioisotope prices. 1. AEC radioisotope prices will be established to provide reasonable compensation to the Government (which ordinarily will be the higher of AEC full cost recovery or reasonable commercial rates) unless this would significantly interfere with (a) research and development and use or (b) encouragement of private sources of supply. In individual cases, if (a) and (b) cannot be equally accommodated, greater weight will be given to encouragement of research and development and use.

2. The AEC will publish a 30 day prior notice of proposed price changes, including the reasons for the proposed changes.

3. The AEC will not change the price of a radioisotope during the period it is reviewing a petition for AEC withdrawal from production and distribution of that isotope.

AEC radioisotope production technology research. 1. AEC will place the conduct of radioisotope production technology research and development it deems necessary to be carried out with groups most qualified to perform such work, whether these be AEC facilities or private organizations.

2. AEC will conduct or support production technology research and development on radioisotopes from which it has withdrawn as it deems necessary, but only to the extent that AEC has satisfied itself that industry is unable, is unwilling or simply is not carrying out such work adequately or where it determines that direct AEC effort is necessary in the interest of the atomic energy program.

(Sec. 161, 68 Stat. 948; 42 U.S.C. 2201)

Dated at Washington, D.C., this 2d day of March 1965.

For the Atomic Energy Commission.

W. B. MCCOOL,
Secretary.

[F.R. Doc. 65-2382; Filed, Mar. 8, 1965; 8:46 a.m.]

Attachment "B"
Item 1

Nuclear Science & Engineering Corporation

P. O. Box 10901, Pittsburgh, Pennsylvania 15236
Area Code 412
Phone: 462-4000 TWX 642-3192

R. A. Brightsen
President

October 6, 1965

Mr. E. E. Fowler
Acting Director
Division of Isotopes Development
United States Atomic Energy Commission
Washington, D. C.

Dear Gene:

In accordance with the published policies and procedures for transfer of commercial AEC radioisotope activities to private industry, Nuclear Science & Engineering Corporation hereby submits a formal petition, requesting that the AEC withdraw from the production and distribution of:

Antimony-124
Cadmium-109
Cadmium-115m
Silver-110m

The attached data sheets contain product specifications showing evidence of comparability to AEC products. They also set forth our estimate of current demand, which is based in part upon published information on Oak Ridge sales (ORNL-3802, "Review of Radioisotopes Program, 1964").

A comparison of NSEC and AEC price and delivery terms is also provided in the attachments. Prices include minimum order requirements and handling charges, where applicable. NSEC prices are listed for the normal shipment sizes.

NSEC has extensive production, processing, and distribution capability. We regularly employ the General Electric Testing Reactor at Vallecitos, California, at which facility each of the listed radioisotopes has been (and will continue to be) produced by bombardment of appropriate NSEC-prepared targets. Other private reactors are available to NSEC, including the Union Carbide facility at Sterling Forest, New York, though flux limitations of the latter might make it unsuited to the production of high specific activity materials.

Processing can be carried out either in NSEC's laboratories at Pittsburgh, Pennsylvania, or at Buffalo, New York by NSEC's wholly-owned subsidiary, the Radioactive Materials Corporation. Both locations have the personnel and handling and storage equipment required for the necessary processing.

Distribution will be through NSEC's established marketing channels, which offer over 700 different radioactive materials (radioisotopes, labeled compounds, sources and standards) throughout the world. NSEC produces and distributes a greater number of radioisotopes than any other United States firm and can readily provide effective distribution for the four products referred to herein. A summary of NSEC's radioisotope line is contained in the enclosed price list. A copy of the complete catalog is on file with your Division.

The extent of NSEC's current production, processing, and distribution capability for the several radioisotopes is given on the data sheets. Cadmium-109 and cadmium-115m have already been produced and processed by us and are in current inventory. Antimony-124 and silver-110m have been produced and are presently being processed. They will be in inventory by November 1 and November 15, respectively.

NSEC's technical resources include a staff of highly qualified scientists with particular competence in the areas of nuclear chemistry and radiochemistry. These include Robert C. Koch (Ph. D., University of Chicago, Nuclear Chemistry), Bernard Keisch (Ph. D., Washington University, Nuclear Chemistry), seven graduate chemists, several technicians and laboratory assistants, and supporting personnel in the areas of health physics, electronics, and other natural sciences. A listing of the directors and officers of the company is appended. Several of the directors have international reputations in the nuclear field and the two officers of the company have been actively engaged in atomic energy work for approximately twenty and ten years, respectively. Our last annual statement is enclosed to demonstrate financial resources.

In view of the extensive investment which has hitherto been made by our company in developing broad isotope production and sales capability, we can conscientiously assure you of our seriousness of intent in this matter. In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest.

Attachment "B"
Item 1

We understand that the procedures call for publication of this petition or a summary thereof. With the sole exception of the financial statements, which are company confidential, any or all information contained herein may be made part of the public record. As we are already in production, we hope that withdrawal can be accomplished on or about November 15.

Very truly yours,

R. A. Brightsen
President

Enclosures

Attachment "B"
Item 1

Isotope Data Sheet

Antimony-124-HSA

(60 d)

	NSEC	ORNL
Product Specifications	Cat. No. 201	Sb-124-P
Chemical Form	Sb(III)	$SbCl_3$, SbOCl
Acidity	~6 N (HCl)	≧ 6 N (HCl)
Concentration	> 5 mc/ml	> 10 mc/ml
Specific Activity	> 2 c/g Sb	≅ 2 c/g Sb
Purity	> 99%	99%
Production Method	n, γ	n, γ
Price Schedule		
0.1 mc	$18.00	$50.00
0.2	18.00	50.00
0.5	18.00	50.00
1.0	20.00	50.00
2.0	30.00	50.00
5.0	45.00	50.00
10.0	60.00	65.00
20.0	110.00	105.00
50.0	POR*	260.00
100.0	POR	460.00
200.0	POR	860.00
500.0	POR	1060.00
1000.0	POR	2060.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~500 mc/yr	
ORNL Data	mc / $ / No. Shipments	
1964	280 / $1411 / 45	
1963	185 / 681 / 39	
NSEC Production, Processing, and Distribution Capability	> 10,000 mc/yr	

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

*Price on Request

Attachment "B"
Item 1

Isotope Data Sheet

Cadmium-109-HSA

(470 d)

	NSEC	ORNL
Product Specifications	Cat. No. 213	Cd-109-P
Chemical Form	Cd(II)	$Cd(NO_3)_2$
Acidity	~1 N(HNO_3)	1 N ± 50%(HNO_3)
Concentration	> 1 mc/ml	> 0.1 mc/ml
Specific Activity	> 1 c/g Cd	≅ 1 c/g Cd
Purity	> 99% (excl. Ag^{109m}, Cd^{115m} <5%)	> 99% (excl. Cd^{115m} - <5%)
Production Method	n, γ	n, γ
Price Schedule		
0.1 mc	$18.00	$50.00
0.2	22.00	50.00
0.5	40.00	85.00
1.0	70.00	145.00
2.0	130.00	265.00
5.0	260.00	625.00
10.0	POR *	1225.00
20.0	POR	2425.00
50.0	POR	6025.00
100.0	POR	12,060.00
200.0	POR	24,060.00
500.0	POR	60,060.00
1000.0	POR	120,060.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~100 mc/yr	
ORNL Data	mc / $	No. Shipments
1964	64 / $4898	35
1963	24 / 1872	35
NSEC Production, Processing, and Distribution Capability	>10,000mc/yr	

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

Attachment "B"
Item 1

*Price on Request

Isotope Data Sheet

Cadmium-115m-HSA

(43 d)

	NSEC	ORNL
Product Specifications	Cat. No. 214	Cd-115m-P
Chemical Form	Cd(II)	$Cd(NO_3)_2$
Acidity	~ 1 N HNO_3	1 N ± 50% (HNO_3)
Concentration	~ 1 mc/ml	>0.1 mc/ml
Specific Activity	>100 mc/g Cd	≅ 100 mc/g Cd
Purity	>98% (excl. other Cd isotopes)	>90%
Production Method	n, γ	n, γ
Price Schedule		
0.1 mc	$18.00	$50.00
0.2	20.00	50.00
0.5	35.00	50.00
1.0	50.00	$58.00
2.0	90.00	91.00
5.0	185.00	190.00
10.0	330.00	355.00
20.0	650.00	685.00
50.0	POR *	1675.00
100.0	POR	2060.00
200.0	POR	4060.00
500.0	POR	10060.00
1000.0	POR	20060.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~200 mc/yr	
ORNL Data	mc / $	No. Shipments
1964	103 / $2619	26
1963	91 / 3003	43
NSEC Production, Processing, and Distribution Capability	>10,000 mc/yr	

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

* Price on Request

Attachment "B"
Item 1

Isotope Data Sheet

Silver-110m-HSA

(249 d)

	NSEC	ORNL
Product Specifications	Cat. No. 268	Ag-110-P
Chemical Form	Ag(I)	$AgNO_3$
Acidity	~1 N HNO_3	<3 N (HNO_3)
Concentration	>1 mc/ml	>1 mc/ml
Specific Activity	>1 c/g Ag	≅ 1 c/g Ag
Purity	>98%	>98%
Production Method	n, γ	n, γ
Price Schedule		
0.1 mc		
0.2		
0.5		
1.0	$18.00	$50.00
2.0	23.00	50.00
5.0	25.00	50.00
10.0	30.00	50.00
20.0	50.00	55.00
50.0	90.00	135.00
100.0	165.00	210.00
200.0	280.00	360.00
500.0	POR*	810.00
1000.0	POR	1560.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~1000 mc/yr	
ORNL Data	mc / $ / No. Shipments	
1964	415 / $1349 / 55	
1963	655 / 853 / 55	
NSEC Production, Processing, and Distribution Capability	>10,000 mc/yr	

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

*Price on Request

Listing of Directors and Officers

Directors

Dr. J. C. Warner (Chairman of the Board)

Dr. Manson Benedict
Mr. Eastman Birkett
Mr. Ronald A. Brightsen
Dr. Charles D. Coryell
Mr. Oscar S. Cox
Mrs. Gordon Dean
Col. H. Grady Gore
Mr. Harvey B. Gram
Mr. Francis S. McMichael
Mr. James R. Wolf

Officers

Ronald A. Brightsen	President and Treasurer
James R. Wolf	Vice President and Secretary

Nuclear Science & Engineering Corporation
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 1

Nuclear Science & Engineering Corporation

P. O. Box 10901, Pittsburgh, Pennsylvania 15236
Area Code 412
Phone: 462-4000 TWX 642-3192

R. A. Brightsen
President

November 1, 1965

Mr. E. E. Fowler
Acting Director
Division of Isotopes Development
United States Atomic Energy Commission
Washington, D. C.

Dear Gene:

In accordance with the published policies and procedures for transfer of commercial AEC radioisotope activities to private industry, Nuclear Science & Engineering Corporation hereby submits a formal petition, requesting that the AEC withdraw from the production and distribution of:

Mercury-203
Phosphorus-32
Sulfur-35

The attached data sheets contain product specifications showing evidence of comparability to AEC products. They also set forth our estimate of current demand, which is based in part upon published information on Oak Ridge sales (ORNL-3802, "Review of Radioisotopes Program, 1964").

A comparison of NSEC and AEC price and delivery terms is also provided in the attachments. Prices include minimum order requirements and handling charges, where applicable. NSEC prices are listed for the normal shipment sizes.

NSEC has extensive production, processing, and distribution capability. Phosphorus-32 and sulfur-35 are currently being produced by our wholly-owned subsidiary, the Radioactive Materials Corporation, Buffalo, New York, using the reactor at the Western New York Nuclear Research Center, Inc. Additional irradiation capacity for these isotopes is available to us at other facilities, including the General Electric Testing Reactor at Vallecitos, California. Irradiations for mercury-203 production are made at the GETR.

Processing capability is already established at Buffalo, where RMC has the requisite personnel and handling and storage equipment. Processed material will be shipped to customers either directly from RMC or from stock at NSEC in Pittsburgh.

Distribution will be through NSEC's established marketing channels, which offer over 700 different radioactive materials (radioisotopes, labeled compounds, sources and standards) throughout the world. NSEC produces and distributes a greater number of radioisotopes than any other United States firm and can readily provide effective distribution for the three products referred to herein. A copy of NSEC's complete catalog is on file with the AEC Division of Isotopes Development.

The extent of our capability (including NSEC and RMC) is summarized for the several radioisotopes on the data sheets.

A statement of our technical, management, and financial resources is contained in our petition of October 6, 1965, and is incorporated herein by reference.

In view of the extensive investment which has hitherto been made by our company in developing broad isotope production and sales capability, we can conscientiously assure you of our seriousness of intent in this matter. In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest.

We understand that the procedures call for publication of this petition or a summary thereof and any or all information contained herein (other than financial statements) may be made part of the public record. As we are already in production, we hope that withdrawal can be accomplished on or about December 10.

Very truly yours,

Enclosures

Attachment "B"
Item 2

Isotope Data Sheet

Mercury-203-HSA
(47 d)

	NSEC	ORNL
Product Specifications	Cat. No. 252	Hg-203-P
Chemical Form	Hg(II)	$Hg(NO_3)_2$
Acidity	~1 N HNO_3	1 N ± 50% (HNO_3)
Concentration	>2 mc/ml	>1 mc/ml
Specific Activity	>1 c/g Hg	≅ 500 mc/g Hg
Purity	>98%	>98%
Production Method	n, γ	n, γ
Price Schedule		
0.1 mc		
0.2		
0.5		
1.0	$18.00	$ 50.00
2.0	18.00	50.00
5.0	30.00	50.00
10.0	35.00	50.00
20.0	60.00	50.00
50.0	72.50	75.00
100.0	POR	125.00
200.0	POR	225.00
500.0	POR	525.00
1000.0	POR	1060.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~100 c/yr	

ORNL Data	mc	$	No. Shipments
1964	27,371	$28,521	165
1963	10,521	10,519	173

NSEC Production, Processing, and Distribution Capability	>500 c/yr
Date of First NSEC Production	March 1965

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

Attachment "B"
Item 2

Isotope Data Sheet

Phosphorus-32-CF (14.55 d)

	NSEC	ORNL
Product Specifications	Cat. No. 263	Sb-124-P
Chemical Form	P(V)	H_3PO_4
Acidity	0.1 N HCl	1 N ± 50% (HCl)
Concentration	>25 mc/ml	>5 mc/ml
Specific Activity	Carrier-free	Carrier-free
Purity	>99% (excl. P^{33})	>99% (excl. P^{33}
Precipitate		Neglig. pH7-9
Total Solids	<1 mg/mc	<1 mg/mc
Production Method	n, p	n, p
Price Schedule		
0.1 mc		
0.2		
0.5		
1.0	$ 18.00	$ 75.00
2.0	20.00	75.00
5.0	23.75	75.00
10.0	23.50	75.00
20.0	37.00	75.00
50.0	60.00	90.00
100.0	95.00	155.00
200.0	140.00	285.00
500.0	310.00	675.00
1000.0	POR	1325.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~250 c/yr	
ORNL Data	mc / $	No. Shipments
1964	53,526 / $51,337	2001
1963	82,141 / 77,674	2170
NSEC Production, Processing, and Distribution Capability	>500 c/yr	
Date of First NSEC Production	September 1965	

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

Attachment "B"
Item 2

Isotope Data Sheet

Sulfur-35-CF
(87 d)

	NSEC	ORNL
Product Specifications	Cat. No. 278	S-35-P-1
Chemical Form	S(VI)	H_2SO_4
Acidity	~0.1 N HCl	~0.1 N (HCl)
Concentration	>10 mc/ml	>1 mc/ml
Specific Activity	Carrier-free	Carrier-free
Purity	>99%	>99%
P^{32}	<1.0%	<0.1%
Total Solids	<1 mg/mc	<1 mg/mc
Production Method	n, p	n, p
Price Schedule		
0.1 mc		
0.2		
0.5		
1.0	$18.00	$ 50.00
2.0	20.00	50.00
5.0	20.00	50.00
10.0	23.00	50.00
20.0	36.00	50.00
50.0	55.00	65.00
100.0	85.00	105.00
200.0	POR	185.00
500.0	POR	425.00
1000.0	POR	775.00
Delivery	Stock	Stock
Current Demand Estimate		
NSEC Estimate	~50 c/yr	

ORNL Data	mc	$	No. Shipments
1964	14,008	$17,645	462
1963	16,880	18,747	493

NSEC Production, Processing, and Distribution Capability	>250 c/yr
Date of First NSEC Production	October 1965

NUCLEAR SCIENCE & ENGINEERING CORP.
P.O. BOX 10901
PITTSBURGH, PA. 15236

Attachment "B"
Item 2

Nuclear Science & Engineering Corporation

P. O. Box 10901, Pittsburgh, Pennsylvania 15236
Area Code 412
Phone: 462-4000 TWX 642-3192

R. A. Brightsen
President

November 12, 1965

Mr. E. E. Fowler
Acting Director
Division of Isotopes Development
United States Atomic Energy Commission
Washington, D. C.

Dear Gene:

In accordance with the published policies and procedures for transfer of commercial AEC radioisotope activities to private industry, Nuclear Science & Engineering Corporation hereby submits a formal petition, requesting that the AEC withdraw from the production and distribution of:

Arsenic-76
Arsenic-77
Bromine-82
Cadmium-115
Copper-64
Gold-198
Gold-199
Lanthanum-140
Mercury-197
Molybdenum-99
Potassium-42
Sodium-24

The attached data sheets contain product specifications showing evidence of comparability to AEC products. They also set forth our estimate of current demand, which is based in part upon published information on Oak Ridge sales (ORNL-3802, "Review of Radioisotopes Program, 1964").

A comparison of NSEC and AEC price and delivery terms is also provided in the attachments. Prices include minimum order requirements and handling charges, where applicable. NSEC prices are listed for the normal shipment sizes.

NSEC has extensive production, processing, and distribution capabilities. All of the listed isotopes are currently being produced, processed, and shipped by our wholly-owned subsidiary, the Radioactive Materials Corporation, Buffalo, New York, using the reactor at the Western New York Nuclear Research Center, Inc. With the exception of arsenic-76 (1964 ORNL sales $440), arsenic-77 (1964 ORNL sales $100) and cadmium-115 (1964 ORNL sales $562), each item is being marketed by at least one other firm in the United States. There is thus no shortage of private production capability to meet market requirements.

Sales will be solicited and made through NSEC's established marketing channels, which offer over 700 different radioactive materials (radioisotopes, labeled compounds, sources, and standards) throughout the world. NSEC produces and distributes a greater number of radioisotopes than any other United States firm and can readily provide effective distribution for the products referred to herein. A copy of NSEC's complete catalog is on file with the AEC Division of Isotopes Development.

The listed radioisotopes, all of which have short half-lives, can readily be produced in multi-curie quantities in short irradiations. We have the capability to produce, process, and distribute quantities at least twice the current estimated demand levels without difficulty.

A statement of our technical, management, and financial resources is contained in our petition of October 6, 1965, and is incorporated herein by reference.

In view of the extensive investment which had hitherto been made by our company in developing broad isotope production and sales capability, we can conscientiously assure you of our seriousness of intent in this matter. In submitting this petition, we do so with the full and confident expectation that the venture will not be discontinued in a manner that would adversely affect the public interest.

We understand that the procedures call for publication of this petition or a summary thereof and any or all information contained herein (other than financial statements) may be made part of the public record. As we are already in production, we hope that withdrawal can be accomplished on or about December 31, 1965.

Very truly yours,

Ron

Enclosures

Attachment "B"
Item 3

Isotope Data Sheet

Arsenic-76-HSA

(26.5 h)

	NSEC	ORNL
Product Specifications	Cat. No. 405	As-76-P
Chemical Form	As (III)	$HAsO_2$
Acidity	~1 N HCl	1 N ± 50% (HCl)
Concentration	>1 mc/ml	>1 mc/ml
Specific Activity	~7 c/g As	≅4 c/g As
Purity	>98%	>98%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 40.00	$ 50.00
5	40.00	50.00
10	40.00	55.00
25	72.50	100.00
50	POR	175.00
100	POR	360.00
200	POR	660.00
500	POR	1,560.00
1000	POR	3,060.00
Delivery	Each Tuesday	Each Monday
Current Demand Estimate		
NSEC Estimate	500 mc/yr	

ORNL Data	mc	$	No. Shipments
1964	209	440	26
1963	175	346	22

Date of First NSEC Production	September 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Arsenic-77-CF

(38.7 h)

	NSEC	ORNL
Product Specifications	Cat. No. 406	As-77-P
Chemical Form	As (III)	$HAsO_2$
Acidity	~ 1 N HCl	3 N ± 50% (HCl)
Concentration	>1 mc/ml	>0.25 mc/ml
Specific Activity	Carrier-free	Carrier-free
Purity	>99%	>98%
Production Method	$Ge^{76}(n, \gamma)\, Ge^{77}(\beta^-)$	$Ge^{76}(n, \gamma)\, Ge^{77}(\beta^-)$
Price Schedule		
1 mc	$ 45.00	$ 50.00
5	85.00	100.00
10	110.00	175.00
25	POR	400.00
50	POR	775.00
100	POR	1,560.00
200	POR	3,060.00
500	POR	7,560.00
1000	POR	15,560.00
Delivery	~One Week	Each Tuesday
Current Demand Estimate		
NSEC Estimate	50 mc/yr	
ORNL Data	mc / $	No. Shipments
1964	8 / 100	4
1963	0 / 0	0
Date of First NSEC Production	November 1965	

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Petition for Transfer of AEC Radioisotope Activities

Isotope Data Sheet

Bromine-82-HSA

(35.55 h)

	NSEC	ORNL
Product Specifications	Cat. No. 415	Br-82-P
Chemical Form	Br^- (H_2O)	KBr in H_2O
Acidity		
Concentration	>1 mc/ml	>1 mc/ml
Specific Activity	~2 c/g Br	~1 c/g Br
Purity	>98%	>98%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 20.00	$ 50.00
5	45.00	50.00
10	55.00	62.50
25	90.00	118.75
50	135.00 *	247.50
100	110.00	435.00
200	110.00	810.00
500	110.00	1,935.00
1000	POR	3,810.00
Delivery	Each Tuesday	Each Tuesday
Current Demand Estimate		
NSEC Estimate	5 c/yr	

ORNL Data	mc	$	No. Shipments
1964	713	2,851	80
1963	653	2,434	95

Date of First NSEC Production	September 1965

Note by the Division of Isotopes Development: *NSEC intends to charge $110.00 for this quantity. The $135.00 is a mistake in their published catalogue which they carried over in their petition to AEC. The foregoing has been confirmed by telephone with NSEC.

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

ATTACHMENT "B"
Item 3

Isotope Data Sheet

Cadmium-115-HSA

(2.3 d)

	NSEC	ORNL
Product Specifications	Cat. No. 420	Cd-115-P
Chemical Form	Cd (II)	$Cd(NO_3)_2$
Acidity	~ 1 N HNO_3	1 N ± 50% (HNO_3)
Concentration	>1 mc/ml	>0.25 mc/ml
Specific Activity	~ 100 mc/g Cd	~ 50 mc/g Cd
Purity	>98% (excl. Cd^{115m}, In^{115m})	>98% (excl. In^{115m})
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 40.00	$ 50.00
5	50.00	55.00
10	77.50	85.00
25	POR	175.00
50	POR	325.00
100	POR	625.00
200	POR	1,260.00
500	POR	3,060.00
1000	POR	6,060.00
Delivery	Each Friday	Each Monday
Current Demand Estimate		
NSEC Estimate	1000 mc/yr	

ORNL Data	mc	$	No. Shipments
1964	164	562	13
1963	29	100	9

Date of First NSEC Production	October 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Copper-64-HSA
(12.8 h)

	NSEC	ORNL
Product Specifications	Cat. No. 430	Cu-64-P
Chemical Form	Cu(II)	$Cu(NO_3)_2$
Acidity	~1N HNO_3	1N±50%(HNO_3)
Concentration	> 10 mc/ml	> 10 mc/ml
Specific Activity	6 c/g Cu	~25 c/g Cu
Purity	> 99%	> 98%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 20.00	$ 75.00
5	35.00	75.00
10	41.50	75.00
25	68.75	75.00
50	105.00	125.00
100	110.00	225.00
200	110.00	425.00
500	110.00	1,060.00
1000	POR	2,060.00
Delivery	Each Tuesday	Each Monday
Current Demand Estimate		
NSEC Estimate	25 c/yr	

ORNL Data	mc	$	No. Shipments
1964	3,383	$4,392	147
1963	6,252	7,918	111

Date of First NSEC Production	September 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Gold-198-HSA
(2.70 d)

	NSEC	ORNL
Product Specifications	Cat. No. 440	Au-198-P
Chemical Form	Au (III)	$AuCl_3$
Acidity	~1N HCl-HNO_3	1N ±50% (HCl-HNO_3)
Concentration	> 10 mc/ml	> 10 mc/ml
Specific Activity	~60 c/g Au	~25 c/g Au
Purity	> 98%	> 98% (excl. Au^{199})
Au^{199}	< 5%	~5%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 25.00	$ 75.00
5	35.00	75.00
10	40.00	75.00
25	53.75	75.00
50	60.00	75.00
100	60.00	75.00
200	60.00	75.00
500	85.00	125.00
1000	110.00	125.00
Delivery	Each Friday	Each Monday
Current Demand Estimate		
NSEC Estimate	7500 c/yr	
ORNL Data	mc / $	No. Shipments
1964	20,537 / $1,627	108
1963	260,190 / 16,007	158
Date of First NSEC Production	September 1965	

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Gold-199-CF
(3.15 d)

	NSEC	ORNL
Product Specifications	Cat. No. 441	Au-199-P
Chemical Form	Au (III)	$AuCl_3$
Acidity	~1N HCl-HNO_3	1N±50%(HCl-HNO_3)
Concentration	> 1mc/ml	> 0.5 mc/ml
Specific Activity	Carrier-free	Carrier-free
Purity	>98% (excl. Au^{198})	>98% (excl. Au^{198})
Au^{198}	<5%	< 5%
Total Solids	<1 mg/mc	<1 mg/mc
Production Method	$Pt^{198}(n, \gamma)Pt^{199}(\beta^-)$	$Pt^{198}(n, \gamma)Pt^{199}(\beta^-)$
Price Schedule		
1 mc	$ 45.00	$ 50.00
5	55.00	62.50
10	90.00	100.00
25	197.50	197.50
50	POR	435.00
100	POR	810.00
200	POR	1,560.00
500	POR	3,810.00
1000	POR	7,560.00
Delivery	Each Friday	Each Tuesday
Current Demand Estimate		
NSEC Estimate	1000 mc/yr	
ORNL Data	mc / $	No. Shipments
1964	64 / $ 345	9
1963	362 / 1,763	29
Date of First NSEC Production	October 1965	

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Lanthanum-140-HSA
(40.3 h)

	NSEC	ORNL
Product Specifications	Cat. No. 450	La-140-P
Chemical Form	La(III)	$LaCl_3$
Acidity	~1N HCl	1N±50%(HCl)
Concentration	> 1 mc/ml	> 0.2 mc/ml
Specific Activity	~5 c/g La	~5 c/g La
Purity	> 98%	> 98%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 25.00	$ 50.00
5	32.50	50.00
10	41.00	55.00
25	80.00	135.00
50	142.50	210.00
100	265.00	360.00
200	POR	660.00
500	POR	1,560.00
1000	POR	3,060.00
Delivery	Each Friday	Each Monday
Current Demand Estimate		
NSEC Estimate	2000 mc/yr	

ORNL Data	mc	$	No. Shipments
1964	693	$2,368	44
1963	431	798	60

Date of First NSEC Production	October 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Hg-197m$_2$-197-HSA
(Hg-197m$_2$, 65 h; Hg-197, 24 h)

	NSEC	ORNL
Product Specifications	Cat. No. 460	Hg-197-P
Chemical Form	Hg (II)	$Hg(NO_3)_2$
Acidity	~ 1N HNO_3	1N±50%(HNO_3)
Concentration	> 25 mc/ml	> 1 mc/ml
Specific Activity	~ 1 c/g Hg	~ 500 mc/g Hg
Purity	> 98%(excl.	> 98% (excl.
	Au^{197m}, Hg^{203})	Au^{197m}, Hg^{203})
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 20.00	$ 50.00
5	25.00	50.00
10	30.00	50.00
25	45.00	62.50
50	60.00	100.00
100	95.00	175.00
200	120.00	360.00
500	210.00	810.00
1000	POR	1,560.00
Delivery	Each Friday	Each Monday
Current Demand Estimate		
NSEC Estimate	250 c/yr	

ORNL Data	mc	$	No. Shipments
1964	12,491	$5,535	60
1963	1,925	747	19

Date of First NSEC Production	November 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Molybdenum-99-HSA (67.0 h)

	NSEC	ORNL
Product Specifications	Cat. No. 465	Mo-99-P
Chemical Form	Mo(VI)	$(NH_4)_2MoO_4$
Acidity	~ 1N NH_4OH	1N±50%(NH_4OH)
Concentration	> 1 mc/ml	> 0.1 mc/ml
Specific Activity	~ 75 mc/g Mo	~ 10 mc/g Mo
Purity	> 99%(excl. Tc^{99m})	> 98% (excl. Tc^{99m})
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 20.00	$ 50.00
5	30.00	50.00
10	31.50	50.00
25	42.50	81.25
50	52.50	137.50
100	70.00	250.00
200	80.00	510.00
500	135.00	1,185.00
1000	POR	2,310.00
Delivery	Each Friday	Each Monday
Current Demand Estimate		
NSEC Estimate	100 c/yr	

ORNL Data	mc	$	No. Shipments
1964	602	$ 602	52
1963	624	933	58

Date of First NSEC Production	October 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Potassium-42-HSA
(12.5 h)

	NSEC	ORNL
Product Specifications	Cat. No. 475	K-42-P
Chemical Form	K(I)	KCl
Acidity	Aqueous sol.	1N±50%(HCl)
Concentration	> 1 mc/ml	> 1 mc/ml
Specific Activity	~250 mc/g K	> 200 mc/g K
Purity	> 99%	> 99%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 25.00	$ 50.00
5	32.50	50.00
10	42.50	53.00
25	78.75	95.00
50	125.00	165.00
100	135.00	305.00
200	140.00	620.00
500	185.00	1,460.00
1000	POR	2,860.00
Delivery	Each Tuesday	Each Monday
Current Demand Estimate		
NSEC Estimate	10,000 mc/yr	

ORNL Data	mc	$	No. Shipments
1964	4,224	$ 9,680	567
1963	4,893	11,029	688

Date of First NSEC Production	September 1965

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

Isotope Data Sheet

Sodium-24-HSA
(15.0 h)

	NSEC	ORNL
Product Specifications	Cat. No. 480	Na-24-P
Chemical Form	Na (I)	NaCl
Acidity	Aqueous Sol.	Water Sol.
Concentration	> 1 mc/ml	> 1 mc/ml
Specific Activity	~ 3 c/g Na	~ 10 c/g Na
Purity	> 99%	> 99%
Production Method	n, γ	n, γ
Price Schedule		
1 mc	$ 20.00	$ 50.00
5	52.50	70.00
10	80.00	150.00
25	116.25	285.00
50	127.50	510.00
100	130.00	960.00
200	140.00	1,860.00
500	185.00	4,560.00
1000	POR	9,060.00
Delivery	Each Tuesday	Each Monday
Current Demand Estimate		
NSEC Estimate	5000 mc/yr	
ORNL Data	mc / $	No. Shipments
1964	1,177 / $8,044	427
1963	1,467 / 9,768	467
Date of First NSEC Production	September 1965	

NUCLEAR SCIENCE & ENGINEERING CORPORATION
P. O. Box 10901
Pittsburgh, Pennsylvania 15236

Attachment "B"
Item 3

ATTACHMENT "C"

DRAFT LETTER TO THE JOINT COMMITTEE ON ATOMIC ENERGY

1. Attached for your information are copies of three formal petitions received from the Nuclear Science and Engineering Corporation (NSEC) requesting AEC withdraw from routine production and distribution of 19 radioisotopes. These petitions were submitted in accordance with the AEC's "Policies and Procedures for Transfer of Commercial Radioisotopes Production and Distribution to Private Industry" which were published in the Federal Register March 9, 1965. (See attached copy).

2. We are planning to publish in the Federal Register for public comment a 30 day notice of AEC intent to withdraw from routine production and distribution of these radioisotopes together with copies of the NSEC petitions.

Table I

ORNL FY-65 Business Volume for Requested Withdrawal Items

	Isotope	mc	Shipments	Dollar Revenue: For Isotope	Dollar Revenue: Handling Charge($25.)	Dollar Revenue: Total Revenue	Average Revenue: $/mc	Average Revenue: $/Shipment
1.	Antimony-124	196	34	$1,046	$ 850	$ 1,896	$ 9.67	$ 55.76
2.	Arsenic-76	266	34	455	850	1,305	4.91	38.38
3.	Arsenic-77	5	2	50	50	100	20.00	50.00
4.	Bromine-82	617	50	2,001	1,250	3,251	5.27	65.02
5.	Cadmium-109	62	33	4,915	825	5,740	92.58	173.94
6.	Cadmium-115	189	14	709	350	1,059	5.60	75.64
7.	Cadmium-115m	55	27	1,799	675	2,474	44.98	91.63
8.	Copper-64	3,611	107	5,284	2,675	7,959	2.20	74.38
9.	Gold-198	11,876	114	1,601	2,850	4,451	0.37	39.04
10.	Gold-199	232	27	1,308	675	1,983	8.55	73.44
11.	Lanthanum-140	521	37	1,987	925	2,912	5.59	78.70
12.	Mercury-197	14,934	53	9,817	1,325	11,142	0.75	210.23
13.	Mercury-203	13,893	137	15,032	3,425	18,457	1.33	134.72
14.	Molybdenum-99	715	53	919	1,325	2,244	3.14	42.34
15.	Phosphorus-32	48,992	1,895	53,428	47,375	100,803	2.06	53.19
16.	Potassium-42	3,815	531	9,227	13,275	22,502	5.90	42.38
17.	Silver-110m	400	53	1,233	1,325	2,558	6.40	48.26
18.	Sodium-24	1,189	435	8,627	10,875	19,502	16.40	44.83
19.	Sulfur-35-P-1	12,766	376	11,747	9,400	21,147	1.66	56.24
	Total	114,334	4,012	$131,185	$100,300	$231,485	$2.03	$57.70

Isacaps-3

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

OFFICIAL USE ONLY

Res. & Status Br. - GHH

UNITED STATES GOVERNMENT

Memorandum

TO : R. E. Hollingsworth, General Manager

DATE: October 18, 1965

Approved _____
R.E.H.

FROM : Original signed by
F. T. Hobbs, Assistant Secretary

Date _____

SUBJECT: CHECKLIST OF MEETING WITH MEMBERS OF THE ADVISORY COMMITTEE ON ISOTOPES AND RADIATION DEVELOPMENT, FRIDAY, OCTOBER 15, 1965, 1:45 P.M., ROOM A-410, GERMANTOWN, MARYLAND

SECY:GF

The Commission noted the question of including individual industry opinions in the Currie Report would be raised for Commission consideration. (ID)

The Commission encouraged the Advisory Committee to consider further the development of a public information program, drawing on the experience gained by the work by the Labor-Management Advisory Committee on public acceptance of atomic power.

cc:
Commissioners

Copy filed:
Dir. T. Isotope & Rad Adv. Comtes

OFFICIAL USE ONLY

11-18-65

Isotopes - 3

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

OFFICIAL USE ONLY

GT FILE

UNITED STATES GOVERNMENT

Memorandum

Reference & Reproduction Branch

TO : E. E. Fowler, Deputy Director
Div. of Isotopes Development

DATE: October 29, 1965
(Revised November 4, 1965)

FROM : ~~Original Signed~~
F. T. Hobbs
F. T. Hobbs, Assistant Secretary

SUBJECT: COMMISSION'S MEETING WITH ADVISORY COMMITTEE ON ISOTOPES AND RADIATION DEVELOPMENT RE CURRIE REPORT

SECY:GF

1. At the Meeting with the members of the Advisory Committee on Isotopes and Radiation Development on October 15, 1965, the Commission noted the Currie Report, excluding the individual visit reports, would be made available to Mr. Currie for distribution to the companies visited.

2. You will recall that the Commission encouraged the Advisory Committee to consider further the development of a public information program, drawing on the experience gained by the work of the Labor-Management Advisory Committee on public acceptance of atomic power.

3. The General Manager has directed you to take the required action.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst.Gen. Mgr. for R&D
General Counsel
Director, Public Information
Director, Industrial Participation

Copy filed: Com-7- Isotopes & Rad. Devel, Adv Comm on

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10-29-65

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

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Isotopes 3-
Copy 1 - Germantown

UNITED STATES GOVERNMENT

Reference & Reproduction Branch

Memorandum

TO : E. E. Fowler, Deputy Director
Div. of Isotopes Development

DATE: October 29, 1965

FROM : Original Signed by F. T. Hobbs
F. T. Hobbs, Assistant Secretary

SUBJECT: COMMISSION'S MEETING WITH ADVISORY COMMITTEE ON ISOTOPES AND RADIATION DEVELOPMENT RE CURRIE REPORT

SECY:GF

1. At the Meeting with the members of the Advisory Committee on Isotopes and Radiation Development on October 15, 1965, the Commission noted the question of including individual industry opinions in the Currie Report would be raised for Commission consideration.

2. You will recall that the Commission encouraged the Advisory Committee to consider further the development of a public information program, drawing on the experience gained by the work of the Labor-Management Advisory Committee on public acceptance of atomic power.

3. The General Manager has directed you to take the required action.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for R&D
General Counsel
Director, Public Information
Director, Industrial Participation

cy filed - O-M-6
O-M-7 Isotopes - Rad. Adv. Committee

10-29-65

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Isotopes -3

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. H-232
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Tuesday, October 19, 1965)

AEC ANNOUNCES COMPLETION OF NEW STUDY ON INDUSTRIAL USE OF ISOTOPES

A comprehensive new study on the commercial use of radioisotopes finds the outlook "broadly encouraging for the future development of the industrial use of isotopes."

The survey, just completed for the Atomic Energy Commission by Arthur D. Little Incorporated, adds:

"It is significant that isotopes seldom lose an application in which they have been found suitable, and new opportunities are continually being introduced."

The study, titled "Isotopes in Industry -- Trends in the Industrial Use of Radioisotopes and Ionizing Radiation," will be sold for $1.50 by the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, and copies will be available by November 1.

In conducting the survey, the first such comprehensive study made since 1958, Little investigated 21 major industrial areas to determine how isotopes are used and the possible future use. More than 200 persons representing 133 industrial, academic and government organizations were interviewed, and research included a study of literature generated over the past five years.

In summarizing some of its findings, Little said:

"The major conclusion we draw from this survey is that the use of radioisotopes by industrial companies in research, in process control instrumentation, and in non-destructive testing is now carried out on a much more routine basis than was the case five years ago.

"The industrial use of ionizing radiation for processing plastics, medical supplies, chemicals, and semiconductors, etc., is a major innovation in the last five years, and

(more)

10-19-65

most of the volume of goods processed this way are treated by electron beams from accelerators, rather than by beta or gamma rays from radioisotopes."

As the technology develops, it is expected that both radioisotopes and machine sources of radiation will find increased application, especially as radiation sources for the low-dose preservation of foods and for the manufacture of wood-plastic materials, the report indicated.

The most important uses of radioisotopes and ionizing radiation by industry are in gaging, radiography, tracer studies, and radiation processing (where radiation is an integral part of a process).

The report says one of the most important aspects of isotope usage is people -- knowledgeable management and trained researchers.

"One of the most important factors influencing the growth of radioisotope applications by industry is the presence of an individual or group of responsible people with training, experience, and enthusiasm to stimulate the use of isotope techniques in solving production problems . . .

"If the human factor is important to the growth of isotope gages, it is even more significant in the area of tracer research, especially the large-scale experiments involving pilot plant or production facilities."

#

10/19/65

Isotopes -3

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

OCT 18 1965

Dear Lauchlin:

Your recent letter inquiring about our plans for public release of the report that you prepared for the Commission on industry's evaluation of isotopes and radiation development in the United States has been brought to my attention. You may know that I have been away from Washington for the past few weeks attending the Ninth General Conference of the International Atomic Energy Agency in Tokyo as well as making visits to other countries. I understand that during my absence Dr. Kavanagh and Mr. Fowler of the staff discussed your letter to me by telephone.

As you mention in your letter, the Commission issued a public announcement on August 10, 1965, which described the survey and the recommendations made in your report. It was also indicated in the public announcement that the Commission had the report under study to determine how the findings could be translated into policy to improve prospects for the future expansion of industrial applications of radioisotopes and radiation. Because of this and because of the privileged nature of much of the industrial information obtained by you in the survey, the Commission concluded that the actual report itself should only be available for internal use.

I am informed that Mr. Fowler is providing you with a current report on the status of staff actions on the report recommendations which is to be made available by you to those industry representatives visited during the course of your survey. I might quickly point out that following your meeting on June 1 with Commissioners Ramey and Tape, the report was referred to various staff elements for review and comment. The Commission also requested the Advisory Committee on Isotopes and Radiation Development to review the recommendations and conclusions of your study. I understand that action is being proposed to implement various sections of the report, such as those relating to an isotopes and radiation demonstration program; and I can assure you that every consideration will be given by the Commission to such recommendations by the staff.

10-14-65

In addition, the Director of Regulation has commented in some detail on the licensing and regulatory aspects of the report and his analysis is currently undergoing review.

I again wish to express my appreciation to you for the very commendable service you rendered in performing the study on behalf of the Atomic Energy Commission.

Cordially,

(Signed) Glenn T. Seaborg

Chairman

Mr. Lauchlin M. Currie
574 Alda Road
Mamaroneck, New York

DISTRIBUTION:
Chairman Seaborg (2)
Commissioner Palfrey
Commissioner Ramey
Commissioner Tape
Secretariat (2)
GM,
AGM
DGM
AGMRD
OGC

OFFICE ▶	DID:DM(Acting)	AGMRD	AGM	DGM	GM	
SURNAME ▶	EEFowler/jaf					
DATE ▶	10/7/65					

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Isotopes-3

OCT 7 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

SUBJECT: ANNOUNCEMENT ON ISOTOPE PRICE REDUCTION

Attached for your information is a public announcement on the reduction of prices on four radioisotopes -- strontium-90, promethium-147, cerium-144, and cesium-137 -- effective November 10. An earlier announcement, issued on August 27, stated these price changes would take place, but no date was given at that time pending signing of the contract with Isochem.

The announcement has the approval of the office of the Assistant General Manager for Research and Development. We plan to issue on Monday afternoon, October 11, about the same time that Richland issues an announcement on the new contract with Isochem.

Signed
Duncan Clark

Duncan Clark, Director
Division of Public Information

Attachment
Announcement

cc: R. E. Hollingsworth, General Manager
[illegible], Jr., [illegible]
[illegible],
[illegible],
J. J. [illegible], OC
[illegible], 5 CY

OFFICE ▶	PI	PI	PI	PI		
SURNAME ▶	J.Barr[illegible]					
DATE ▶	10/7/65					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16 - 62761-3

10-7-65

AEC ANNOUNCES PRICE REDUCTIONS ON
FOUR RADIOISOTOPES TO TAKE EFFECT NEXT MONTH

Sharp price reductions on four radioisotopes -- strontium-90, promethium-147, cerium-144 and cesium-137 -- will take effect November 10.

Plans for the price cuts first were announced on August 27 when the Atomic Energy Commission said it would make the new schedule effective [illegible] after the signing of a contract with Isochem Incorporated. A contract now has been signed with the company for the privately financed construction and operation of a new Fission Products and Encapsulation Plant at the Commission site at Richland, Washington.

The plant, which will begin production in the fall of 1968, will produce the four radioisotopes commercially. The Commission's new schedule sets prices at levels approaching the prices expected to be charged by Isochem, in order to further stimulate the market for these materials before the new plant begins operation.

The new schedule is graduated, setting progressively lower unit prices for larger orders.

Here are the old and new prices:

I. NEW PRICE SCHEDULE*

Quantity (curies)	Price per Curie		
	Sr 90	Pm 147	Ce 144
0-5000	$ 0.50	$ 0.50	$ 0.50
5001-50,000	0.30	0.30	0.30
50,001-150,000	0.25	0.25	0.20
over 150,000	0.20	0.20	0.15

	Cs 137
0-10,000	$ 0.50
10,001-50,000	0.45
50,001-200,000	0.35
over 200,000	0.125

*Applicable to same chemical forms and specifications as in current catalog, issued by the AEC's Oak Ridge (Tenn.) National Laboratory.

II. OLD PRICE SCHEDULE

Quantity (curies)	Price per Curie
	Sr 90
0-5000	$ 2.00
5000-30,000	1.00
over 30,000	0.75
	Pm 147
0-20,000	$ 5.00
20,000-50,000	2.50
over 50,000	1.75

Quantity (curies)	Ce 144	Cs 137
0-20,000	$ 2.00	$ 1.00
20,000-100,000	1.50	0.75
over 100,000	1.00	0.50

Isotopes-3

SEP 27 1965

Division of Industrial Participation

E. W. Rebol, Chief, Materials Branch
Division of International Affairs

REDUCING THE POSSIBILITY OF UNSAFE USE ABROAD OF U.S.-SUPPLIED RADIOISOTOPES - AEC 398/22

As you know, at Commission meeting 2115 Staff Paper AEC 398/22 subject as above, was considered. The Commission noted that the staff would explore with the domestic radioisotope industry various possible procedures to reduce the chance of unsafe use abroad of U.S. supplied radioisotopes.

This is to confirm discussion with Mr. V. D'Amico of your staff requesting your assistance in contacting U.S. radioisotope industry for their views.

cc: Secretariat

DIA:M DIA:M

JMWardrop:fb Rebol
9/27/65

9-27-65

Sent by ~~Courier~~ Staff
Isotopes - 3

SEP 22 1965

[illegible] Original Signed by E. J. Black
[illegible] GENERAL MANAGER

SUBJECT: ARC INTEREST IN ARTIFICIAL HEARTS; CHAIRMAN SEABORG'S UPCOMING VISIT WITH DR. DeBAKEY, BAYLOR UNIVERSITY

We have learned of your forthcoming visits to Dr. Michael E. DeBakey and of your interest in obtaining information on isotope power supplies for heart pacemakers. We understand further that Mr. Wilson Shaw is obtaining background information for your use on this subject.

It is possible that your discussions with Dr. DeBakey may turn to the subject of the development of artificial hearts, because he is a prominent worker in the field. Many members of the AEC have been involved to a peripheral extent in this area, since consideration is being given to employing nuclear power for this purpose also. We have therefore prepared background information on the AEC interest for your possible use in the form of the attached document. If you desire further details or the names of people involved in the various organizations mentioned therein, we are prepared to furnish them.

(Signed) S. G. English

S. G. English
Assistant General Manager
for Research and Development

cy filed - Sec. 5-1 Visit by Commissioners Staff
MH&S-21

Attachment:
Background Information
on Artificial Hearts

Distribution:
C.L. Dunham, DBM
Wilson Shaw, BDT
AGMRD
Dr. Vanderryn
E.E. Fowler
Secretariat (2)

GM	DGM	AGM	DBM	BDT	AGMRD
			CLDunham	W. Shaw	J. Vanderryn
			9/ /65	9/ /65	9/ /65

DBD:RAB	DBD:AD	AGM	DGM	GM	AGMRD
JLBlocm:jk	EEFowler				SGEnglish
9/17/65	9/ /65	9/ /65	9/ /65	9/ /65	9/ /65

9-22-65

Isotopes

GENERAL ELECTRIC
COMPANY
175 CURTNER AVENUE
SAN JOSE, CALIFORNIA 95125

JAMES F. YOUNG
VICE PRESIDENT AND GENERAL MANAGER
ATOMIC PRODUCTS DIVISION

September 17, 1965

Dr. Glenn T. Seaborg, Chairman
United States Atomic Energy Commission
Washington, D. C.

Dear Glenn:

The September 16 Nucleonics Week report on General Electric's views on commercial cobalt gives a most misleading impression of our current thinking, and I wanted to correct the record with you as soon as possible. The report is based on a quite informal discussion which I had in Washington on September 7 with a representative of Nucleonics Week. The reporter has misconstrued a number of very tentative observations in this interview.

I would like to emphasize that we have come to no definite conclusions as to our plans in this area either with respect to the Vallecitos reactor or as to what action we would urge the Commission to take with respect to continued participation in Cobalt-60 sales. We have, over a period of time, studied the feasibility of reactivating the VBWR and, in addition, have considered proposing to the Commission under its outstanding rules a withdrawal from some (but not all) of its current Cobalt-60 production.

I do want to assure you that when we do come to some firm decisions on this matter, we will, prior to any public announcement, review them with the Commission, and present the reasoning behind our decisions. I very much regret that the Nucleonics Week article has conveyed an erroneous impression of the present state of our thinking.

Sincerely,

J. F. Young

JFY:rk

cc: E. W. O'Rorke

9-17-65

Isotopes - 3

UNCLASSIFIED

September 13, 1965

AEC 398/23

COPY NO. 62

AEC 398/23

ATOMIC ENERGY COMMISSION

RADIOISOTOPES IN MEDICINE

Note by the Secretary

The attached letter of September 9, 1965 from Mr. Harold Price to Mr. Alan Fitzgibbon of the Medical Tribune is circulated for the information of the Commission at the request of the Director of Regulation.

W. B. McCool

Secretary

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9-13-65

UNCLASSIFIED

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

SEP 9 1965

Mr. Alan L. Fitzgibbon
Medical Tribune
624 Madison Avenue
New York, New York 10022

Dear Mr. Fitzgibbon:

I am pleased to present here my views on the general subject of the use of radioisotopes in medicine. The attached comments are directed to the specific questions raised in your letter of August 4, 1965, and I hope they are helpful to you in preparing your report.

I would appreciate seeing a copy of your report before publication, and will return it with no delay.

We are, as you know, deeply involved in the licensing of medical uses of radioisotopes, and will await with considerable interest your report on this subject.

Sincerely yours,

Harold L. Price
Director of Regulation

Enclosure

COMMENTS BY
HAROLD L. PRICE, DIRECTOR OF REGULATION
U. S. ATOMIC ENERGY COMMISSION

(In response to letter of August 4, 1965,
from Alan L. Fitzgibbon)

When the Atomic Energy Commission radioisotope distribution program was established in 1946, there was little literature available on clinical uses of radioisotopes and few physicians had training or experience in their use. The general goal of the AEC program was to make radioisotopes available for medical uses where they were needed and where they could be handled properly and safely.

The AEC in its licensing program has, with the assistance of its Advisory Committee on the Medical Uses of Isotopes, considered patient safety and drug efficacy; the medical qualifications of physicians to use radioisotopes effectively and safely; and the radiation safety of physicians, employees, and members of the public.

The use of radioisotopes in medicine is now quite widespread. As the field has developed, the safety and effectiveness of some diagnostic and therapeutic procedures have become well-known, clinical procedures have been published extensively, the qualifications of physicians to use radioisotopes have been

defined, training courses in nuclear medicine have been established, and a professional society for those engaged in nuclear medicine has been founded.

We believe that eventually an appropriate balance with respect to radiopharmaceuticals should be achieved whereby they are regulated and used in a manner similar to other potentially dangerous non-radioactive drugs. This would mean that Government agencies which control the pharmaceutical quality of non-radioactive drugs with respect to the patient would exercise similar control for radioactive drugs; the medical community through its medical schools, specialty boards, or state licensing boards would determine that individual physicians are qualified to use radiopharmaceuticals effectively; and the AEC (or Agreement States) would prescribe radiation safety requirements to protect persons handling the drugs and the public during use of the drugs.

In issuing licenses for medical uses of radioisotopes, a primary consideration is the qualification of the proposed user -- the specialized training of the physician and his experience in the use of radioisotopes. Historically, radiologists were among the first users of radioisotopes in medicine because of their interest and established qualifications in matters related to radiation. We now license many different specialists,

including radiologists, pathologists, internists and surgeons, who have demonstrated the necessary qualifications.

As we in the AEC regulatory program see it, the need for a new specialty board to certify physicians to use radioisotopes might depend somewhat on the extent to which professional standards for training in nuclear medicine are developed, and the extent to which the qualifications of physicians in this field are determined in state license examinations. Certification by a specialty board would be evidence of qualification, but it is too early to say whether it could be the sole basis upon which licenses would be issued.

The AEC has recently amended its regulations to provide for distribution of radiopharmaceuticals to physicians for certain well-established diagnostic procedures under a general license. This is among the first steps being taken towards the goal of placing the use of radioisotopes in medicine on the same basis as other potentially dangerous drugs. The AEC believes this step is justified at this time in view of the nature of the diagnostic procedures, the availability of clinical information, and the status of physician training.

In connection with this change in its regulations, the AEC is conducting a study based on use of the general license which should indicate at the end of two or three years whether or not

it will be desirable to place additional restrictions on the general license or, on the other hand, whether it will be possible to expand the scope of the general license. There is no indication that restrictions over and above those now imposed by the general license are necessary at this time.

Isotopes - 3

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

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Res. & Status Br. - GTN

UNITED STATES GOVERNMENT

Memorandum

TO : File

DATE: September 7, 1965

FROM : W. B. McCool, Secretary

SUBJECT: LICENSING AND REGULATION OF RADIOISOTOPES

SECY:JCH

1. At Regulatory Information Meeting 166 on September 1, 1965, the Commissioners approved Mr. Price's recommendation to establish a panel after January 1, 1966. The Regulatory staff's June 30 report may be transmitted to the members of the Committee on Isotopes and Radiation Development after a check with Dr. Currie regarding specific quotes in the report.

2. It is our understanding the Director of Regulation is taking the required action.

cc:
Chairman
Director of Regulation
Deputy Director of Regulation
Asst. Dir. of Regulation
Asst. Dir. of Regulation for Admin.
Asst. Dir. of Regulation for Nuclear Safety
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
General Counsel

9-7-65

Copy filed:
ACRS-7- Isotopes, Radiation, Contrs

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Isotopes-3

574 Alda Road,
Mamaroneck, N.Y.,
September 5, 1965.

Dr. Glenn T. Seaborg,
U.S. Atomic Energy Commission,
Washington, D.C.

Daer Dr. Seaborg:

Since the distribution of the news-release re the report Oscar Bizzell and I made on our survey of industries interested in radio isotopes, I have had several inquiries as to when the summary and recommendations of that report will be issued. Particular inquiries came from "Nucleonics" and other journals, and from several men on whom Bizzell and I called, and who indicated that I had promised to send them this information. (N.B., I don't recollect having made any such "promises", but we may have told them that the report would be made public.)

In my discussion with Messrs Ramey, Tape et als, June 1, I believe it was assumed that the report would be issued as soon as the Commission decided what action should be taken on the recommendations in the report. I think it should be.

Can you tell me if and when the report may be published, and what reply I should make to past and future inquiries? I would appreciate it very much.

Sincerely,

Lauch.

Lauchlin M. Currie.

CC: Messrs
Ramey
Fowler

#182 ltd 8/10/65

Info mtg 505

9-5-65

~~O-M-2-Gen. Mgr.~~ Isotopes 3

SEP 2 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER BAILEY
COMMISSIONER TAPE

THROUGH GENERAL MANAGER (Signed) John V. Vinciguerra for

SUBJECT: INTER-DIVISIONAL PLANNING ON ISOTOPES

Attached for the information of the Commission is a staff memorandum describing the procedure which has been adopted to effect an integration of program planning among the Divisions responsible for production and development of large-scale applications of radioisotopes.

G. F. QUINN

C. F. Quinn
Assistant General Manager
for Plans and Production

Encl.

cc: SECY (2)

bcc: GM

Ufiled O-M 2 Gen. Mgr
O-M-2-Production
O-M-2-Isotope Devl
O-M-2-Reactor Devl
O-M 2-Space Nuclear System

OFFICE ▶	AGMPP	AGM	DGM	GM		
SURNAME ▶	GFQuinn/hm					
DATE ▶	9/2/65					

9-2-65

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Isotopes-3

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Res. & Status Br. - GTN

UNITED STATES GOVERNMENT

Memorandum

TO : File

DATE: August 30, 1965

FROM : W. B. McCool, Secretary

SUBJECT: PRESS RELEASE ON REDUCTIONS IN COSTS OF RADIOISOTOPES

SECY:JCH

1. At Information Meeting 510 on August 26, 1965, the Commissioners approved the proposed press release regarding reductions in costs of certain radioisotopes and requested that Mr. Conway, JCAE, be informed of the release and of the reason why the press release procedure was being used in this instance.

2. It is our understanding the Division of Public Information and Office of Congressional Relations have taken the required action.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
General Counsel
Director, Isotopes Development
Director, Congressional Relations
Director, Public Information

Copy filed:
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8-30-65

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Isotopes-3

No. H-196
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Friday, August 27, 1965)

SECY
B-425

AEC ANNOUNCES PRICE REDUCTIONS ON FOUR RADIOISOTOPES

The Atomic Energy Commission is making sharp price reductions on four radioisotopes -- strontium-90, promethium-147, cerium-144, and cesium-137.

In announcing the changes the Commission also said it expects a contract will be executed soon with Isochem Incorporated for the privately financed construction and operation of a new Fission Products Conversion and Encapsulation Plant (FPCE) at the AEC site at Richland, Washington, to produce these four isotopes commercially. The Commission's new price schedule will take effect 30 days after the signing of the contract with Isochem.

The FPCE, to begin operation in the fall of 1968, would be designed for large-scale production and distribution of the four products at low unit prices, opening the way for greatly expanded uses of the materials.

The new lower prices on the four radioisotopes are set at levels approaching the prices expected to be charged by Isochem, in order to further stimulate the market for these materials in the period before the proposed new plant begins operation.

The price schedule is graduated, setting progressively lower unit prices for larger orders. Here are examples of the price changes:

Strontium-90 -- In quantities up to 5,000 curies, the price is being reduced from $2 per curie to 50 cents per curie, and in very large quantities the new price is 20 cents per curie.

Promethium-147 -- At present, up to 20,000 curies costs $5 per curie. Under the new schedule, up to 5,000 curies

(more)

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8-27-65

may be purchased at 50 cents per curie, and as low as 20 cents per curie in large quantities.

Cerium-144 -- The present price per curie is $2 for orders up to 20,000 curies. The new price will be 50 cents per curie for up to 5,000 curies, and 15 cents a curie on large orders.

Cesium-137 -- The existing price of $1 per curie for up to 20,000 curies will be reduced to 50 cents a curie for up to 10,000 curies, and 12.5 cents on large orders.

Promethium-147 and strontium-90 have a number of industrial applications, such as in luminous sources and atomic "batteries." They also can provide electric power for small installations such as arctic weather stations and sea buoys. Strontium-90 also is employed in industrial thickness gauges and in the treatment of certain eye disorders. Both are beta emitters.

Cesium-137 is used as a radiation source for both industrial and medical uses. Cesium also is a beta emitter, but it produces "daughter" products by radioactive decay and these emit gamma radiation.

Cerium-144, which emits both beta and gamma, is used for various research purposes and has a good potential for use as a heat source.

The four radioisotopes occur as by-products of the fission process in nuclear reactors. At present, the AEC's Oak Ridge (Tenn.) National Laboratory and the Martin Company's Quehanna, Pennsylvania facility process these isotopes. The FPCE will have a far greater production capacity than the present Oak Ridge and Quehanna plants which are primarily pilot facilities.

The new prices will be applicable to all purchasers, foreign and domestic, including Federal agencies. The reduced prices are being established in order to stimulate their large scale utilization and to help develop a source of supply of fabricated and encapsulated fission products independent of the AEC.

It is expected that such market development and private participation will benefit not only private industry and the civilian economy generally, but also assist the current and

planned governmental efforts in space, terrestrial and oceanographic areas, some of which are potentially large users of fission products for power and heat purposes.

The long range net effect of this price reduction is expected to be market stimulation leading to large-scale use of otherwise wasted fission products. The Commission will withdraw from supplying these four products when the FPCE commences commercial operation.

Isochem is jointly owned by Martin Marietta Corporation and U. S. Rubber Corporation. The new company was selected to build and operate the FPCE on the basis of its proposal submitted in response to a Commission invitation last year. Three proposals were received.

Under the agreement now being negotiated with Isochem, the company would build the FPCE -- at an estimated cost of eight million dollars -- and operate the facility on a commercial basis. The FPCE site will be leased by the AEC to Isochem. In addition, Isochem also would manage the AEC's chemical separations and related facilities at Richland under a cost-plus-fixed-fee contract.

The old and new price schedules are attached.

#

(NOTE TO EDITORS: This announcement is being issued simultaneously by the Commission's Operations Offices at Richland, Washington and Oak Ridge, Tennessee.)

8/27/65

I. NEW PRICE SCHEDULE*

Quantity (curies)	Price per Curie Sr 90	Pm 147	Ce 144
0-5000	$ 0.50	$ 0.50	$ 0.50
5001-50,000	0.30	0.30	0.30
50,001-150,000	0.25	0.25	0.20
over 150,000	0.20	0.20	0.15

	Cs 137
0-10,000	$ 0.50
10,001-50,000	0.45
50,001-200,000	0.35
over 200,000	0.125

*Applicable to same chemical forms and specifications as in current catalog.

II. PRESENT PRICE SCHEDULE

Quantity (curies)	Price per Curie Sr 90
0-5000	$ 2.00
5000-30,000	1.00
over 30,000	0.75

	Pm 147
0-20,000	$ 5.00
20,000-50,000	2.50
over 50,000	1.75

Quantity (curies)	Ce 144	Cs 137
0-20,000	$ 2.00	$ 1.00
20,000-100,000	1.50	0.75
over 100,000	1.00	0.50

#

Isotope-3

AUG 26 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

SUBJECT: PUBLIC ANNOUNCEMENT ON PRICE REDUCTIONS ON FOUR RADIOISOTOPES

Attached is a press release concerning price reductions on four radioisotopes -- strontium-90, promethium-147, cerium-144 and cesium-137.

Commissioner Ramey plans to make this announcement at a press conference at Hanford tomorrow (August 27). I understand the release was to be discussed at the Commission's Information Meeting today.

We plan to make distribution of the announcement here at 2 p.m. on August 27, and after the Isochem contract is signed we will issue a supplemental announcement giving the specific effective date of the revised price schedule.

Signed
Duncan Clark

Duncan Clark, Director
Division of Public Information

Attachment
Announcement

cc: R. E. Hollingsworth, General Manager
H. C. Brown, Jr., AGMA
J. Burke, OGC
Dr. S. English, GM
F. Fowler, ID
H. A. Wildson, CM
W. B. McCool, SECY

OFFICE ▶	PI	PI	PI			
SURNAME ▶	J.Harris/ab					
DATE ▶	8/25/65					

8-26-65

The Atomic Energy Commission is making sharp price reductions on four radioisotopes -- strontium-90, promethium-147, cerium-144, and cesium-137.

In announcing the changes the Commission also said it expects a contract will be executed soon with Isochem Incorporated for the privately financed construction and operation of a new Fission Products Conversion and Encapsulation Plant (FPCE) at the AEC site at Richland, Washington, to produce these four isotopes commercially. The Commission's new price schedule will take effect 30 days after the signing of the contract with Isochem.

The FPCE, to begin operation in the fall of 1968, would be designed for large-scale production and distribution of the four products at low unit prices, opening the way for greatly expanded uses of the materials.

The new lower prices on the four radioisotopes are set at levels approaching the prices expected to be charged by Isochem, in order to further stimulate the market for these materials in the period before the proposed new plant begins operation.

The price schedule is graduated, setting progressively lower unit prices for larger orders. Here are examples of the price changes:

Strontium-90 -- In quantities up to 5,000 curies, the price is being reduced from $2 per curie to 50 cents per curie, and in very large quantities the new price is 20 cents per curie.

Promethium-147 -- At present, up to 20,000 curies costs $5 per curie. Under the new schedule, up to 5,000 curies may be purchased at 50 cents per curie, and as low as 20 cents per curie in large quantities.

(more)

Cerium-144 -- The present price per curie is $2 for orders up to 20,000 curies. The new price will be 50 cents per curie for up to 5,000 curies, and 15 cents a curie on large orders.

Cesium-137 -- The existing price of $1 per curie for up to 20,000 curies will be reduced to 50 cents a curie for up to 10,000 curies, and 12.5 cents on large orders.

Promethium-147 and strontium-90 have a number of industrial applications, such as in luminous sources and atomic "batteries." They also can provide electric power for small installations such as arctic weather stations and sea buoys. Strontium-90 also is employed in industrial thickness gauges and in the treatment of certain eye disorders. Both are beta emitters.

Cesium-137 is used as a radiation source for both industrial and medical uses. Cesium also is a beta emitter, but it produces "daughter" products by radioactive decay and these emit gamma radiation.

Cerium-144, which emits both beta and gamma, is used for various research purposes and has a good potential for use as a heat source.

The four radioisotopes occur as by-products of the fission process in nuclear reactors. At present, the AEC's Oak Ridge (Tenn.) National Laboratory and the Martin Company's Quehanna, Pennsylvania facility process these isotopes. The FPCE will have a far greater production capacity than the present Oak Ridge and Quehanna plants which are primarily pilot facilities.

The new prices will be applicable to all purchasers, foreign and domestic, including Federal agencies. The reduced prices are being established in order to stimulate their large scale utilization and to help develop a source of supply of fabricated and encapsulated fission products independent of the AEC.

(more)

It is expected that such market development and private participation will benefit not only private industry and the civilian economy generally, but also assist the current and planned governmental efforts in space, terrestrial and oceanographic areas, some of which are potentially large users of fission products for power and heat purposes.

The long range net effect of this price reduction is expected to be market stimulation leading to large scale use of otherwise wasted fission products. The Commission will withdraw from supplying these four products when the FPCE commences commercial operation.

Isochem is jointly owned by Martin Marietta Corporation and U. S. Rubber Corporation. The new company was selected to build and operate the FPCE on the basis of its proposal submitted in response to a Commission invitation last year. Three proposals were received.

Under the agreement now being negotiated with Isochem, the company would build the FPCE -- at an estimated cost of eight million dollars -- and operate the facility on a commercial basis. The FPCE site will be leased by the AEC to Isochem. In addition, Isochem also would manage the AEC's chemical separations and related facilities at Richland under a cost-plus-fixed-fee contract.

The old and new price schedules are attached.

#

I. NEW PRICE SCHEDULE*

Quantity (curies)	Price per Curie		
	Sr 90	Pm 147	Ce 144
0-5000	$ 0.50	$ 0.50	$ 0.50
5001-50,000	0.30	0.30	0.30
50,001-150,000	0.25	0.25	0.20
over 150,000	0.20	0.20	0.15

	Cs 137
0-10,000	$ 0.50
10,001-50,000	0.45
50,001-200,000	0.35
over 200,000	0.125

*Applicable to same chemical forms and specifications as in current catalog.

II. PRESENT PRICE SCHEDULE

Quantity (curies)	Price per Curie
	Sr 90
0-5000	$ 2.00
5000-30,000	1.00
over 30,000	0.75
	Pm 147
0-20,000	$ 5.00
20,000-50,000	2.50
over 50,000	1.75

(more)

Quantity (curies)	Ce 144	Cs 137
0-20,000	$ 2.00	$ 1.00
20,000-100,000	1.50	0.75
over 100,000	1.00	0.50

Isotopes-3

AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

No. H-194
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Wednesday, August 25, 1965)

SEC4
B-425

AEC INCREASES PRODUCTION OF COBALT-60 TO MEET GROWING DEMAND

The Atomic Energy Commission has increased production of cobalt-60 at its Savannah River (S.C.) Plant to meet a growing demand for large quantities of this radioactive material for use in industry, medicine and research.

Cobalt-60 emits penetrating gamma radiation. It is produced in Savannah River reactors by the irradiation of stable cobalt target material in various shapes. Cobalt is a lustrous, silver-white metal related to, and occurring with, nickel and iron in natural deposits.

At present, 5.5 million curies of cobalt-60 are in production at Savannah River, and most of this is scheduled for eventual delivery to two AEC installations -- Oak Ridge (Tenn.) National Laboratory and Brookhaven National Laboratory in New York. The cobalt shipped to Oak Ridge will be sold to commercial users, and that shipped to Brookhaven will be used in research irradiations.

A curie is a basic unit describing radiation intensity, and equals 37 billion disintegrations per second, or about the radioactivity of one gram of radium.

The 5.5 million curies now in production include:

--About 975,000 curies for use in studies into the characteristics and applications of high specific-activity cobalt, in the range of 300 to 600 curies per gram. Oak Ridge, Brookhaven and Savannah River will be the main participants in these studies.

--About 1.25 million curies for reloading the irradiator at the U.S. Army Radiation Laboratory at Natick, Mass.

--About 700,000 curies for studies by Savannah River Laboratory of cobalt heat sources in the range of 4,000 to 10,000 thermal watts.

(more)

8-25-65

--About 160,000 curies for the AEC's Argonne (Ill.) National Laboratory for use in radiation chemistry research.

--About one million curies for redistribution by Oak Ridge to commercial users.

--About 1,440,000 curies for the AEC's Brookhaven National Laboratory for research irradiations.

The AEC's policy is to distribute radioisotopes to commercial users only when domestic commercial producers cannot meet requirements under reasonable conditions of time, quality of product, or reasonable price.

Since 1955, when the cobalt-60 production program was initiated at Savannah River, the installation has produced and transferred more than 4 million curies to Oak Ridge and to other Government agencies for redistribution to industrial, commercial, and medical users. The medical uses involve research and treatment of cancer and deep-seated malignancies; in industry, cobalt-60 is used in various processes, for radiographic work, and other applications.

Of the cobalt-60 distributed since 1955, 1.3 million curies went to the U.S. Army Radiation Laboratory at Natick, Mass., as the original radiation source of food process experimentation work. One million curies went to Brookhaven, of which 750,000 curies still are being used in research. The remaining 250,000 curies sent to Brookhaven were for use in the Marine Products Development Irradiator at Gloucester, Mass., a joint project of the Department of the Interior and the AEC. The U.S. Bureau of Mines Metallurgical Laboratory at Albany, Ore., also has received about 120,000 curies for research on metals. The remaining amount -- about 1.6 million curies -- was shipped to ORNL for sale.

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(NOTE TO EDITORS AND CORRESPONDENTS: This announcement also is being issued by the Commission's Operations Offices at Oak Ridge, Tennessee, and Aiken, South Carolina.)

8/25/65

Do o tapes.

AUG 23 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

SUBJECT: LICENSING AND REGULATION OF RADIOISOTOPES

In response to the Commission's request, I am enclosing a report concerning Dr. Currie's survey, "Industry's Evaluation of Isotopes and Radiation". The enclosed regulatory staff report analyzes the comments from industry sources pertaining to the regulatory program.

The specific complaints reported by Dr. Currie deal with various aspects of the regulatory program as it applies to radioisotopes. In some instances they are raw and unevaluated criticisms of specific actions or failures to act by the staff. In other cases they represent general criticism of the regulatory and safety philosophy of the materials licensing program or of the procedures observed in administering the program. In still other instances, respondents in the survey report complaints which they attribute to licensees other than themselves.

Although I am sure our licensees believe that licensing and regulatory programs are desirable, I also am sure that many feel the program is needed only for the other person. I doubt that government regulation is ever received without some criticism of its restraining effect.

An analysis of Dr. Currie's report indicated that the most frequent complaints were:

(1) that the AEC's licensing and safety requirements are overly restrictive, thus discouraging potential new users of radioisotopes; and

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SURNAME ▷						
DATE ▷						

8-23-65

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(2) that use of radioisotopes is unduly inhibited by regulatory red tape and that there is too much legalistic nit picking by the AEC and agreement State regulatory groups.

The philosophy underlying the regulatory program with respect to radioisotopes requires each license applicant to demonstrate that his equipment, his staff, his proposed organization and procedures, and his ability to carry out the prescribed work qualify him to use radioactive material without presenting undue hazards to the health and safety of employees and the public. These have been the principles of the program since its inception.

During the approximately 10 years since the regulatory program was established under the Atomic Energy Act of 1954, there have been numerous changes in the regulations, most of which have provided greater flexibility and simplified the licensing process while some have been more restrictive for good cause (e.g., radiographers). Also, licensing criteria and requirements have been published in the form of new regulations providing guidance to materials licensees. In addition, nine licensing guides have been issued to assist applicants in preparing license applications, including the following three dealing with radioisotope licensing: Industrial Radiography; Teletherapy; and Medical Use of Radioisotopes.

We now have 8,500 byproduct licenses under AEC jurisdiction plus another 3,800 under the various agreement States; the activities covered by these licenses range from use of millicurie sources for calibration of instruments to use of kilocurie sources for irradiation of food and from the use of small quantities of radioisotope-labeled pharmaceuticals in medicine to complex fuel research and development programs involving megacurie quantities of byproduct material. With such a broad scale licensing program, covering such diverse activities, it is inevitable that there will be licensees who are unhappy with details of the program, particularly in areas where their operating flexibility may be restricted by our regulations.

I believe, however, that it might be a good idea to consider appointment of a panel, similar to the recent Regulatory Review Panel, to look at some aspects of the byproduct

licensing program, and possibly to review other portions of the materials licensing activity. Such a panel might, for example, look at the appropriateness - in the light of experience and present technology - of the AEC's basic safety and regulatory philosophy, as expressed in our byproduct licensing regulations, and review the adequacy and reasonableness of our practices and procedures.

But I do not believe this is something which should be done in the immediate future. The staff is presently heavily involved with the recommendations of the Mitchell Panel and this work has top priority. After the first of the year it may be appropriate to consider a materials licensing review panel again.

In the meantime, working through the new Director of the Division of Materials Licensing, we will continue to review our licensing policies and practices to see where simplification of procedures is possible. As the Commission knows, we are moving in the direction of increased general licensing of byproduct materials, when the Division of Safety Standards finds this can be done without undue hazard. We are also urging, wherever it is feasible, that licensees whose programs require some flexibility in directing licensed work apply for broad licenses which will provide this latitude. Both of these trends will be continued.

I would like to discuss this matter with the Commission at an early Information Meeting.

(Signed) HLP

Harold L. Price
Director of Regulation

Enclosure:
Regulatory Staff Comments

cc: General Manager
Secretariat (2)
General Counsel (2)

bcc: H. L. Price
L. E. Johnson
J. A. McBride
REG Rdg. File
DML Rdg. File

OFFICE ▶	DML			REG HLP	
SURNAME ▶	McBride:dwb			H. L. Price	
DATE ▶	8/20/65			hlm per - 8/23/65	

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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

AUG 2[illegible] 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPP

SUBJECT: PUBLIC ANNOUNCEMENT ON INCREASED PRODUCTION OF COBALT-60

Attached is a public announcement on the increased production of Cobalt-60 to meet a growing demand. The announcement has the approval of the office of the General Manager. Savannah River Operations Office and Oak Ridge Operations Office also have cleared the announcement and will issue simultaneously with us, on Wednesday, August 25.

(Signed) William E. Hughes
William E. Hughes
Acting Director
Division of Public Information

Attachment

cc: R. E. Hollingsworth, General Manager
W. B. McCool, SECY

8-20-65

KARL E. MUNDT
MADISON, SOUTH DAKOTA

R. L. McCAUGHEY
ADMINISTRATIVE ASSISTANT
ABERDEEN, SOUTH DAKOTA

ROBERTA VAN BEEK
EXECUTIVE SECRETARY
ABERDEEN, SOUTH DAKOTA

WALTER C. CONAHAN
PRESS SECRETARY
LEOLA, SOUTH DAKOTA

Santops - 3

6

United States Senate

WASHINGTON, D.C.

MEMBER:
APPROPRIATIONS COMMITTEE
FOREIGN RELATIONS COMMITTEE
GOVERNMENT OPERATIONS COMMITTEE
SENATE INVESTIGATIONS SUBCOMMITTEE
ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS

July 16, 1965

Dr. Glenn T. Seaborg, Chairman
Atomic Energy Commission
Washington, D.C. 20545

Dear Chairman Seaborg:

Enclosed is a copy of a letter I have just received from a constituent of mine, Dr. C. S. Larson of Sioux Falls, South Dakota.

I would appreciate it if you would look into this matter and give me a report as soon as possible.

With best regards, I am

Cordially yours,

Karl E. Mundt

Karl E. Mundt
U. S. Senator

KEM:kpb
Enc.

8-16-65

DONALD H. BREIT, M. D.
C. STANLEY LARSON, M. D.
DONALD J. PEIK, M. D.
BRYSON R. MCHARDY, M. D.

DRS. BREIT, LARSON, PEIK AND MCHARDY

MEDICAL X-RAY CENTER
SOUTH MINNESOTA AVENUE AT TWENTY-THIRD STREET
SIOUX FALLS, SOUTH DAKOTA

X-RAY DIAGNOSIS
X-RAY THERAPY
RADIUM THERAPY
RADIOACTIVE ISOTOPES

July 12, 1965

Senator Karl Mundt
Senate Office Building
Washington, D. C.

Dear Senator Mundt:

Our office has recently completed a request for authorization by the United States Atomic Energy Commission, Control No. 09533, for approval of our plans for installation of a Cobalt treatment unit in our office.

The installation of this unit at this site was determined by a meeting with both hospitals and the doctors of the community. This will be the first Cobalt installation in South Dakota.

Since approval of our plans by the Atomic Energy Commission may take several months, and since we are hopeful of being able to complete construction prior to the advent of cold weather, we wonder if there would be any means of expediting the approval. We thought perhaps you would be able to check into this and see if the Commission could study our plans and give official approval sooner than they might normally act upon this request.

Anything you can do in this matter will be deeply appreciated.

We enjoyed your picture in the Sunday Argus at the Washington Zoo, particularly the picture with you and Dr. Reagan's daughter and grandchildren.

Very truly yours,

C. S. Larson, M.D.
for Drs. Breit, Larson, Peik and McHardy

CSL:JS

Isotopes-3 Secretariat

AUG 13 1965

Dear Mr. Schultze:

In response to your letter of July 1, 1965, this is to inform you that the Commission is planning to establish in the near future a schedule of reduced prices for the fission products strontium 90, cesium 137, cerium 144 and promethium 147. The current and planned prices for these fission products are set forth in the attachment.

This action is being taken in accordance with the Memorandum of Understanding between the Commission and Isochem, Inc., concerning the establishment of a Fission Products Conversion and Encapsulation (FPCE) plant at Richland and operation of the Hanford 200 area. The Memorandum of Understanding provides that the Commission will establish a fission product price schedule for the period prior to commencement of commercial operation of the FPCE (presently estimated to be 9/1/68) designed to encourage the early development of a market for such products. It is expected that such market development would benefit not only private industry and the civilian economy generally, but would also assist the current and planned governmental efforts in space, terrestrial and oceanographic areas, some of which are potentially large users of fission products for power and heat purposes.

The new price schedule will not be published until the definitive contracts with Isochem have been executed.

Of course, the sale of these fission products at the developmental prices indicated will not immediately recover production costs--a result expected to be overcome by the long range benefits to be realized. Based upon forecast market demand at the reduced prices, the difference between revenues and "out of pocket" costs would amount to 5.6 million dollars on sales of finished product in inventory

AEC994/26

8-13-65

AUG 13 1965

at 6/30/65 and an estimated 2.7 million dollars on sales of finished product to be produced in the period FY 1966 - FY 1968. However, it is to be recognized that current fission product inventories are not saleable at present AEC prices in any event, and, if not disposed of by the time Isochem establishes its commercial prices, their market value would not exceed the Isochem schedule; accordingly, a loss on current inventories will be experienced under any circumstances. Personnel and facilities to be employed for required production of fission products in the period FY 1966 - FY 1968 would be utilized for other purposes if they were not engaged in this activity, therefore, no significant savings in budgeted dollars would be realized if fission products were not produced in FY 1966 - 1968 and, in fact, the revenues from fission product sales provide a partial offset to costs which would be incurred in any event.

In summary, the long range net effect of this price reduction is expected to be market stimulation leading to large scale use of otherwise wasted fission products, as well as an actual economic benefit to the fission products industry and the country as a whole.

Cordially,

(Signed) Glenn T. Seaborg

Chairman

Honorable Charles Schultze, Director
Bureau of the Budget

Attachment:
Fission Product Prices - Table

bcc: Chairman (2)
Commissioner Palfrey
Commissioner Ramey
Commissioner Tape
Cong. Liaison)2)
Secretariat (2)
AGMRD
AGM/DGM
OC - Lenderman
General Manager
EEFowler

OFFICE ▷	DID:BA	DID:AD	OC	AGMRD	AGM/DGM	GM
SURNAME ▷	MELockyer/jha	EEFowler				
DATE ▷	8/10/65	8/ /65	8/ /65	8/ /65	8/ /65	8/ /65

FISSION PRODUCT PRICES

I. Proposed AEC Catalog Prices*

Quantity	Price per Curie		
	Sr 90	Pm 147	Ce 144
0-5000 c	$ 0.50	$ 0.50	$ 0.50
5001-50,000	0.30	0.30	0.30
50001-150,000	0.25	0.25	0.20
over 150,000	0.20	0.20	0.15

Quantity	Ce 137
0-10,000 c	$ 0.50
10,001-50,000	0.45
50,0001-200,000	0.35
over 200,000	0.125

*Applicable to same chemical forms and specifications as in present catalog.

II. Present AEC Catalog Prices

Quantity	Sr 90
0-5000 c	$ 2.00
5000-30,000	1.00
over 30,000	0.75

Quantity	Pm 147
0-20,000 c	$ 5.00
20,000-50,000	2.50
over 50,000	1.75

Quantity	Ce 144	Ce 137
0-20,000 c	$ 2.00	$ 1.00
20,000-100,000	1.50	0.75
over 100,000	1.00	0.50

Isotopes - 3 Strontium

AUG 13 1965

Dear Mr. Conway:

This is to inform the Committee that the Commission is planning to establish in the near future a schedule of reduced prices for the fission products strontium 90, cesium 137, cerium 144 and promethium 147. The current and planned prices for these fission products are set forth in the attachment.

This action is being taken in accordance with the Memorandum of Understanding between the Commission and Isochem, Inc., (copy recently provided to you) concerning the establishment of a Fission Products Conversion and Encapsulation (FPCE) plant at Richland and operation of the Hanford 200 area. The Memorandum of Understanding provides that the Commission will establish a fission product price schedule for the period prior to commencement of commercial operation of the FPCE (presently estimated to be 9/1/68) designed to encourage the early development of a market for such products. It is expected that such market development would benefit not only private industry and the civilian economy generally, but would also assist the current and planned governmental efforts in space, terrestrial and oceanographic areas, some of which are potentially large users of fission products for power and heat purposes.

The new price schedule will not be published until the definitive contracts with Isochem have been executed.

Of course, the sale of these fission products at the developmental prices indicated will not immediately recover production costs--a result expected to be overcome by the long range benefits to be realized. Based upon forecast market demand at the reduced prices, the difference between revenues and "out of pocket" costs would amount to 5.6 million dollars on sales of finished product in inventory at

AEC 994/26

8-13-65

6/30/65 and an estimated 2.7 million dollars on sales of finished product to be produced in the period FY 1966 - FY 1968. However, it is to be recognized that current fission product inventories are not saleable at present AEC prices in any event, and, if not disposed of by the time Isochem establishes its commercial prices, their market value would not exceed the Isochem schedule; accordingly, a loss on current inventories will be experienced under any circumstances. Personnel and facilities to be employed for required production of fission products in the period FY 1966 - FY 1968 would be utilized for other purposes if they were not engaged in this activity, therefore no significant savings in budgeted dollars would be realized if fission products were not produced in FY 1966 - 1968 and, in fact, the revenues from fission product sales provide a partial offset to costs which would be incurred in any event.

In summary, the long range net effect of this price reduction is expected to be market stimulation leading to large scale use of otherwise wasted fission products, as well as an actual economic benefit to the fission products industry and the country as a whole.

Cordially,

(Signed) Glenn T. Seaborg

Chairman

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Attachment:
Fission Product Prices - Table

bcc: Chairman (2)
Commissioner Palfrey
Commissioner Ramey
Commissioner Tape
Cong. Liaison (2)
Secretariat (2)
AGMRD
AGM/DGM
General Manager
EEFowler

OFFICE ▶	DID:BA	DID:AD	AGMRD	AGM/DGM	GM	CONG LIA
SURNAME ▶	MELockyer/jha	EEFowler				
DATE ▶	8/10/65	8/ /65	8/ /65	8/ /65	8/ /65	8/ /65

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AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Isotopes - 3

No. H-182
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Tuesday, August 10, 1965)

AEC STUDIES WAYS TO INCREASE ISOTOPE AND RADIATION USE

A survey of industrial users of radioactive material shows that most such firms foresee greater use of radioisotopes and radiation in their companies over the next five years.

The study was conducted for the Atomic Energy Commission by Dr. Lauchlin M. Currie, Chairman of the AEC Advisory Committee on Isotopes and Radiation Development. The survey was designed to determine the extent of industrial development of isotopes and radiation, identify factors that limited their use, and obtain recommendations on how AEC might better help this portion of the Atomic Energy Program.

Forty firms, representing a cross-section of industrial users, were visited. Since much of the information obtained was proprietary in nature, the study will not be made public.

Most of the firms interviewed were favorably disposed toward the AEC's Isotopes and Radiation Development Program. The industry indicated a tremendous potential for expansion of routine applications of isotopes and radiation applications and that the present rate of growth in industrial uses of isotopes -- said to be about 3-5 percent per year -- could reach 15-20 percent per year with AEC's assistance. Company representatives recommended that the Commission:

1. Actively seek joint funding projects for isotopes and radiation developments with industry.

2. Set up procedures for loan or rental of large radiation sources.

3. Broaden AEC patent procedures.

4. Extend the use of the general licensing provision of AEC regulations in light of past experience.

(more)

copy & draft Release (8-6-65)
Dist: OGM-7- Isotopes & Rad Devel, Edu. Entire on

8-10-65

5. Adopt a more positive public information program to off-set unfounded fears about isotopes and radiation.

Of the forty firms visited, "93 percent foresee greater use of isotopes in their companies in the next five years, and 43 percent expect this increased usage to be substantial," the study showed.

It also indicated:

--75 percent report that their isotopes use is increasing, 22 percent report a constant level of usage, and 3 percent report a decreasing trend in use.

--55 percent consider isotopes in the research and development programs to be essential; 45 percent consider them useful; and none considers them to have only marginal value.

--35 percent produce some radioisotopes for their own use, and/or prepare radioisotope-labeled compounds or sealed sources for sale.

The Commission is studying the report to determine how the findings can be translated into policy which would improve prospects for the further expansion of industrial applications of radioisotopes and radiation.

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8/10/65

Isotopes - 3

OFFICIAL USE ONLY

Res. & Status Br. - GTN

OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

TO : E. Eugene Fowler, Acting Director
Division of Isotopes Development

DATE: August 4, 1965

FROM : F. T. Hobbs, Acting Secretary

Original signed by
F. T. Hobbs

SUBJECT: AEC 994/26 - FISSION PRODUCT PRICING

SECY: GF

1. At Meeting 2128 on August 2, 1965, the Commission:

a. Approved the fission product price schedule identified in Part I of Appendix "A" to AEC 994/26;

b. Noted that this approval is contingent upon execution of the definitive contracts with Isochem for the FPCE and operation of the Hanford 200 area;

c. Noted that the fission product price schedule herein approved will be implemented in accordance with the Federal Register notice published March 9, 1965, (30 F.R. 3247) promptly after execution of the aforementioned definitive contracts and notification to the BOB;

d. Noted that these prices will be applicable to all purchasers, foreign and domestic including the AEC and other Federal agencies;

e. Noted that although these prices will result in a substantial loss on the sale of the isotopes involved, the establishment of the reduced prices is necessary in order to stimulate their large scale utilization and will help develop a source of supply of fabricated and encapsulated fission products independent of the AEC;

f. Noted that the Commission will re-examine the cesium 137 price in the event of any future reductions in the AEC cobalt 60 price;

g. Noted that the BOB and JCAE will be notified of this action before the price schedule is put into effect, by letter such as Appendix "E", as revised, to AEC 994/26; and

h. Noted that no press announcement will be made at this time.

8-4-65

Copy filed in R.D. 1-1 Pricing Policy

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2. The Commission requested the draft letter to the BOB and JCAE be revised to emphasize the long-range benefits that would accrue to the fission products industry and to the Government as a result of the lower prices.

3. The General Manager has directed you to take the action required by the above decision. It is our understanding that your office will prepare the correspondence to the BOB and the JCAE. Copies of these letters together with other pertinent correspondence should be provided the Office of the Secretary.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for R&D
General Counsel
Controller
Director, Congressional Relations

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July 29, 1965

REVISION TO AEC 994/26

COPY NO. 93

ATOMIC ENERGY COMMISSION

REVISIONS TO AEC 994/26 - FISSION PRODUCT PRICING

Note by the Secretary

1. The Division of Isotopes Development has made the following changes in the subject paper:

a. Deletion of the footnote at the bottom of page 6 and the related asterisk at the end of paragraph 9;

b. Deletion of the note at the end of Appendix "B" on page 11; and

c. Deletion of paragraph 5 at the end of Appendix "E" on page 16.

2. In submitting these revisions, DID requested that the following notation be made: "The deleted material has no relationship to the pricing action recommended in this paper. It was included originally as an item of incidental information but will now be presented to the Commission separately since the subject has proven to be more complex than initially believed."

3. Please substitute the attached revised pages.

W. B. McCool

Secretary

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
Secretary	1,90-100	Contracts	30-32
Commissioners	2-6,101-106	Controller	33-37
General Manager	7 - 8	Economic Impact	38
Deputy Gen. Mgr.	9	Ind. Participation	39-40
Asst. Gen. Mgr.	10	Inspection	41
Dir. of Regulation	11-13	Isotopes Development	42-59
Deputy Dir. of Regulation	14	Materials Licensing	60-61
Asst. Dir. of Regulation	15	Military Application	62
Exec. Asst. to GM	16	Naval Reactors	63-64
Asst. GM for Admn.	17	Nuclear Materials Mgmt.	65
Asst. GM for Operations	18	Operations Analysis	66
Asst. GM for Plans & Prod.	19	Plans & Reports	67-68
Asst. GM for Reactors	20-21	Production	69-72
Asst. GM for R&D	22	Public Information	73-74
General Counsel	23-27	Reactor Dev. & Tech.	75-84
Biology & Medicine	28	Research	85-86
Congr. Relations	29	Space Nuclear Systems	87-89

X-PLBOL-7-Pacific Northwest

7-29-65

DATE:

INDEX: Isotopes 3

~~MH&S 3 Hazards frm Power Reactors~~

~~PL P&L 7 Pacific Northwest~~

~~Budget 12 Financial Protection Reg~~

~~MH&S 3 Reg. Hazards frm. Power Reactors~~

TO: PFC 1-1 Reg. Production Utilization Facility

FROM:

SUMMARY: AEC-R 122 - DETERMINATION THAT THE FISSION PRODUCT CONVERSION AND ENCAPSULATION FACILITY IS A UTILIZATION FACILITY Plant is proposed for construction at Hanford and there is considerations involved in the safety evaluation; indemnity extended to the facility & reg. by an agreement State (Wash is in process of becoming an Agree. State).

FILED: PFC 1-1 Reg. Utilization Facility

INDEXER: date of paper: 7-28-65

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

7-28-65

☆ U.S. GOVERNMENT PRINTING OFFICE: 1947 760959

DATE:

INDEX: Isotopes 3

[redacted]

[redacted]

[redacted]

TO:

FROM:

SUMMARY: AEC 853/13 - PRODUCTION OF PLUTONIUM
To consider additional recycling of uranium irradiated in production reactors for the purpose of increasing the production of Pu-238.

FILED: Materials Plutonium

INDEXER: date of paper: 7-27-65

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

7-27-65

☆ U.S. GOVERNMENT PRINTING OFFICE: 1947 760959

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July 26, 1965

CORRECTION NOTICE

COPY NO. 93

ATOMIC ENERGY COMMISSION

CORRECTION NOTICE TO AEC 994/26
FISSION PRODUCT PRICING

Note by the Secretary

Please make the following pen-and-ink change in your copy of the subject paper:

On page 6, third line of paragraph 9, insert "not" before "able" so the sentence will read "We are not able to estimate ....."

done

W. B. McCool

Secretary

DISTRIBUTION	COPY NO.
Secretary	
Commissioners	1,90-100
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7-26-65

Isotopes 3-

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AEC 994/26

July 23, 1965

COPY NO. 93

ATOMIC ENERGY COMMISSION

FISSION PRODUCT PRICING

Note by the Secretary

The General Manager has requested that the attached report by the Acting Director of Isotopes Development be circulated for consideration by the Commission at an early date.

AEC 994/26

W. B. McCool
Secretary

DISTRIBUTION	COPY NO.
Secretary	1, 90-100
Commissioners	2-6, 101-106
General Manager	7-8
Deputy Gen. Mgr.	9
Asst. Gen. Mgr.	10
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Production	69-72
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Reactor Dev. & Tech.	75-84
Research	85-86
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7-23-65

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ATOMIC ENERGY COMMISSION

FISSION PRODUCT PRICING

Report to the General Manager by the
Acting Director of Division of Isotopes Development

THE PROBLEM

1. To establish AEC prices for the fission products strontium 90, cesium 137, cerium 144 and promethium 147 at levels comparable to the commercial prices to be charged for these isotopes when they become available from the privately owned and operated Fission Products Conversion and Encapsulation plant at Richland.

BACKGROUND AND DISCUSSION

2. The AEC has negotiated a Memorandum of Understanding with Isochem, Inc. (a corporation established and jointly owned by Martin Marietta - U.S. Rubber Corporations) relative to its privately financing the construction and operation of a Fission Products Conversion and Encapsulation (FPCE) plant at Richland. The FPCE is to be designed for large scale production and distribution of the aforementioned fission products at low unit prices with the objective of fostering their widespread use.

3. Annual production capacity of the FPCE, which far exceeds current market demand at present AEC prices, will be as follows:

Sr 90 - 29 Mc

Cs 137 - 29 Mc

Pm 147 - 53 Mc

Ce 144 - 200 Mc

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4. At Meeting 1982 on January 2, 1964, in connection with AEC 1143/5 and 1143/6, the Commission agreed to consider establishing AEC prices for strontium 90 and cesium 137 for the period prior to initiation of commercial operation of the FPCE (currently estimated to be 7/31/68) at levels approaching those to be charged by the FPCE contractor in order to stimulate development of the market for these isotopes. At Meeting 2009 on May 19, 1965, the Commission approved the draft Memorandum of Understanding with Isochem, Inc. (AEC 1143/31), thereby accepting this pricing principle and extending it to promethium 147 and cerium 144 as well as strontium 90 and cesium 137.

5. Isochem has proposed that AEC currently establish prices for these isotopes which would be consistent with, although from 33% to 60% higher than their own presently planned initial prices. The proposed AEC prices are markedly below present AEC prices and substantially below past AEC full cost experience. Present AEC prices and those Isochem proposes be currently established by AEC are set forth in Appendix "A", together with the market demand forecast by Isochem for the period FY 66 through FY 68 at the proposed prices. Information available to the AEC is not inconsistent with the Isochem market forecast.

6. The Memorandum of Understanding provides that the interim AEC prices will be reviewed annually to determine the effectiveness of their market stimulation and continued consistency with initial pricing plans of Isochem. The "safety factor" included in Isochem's proposed schedule of AEC prices is designed to minimize the possibility of there having to be any upward adjustment in these prices as a result of the aforementioned reviews. Isochem initially proposed an AEC schedule of fission product prices in December, 1964. This schedule was revised

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upwards twice at the request of AEC on the basis of providing a safety margin against a later need to increase prices. With respect to the last revision, which is the price schedule recommended in this paper, Isochem stated: "These revised recommendations, as listed below, are much more greatly influenced by the ceiling nature of the price than by true market stimulation and are valid only on the condition that periodic reviews be held to ascertain whether sufficient market stimulation is being achieved." However, Isochem has declined to commit itself contractually to charging prices which do not exceed Isochem's proposed schedule of AEC prices.

7. It is judged that the prices that Isochem proposes AEC adopt contain an adequate safety factor and will permit profitable operation of the FPCE (ref. AEC 1143/21.) Moreover, economic analyses which have been performed indicate that the proposed AEC prices are an upper limit for achieving any significant market stimulation and also an upper limit beyond which Isochem could not expect to realize sales even remotely approaching FPCE production capability.

a. An economic comparision of fission products with other energy sources for power applications establishes the strontium 90 break-even price for a few representative applications to be as follows:

Application Studied	Sr 90 Break-even Price
Coast Guard Light Buoys	14.5 c/c
Coast Guard Fixed Shore Lights	25.0
Other Buoy Applications	10.0
Underseas Devices	6.8
Weather Buoys	14.5
Weather Stations	20.0

b. In the case of Pm 147, it is of particular note that the NASA interest in this material as set forth in Mr. Webb's March 16, 1965, letter to the Chairman is based upon a Pm 147 price of about $0.125 per curie.

c. Cesium 137 pricing involves special considerations. No significant market stimulation can be expected at a price in excess of $0.125 per curie. For many applications under development this isotope competes technically with cobalt 60, which is priced at $0.50 per curie, but has only 1/4 the radiation output per curie as compared to cobalt 60. Studies indicate that at $0.10 per curie fully encapsulated the cumulative market for cesium 137 through 1968 would be 86 megacuries, whereas at $0.15 per curie fully encapsulated the market would be only 5 megacuries. Isochem specifically recognizes this relationship and has requested that AEC re-examine its cesium 137 price in the event of any reductions in the AEC cobalt 60 price. Such cobalt 60 price reductions are a current matter of consideration by the Advisory Committee on Isotopes and Radiation Development and within the staff. ACIRD recommendations on this point will be received by the Commission in the near future. However, the AEC cesium 137 price proposed by Isochem anticipates a change in the AEC cobalt 60 price policy to the extent that the cesium 137 price proposal is based on lowering the minimum order for 30 curie per gram cobalt 60 from the present 100,000 curies to 50,000 curies.

No significant adverse impact on the current markets of cobalt 60 distributors as a result of reduced cesium 137 prices is envisioned. In any case, cobalt 60 suppliers ultimately will have to face up to the impact of low cesium 137 prices, whatever its extent, either now or at the time the FPCE goes into commercial operation.

d. The magnitude of the market development task is indicated by the following table:

Isotope	Present Price	FY 65 Commercial Sales	Projected FY 66-68 Sales[a]	FPCE Capacity
Sr 90	$0.75 c/c	0.001 Mc	6 Mc	29 Mc
Cs 137	0.50	0.25[b]	5	29
Pm 147	1.75	0.005[c]	4	53
Ce 144	1.00	0	0.5	200

a) At proposed AEC prices
b) Includes 0.2 Mc single shipment to France
c) Includes 0.004 Mc foreign sales

8. In view of the foregoing it is recommended that AEC adopt the price schedule proposed by Isochem. To provide maximum market stimulation, these prices should be applicable to all purchasers, foreign and domestic, including the AEC and other Federal agencies.

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9. Assuming realization of the market demand forecast by Isochem, AEC would experience a substantial loss on the sale of fission products at the recommended prices. We are not able to estimate the much smaller market demand if the prices were not reduced; however, it should be recognized that with a continuation of our present higher prices and consequent smaller market, we would probably reduce our production. However, to give some indication of the outside limits of the potential loss, the following figures represent the difference between costs and revenue at the proposed sales prices, assuming the Isochem estimated market demand. On a fund cost basis, this difference would amount to $5.6 million on sales of finished product in inventory at 6/30/65 and an estimated $2.7 million on sales of finished product to be produced in the period FY-66-68, for a total difference of $8.3 million. These differences are further detailed in Appendix "B".

It should be noted that current fission product inventories are not saleable at present AEC prices and if not disposed of by the time Isochem establishes its commercial prices, their market value would not exceed the Isochem schedule; accordingly, a loss on current inventories will be experienced under any circumstances.

It should be further noted that production costs of $1.5 million will be incurred at the ORNL Fission Product Development Laboratory for fission product production during FY 66-68. These

costs would be incurred in any case since the FPDL would be operated with research and development funds if it were not engaged in fission product production. Similarly, operation of the hot semi-works at Hanford for fission product production during FY 66-68 entails a cost of $2.0 million. Most of this is cost of labor, which in all probability would be employed in other operations in the absence of fission product production. Accordingly, no savings in budgeted dollars would be realized if fission products were not produced in FY 66-68 and, in fact, the revenues from fission product sales provide a partial offset to costs which would be incurred anyway.

10. By letter dated July 1, 1965, the BOB requested that they be informed of the AEC's proposed reduced fission product price schedule before final action is taken to establish it.

11. Fission product costs, revenues and inventory changes will be handled through the current budget programs in the usual manner. However, the concept of selling these products below cost and the extent of losses anticipated will have to be specifically identified to the JCAE in connection with its consideration of the Memorandum of Understanding with Isochem.

STAFF JUDGMENTS

12. The Office of the General Counsel and the Divisions of Industrial Participation and Contracts concur in the recommendation of this paper. The Division ofProduction has no objection. The Office of the Controller objects to having the reduced fission product prices applicable to AEC project purchases, but otherwise concurs in the recommendation of this paper. The views of the Controller and those of the Division of Isotopes Development on the matter of AEC fission product purchases are set forth in Appendices "C" and "D" respectively. The Division of Public Information concurs in recommendation 13i. The Office of Congressional Relations concurs in recommendation 13h.

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RECOMMENDATION

13. The General Manager recommends that the Commission:

a. Approve the fission product price schedule identified in Part I of Appendix "A";

b. Note that this approval is contingent upon execution of the definitive contracts with Isochem for the FPCE and operation of the Hanford 200 area;

c. Note that the BOB will be advised of this price schedule before it is put into effect by letter such as Appendix "E";

d. Note that the fission product price schedule herein approved will be implemented in accordance with the Federal Register notice published March 9, 1965, (30 F.R. 3247) promptly after execution of the aforementioned definitive contracts and notification to the BOB;

e. Note that these prices will be applicable to all purchasers, foreign and domestic including the AEC and other Federal agencies;

f. Note that although these prices will result in a substantial loss on the sale of the isotopes involved, the establishment of the reduced prices is necessary in order to stimulate their large scale utilization and will help develop a source of supply of fabricated and encapsulated fission products independent of the AEC;

g. Note that the Commission will re-examine the cesium 137 price in the event of any future reductions in the AEC cobalt 60 price;

h. Note that the JCAE will be notified of this action by letter such as Appendix "E"; and

i. Note that no press announcement will be made at this time.

LIST OF ENCLOSURES

APPENDIX "A"

FISSION PRODUCT PRICES AND MARKET FORECAST

I. Proposed AEC Catalog Prices*

Quantity	Price per Curie		
	Sr 90	Pm 147	Ce 144
0-5000 C	$ 0.50	$ 0.50	$ 0.50
5001-50,000	0.30	0.30	0.30
50001-150,000	0.25	0.25	0.20
over 150,000	0.20	0.20	0.15

	Cs 137
0-10,000 C	$ 0.50
10,001-50,000	0.45
50,001-200,000	0.35
over 200,000	0.125

*Applicable to same chemical forms and specifications as in present catalog.

II. Present AEC Catalog Prices

Quantity	Price per Curie
	Sr 90
0-5000	$ 2.00
5000-30,000	1.00
over 30,000	0.75
	Pm 147
0-20,000	$ 5.00
20,000-50,000	2.50
over 50,000	1.75

	Ce 144	Cs 137
0-20,000 C	$ 2.00	$ 1.00
20,000-100,000	1.50	0.75
over 100,000	1.00	0.50

III. Market Forecast at Proposed Prices (KC)

	Sr 90	Pm 147	Cs 137	Ce 144
FY 1966	1180	930	750	
FY 1967	2900	2060	2500	
FY 1968*	2020	1165	1750	
	6100	4155	5000	500

*one-half fiscal year

APPENDIX "B"

FISSION PRODUCT LOSSES
(000 omitted)

FY-1966 - 1968

	Estimated Revenues from Sales[a]	Estimated Cost of Sales[b]	Estimated Loss[b]
1966	$ 525	$2075	$ 1550
1967	1325	5325	4000
1968	900	3675	2775
	2750	11,075	8325[c]

a) Based on lowest proposed unit selling prices and forecast curie sales set forth in Martin Co. letters of 3/16/65, 3/29/65 and 4/14/65.

b) Fund cost basis. Includes finished product inventory costs accumulated through 6/30/65.

c) This consists of a $ 5.6 million loss on sales of finished product in inventory at 6/30/65 and a $ 2.725 million loss on sales of finished product to be produced in the period FY 1966-68. On AEC full cost basis, the total loss would be approximately $ 11.0 million.

on current inventories will be experienced under any circumstances. Further, personnel and facilities to be employed for required production of fission products in the period FY 1966 - FY 1968 would be utilized for other purposes if they were not engaged in this activity. Therefore, no significant savings in budgeted dollars would be realized if fission products were not produced in FY 1966 - 1968 and, in fact the revenues from fission product sales provide a partial offset to costs which would be incurred anyway.

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APPENDIX "C"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

MEMORANDUM June 1, 1965

TO : E. E. Fowler, Acting Director
Division of Isotopes Development

FROM : Deputy Controller

SUBJECT: FISSION PRODUCT PRICING

We have reviewed the draft staff paper transmitted by your memorandum dated May 20, 1965, subject as above, pertaining to proposed reductions in fission product prices.

We are in agreement with the objectives of this staff paper and concur in the proposed reductions in fission product sales prices to outsiders. We do not concur, however, in the proposal to use the reduced sales prices as a basis for charging costs to AEC programs using these fission products.

Under the AEC cost-based performance budget, the fund costs of services rendered or goods received, whether as issues from inventory or direct procurement, are charged to the programs involved. In the case of sales of fission products, the fund cost of the product issued from inventory is charged to the program, Cost of Work for Others, and the revenues received are credited to the program, Revenues Applied. The budget presented to the Bureau of the Budget and the Congress will make full disclosure of both costs and revenues including the extent of the discount (reduction) to outsiders.

In the case of fission products used in AEC programs, we believe we should follow the existing budget and accounting system by charging the fund cost of fission products used to the applicable program. The estimates included in the President's budget for FY 1966 were developed on this basis. The proposed alternate procedure--if programs were charged at the discount (reduced) rate--would require disclosure of the extent of the discount (reduction) against some program, probably the Isotopes Development Program. Aside from the additional justification problem this would present, we do not believe the program would, in fact, receive a benefit and such a charge would not be appropriate.

We urge that you revise the staff paper to reflect this change.

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OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

APPENDIX "D"

UNITED STATES GOVERNMENT

Memorandum

TO : FILES

DATE: June 17, 1965

FROM : J. E. Machurek, Assistant to the
Director for Planning & Evaluation
Division of Isotopes Development

SUBJECT: STAFF PAPER ON "FISSION PRODUCT PRICING"

By memorandum dated June 1, 1965, the Office of the Controller concurred in the subject staff paper with the exception that it objected to making the proposed reduced prices applicable to AEC projects. The Controller takes the position that AEC projects should pay actual fund costs for fission products. On this basis AEC projects would be charged approximately $1.32 per curie of strontium 90, 40¢ per curie for cesium 137 and 22¢ per curie for promethium 147. All other customers both domestic and foreign, including other Government agencies, would be charged 20¢ per curie, 12½¢ per curie and 20¢ per curie respectively for the same radioisotopes.

Such price discrimination against AEC projects is inconsistent with the objectives of the proposed fission product price reduction and would tend to compromise AEC's own programmatic interests.

1) The stimulation of use sought to be achieved by the proposed fission product price reductions will also depend in part upon AEC programs for demonstrating isotopic power, heat and radiation applications of fission products. AEC's ability to carry out and expand such work would be artificially inhibited as a result of AEC projects being charged the higher fund costs.

2) AEC has played the principal role to date in advancing the technology for space, terrestrial and marine applications of fission products. It's continuance in the forefront of technology development in these areas would be prejudiced as a result of the major price advantage private groups and other Federal agencies would possess relative to AEC itself in the purchase of fission products.

3) Even though arguments of budgetary mechanics might be advanced in support of the Controllers position, as a practical matter such AEC price discrimination against itself would be very difficult to explain convincingly to the JCAE and others, particularly since it would be directly contrary to the stated objectives of the proposed fission product price reductions.

It is recognized that charging AEC projects the same price as other customers for fission products would be a departure from current procedure. However, the entire concept behind the proposed fission product price reductions is in itself a departure from present AEC policy. The justification which supports the making of such a policy exception in relation to non-AEC customers, which is accepted by the Controller, is no less applicable to AEC project customers. In our view the problem raised by making the proposed reduced fission product prices applicable to AEC projects is merely one of budgetary mechanics and does not entail substantive policy considerations. The Controller has agreed that fission product costs, revenues and inventory changes relating to production and sale of fission products for others will be handled through the current budget programs in the usual manner. The extent of losses incurred thereby will be disclosed in the course of the budgetary process. It would appear to us that it should be possible to establish a comparable budgetary procedure for fission product sales to AEC projects, thereby providing for similar disclosure of losses with respect thereto.

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APPENDIX "E"

DRAFT LETTER TO JCAE AND BOB

1. This is to inform the (Bureau) Committee that the Commission is planning to establish a reduced price schedule for the fission products strontium 90, cesium 137, cerium 144 and promethium 147. The current and planned prices for these fission products are set forth in the attached schedule.

2. This action is being taken in accordance with the Memorandum of Understanding between the Commission and Isochem, Inc., concerning the establishment of a Fission Products Conversion and Encapsulation (FPCE) plant at Richland and operation of the Hanford 200 area. The Memorandum of Understanding provides that the Commission will establish a fission product price schedule for the period prior to commencement of commercial operation of the FPCE (presently estimated to be 7/31/68) designed to encourage the early development of a market for such products.

3. The new price schedule will not be published until the definitive contracts with Isochem have been executed.

4. Revenues from the sale of fission products at the planned prices will not recover production costs. Based upon forecast market demand at the reduced prices, the difference between revenues and "out of pocket" costs would amount to 5.6 million dollars on sales of finished product in inventory at 6/30/65 and an estimated 2.7 million dollars on sales of finished product to be produced in the period FY 1966 - FY 1968. It is to be recognized, however, that current fission product inventories are not saleable at present AEC prices and if not disposed of by the time Isochem establishes its commercial prices, their market value would not exceed the Isochem schedule; accordingly, a loss

Dictyes-3

June 21, 1965

Dear Dr. Mylon:

It was a great pleasure to hear from you after these many years. Your letter prompted me to look into AEC licensing procedures with the following results.

We do distinguish, in our licensing procedures, between those radiopharmaceuticals whose safety and effectiveness are well enough known that they may be used routinely for clinical diagnosis and therapy, and those radiopharmaceuticals classified as "investigational", i.e., still in the research phase of development. Our policies governing the latter are similar to Federal Drug Administration policies for non-radioactive investigational drugs.

Atomic Energy Commission policy does not intentionally distinguish between isotope work conducted in university hospitals and that conducted in hospitals not associated with universities. We have issued broad licenses to a number of hospitals with large medical research programs. This type of license permits the hospital to set up an internal isotopes committee which reviews and approves research proposals to use radioisotopes in humans. Physicians other than those working in such institutions must submit their proposals to the AEC and obtain a specific license. These proposals are evaluated with the help of our Medical Advisory Committee.

I have asked Dr. J. A. McBride, Director of our Division of Materials Licensing, to call you to discuss any problems you may be having in obtaining AEC permission to use radioisotopes at your hospital.

With best wishes for continuing success in your radioisotope program, I am

Sincerely yours,

(signed) Mary I. Bunting

Mrs. Mary I. Bunting
Commissioner

Dr. Ernest Mylon
Lawrence and Memorial Hospitals
New London, Connecticut 06320

Retyped in Mrs. Bunting's Office 6/21/65

6-21-65

Isotopes-3

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

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UNITED STATES GOVERNMENT

Memorandum

TO : M. B. Kratzer, Director
Division of International Affairs

DATE: June 21, 1965

FROM : W. B. McCool, Secretary

Original signed by F. T. Hobbs for

SUBJECT: AEC 398/22 - REDUCING THE POSSIBILITY OF UNSAFE USE ABROAD OF U.S.-SUPPLIED RADIOISOTOPES

SECY:ICB

1. At Meeting 2115 on June 16, 1965, the Commission:

a. Noted staff would explore with the Department of State and the domestic radioisotope industry various possible procedures to reduce the chances of unsafe use abroad of U.S.-supplied radioisotopes;

b. Noted that concurrently, the IAEA would be encouraged to consider developing an appropriate system to achieve the same end; and

c. Noted that an announcement, as suggested by the Division of Biology and Medicine might be made in the form of letters to foreign governments following discussion of the matter with the IAEA.

2. The General Manager has directed you to take the action required by the above decision. Copies of pertinent correspondence should be provided the Office of the Secretary.

cc:
Chairman
General Manager
Deputy General Manager
Asst. General Manager
Exec. Asst. to Gen. Mgr.
Asst. Gen. Mgr. for IA
Asst. Gen. Mgr. for R&D
General Counsel
Director, Congressional Relations
Director, Public Information
Director of Regulation
Deputy Director of Regulation
Asst. Dir. of Regulation
Asst. Dir. of Reg. for Admin.
Asst. Dir. of Reg. for Nuclear Safety
Director, Isotopes Develop.
Controller
Director, Biology & Medicine
Director, Materials Licensing

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Isotopes - 3

M. B. Kratzer, Director
Division of International Affairs

JUN 16 1965

E. E. Fowler, Acting Director
Division of Isotopes Development

(398/22)

REVIEW OF AEC STAFF PAPER, "REDUCING THE POSSIBILITY OF UNSAFE USE ABROAD OF U.S.-SUPPLIED RADIOISOTOPES"

Reference is made to your memorandum of June 11, 1965, transmitting the proposed AEC Staff Paper, "Reducing the Possibility of Unsafe Use Abroad of U.S.-Supplied Radioisotopes." The Division of Isotopes Development does not concur in the conclusions and recommendations of the staff paper for the following reasons:

1. It is difficult to see how notifying the embassies of foreign countries of proposed radioisotope shipments could, in any measure, ameliorate the problems noted in your paper.

2. The net effect of the proposed actions would be the reduction of the competitive situation of U.S. radioisotope producers in current markets.

bcc; EEFowler

DISPATCH
DIV. OF ISOTOPES DEVELOPMENT
U.S. ATOMIC ENERGY COMMISSION
JUN 16 1965
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June 11, 1965

AEC 398/22

COPY NO. 81

AEC 398/22

ATOMIC ENERGY COMMISSION

REDUCING THE POSSIBILITY OF UNSAFE USE ABROAD OF U.S.-SUPPLIED RADIOISOTOPES

Note by the Secretary

The General Manager has requested that the attached report by the Director of International Affairs be circulated for consideration by the Commission at an early date.

W. B. McCool

Secretary

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ATOMIC ENERGY COMMISSION

REDUCING THE POSSIBILITY OF UNSAFE USE ABROAD OF U.S.-SUPPLIED RADIOISOTOPES

Report to the General Manager by the Director, Division of International Affairs

THE PROBLEM

1. To consider what, if any, assurances should be obtained that U.S. exports of radioisotopes (byproduct material) are made only to qualified users abroad or, alternatively, what procedures could be used to assure that adequate notice is given as to the hazards involved.

SUMMARY AND BACKGROUND

2. In concurring in AEC-R 30/37, "Proposed Amendments to 10 CFR 30 and 10 CFR 40 - Exports and Imports of Byproduct and Source Material", the Division of International Affairs expressed concern that the proposed amendment to 10 CFR 30 which would permit "middlemen" to export radioisotopes under certain circumstances would increase the possibility of shipment to unqualified users abroad. If serious accidents or injuries resulted from such use, the AEC's international programs might be damaged. It was suggested that a broader study of this question be made and, at Regulatory Meeting 171 on April 3, 1963, the Commission requested that this Division initiate such a study.

3. In order to evaluate the impact of any additional measures which the AEC might take in attempting to alleviate the possibility of such accidents or injuries, we have assembled some statistical information on the volume and types of radioisotope exports. In 1962, the last year in which Bureau of Census statistics were obtained, there were about 1,200 items

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(each "item" may include an assemblage of individual isotopes or packages) exported with a total radiation level of about 227,000 curies. It is estimated that about 15% of these exports (150 items) were by AEC contractors and the balance by licensed, commercial firms. It is believed that the bulk of the total activity was represented by a relatively few high-activity shipments and that the average individual radioisotope shipment was in the range of 0.1 to 0.01 curies.

4. No statistics are available on injuries or fatalities abroad which have resulted from the use of radioisotopes; however, such incidents apparently have been relatively rare. The death of five members of a family in Mexico City from radiation sickness was reported several years ago. This incident occurred when a five-curie Co-60 source obtained from AECL by a Mexican engineer for industrial radiography accidently fell into the hands of the two children in the family and the other members of the family were, in turn, exposed. Another case occurred in Colombia; a patient is reported to have died following a cranial implantation of Au-198 by a Bogota doctor. It appears from AEC records that on several occasions, this doctor sent gold wire, procured elsewhere, to ORNL for service irradiation. It was a portion of this wire which the doctor used in performing the operation in question. Some time after death had occurred, an analysis of the gold wire was performed by Colombian authorities, who found what was apparently a significant silver impurity, and concluded that silver 110^m had been the cause of death. Evidently believing that the material itself had been supplied by ORNL, the Colombian Institute of Forensic Medicine exonerated the doctor and blamed ORNL for having provided him with impure material. Although the finding of the Institute seems to have been erroneous in two respects--U.S. medical authorities

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advise that the silver 110^m impurity could not have caused death and any silver which may have been found in the gold wire was present through no fault of ORNL--this case illustrates the fact that U.S. radioisotopes are distributed under procedures which are directed neither to attempting to prevent unsafe use (as by seeking to cooperate with the appropriate regulatory authorities in the country of destination) nor to protecting the best interests of the United States in its foreign relations.

5. Some of the relevant factors considered in deciding what, if any, action the AEC should take in this situation are:

a. Regulation and Control by Recipient Nation - Most nations, and presumably all of the technically advanced ones, have some form of regulation to control the use of radioactive materials and to provide safety standards for radiation protection. These basic standards, in most cases, follow closely the ICRP recommendations. However, such regulations do not in themselves insure public safety--they may be circumvented either accidentally or wilfully. Further, many countries have neither the technical staff nor the funds necessary to carry out a meaningful enforcement program.

b. Availability from Other Sources - Today the U.S. is the sole source of only a few radioisotopes; the U.K., Canada, and the USSR all are major exporters of a wide range of radioisotopes, and a number of other countries have more limited commercial sales programs. Thus, if we take any action which makes it significantly more difficult for a foreign user to obtain his radioisotopes from the U.S., we may expect that he will turn to other sources which do not exercise similar controls. In this case, not only does the potentially hazardous situation remain, but a U.S. sale is lost.

c. "Advance of Technology" Rationale - Many major technological advances have been accompanied by certain hazards and, correspondingly, public opposition. As time has gone by, safety of the device and its utilization have improved, and both the persons exposed directly to the hazard and the lay public have become better educated until the risk has become routinely accepted as a part of the overriding benefit derived. It may be contended that the use of radioisotopes is in the first, infant phase of such a technological advance and, particularly in view of the relatively few serious accidents resulting to date from their use, regulatory controls should be kept to a minimum and an effort made instead to speed up and improve this educational process.

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d. Inherent Warning in Shipping Labels - In addition to other regulations and controls, most export shipments of radioisotopes will carry, under shipping regulations such as those of IATA, IAEA, etc., a label which has a graphic warning (i.e., skull-and-crossbones or radiation symbol) of its hazard as well as technical information on the shipment. However, since a "wholesale" quantity or more than one isotope may be sent in a shipment, the individual items may subsequently be broken down into smaller packages which are not so relabeled before reaching the ultimate user.

e. Probable Attitude of U.S. Industry - In view of the highly competitive nature of today's international market, we can expect the U.S. radioisotope industry to object to any export control procedure which the AEC might propose which would significantly increase its administrative burdens.

6. The AEC did at one time control (in consultation with the Department of State) the export of radioisotopes (See AEC 398/15, Appendices "E" and "F"). The purpose of this control was three-fold, (a) to assure that these isotopes, which were often scarce, were made available to competent research people who could effectively utilize them, (b) to assure against possible use for other than civil purposes, and (c) to assure that the foreign government involved fully understood that the AEC took no responsibility for the health and safety aspects of the transaction. All foreign requests were channeled through a single representative in the United States, which could be either the foreign government itself or a commercial agent. The controls were the subject of some criticism, since they occasionally delayed the shipment of short half-life isotopes, and were dropped, (AEC 398/15, approved at Meeting 1154, December 7, 1955) without objection on the part of any of the foreign governments, when U.S. commercial isotope processors and competing groups from abroad came increasingly into the picture. In this connection, the Commission in December 1962 eliminated from Title 10 Part 30 of the Code of Federal Regulations covering byproduct material the requirement that a licensee exporting

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byproduct material under general license must report the transaction to the AEC within 90 days.

7. The Office of the General Counsel has asked that an informal survey be made of the scope of export regulations by other Federal agencies of other commodities potentially dangerous to health or safety, the extent to which they follow a practice similar to that proposed in this staff paper and their reaction to our proposal in terms both of their experience and its impact, if adopted, on them. The views of the Departments of Health, Education and Welfare (HEW), Commerce and Agriculture and the U.S. Coast Guard have been sought in response to OGC's request. None of these agencies have any practice which parallels that proposed in this staff paper and, thus, cannot comment on their experience. They do not believe, however, that our proposal would have any significant impact on them. The usual requirement of these agencies is that the hazardous material be labeled and packaged in accordance with the laws of the recipient country and that its export is not in conflict with the laws of the country to which it is being exported. The Department of Commerce "geographic desks" are prepared to advise the U.S. exporter of the requirements of the foreign government in such instances. It should be pointed out, however, that in few, if any, of these cases is the U.S. Government as closely identified with the production and control of the hazardous material as in the case of radioisotopes. Some of these radioisotopes are directly distributed abroad by the AEC's facility contractors (or the irradiation services for their production performed under direct arrangements between AEC facility contractors and the overseas customer). Many of the others are produced in AEC facilities, even though subsequently handled and distributed by private interests. Moreover, domestic radioisotope usage, including

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export, is subject to governmental controls. Thus, the U.S. Government tends to be blamed in the event of any incident abroad, even though it has no factual or legal responsibility, as in the Colombian case outlined in paragraph 4.

CONCLUSION

8. The AEC cannot require that U.S.-produced radioisotopes distributed abroad be regulated by the recipient nation in accordance with a system patterned after U.S. domestic regulations, since (a) this would be interference in the internal affairs of sovereign states and (b) there are other nations willing and able to supply almost all of these radioisotopes if we attempt to put restrictions on their distribution and usage abroad. A practical step which we can take, however, is to ensure that the appropriate health or regulatory agency of the recipient nation is notified when such materials are entering that country so that it can take whatever safety measures it considers necessary and is aware that the U.S. looks to the recipient nation to exercise appropriate controls over the use of these materials by persons under its jurisdiction. We believe that the following procedure meets these requisites:

a. The AEC (DIA) would inform each country for which there is a general license for shipment of byproduct material under 10 CFR 30 (i.e., non-Soviet bloc countries) of the proposed notification procedure and the reasons for its institution. (In conveying this information, we would make it clear that the procedure involved no assumption of safety responsibility on the part of the United States and was solely designed to aid the recipient country in exercising its own controls.) At the same time we would request that a point of contact be designated in the United States for each country to receive such notices and that we be informed promptly of any changes in this point of contact;

b. A standard AEC notification form would be developed; and

c. By modification to the appropriate AEC Regulations and Manual Chapters, U.S. private radioisotope producers and distributors and AEC contractors distributing radioisotopes abroad, respectively, would be required to mail a completed copy of the standard notification form

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to the designated foreign point of contact for the country at the time each export order was filled. (No copies would be required by AEC; compliance would be determined through normal procedures of the Divisions of Compliance and Inspection.) Prior to adoption of the necessary amendments to AEC Regulations, these proposed changes would be published for formal comment by U.S. industry.

While the foregoing procedure appears to be the most workable which we can realistically adopt on a unilateral basis, we believe the IAEA should be encouraged to consider coordinating, and perhaps administering, some type of system to reduce potential health and safety risks from international commerce in radioisotopes. Adoption of such a system would, hopefully, enable us to terminate the U.S. notification procedure recommended above.

STAFF JUDGMENTS

9. The Division of Isotopes Development and the Offices of the Controller and General Counsel concur in the recommendation of this paper. The Office of Congressional Relations concurs in recommendation 10.f. and the Division of Public Information in recommendation 10.g. The Division of Biology and Medicine suggests that, in light of the competitive situation and the lack of controls by other supplying nations, the AEC instead make a world-wide announcement that no restrictions are imposed on U.S. radioisotope exporters other than those for appropriate labeling and that recipient countries are expected to establish their own safety controls to the extent that each country considers necessary. The Director of Regulation points out that (a) no government has requested that we establish the procedure recommended in this paper, (b) there is no assurance that the information would be used by the receiving country, and (c) even if used, it is not clear that incidents such as those cited would be avoided. Therefore, it recommends against the proposed notification procedure for licensees, particularly since it would be inconsistent with the aim of simplifying the licensing system whenever possible.

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RECOMMENDATION

10. The General Manager recommends that the Atomic Energy Commission:

a. Approve the procedures proposed in paragraph 8 for notifying other nations of the export from the U.S. of byproduct material;

b. Note that upon this approval the staff will (1) discuss the proposed procedure with the Department of State, and (2) develop the necessary letter of notification to foreign governments, standard notification form, and appropriate revisions in AEC regulations to bring the procedures into effect;

c. Note that the appropriate revisions in AEC regulations will be published in the Federal Register for comment;

d. Note that if the views of the Department of State, the foreign governments, or U.S. industry raise serious questions as to the desirability of the proposed procedures, these views will be called to the Commission's attention before taking further steps to bring the procedures into effect;

e. Note that concurrently the IAEA will be encouraged to consider developing a system to reduce the potential safety hazards from international commerce in radioisotopes;

f. Note that the JCAE will be informed of this action when the AEC is prepared to bring these procedures into effect; and

g. Note that a public announcement will be made in connection with the appropriate U.S. regulatory action.