

~~SECRET~~

UNCLASSIFIED

CIC-14 REPORT COLLECTION  
REPRODUCTION  
COPY

LAMS - 355

C.3

~~SECRET~~

March 8, 1946

This document contains 65 pages

RADIOCHEMISTRY OF THE FISSION PRODUCTS

Compiled by

L. Winsberg

**PUBLICLY RELEASABLE**

Per Steve Biggs FSS-16 Date: 2-7-96

By Marie Kelly CIC-14 Date: 2-20-96

Classification changed to UNCLASSIFIED  
by authority of the U. S. Atomic Energy Commission  
Per N. J. Carrell 9-10-57  
By REPORT LIBRARY J. Martini  
10-10-57

LCS ALAMOS NATIONAL LABORATORY  
3 9338 00356 7467

~~SECRET~~  
ing of the Espionage Act  
to all unauthorized person is prohibited by law.

~~SECRET~~

UNCLASSIFIED

~~SECRET~~

UNCLASSIFIED

INTRODUCTION

As is true in nearly all sections of the project we in the fission products groups at Chicago, Clinton, and Los Alamos have found the volume of reports so large that it is often very difficult to refer back to previous work. The purpose of this index is to provide ready access to any item in the large number of reports on the fission products.

This report is a continuation of the indexes published by C. D. Coryell in January, 1943, as CC-477 and by L. Winsberg in February, 1944, as CN-1505 and all the references therefrom are included here. The reports available in the document room at Los Alamos through the month of November, 1945, have been included in this index. We plan to bring this index completely up to date within the next several months.

A few things need to be mentioned:

- 1) For most of the reports issued before March, 1943, a letter follows the report number, e.g., CC-465-B. This letter refers to the section of the report which contains our work.
- 2) There are two parts to the report index. The first part is a listing of reports by the fission products groups and the second, entitled Other Reports, by groups not specifically assigned to a study of the fission products but which have on occasions done work of interest to fission product radiochemistry. All of these reports are included in the Subject Index.
- 3) The half-life, element, and mass assignments indicated for an activity are the latest values known and all work done on the activity is included under those values.

Criticisms, suggestions, and corrections will be appreciated.

I wish to acknowledge with gratitude the cheerful assistance of Miss Anna Marie Horan and Miss Mary Virz.

L. Winsberg



UNCLASSIFIED



UNCLASSIFIED

2.

<u>Report</u>	<u>Date</u> 1942	<u>Main Topics and Authors</u>
CC-258-D	Sept. 15	Fission yields Ba, Br Chem. separations Ce, Y, La, Ar, Cs Apparatus for study recoils in He, prelim (C. D. Coryell, Section chief)
CA-287	Oct. 3	First trial, accumulation of radioactivity in cooling gases (C. D. Coryell, Section chief)
CC-298-D	Oct. 15	12d Ba; 44h La; 27y Cs; La; Y; Ce (C. D. Coryell, Section Chief)
CC-342-F	Nov 15	Elementary distribution Fission Activity (C. D. Coryell, et al) 5.3d Xe <sup>133</sup> ; (N. Elliott) Gases from Graphite (W. Rubinson, E. L. Brady)
CC-389-B	Dec. 15	Tabulation chains; Elementary distribution fission activity; Identification of Pr; (N. E. Ballou) Radiations from Xe <sup>127</sup> ; (N. Elliott) Quantitative study radioactivity from recoil in gases; (N. Sugarman)
CT-393-D	Dec 15	Gases from Graphite (W. Rubinson, E. L. Brady)
	1943	
CC-418-B	Jan. 15	Accumulation of Radioactivity by Recoil (N. Sugarman) Application to the pile (N. Sugarman) Radiations from Zr and Cb (E. L. Brady, D. W. Engelkemeir) Absence of Activity in In. (L. E. Glendenin)
CC-465-B	Feb. 13	1. Elementary breakdown of fission activity in pile operation up to 100 days (C. D. Coryell, et al) 2. Energy dissipation among fission products (N. Elliott) 3. Identification of some fission product chains of gaseous ancestry (E. L. Brady, N. Sugarman, et al) 4. Radioactivity in an air-cooled pile (N. Sugarman) 5. Rare earth fractionations and identification of rare earth fission products other than Ce (N. E. Ballou)
CC-477	Jan. 31	6. Fission product and cyclotron Ce activities (N. E. Ballou) Index of reports, Chemistry of the Fission Products (C. D. Coryell)

UNCLASSIFIED

::: . . . .  
 :TF:FO:

3-

<u>Reports</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
CT-482-F	Feb. 20	Composition of gases evolved from graphite on heating to 5000C in the absence and presence of metal (W. Rubinson, C. L. Coryell)
AUC-CDC #7	Feb. 27	UX <sub>1</sub> and UX <sub>2</sub> absorption curves and the possibilities of their use for the determination of coating thicknesses (C. D. Coryell, H. Gest, D. V. Engelkemeir)
CN-528	Mar. 13	<ol style="list-style-type: none"> <li>1. The experimental ratio of capture to fission for the cyclotron together with preliminary measurements for the pile (D. V. Engelkemeir, E. L. Brady, F. H. Burgus)</li> <li>2. The coprecipitation of Ba in the wet fluoride process as a function of Ba hold-back carrier concentration (N. E. Ballou, C. L. Coryell, H. Gest)</li> <li>3. The radioactivity of certain pile products as a function of time (C. D. Coryell)</li> </ol>
CC-529	Mar. 13	<ol style="list-style-type: none"> <li>1. Decay of gross fission product <math>\beta</math> activity and energy after short bombardments (N. Elliott, N. Sugarman)</li> <li>2. An attempt to establish yield of 27 in pile materials (W. Rubinson, C. D. Coryell)</li> <li>3. Some considerations on counting arrangements for precision work (D. V. Engelkemeir, J. B. Dial, C. L. Coryell)</li> <li>4. Revised relative fission yield data (E. L. Brady, L. Creutz)</li> <li>5. Contributions to the radiochemistry of the fission products (L. E. Glendenin, N. E. Ballou, E. L. Brady, G. T. Campbell, T. B. Novey, F. H. Sullivan, A. S. Neuton, N. R. Sleight, O. Johnson, W. H. Burgus, C. D. Coryell)</li> </ol>
CN-576	Apr. 15	<ol style="list-style-type: none"> <li>I. Gross Decontamination</li> <li>II. Specific Decontamination (C. D. Coryell)</li> </ol>
CC-579	Apr. 17	<ol style="list-style-type: none"> <li>1. Elementary breakdown of fission activity in the pile operation up to 170 days (C. D. Coryell, et al)</li> <li>2. Heat generation of individual <math>\beta</math> and <math>\gamma</math> activities (L. Winsberg, W. Rubinson)</li> <li>3. New fission product activities and recalculation of old data (L. E. Glendenin, E. P. Steinberg, N. E. Ballou)</li> <li>4. Theoretical Study of <math>\beta</math>-Absorption Curves and Correlation with Weather Method of <math>\beta</math>-Energy Determination (T. B. Novey et al)</li> </ol>

:: . . . .  
 : : : : :  
 : : : : :

4

<u>Reports</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
CC-643	May 19	Time variation of percent distribution of fission activity in bombarded uranyl nitrate (E. L. Brady, C. D. Coryell)
CC-680	May 20	1. Experimental study of induced and fission recoil activity in air and the X-pile (N. Sugarman, J. D. Knight) 2. New fission product activities and re-evaluation of old data (L. E. Glendenin, E. P. Steinberg, N. E. Ballou, T. B. Novey, V. H. Burgus) 3. $C^{14}$ Activity in cyclotron bombarded nitrate (W. Rubinson, A. Turkevich) 4. Coseparation of Ba in $LaF_3$ Precipitations (H. Gest, B. Abraham, N. E. Ballou, C. D. Coryell)
CN-692	May 29	Separation Processes Section I. E. Specific Decontamination in $BiPO_4$ Process (W. Rubinson, Supervisor)
CN-722	June 21	Elementary activities present at different stages in the wet fluoride process (W. Rubinson, Supervisor)
CC-724	June 21	1. $^{7.0d}$ Uranium (E. L. Brady, W. Rubinson) 2. Energy of $^{9.3h}$ Te (G. W. Campbell)
CC-763	May 15	The beta and gamma radiations from the chain $^{77h} Te \rightarrow ^{2.4h} I$ (T. B. Novey, V. H. Sullivan, C. D. Coryell, A. S. Newton, N. R. Sleight, O. Johnson)
CE-771	July 10	Capture and fission in metal, nitrate, and oxide; Monitoring of columns and masses at the St. Louis cyclotron to provide for higher product yield (A. Turkevich, T. P. Kohman, A. H. Jaffey, C. D. Coryell, L. Engelskemeir, N. Elliott, T. B. Novey, H. S. Brown, N. R. Davidson) 1. Most effective moderation of very fast neutrons by uranium metal 2. Fast-neutron multiplication in uranium metal 3. Competition by other fast neutron processes when nitrate is close to the target 4. Competition of slow neutron reactions

: : : : :  
 : : : : :

: : : : :  
 : : : : :

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>
	1943	
CH-774	July 15	<p>concentration of by-products in cooling water and river water from W. pile (C. D. Coryell, J. Howe, E. O. Wollan)</p> <ol style="list-style-type: none"> <li>1. Tolerance concentration of radioactive products in water</li> <li>2. Pile constants assumed for W. operation</li> <li>3. Radioactivity induced in water by neutrons including recoil from the Al piles</li> <li>4. Radioactive contamination of the water from fission recoil</li> <li>5. Radioactive contamination of water resulting from metal dissolved at points of coating failure</li> <li>6. Corrosion products</li> <li>7. Summary of activity after 8 hour holdup</li> </ol>
CC-793	July 19	<ol style="list-style-type: none"> <li>1. Determination of absolute fission yields (D. W. Engelkemsir, T. B. Novey, D. Schover)</li> <li>2. Thorium fission - Study of chemical procedures in quantitative isolation of fission activities for Th (N. Sugarman, M. F. Ravelly, L. E. Glendenin, H. Finklestein)</li> <li>3. Improved method for determination of UX (L. Winsberg)</li> <li>4. The electrostatic <math>\beta</math>-ray spectrograph (B. Abraham)</li> </ol>
CC-829	July 29	<p>Activity and <math>\beta</math> and <math>\gamma</math> energy dissipation of the long-lived fission products (J. A. Lane, E. L. Brady)</p>
CN-850	Aug. 12	<ol style="list-style-type: none"> <li>1. Decontamination of specific elements in the <math>\text{BiPO}_4</math> process (H. B. Evans, G. R. Leader, J. P. Tordella, D. N. Hume)</li> <li>2. The oxidation of ferrous ion by nitric acid at 75° (E. H. Burgus, G. R. Leader)</li> <li>3. <math>\beta</math>-Decontamination of <math>\text{BiPO}_4</math> process mother liquor with varying amounts of <math>\text{BaSO}_4</math> and <math>\text{ZrO}(\text{H}_2\text{PO}_4)_2</math> (J. P. Tordella)</li> </ol>
CC-851	Aug. 7	<ol style="list-style-type: none"> <li>1. Elementary breakdown of the fission activity in irradiated nitrate up to 250 days cooling (C. D. Coryell, et al)</li> <li>2. An investigation of the methods used to determine <math>\beta</math> counting geometry (D. W. Engelkemsir, W. Rubinson, N. Elliott)</li> <li>3. The thorium iodate method for analysis for UX - detailed procedure (L. Winsberg)</li> </ol>

. . . . .  
 . . . . .  
 . . . . .

<u>Reports</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
CC-851 (cont'd)		4. Studies on the oxidation of Ce for separation from other rare earths by iodate precipitation (N. E. Ballou) 5. Zr iodate isolation of Ce activity without carrier (N. E. Ballou) 6. Tests on separating La and Y by ammonium formate (N. E. Ballou)
MUC-CDC #76	Sept 7	Estimated gamma curies in a 30 day X slug (C. D. Coryell)
CC-920	Sept. 15	1. Determination of pile fission yields (T. B. Novey, D. V. Engelkemeir, E. L. Brady) 2. Decay of gross fission product $\gamma$ -activity and energy after short cyclotron bombardments (N. Elliott, S. Katoff, J. D. Knight, N. Sugarman) 3. Thorium fission work (N. E. Ballou, W. H. Burgus, J. B. Dial, L. E. Glendenin, H. Finklestein, M. Ravelly, B. Schloss, N. Sugarman) 4. Rare earth chemistry and separation procedures (N. E. Ballou) 5. New fission activities and re-evaluation of old data (L. E. Glendenin, E. L. Brady) 6. Yield of $^{237}\text{U}$ from cyclotron neutron bombardment (E. L. Brady) 7. Preliminary search for positron emitters among fission products (D. V. Engelkemeir, L. E. Glendenin, N. Sugarman)
CN-933	Sept. 11	1. Specific decontamination factors (T. H. Davies, et al) 2. Scavenger studies on $\gamma$ decontamination (T. H. Davies, et al) 3. Ru coseparation (T. H. Davies, et al) 4. Zr and Cb hold-back in the presence of HF (T. H. Davies, et al) 5. The solubility of bismuth phosphate (C. R. Dillard, H. B. Evans, G. R. Leader, L. Safranski, D. Revinson, R. Bane) 6. Volatilization of Ru, I, and Te accompanying metal dissolving (C. R. Dillard, D. N. Hume, G. R. Leader) 7. Oxidation of .04 M $\text{Fe}^{+2}$ solution by $\text{HNO}_3$ (W. H. Burgus, G. R. Leader) 8. Attempted electrophoresis studies on $\text{BiFO}_4$ suspensions (H. Gest, B. Schloss)



. . . . .  
 . . . . .  
 . . . . .

7.

<u>Reports</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
CT-959	Sept. 27	Report on Columbia Sealing Circuit (B. Schloss, S. Robinson) I. Sealing circuit troubles II. The circuit action III. Experimental IV. Discussion V. Circuit modifications VI. Summary
Addendum I to CC-959	Nov. 16	(B. Schloss, S. Robinson)
CC-971	Sept. 15	Procedures for the determination of the fission elements in UNM (Editors: C. D. Coryell, W. Robinson, D. N. Hume, T. H. Davies) Cesium, barium, borium and strontium, cerium, lanthanum, yttrium and praseodymium, zirconium and columbium, molybdenum, ruthenium and 43, silver, tellurium, iodine, bromine, uranium x (L. E. Glendenin, W. H. Burgus, D. W. Engelkemeir, N. E. Ballou, E. L. Brady, J. B. Dial, T. E. Novey, G. W. Campbell, L. Winsberg)
Addendum I to CC-971	Oct 20	Procedure for analysis of Zr and Cb in UNH (E. P. Steinberg)
MUC-CDC #80	Sept. 20	Information on slow neutron fission products
CC-988	Oct. 11	1. Fast method for rough analysis of BiPO <sub>4</sub> process solutions-preliminary (W. <sup>4</sup> Rubinson, L. Winsberg) 2. New method for the separation of zirconium and columbium from bombarded uranyl nitrate (E. P. Steinberg) 3. P-9 studies - distribution of products in an oxide-water system (C. R. Dillard, H. Finkelstein, A. Turkevich) 4. Decay of gross fission product $\beta$ - activity and energy after short cyclotron bombardment (cont'd) progress report (S. Katcoff, B. Finkle, N. Sugarman) 5. Radioactivity in graphite at Argonne (J. Abraham, A. Turkevich, W. Rubinson L. Winsberg, E. P. Steinberg)

: : : :  
 : : : :  
 : : : :  
 : : : :

<u>Reports</u>	<u>Date</u> 1948	<u>Main Topics and Authors</u>
CN-989	Oct. 11	I. Capture to fission ratio for pile material (D. W. Engelkemeir, E. R. Novey, D. Schover) II. Bismuth phosphate process studies (G. R. Leader, J. T. Lassiter, E. Mepp, J. Tordella, C. Stanley, H. B. Evans)
CC-1042 (A-1462)	Nov. 11	Rates of energy generation and curies activity of long-lived radioelements from a 1000 KW pile as a function of days of pile operations and days cooling (E. L. Brady, L. Winsberg, L. Greutz, W. Rubinson)
CC-1043 (A-1440)	Nov. 10	Fast methods for analysis of rare earths and UX (L. Winsberg, E. P. Steinberg, J. A. Seiler, W. Rubinson) 1. Isolation of Ce 2. La-Y and UX
CN-1044 (A-1433)	Nov. 10	I. Weights of fission products in pile material (T. P. Kohman, A. Turkevich) II. Bismuth phosphate method for extraction and decontamination of Pu (G. R. Leader, E. Mepp, R. B. Evans, C. Stanley, W. Rubinson)
CC-1050 (A-1456)	Nov. 8	1. Tracer studies and the preparation of carrier-free tracers (T. H. Davies, D. N. Hume, L. E. Glendenin, N. E. Ballou) 2. New information of fission products (L. E. Glendenin) 3. An investigation of the UX <sub>2</sub> $\beta$ radiation emitted by uranium foils (N. Elliott)
CC-1051 (A-1457)	Nov. 8	4. Determination of fission elements in process solutions (D. N. Hume, N. E. Ballou) 5. Scavenging experiments and process decontamination (T. H. Davies, W. H. Burgus, H. Gest)

: : : :  
 : : : :  
 : : : :

••• • • •••

•••••

<u>Reports</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
CN-1055 (A-1452)	Nov. 8	1. The effects of pile radiation upon various substances (G. Jenks, R. A. Day) 2. By-product concentration studies (G. Jenks, R. A. Day, J. W. Boyle) 3. The effect of W activities on the separation Processes (L. T. McClinton)
CC-1109 (A-1452)	Dec 11	1. Effects of radiation on glass and masonite (R. A. Day, G. Jenks) 2. Status of water tube experiments (G. Jenks, J. W. Boyle) 3. Concentration of by-products (R. A. Day, L. T. McClinton)
CC-1112 (A-1600)	Dec 11	1. Growth, decay and energetics of the long-lived Zr-CP chains (L. S. Goldring, C. D. Coryell) 2. Tracer chemistry and the preparation of carrier-free tracers (L. E. Glendenin, H. Gest, D. N. Hume, N. E. Bellou) 3. New data on the fission products (L. E. Glendenin, C. D. Coryell) 4. Pile and physical studies group; progress report (N. Elliott, J. D. Knight, T. B. Novey, D. Schover) 5. Hot laboratory operations (H. A. Levy, L. G. Stang, E. L. Brady, W. D. Webb, C. D. Coryell)
CN-1113 (A-1601)	Dec. 11	6. Fission product analyses in process solutions (W. H. Burgus, T. H. Davies) 7. Scavenging experiment and process decontamination (W. H. Burgus, H. Gest, R. R. Edwards) 8. Literature references (C. D. Coryell)
CC-1128 (A-1616)	Dec. 11	Decay of gross fission product $\beta$ -activity and energy after short bombardments (S. Katcoff, B. Finkle, N. Elliott, J. D. Knight, N. Sugarman)
CN-1141 (A-1628)	Dec. 18	1. Capture to fission ratio for Argonne metal (D. W. Engelkemper, M. Freedman) 2. Bismuth phosphate process studies (E. R. Lender, H. B. Evans, E. Mapo, C. Stanley)

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

10.

<u>Reports and</u>	<u>Date</u>	<u>Main Topics and Authors</u>
	1943	
CC-1142 (A-1629)	Dec. 13	1. Revised fission yield of 65d Zr (E. P. Steinberg) 2. New methods of analysis -UX, La-Y, and Zr and Cb (L. Winsberg, J. A. Seiler, E. P. Steinberg) 3. Fast, rough analysis of UNH solutions (L. Winsberg, J. A. Seiler, E. P. Steinberg, W. Rubinson) 4. Behavior of some products in a homo- geneous system (C. R. Dillard, A. Turkevich, H. Finkelstein) 5. Sweeping out fission product from a homogeneous system (C. R. Dillard, A. Turkevich, H. Finkelstein, R. M. Adams) 6. Search for radioactivity in Ce <sup>140</sup> arising from La <sup>140</sup> in fission (N. Sugarman)
	1944	
CC-1204 (A-1684)	Jan. 11	1. General radiochemistry: the system 12.5d Ba <sup>140</sup> ---40h La <sup>140</sup> (H. A. Levy, L. G. Stang) 2. Discussion of fission yield irregular- ities; the four ghost isotopes (C. D. Coryell) 3. The isotope U <sup>236</sup> (C. D. Coryell) 4. Tracer preparation chemistry (N. E. Ballou, D. N. Hume) 5. Fission product analysis (N. E. Ballou) 6. New data on the fission products (C. D. Coryell, L. E. Glendenin) 7. Pile studies (J. D. Knight) 8. Physical studies and counting standard- ization (N. E. Elliott, E. Shapiro, T. B. Novey) 9. Hot laboratory operations (C. D. Coryell, H. A. Levy, C. V. Cannon, G. Jenks, J. W. Boyle, L. T. McClinton, R. A. Day, E. Shapiro) 10. Radiation chemistry (R. A. Day, J. W. Boyle, G. Jenks)
CM-1205 (A-1685)	Jan 11	11. Fission product analysis in process solutions 12. Process thermodynamics (C. D. Coryell, T. H. Davies) 13. Process decontamination (H. Gest, E. H. Burgus) 14. Reference list and author index (L. S. Goldring)

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

11.

<u>Reports</u>	<u>Date</u> 1944	<u>Main Topics and Authors</u>
CN-1214 (A-1696)	Jan 8	1. Studies of the two forms of $\text{BiPO}_4$ (H. R. Evans, G. R. Leader, W. Rubinson, G. Stanley) 2. Ru decontamination (H. R. Evans, N. Sugarman) 3. The solubility of lanthanum fluoride in $\text{HNO}_3$ (G. R. Leader, C. Stanley)
CC-1215 (A-1805)	Jan 8	General activities of the section (N. Sugarman, Section Chief)
CC-1302 (A-2040)	Feb 15	Methods for fission product analysis (D. N. Hume, L. E. Glendenin, N. E. Ballou)
CC-1304		Preparation of Carrier-Free Tracers (C. N. Hume, C. D. Coryell, L. E. Glendenin, N. E. Ballou)
M-CC-1306	Feb 24	Some measurements on short-lived activities in Pile-bombarded water (J. D. Knight, T. R. Novey, D. Schover)
CN-1307 (A-2296)	May	The effect of radiation of the $\text{BiPO}_4$ Separation Process (L. T. McClinton, G. Jenks, R. A. Day, C. V. Cannon, E. Shapiro, J. W. Boyle)
CC-1308 (A-2296)	April 12	Activities induced in solid residues from Columbia River water (N. Elliott, C. D. Coryell)
CN-1309 A-2281)	April 17	The distribution of fission products in product containing fractions: five plant D-I-P- solutions, all of plant run #43, and all of a liter scale laboratory run (C. D. Coryell, Section Chief)
CC-1310 (A-2285)	May 3	The effect of radiation on water and on aqueous solutions - Part I (E. Shapiro, J. W. Boyle, G. Jenks)
CN-1311 (A-2478)	June 6	The distribution of fission products in product-containing fractions of plant run #86 (C. D. Coryell, Section Chief)

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>
	1945	
CN-1712 An-X	May 15	Development of methods for the determination of fission product activities in plant process solutions (L. E. Glendenin, N. E. Ballou, D. N. Hume, C. M. Nelson, C. I. McCabe, M. H. Humphrey, D. M. Black, R. I. Martins, D. E. Waters, H. Gest, J. M. Siegel)
CC-1331 (A-1880)	1944 Feb. 7	I. The determination of the absolute yield of $^{125d}\text{Ba}$ (M. Freedman, D. V. Engelkemeir) II. Redetermination of fission yields of some moderate-lived fission products (S. Katcoff, B. Finkle, N. Sugarman) III. New activities in X-bombarded eggs (E. P. Steinberg, J. Winsberg) IV. Production of $\text{U}^{237}$ at Clinton (A. Turkevich) V. Fission products swept out of a homogeneous system (C. R. Dillard, H. Finkelstein, R. M. Adams, A. Turkevich) VI. The exchange of charge between cerous and ceric ions (J. A. Seiler, W. Rubinson, R. R. Edwards) VII. Experimental study of the $^{125d}\text{Ba}^{140}_{40}\text{-}^{140}\text{La}^{140}_{40}$ system (B. Finkle, N. Sugarman)
CN-1332 (A-1881)	Feb. 7	Report for month ending February 7, 1944 (G. R. Leader, C. Stanley) I. Tracer studies on decontamination of Ba, Sr, Ce, and Y II. The effect of certain variables on carrying of Ce and Y by $\text{BiPO}_4$ III. Effect of hold-back carrier on carrying of Ce and Y IV. Effect of amount of $\text{BiPO}_4$ carrier on carrying of Ce activity V. Effect of iron on formation of abnormal $\text{BiPO}_4$
CC-1394 (A-2034)	March 48	Report for month ending March 4, 1944 (A. Turkevich)
CP-1395 (A-2035)	Feb 15	Report for period ending Feb 15, 1944 Electronics group of chemistry section C-III. (B. Schloss)

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>
CF-1395 (cont'd)	1944	<ul style="list-style-type: none"> <li>I. Poor plateaus with thin window GM tubes</li> <li>II. Positive-suppressor grid voltages, in a scaling circuit</li> <li>III. Effect of tube mismatch in scaling circuits</li> <li>IV. A rapid method for checking the accuracy of a scaling circuit</li> <li>V. Adaptation of Chicago scaler for fission counting</li> <li>VI. Adaptation of Chicago scaler for Neher-Harper quenching circuit</li> </ul>
CN-1505 (A-2088)	Feb. 29	Index of reports, Chemistry of the fission products (L. Winsberg)
CL-CDC #4	March 15	A manual of the radiochemical analysis of fission products in process solutions (D. N. Hume, N. E. Ballou, L. E. Glendenin)
CC-1546 (A-2218)	April 17	Report for month ending April 3, 1944 (N. Sugarman, Section Chief)
CC-1559 (A-2229)	April 8	Variation in ranges of fission recoil fragments of known mass numbers (M. S. Freedman, R. P. Metcalf, N. Sugarman)
MUC-NS #183	June 6	Cesium Procedure (R. P. Metcalf)
MUC-NS #184	June 6	Silver Procedure (E. P. Steinberg)
CC-1631 (A-2482)	June 10	Contributions to water problem (T. E. Novey, J. D. Knight, D. S. Schover, N. Elliott) <ul style="list-style-type: none"> <li>1. Chemical identification of the 8 second activity found in pile irradiated oxygen compounds</li> <li>2. Preliminary study of the aluminum n, <math>\gamma</math> recoil range determination by collection in cellophane and benzene</li> </ul>
MUC-NS #187	June 19	Factors effecting counting of gamma rays (R. P. Metcalf)
MUC-NS #190	July	Addendum to CL-CDC #4 (N. Sugarman, Section Chief)
MUC-NS #199	July	Plotting absorption curves-counting procedure; plotting the data (N. Sugarman, Section Chief)

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>	14.
MUC-NS #200 CN-1394	1944 July	Procedures for short-lived and low fission yield isotopes (Ge, As, Se, Rh, Pd, Sn, Sb, and Eu) (L. Winsberg, J. A. Seiler)	
MUC-NS #203	July 3	Cadmium procedure (R. P. Metcalf)	
CN-1641 (A-2498)	July 7	Surface reactions of zirconium, barium and tellurium ions with lanthanum fluoride and manganese dioxide (H. Gest, W. H. Burgus)	
CC-1683 (A-2498)	May 10	Report for month ending June 10, 1944 (N. Sugarman, Section Chief)	
CC-1767 (A-2472)	June 12	Report for month ending June 10, 1944 (N. Sugarman, Section Chief)	
CC-1805 (A-2633)	July 14	Investigation of chains with gaseous members (C. R. Dillard, R. M. Adams, H. Finklestein, A. Turkevich)	
CK-1806 (A-2634)	June 30	Ranges of U and Pu fission recoil fragments of known mass numbers (B. Finkle, E. Hoagland, S. Katcoff, N. Sugarman)	
CN-1839 (A-2496)	July 10	Fission product distribution in an adsorption extraction decontamination cycle with an ion exchanger (J. A. Swarthout, D. N. Hume, et al)	
CN-S-1843 X (A-2688)	August 6	Scavenger studies with particular reference to by-product precipitates for the removal of rare earth activities (T. H. Davies, J. A. Swarthbut, et al)	
CN-1868 X-G (A-2690)	July 30	The solubility of $\text{BiPO}_4$ in $\text{HNO}_3$ (G. R. Leader, Neville, E. Papp, H. B. Evans)	
CN-1873 S-X	1945 Jan 1	Studies in ion exchange adsorption: equilibria with Pu (IV), fission, and other cations (G. E. Boyed, J. Schubert, et al)	
CN-S-1878 X (A-2691)	1944 August 1	Basic fission product solution chemistry: hydrolysis and complex ion formation in solutions of zirconium, columbium, and uranium (Ketelle, G. E. Boyed, T. H. Davies)	



CONFIDENTIAL

15.

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>
	1944	
CN-1911 (A-2699)	July 12	Report for month ending July 8, 1944 (N. Sugarman, Section Chief)
CN-1917 (A-2805)	July 12	The ratio of capture to fission in "X" metal (D. W. Engelkemeir, M. Freedman)
CCN-1919 (MUC-NS#312)	March 8	Variation of the amount of backscattering as a function of thickness of backscatterer for $\beta$ 's of several different maximum energies Also variation of saturation amount of backscattering with the atomic number of the backscatterer (D. W. Engelkemeir)
CN-1958 (A-2836)	August 1	Determination of yields of 49 fission products (S. Finkle, E. Hoagland, S. Katcoff, N. Sugarman)
CC-1959 (A-2837)	August 1	Presence of a $\gamma$ in the 12.5d Ba <sup>140</sup> (D. W. Engelkemeir)
CC-1993 R-C	1945 Jan. 20	Radiochemistry of the fission products, progress report (N. Sugarman, Section Chief)
CN-1998 CC-R (A-2858)	1944 August 12	Report for month ending August 12, 1944 (N. Sugarman, Section Chief)
CC-2000 R (A-2859)	August 12	Long-lived europium fission isotopes (L. Winsberg)
CC-2009 G-X (A-2870)	August 28	Preparation of carrier free Zr-Cb tracer (J. A. Marinsky, N. Ballou)
CC-2014 R-X	Sept. 4	An improved preparation of carrier-free columbium tracer with manganese dioxide for remote control operations (J. M. Siegel, W. P. Bigler, D. M. Hume)
MUC-NS #230	Sept 12	Standard $\beta$ and $\gamma$ absorption curves of the longer lived isotopes (R. P. Metcalf, W. Rubinson, J. Seiler, E. P. Steinberg, L. Winsberg)
CN-2027 SX (A-2878)	Sept 14	Nemographs for the solubility of BiPO <sub>4</sub> in HNO <sub>3</sub> , HNO <sub>3</sub> -H <sub>3</sub> PO <sub>4</sub> and HNO <sub>3</sub> -Bi <sub>2</sub> S <sub>3</sub> sol'n's (G. R. Leader, J. A. Swartout)
CC-2076 R	Aug 25	Range of fission recoils as a function of mass number (B. Finkle, E. Hoagland, S. Katcoff, N. Sugarman)

1944 . . . . .

CN-2126 CC-R Sept 9 Report for month ending September 9, 1944  
(N. Sugarman, Section Chief)

CC-2176 R Nov 9 Direct calorimetric study of fission  
product decay in active slugs  
(R. A. Day, C. V. Cannon)

CC-2187 XR Nov 2 An investigation of the absorption  
cross section of  $Xe^{135}$  for pile neutrons  
(N. Elliott, J. D. Knight, T. R. Novey,  
E. Shapiro)

CN-2195 S-X Oct 1 Solubility of  $PiPO_4$  and uranyl phosphate  
in UNH solutions  
(G. R. Leader, Richter)

CN-2196 X Sept 15 Preparation of radioactive barium-lanthanum  
(D. S. Webster, et al)

CL-CDC No 5 Dec 22 Standard procedures for the radiochemical  
assay of barium in the 706-C process  
(D. N. Hume, C. V. Nelson, W. F. Boldridge)

1945

CC-2218 X Jan 20 The interchange of radioactive iodine with  
carrier; a procedure for the quantitative  
separation of radioactive iodine from  
fission material  
(L. E. Glendenin, R. P. Metcalf, T. R.  
Novey)

CC-2219 R-X Feb 1 Fission yield and decay characteristics of  
the chain  $6.7h I^{135}$   $9.2h Xe^{135}$   
(L. E. Glendenin, R. Metcalf)

1944

CC-2220 G-X Dec 27 The reaction of lead and barium sulfates  
with carbon tetrachloride  
(N. Elliott)

1945

CC-2310 R-C Jan 1 Radiochemistry of the fission products  
(L. Winsberg, Editor)

A. Search for long-lived triple fission  
products

1. Sulfur (R. P. Metcalf)
2. Chlorine (J. A. Seiler)
3. Calcium (E. P. Steinberg)
4. Scandium (L. Winsberg)
5. Iron (R. P. Metcalf)

B. Radiochemistry of the fission products  
(Germanium to Europium)

0113

0113

ReportsDateMain Topics and Authors

CC-2310 (cont'd)

1. Germanium and Arsenic
  - a. Short-lived Ge and As Fission activities  
(E. P. Steinberg, D. W. Engelkemeir)
  - b. Absence of long-lived Ge in fission  
(L. Winsberg)
  - c. Absence of long-lived As in fission  
(L. Winsberg)
2. Selenium: Absence in fission of Se isotopes with half-lives greater than 30 minutes  
(L. Winsberg)
3. Bromine; half-life and  $\beta$  energy of Br<sup>84</sup>  
(S. Katcoff)
4. Krypton
  - a. Half-lives of some short-lived Kr activities  
(C. R. Dillard, R. M. Adams, H. Finkelstein, A. Turkevich)
  - b. Long-lived Kr (E. J. Hoagland, N. Sugarman)
5. Strontium and Yttrium
  - a. Sr<sup>91</sup> and Y<sup>91</sup>; Half-lives, radiations, and decay relationships  
(S. Katcoff, B. Finkle, N. Sugarman)
  - b. Fission yield of 20m Y  
(C. R. Dillard, R. M. Adams, H. Finkelstein, A. Turkevich)
  - c. Fission yield and radiations of 3.5h Y(92)  
(E. J. Hoagland, S. Katcoff)
6. Zirconium and Columbium
  - a. Energies of radiation of 17h Zr<sup>(97)</sup> and 75m Cb<sup>(75)</sup>  
(S. Katcoff, B. Finkle)
  - b. Parentage and radiations of 90h Cb<sup>(95)</sup>  
(E. P. Steinberg)
7. Molybdenum;  $\beta$  energy of 67h Mo<sup>99</sup>  
(S. Katcoff)
8. Ruthenium; Fission yields of 42d Ru<sup>103</sup> and 1.0y Ru<sup>(106)</sup>  
(E. P. Steinberg)
9. Rhodium; Absence of long-lived Rh in fission  
(J. A. Seiler, L. Winsberg)
10. Palladium and Silver
  - a. Pd and Ag isotopes (13h Pd<sup>107,109</sup>, 21h Pd<sup>112</sup>, 3.2h Ag<sup>112</sup>) in fission  
(J. A. Seiler)
  - b. Absence of long-lived Pd isotopes in fission.  
(J. A. Seiler)

ReportsDate  
1945Main Topics and Authors

CC-2310(cont'd)

11. Cadmium and Indium (R. P. Metcalf)
  - a.  $^{43d}\text{Cd}^{115}$  energy and fission yield
  - b.  $^{2.33d}\text{Cd}^{115}$  and  $^{4.5h}\text{In}^{115}$ : RAD radiations and fission yield
  - c.  $\text{Cd}^{117}$  and  $\text{In}^{117}$ ; half-lives, radiations and fission yield
12. Tin; Sn isotopes (" $^{80m}$ ",  $^{62h}$ ,  $^{10d}$ ) in fission  
(J. A. Seiler)
13. Antimony; absence of long-lived Sb in fission  
(J. A. Seiler)
14. Tellurium; fission yield of  $^{30h}\text{Te}^{131}$   
(S. Katcoff)
15. Iodine; fission yield, half-life, and radiations of  $\text{I}^{135}$   
(S. Katcoff, C. R. Dillard, H. Finkelstein, B. Finkle, J. A. Seiler, N. Sugarman)
16. Xenon
  - a. Half-lives of some short-lived Xe activities  
(C. R. Dillard, R. M. Adams, H. Finkelstein, A. Turkevich)
  - b. Half-life and radiations of  $\text{Xe}^{133}$   
(D. W. Engelkemeir, N. Sugarman)
  - c. Half-life and  $\beta$  radiations of  $\text{Xe}^{135}$   
(E. J. Hoagland, N. Sugarman)
  - d. Independent yield of  $^{9.2h}\text{Xe}^{135}$  in fission  
(E. J. Hoagland, N. Sugarman)
17. Cesium
  - a. Search for  $\text{Cs}^{135}$  from  $\text{I}^{135}$   
(B. Finkle, N. Sugarman)
  - b. Search for  $\text{Cs}^{135}$  from  $\text{Xe}^{135}$   
(D. W. Engelkemeir)
  - c. Identification of Mass Number of " $^{25y}$ " Cs as 137  
(A. Turkevich, E. P. Steinberg, N. Sugarman, B. Finkle)
18. Barium; Half-life of  $\text{Ba}^{139}$   
(C. R. Dillard, H. Finkelstein, R. M. Adams, A. Turkevich)
19. Lanthanum
  - a. Independent yield of  $^{40h}\text{La}^{140}$  in fission  
(N. Sugarman)
  - b. Radiations of  $^{3.5h}\text{La}^{141}$   
(S. Katcoff)

<u>Reports</u>	<u>Date</u>	<u>Main Topics and Authors</u>
CC-2310 (cont'd)	1945	20. Cerium and praseodymium a. Search for $^{140}\text{Ce}$ in fission (J. A. Seiler, L. Winsberg) b. Half-life of long-lived $\text{Ce}^{144}$ (W. H. Burgus) c. Identification of the $\gamma$ emitter in the long-lived Ce chain as $^{17\text{m}}\text{Pr}^{144}$ (J. Seiler, L. Winsberg) d. Radiations of $^{145}\text{Pr}^{145}$ (S. Katcoff) 21. A long-lived rare earth activity (J. Seiler, L. Winsberg) 22. Europium; Eu activities ( $^{60\text{m}}\text{Eu}$ , 15.4h, 15.4d, 2-3y) in fission (L. Winsberg)
CC-2379-R	1944 Nov 16	Report of month ending Nov 15, 1944 (N. Sugarman, Section Chief)
CC-2485 R	Dec 15	Radiochemistry and process studies, Progress report (N. Sugarman, Section Chief)
CC-2570 R-X	1945 Feb 1	The development of standard procedures for the radiochemical assay of barium in the 706 C process (C. M. Nelson, W. F. Boldridge, D. N. Hume)
CC-2580 R-X	Feb 1	Tracer supply (D. N. Hume)
CN-2581 AN-X	Feb 1	Fission product analysis training program (D. N. Hume)
CP-2582 I-X	Feb	A simple method of evaluating coincidence losses in Geiger-Muller Counting Circuits (R. P. Metcalf, E. Hennessee)
CC-2605 R-X	Feb 28	Some activities from tritium bombardment in neutron irradiated lithium salts (J. D. Knight, T. B. Novey, C. V. Cannon, A. Turkevich)
CC-2658 R-C	Feb 16	Summation study A comparison of gross fission product decay with decay of the sum of the separated fission products (W. Rubinson, R. P. Metcalf, J. Seiler, E. P. Steinberg, L. Winsberg)
CC-2739 R-C	Feb 23	Radiochemistry of the fission products, Progress report (N. Sugarman, Section Chief)

REPORTS  
 Reports

<u>Reports</u>	<u>Date</u> 1945	<u>Main Topics and Authors</u>
CF-2773 C	March 15	Calorimetric determination of product-power ratio and of fission energy (D. W. Engelkemeir, M. S. Freedman, D. L. Hill, H. L. Anderson)
CC-2775 R-C	March 24	Preliminary spectrometer examination of $^{209}\text{Po}$ Cb (J. S. Levinger)
CP-2782 G-C	Feb 15	Thermal neutron cross-section of $^{135}\text{Xe}$ (N. S. Freedman, R. M. Adams, A. Turkevich, N. Sugarman)
CN-2799 G-C	March 29	Progress report Radiochemistry of the fission products (N. Sugarman, Section Chief)
MUC-WR #340 (AM-1655)	April 20	Methods of radiochemical analysis (Mo, Ru, Cd, Sb, I, Cs, La-Ir, and Sm) (L. Winsberg, editor)
CC-2810 (A-670)	June 7 (CL-DNH-3)	Tables of half thicknesses, ranges and energies for fission product activities (D. N. Black)
CN-2815 An-X	June 30	A manual of the radiochemical determination of fission product activities (D. N. Hume, N. E. Ballou, L. E. Glendenin)
CP-2825 G-X	June 4	A correlation of methods for the determination of absolute neutron flux (T. B. Novey)
CC-2826 R-X	June 1	The radiochemical determination of total antimony tracer activity and differential antimony (III) and antimony (V) activities (W. F. Boldridge, D. N. Hume)
CC-2828 R-X	June 226	The preparation of carrier free ruthenium tracer and some observations on the chemistry of plutonium (D. N. Hume)
CC-2829 R-X	June 1	The separation and identification of Nd and element 61 fission activities by specific elution from amberlite resin (J. A. Marinsky, L. E. Glendenin)
CC-2835 R-X	June 15	Zn and Ga activities in uranium fission (J. M. Siegel, L. E. Glendenin)

<u>Report</u>	<u>Date</u> 1945	<u>Main Topics and Authors</u>
CC-2836 R-X	June 30	Special procedures for the isolation of Zn and Ge fission activities (J. M. Siegel, L. E. Glendenin)
CC-2845 R-X	June 30	A study of the separation of cerium by iodate precipitation and the improved radiochemical determination of cerium and rare earth activities (W. F. Boldridge, D. N. Hume)
CC-2891 R-C	April 10	Cross-sections and radiations of some Kr isotopes produced by neutron bombardment of Kr (E. Hoagland, N. Sugarman)
CN-2898 G-C	April 1	The solubility of $\text{LaPO}_4$ in $\text{HNO}_3$ solutions (A. Goldstein, E. Motts, W. Rubinson, M. Taylor)
CC-2908 R-C	April 7	The thermal neutron absorption cross-section of $^{139}\text{Ba}$ (S. Katcoff)
CN-2929 G-C	April 27	Progress reports Radiochemistry of the fission products (N. Sugarman, Section Chief)
CC-2966 R-C	April 15	The presence of $^{47}\text{Sm}$ in fission (L. Winsberg)
CC-2998 R-C	June 1	A gas-sweeping apparatus for the large scale collection of fission products on a charged wire (S. Raynor)
CC-3007 R-C	April 15	Independent yield of $^{135}\text{Xe}$ (E. Hoagland, N. Sugarman)
CP-3050 I-C	March 1	Preliminary experiments on the feasibility of using solid dielectrics as ionizing media in ionization chambers (B. Schloss)
CC-3059 R-C	April 15	The thermal neutron absorption cross section of $^{89}\text{Sr}$ (S. Katcoff)
CC-3106 R-C	August 1	The adsorption of xenon on charcoals at room temperature (H. A. Ladd, T. F. Young)

<u>Report</u>	<u>Date</u> 1945	<u>Main Topics and Authors</u>
CC-3146 R-C	Sept 4	Sweeping of fission gases from solutions of U and plutonium (R. M. Adams, H. Finklestein, W. Rubinson)
CC-3148 R-C	June 1	A new decay chain produced by (n, γ) on Ba: Ba <sup>131</sup> → Cs <sup>131</sup> → Xe <sup>131</sup> (S. Katcoff) Further studies on the radiations from Ba <sup>131</sup> and Cs <sup>131</sup> (B. Finkle)
CP-3166-G. C.	June 15	Upper limit to absorption cross section of U <sup>236</sup> (H. Finkelstein, A. Turkevich)
CL-CDC #8	July 16	Fission product chains and fission yields (L. E. Glendenin, J. M. Siegel, C. D. Coryell)
MonP-5 (AM-1643)	August 1	Removal of noble gases from solutions with carrier gases (R. Livingston, E. Shapiro, N. Elliott)
MonN-13	Sept 1	Development of a method for the determination of Np activity in process solution (J. E. Hudgins, J. E. Sattizahn, F. R. Bruce, M. W. Carlson)
LA-282	May 25	Radioactivity measurements at the 100-ton trial (H. L. Anderson and Group)
LA-282A	June 22	100-ton test: Radiation above the crater after 41 days (H. L. Anderson, H. Heskett, J. Twombly)
LA-290	June 28	100-ton test: Radiochemistry (N. Sugarman and Group)
LA-356	Sept 25	July 16th nuclear explosion, Determination of nuclear efficiency (H. L. Anderson, N. Sugarman and Group)

Monthly and Semi-monthly Progress Reports  
of the  
Chemistry Division of the Clinton Laboratories

<u>Report</u>	<u>Date</u> 1944	<u>Report</u>	<u>Date</u> 1944
M-CN-1285	Feb 15	M-CN-2034	Sept 15
M-CN-1296	Feb 29	M-CN-2177	Oct 31
M-CN-1404	March 15	M-CN-2184	Sept 30



. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

<u>Report</u>	<u>Date</u> 1944	<u>Report</u>	<u>Date</u> 1944
M-CN-1414	March 31	M-CN-2194	October 15
M-CN-1424	April 15	OSN-1281m	December 27
M-CN-1434	April 30		1945
M-CN-1614 <sup>o</sup>	May 15	CN-2586	Feb 15
M-CN-1624	May 31	CN-2596	March 15
M-CN-1634 <sup>4</sup>	June 15	CN-2809X	April 15
M-CN-1654	June 30	CN-2819X	May 15
M-CN-1844	July 15	CN-2839X	June 15
M-CN-1854	July 31	MonN-2 (AM-1635)	July 15
M-CN-1884	August 15	MonN-6 (AM-1642)	August 15
M-CN-2016	August 31	MonN-15	September 15

## Other Reports

<u>Report</u>	<u>Date</u> 1942	<u>Main Topics and Authors</u>
BM-73 (MS 87)		The loss of energy by fission fragments at high temperatures (G. J. Kynch)
CC-295	Sept 18	Survey of long-lived fission products (B. L. Goldschmidt, I. Perlman)
CP-318	Oct 19	Radiations from radioactive lanthanum (A. G. C. Mitchell, L. M. Langer, L. J. Brown)
CL-697, Chapter III		C. Project Handbook C. Spontaneous nuclear reactions D. Uranium fission products (A. Turkevich, Editor)
CC-765	1943 June 30	Chemical methods for the separation of the fission products (W. H. Sullivan)
CC-826	July 12	Report on gamma rays of certain fission products (A. G. C. Mitchell, L. J. Brown)
CP-844	Aug 7	Preliminary report activity of thorium fission products (J. L. Levinger, R. Wilkinson)

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

<u>Report</u>	<u>Date</u> 1943	<u>Main Topics and Authors</u>
MC-11 (CC)	Aug 14	Search for long-lived fission elements (B. L. Goldschmidt, F. Morgan)
BM-691 (BR-447)	Sept 26	The range of the fission fragments of U235 in uranium oxide and in gold (B. B. Kinsky, B. A. Nahum)
CP-1156 (A-1671)	1944 Jan 4	Preparation of primary $\beta$ -ray standards (J. H. Roberts)
CC-1380 (A-2021)	Feb 25	A low absorption counter of improved design (W. H. Sullivan, N. R. Sleight, E. M. Gladrow)
CH-1460 (A-2050)	Feb 15	Metabolism of fission products A. Preparation of radioactive materials Preparation of Pr, Ba, Cs, and Cb (J. Hamilton)
LA-64	Feb 29	Stopping power of various substances for fission fragments (C. Wiegand, E. Segre)
CC-1493 (A-2076)	March 8	Radioactivities of ruthenium and rhodium (W. H. Sullivan, N. R. Sleight, E. M. Gladrow)
CN-1540 (A-2206)	March 27	Discovery of Element 95 (and/or 96) (H. W. Crandall, J. W. Gofman, W. H. Reas)
M-CC-1602 (M-626)	March 1944	A manual on the measurement of radioactivity (A. H. Jaffey, T. P. Kohman, J. Crawford)
BM-429 (MC-58)	April	Branching ratios of barium 139 and 140 produced in neutron fission of uranium (W. E. Grummitt, J. Gueron, G. Wilkinson, L. Yaffe)
CN-1615 (A-2293)	May 15	Activities in the off gas from the metal solution step (W. R. Kanne, G. M. Branch)
M-CC-1776 (A-2605)	July 10	Radiations associated with the 330 day Ru $\rightarrow$ 30second Ru decay chain (N. R. Sleight)
CN-1840 (A-2669)	June 26	Comparison of fission products of plutonium and uranium arising from slow neutron irradiation (J. E. Brolley)

. . . . .  
 . . . . .  
 . . . . .

<u>Report</u>	<u>Date</u>	<u>Main Topics and Authors</u>
CN-1850 (A-2673)	1944 July 6	Abstracts of analytical methods appearing in the classified reports (H. C. Andrews)
CP-1903 R (A-2668)	July 6	Forty-three day $^{115}\text{Cd}$ (L. Seren, D. W. Englekemeir, W. Sturm)
Addendum to CP-1903		Presence of $\sim 0.5$ Mev $\gamma$ in $^{115}\text{Cd}$ (L. Seren, H. N. Friedlander, S. H. Turkel)
CP-1954 (A-2833)	July 29	Report for month ending July 29, 1944 Physics Research (E. P. Wigner)
CP-1967 (A-2844)	July 29	Chemical isolation of two of the delayed neutron activities (J. S. Levinger, E. P. Meiners, M. B. Sampson, A. H. Snell, R. G. Wilkinson)
CN-2044 GX (A-2884)	October 3	The power-product and capture-fission ratios in X-metal (I. Perlman)
CP-2090	Aug 28	Physics Research report for month ending August 28, 1944 (E. P. Wigner)
M-CN-2096 R	August 30	Guide to project information (J. Howe, Goldsmith, E. Mapp, Froula, Cortelyou, Quill, Mulliken)
CP-2122 G	August 5	Positive ion emission from fission element oxides (L. G. Lewis, W. M. Garrison, D. King, R. J. Hayden)
CP-2160 G	Sept 23	Report for month ending Sept 23, 1944- physics (E. P. Wigner)
CP-2192 XG	Nov 8	File poisoning due to short lived fission products (Borst, Jones, Nordheim, Slotin, Soodak)
M-CP-2203 G	Nov 30	Monthly report for the period ending Nov 30, 1944 Physics Section (A. H. Snell, L. W. Nordheim, E. O. Wollan, ---Section Chiefs)
LAMS-142	Oct 7	Energy of the hard gamma rays of $\text{La}^{140}$ (M. Deutsch)
CP-2283 H	Oct 23	Beta-ray spectra of some fission activities (V. K. Medzel)

<u>Report</u>	<u>Date</u> 1944	<u>Main Topics and Authors</u>
CC-2299 R	Oct 24	Fast neutron induced activities in Cb (V. A. Nedzel, Brown, E. Meiners)
CP-2301 G	Oct 28	Report for the month ending Oct 28, 1944 Argonne Laboratory (E. Fermi, Laboratory Director)
CK-2318 P	Nov 4	An investigation of the delayed neutron decay curves resulting from uranium and plutonium fission (C. Redman, D. Saxon)
CC-2345	Dec 2	Cb isotopes from Zr and Mo (L. Jacobson, R. Overstreet)
CP-2376 G	Nov 21	Slow neutron activation cross-sections (L. Seren, H. N. Friedlander, S. H. Turkel)
CC-2409	Oct 28	Activities of Cs and Xe (M. Camao)
A-670	Dec 1	Some chemical problems associated with the operation of homogeneous breeder and converter piles (H. S. Brown, Asst Division Director)
CP-2468 G-C	Dec 15	Fission product poisoning in a pile (Katherine Way)
CN-2563 S-X	1945 Feb 1	The extraction, concentration and decontam- ination of Ba <sup>140</sup> from uranyl nitrate solutions by and adsorption process (J. Schubert, J. W. Richter, R. A. Duckett, W. E. Coch, E. R. Tompkins, J. X. Khym, S. Weiss, J. Teresi)
CP-2569 G-X	Feb 15	Magnetic lens beta ray spectrometer (R. Wilkinson, W. Rall)
CN-2583 S-X	Feb 15	An alternate procedure for the separation of lead from barium based on ion exchange adsorption. The lead-barium, lead- lanthanum equilibrium in amberlite IR-I (J. Schubert)
CP-2590 G-X	Feb 15	The beta and gamma energies of several radioactive isotopes (R. Wilkinson, W. Rall)
CP-2600 G-X	March 28	Xenon 135 (L. A. Pardue, C. D. Moak, P. W. Levy, E. O. Wollan, E. Meiners)

<u>Report</u>	<u>Date</u>	<u>Main Topics and Authors</u>
CG-2626 R	1945 Jan 3	Transference and adsorption on glass of carrier free zirconium (H. W. Dodgen, G. K. Rollefson)
BM-1120 (MS-128)	March 29	Isotopic abundances of fission product xenon and some relative branching chain ratios for U <sup>235</sup> fission (H. G. Thode, R. L. Graham)
LA-253	April 7	Short-period delayed gammas from fission of 25 (J. A. Hofmann, P. B. Moon)
BM-1149 (MX-129)	April 10	A further mass spectrometer investigation of fission product xenon and fission product krypton (H. G. Thode, R. L. Graham)
CG-2720 G-I	May 9	Preliminary report on a rapid method for separating rare earths (F. H. Spedding, N. R. Sleight, E. M. Gladrow, A. F. Voight)
CF-2796 C	March 15	Report for month ending March 15, 1945 Physics Division (A. J. Dempster, Division Director)
BM-1248 (MC-127)	May 1	Interim report on the krypton and xenon arising from fission (W. J. Arrol, K. F. Chackett, S. Epstein)
CF-2805 G-X	May 5	Dependence of xenon capture cross section on neutron temperature (E. O. Wollan, L. A. Pardue)
CN-2827 S-X	June 1	The separation and purification of carrier-free fission products, including individual rare earths, by specific elution from amberlite resin (Tompkins, Khym, Parker, Weiss, Cohn, Ballantine, Ross, Vanneman)
CN-2833 G-X	June 16	Development of Szilard-Chalmers methods for preparing carrier-free tracers: Studies on U <sup>237</sup> (Stanley, A. Adamson, Leslie)
CF-2926	April 15	Report for month ending April 15, 1945 Physics Division (A. J. Dempster, Division Director)

SECRET

PR

<u>Report</u>	<u>Date</u> 1945	<u>Main Topics and Authors</u>
CP-2927 G-C	April 27	A mass spectrograph for the analysis of fission product mixtures (L. G. Lewis, R. J. Hayden)
CP-2928 G-C	April 27	Direct mass assignments of 55 day strontium and 57 day yttrium (L. G. Lewis, R. J. Hayden)
CP-2984 G-C	April 25	Report for period ending April 25, 1945 Argonne Laboratory (W. H. Zinn, Asst Laboratory Director)
CP-3028 G-C	May	Report for month of May, 1945 Physics Division (A. J. Demoster, Division Director)
CG-3032 R-C	June 13	Summary and correlation of data on the rate of decay of fission products (E. P. Wigner, K. Way)
CF-3070 G-C	June	Report for month of June, 1945 Physics Division (A. J. Demoster, Division Director)
CP-3094 G-C	July 30	Delayed neutrons from fission of 25 (D. J. Hughes, J. Dabbs, A. Cahn)
CP-3102 G	June 30	Beta and gamma ray spectra (I. C. Miller, L. F. Curtis)
CP-3147 G-C	Sept 19	Delayed neutrons from fission of 23 (A. Cahn, Jr., J. W. T. Dabbs, Jr., D. J. Hughes)
CP-3221 G-C	September	Report for month of September, 1945 (Physics and Metallurgy Division (A. J. Demoster, Division Director)
MonC-10	Sept 1	Preparation of carrier-free 10.2d Cs <sup>131</sup> (B. J. Finkle, W. E. Cohn)
MonC-11	Sept 1	Preparation of carrier free 13.8d Pr <sup>143</sup> (B. J. Finkle, W. E. Cohn)
LA-427	Oct 17	Range of 25 fission frangements in phototrophic emulsion fragments in (H. T. Richards, T/4 Lyda Speck)

SECRET

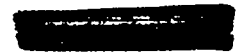
000000

000000

Report

Date  
1945

Main Topics and Authors



CP-3295 G-C

Oct 22

Mass spectrographic identification of active isotopes contained in three fission product mixtures  
(L. G. Lewis, R. J. Hayden)

CN-3328 G-C

Nov 2

Techniques for the preparation of thin films of radioactive material  
(D. L. Hufford, D. F. Scott)



000000

000000

SECRET

30

A

## B. Subject Index

Reports are referred to by number (and section)  
and pages (e.g., CC-208-E, 2)

## Symbols:

F - Figure, e.g., figure #2 - F2  
T - Table

## A Activity

Curies activity of long-lived fission products, CC-829, 1; CC-1042, 1-14,  
CL-697, III D.7, 3-5, 18-31

In cooling gas, CC-465-B, 18-19; CC-680, 4-8

Induced, CC-1112, 22

## Recoil products

Apparatus, CC-258-D, 6; CA-287; CC-389-B, 15-19

Correlation with pile, CC-418-B, 6-8

Effect of filtering He stream, CC-218-B, 3-5

Electroscope study, CA-287; CC-389-B, 15-17

Study by Geiger counter, CC-389-B, 18-19

Study by ionization chamber, CC-389-B, 17

In ether extract of irradiated UNM, CC-1112, 13-14

In pile water, CH-774, 2-5

Induced in solid residues from Columbia River water, CC-1308, 2-8

July 16 nuclear explosion, determination of nuclear efficiency, LA-356, 2-45

One Hundred Ton Trial, LA-282, 2-10; LA-282A, 2-3; LA-290, 2-22

Preparation of thin films of radioactive material, CN-3328, 2-46

Rate of decay of fission products, CC-3032, 2-28, F1-5

Short bombardments, gross decay, M-CN-1634, 11

Adsorption Process for Separating Fission Products, CN-1839, 1-15; CN-1873, 2-118;

CN-2563, 2-23, F1-10; CN-2583, 2-8; CC-2720, 2-27; CN-2827, 2-35, F1-30;

CC-2829, 2-20

## Alpha Particles

activity in  $\text{BiPO}_4$  process, CN-692, 41-45

counting, M-CC-1602, 2-18

Counting rate of 49 - capture to fission ratio det'n., CC-465-B, 9

CN-528, 2-8; CN-1141, 5-8

Aluminum<sup>28</sup>, Recoil Range from (n,  $\gamma$ ) on  $\text{Al}^{27}$ , CC-1631, 2, 5-7

Analytical Procedures, CC-765, 2-31; CC-971, 1-36, Addendum I; CL-CDC #4, 1-50;  
MUC-NS #190, 1-8; MUC-NS #200, 1-15; CL-697 III D.7, 1-27; MUC-WR #340,  
1-17; CN-1312, 2-135; CN-2815, 2-74;

Abstracts of analytical methods appearing in classified reports, CN-1850, 1-127

Adsorption process for separating rare earths, CC-2720, 2-27; CN-2827, 2-35;

CC-2829, 2-20

$\text{BiPO}_4$  process solutions, CC-988, 3; CL-CDC #4, 1-50; CN-1312, 2-135; CN-2815,  
2-74

One Hundred Ton Test: Radiochemistry, LA-290, 2-22

SECRET



SECRET

A-B

Antimony CC-1204, 22-26; CC-2826, 2-20

93h<sup>127</sup>, CC-529, 48-50

Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4

Thermal fission yield in Pu<sup>239</sup> and U<sup>235</sup>, CN-2799, 2

4.2h<sup>129</sup>, CC-196-E, 1

Analytical procedures, CC-1683, 4; MUC-NS #200, 10-11; CN-1850, 10-11;

CL-697, III D, 7, 17; MUC-WR #340, 9; CC-2826, 15-20

Determination of H<sub>2</sub>S group activities in process solutions, CN-1312, 49-54

Ether extraction of SbCl<sub>3</sub>, CC-1546, 4

Available information on fission isotopes, C-200, T3; MUC-CDC #80, III, IV;

CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10

and activity in pile products, CC-342-F, 4-5; CC-829, 1

BiPO<sub>4</sub> process, distribution in product containing fractions, CN-1309, 2-5

Long-lived Sb, absence in fission, CC-1683, 2; M-CN-1844, 13; CC-2310, 155

Loss in HBr distillation, CC-188-E, 2

Summation study, CC-1394, 3

Szilar-Chalmers reaction for preparing tracers, CN-2809, 10, 17; CC-2819,

14, 23-24; CN-2839, 11; MonN-2, 17

Weight in pile material, CN-1044, 4-8, CL-697, III, D, 4, 1-2

Yield of SbH<sub>3</sub>, CC-238-D, 3

Argon, activity in pile air stream, CC-465-B, 19; CC-1112, 22

#### Arsenic

40h<sup>77</sup>, CN-2126, 3-4; CC-2310, 31-46, CC-2379, 5

Fission yield in U<sup>235</sup>, CC-2310, 31-46

Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4

Thermal fission yield in Pu<sup>239</sup>, CN-2799, 2

90m<sup>(78)</sup>, CN-2126, 3-4; CL-2310, 31-46; CC-2379, 5

Analytical procedures, CC-1546, 4; MUC-NS #200, 1-3; CL-297, III D, 7.2

Available information on fission isotopes, CL-CDC #8, 1-10

Long-lived As, absence in fission, CC-1767, 8; CC-2310, 48

#### B Barium

12d<sup>131</sup>, CN-2799, 9; CC-3148, 2-17

85m<sup>139</sup>, chains of gaseous ancestry, CN-1998, 12-15; CN-2126, 6-7; CC-2310,

167-169; CC-3146, 1-20

Fission yields, BA-429, 1-14

In U<sup>235</sup>, CC-258-D, 2; CC-920, 4-8; CC-1331, 10-16

In Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8

Half-life, CC-2310, 198-200

Range of fission recoils, CC-1546, 6; CC-1559, 1-5; CC-1683, 7; CC-1767, 2;

CK-1806, 1-14

Thermal neutron absorption cross-section, CN-2799, 8-9; CC-2908, 2-8

Th fission, CC-920, 24-27

12.8d<sup>140</sup>, β energy, CC-298-D, 1; CC-465-B, 11-13; CP-2590, 9, 11-13

Calibration of cyclotron counting apparatus, CC-920, 11-13

Capture to fission ratio det., CC-465-B, 8-10; CN-528, 2-6, 8; CN-989, 3-5;

CN-1141, 5-8; CN-1917, 1-4

:: : . : :  
 : : : : :  
 : : : : :

72.

B

Chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26;  
 CC-1331, 35-37; CC-1546, 2; CC-1805, 1-16; CN-1998, 12-15;  
 CC-2310, 167-169; CC-3146, 1-20  
 Fission yield in U<sup>235</sup>, CC-258-D, 2; BA-429, 1-14; CC-529, 28-30;  
 CC-793, 6-16; CC-920, 4-8; CC-1331, 4-9  
 Fission yield in U<sup>238</sup>, BA-429, 1-14; CC-2379, 5-6; CC-2485, 4  
 Fission yield in Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8  
 Absolute slow and fast yields, CN-2929, 2  
 Flux measurement CP-2825, 3-4  
 Gamma energy, CC-208-E, 1; CC-238-D, 3; CC-298-D, 2; CC-1959, 1-8;  
 CC-2283, 2-3, 8; CP-2590, 9, 11-13; CSN-1281m, 7-8  
 Homogeneous slurry pile, CC-1142, 21-22  
 July 16th nuclear explosion, determination of nuclear efficiency,  
 LA-356, 2-45  
 100-ton Test, LA-290, 2-22  
 Range of fission recoils, CK-1806, 1-14; CN-1998, 7; CC-2076, 1-17  
 Standard absorption curves, MUC-NS #230, 4, F17-18, 20a  
 System 12.5d Ba<sup>140</sup> → 40h La<sup>140</sup>, CC-1204, 9-11; CC-1331, 43-44  
 Th fission, CC-920, 24-27  
 18m<sup>141</sup>, half-life, CN-2799, 4  
 Variation of fission yield with chain member, CN-2929, 3-4  
 Activity on pile graphite, CC-988, 13  
 Adsorption process, CN-1839, 1-15; CN-2563, 2-23, F1-10; CN-2583, 2-8;  
 CN-2827, 2-35; F1-30  
 Analytical procedures, CC-227-E, 1; CC-238-D, 2; CC-971, 4-8; CC-1142, 15-16;  
 CL-CDC #4, 13-17; CN-1312, 4-15; M-CN-1414, 14; M-CN-1424, 16; MUC-NS #190,  
 1-2; M-CN-1434, 20; CN-1850, 12-14; CL-CDC #5, 2-15; CC-2570, 2-21;  
 CL-697, III D, 7.21; CN-2815, 19-26; CP-2825, 4-6  
 Analysis in process solutions, CC-988, 3; CL-CDC #4, 13-17; CN-1312, 4-15;  
 MUC-NS #190, 1-2; CL-CDC #5, 2-15; CC-2570, 2-21; CN-2815, 19-26  
 15 minute procedure, CC-2739, 2  
 Extraction of Ba and Sr by partial precipitation of Pb(NO<sub>3</sub>)<sub>2</sub>, M-CN-2184, 12  
 Separation from Sr, CC-238-D, 2  
 Separation of Ba(NO<sub>3</sub>)<sub>2</sub> from La, CC-227-E, 2; CC-238-D, 2  
 Separation of La(OH)<sub>3</sub> from Ba, CC-227-E, 2  
 Available information on fission isotopes, C-200, T3; MUC-CIC #80, III, IV,  
 CL-697, III D, 1-2; 1-14; CL-CDC #8, 1-10  
 BaHPO<sub>4</sub> crystals, Density and X-ray analysis, CN-1998, 8-9  
 Transformation at 5000, CN-2126, 10  
 β and γ activity in pile products, CC-342-F, 4-6; CC-389-B, 4, 6-10  
 Energy generation curves, CC-579, 10; CC-829, 1, F1-6, T1; CC-1042, 1-2,  
 10-27; CL-697, III D, 6, 1-31  
 BiPO<sub>4</sub> process  
 Carrying by BiPO<sub>4</sub> and LaF<sub>3</sub>, CN-1051, 18  
 Decontamination, CN-576, 4-7; CN-692, 41-45; CN-850, 12, 14; CN-933, 5-7;  
 CN-1113, 39; CN-1309, 1-27; CN-1311, 1-16; CN-1332, 3-6; CN-S-1843, 15-20  
 Chains of gaseous ancestry, CC-465-B, 14-18  
 Coseparation with LaF<sub>3</sub>, CC-227-E, 2; CC-238-D, 2; CN-528, 9-13; CC-680, 32-39;  
 CN-1641, 11, XVI-VII  
 Loss of Ba in NH<sub>4</sub>OH-NH<sub>4</sub>F<sub>5</sub> solution, CC-258-D, 2  
 Pu fission, M-CN-1654, 10  
 Preparation of active La, M-CN-1614, 26; M-CN-1624, 24; M-CN-1634, 10;  
 M-CN-1654, 11; M-CN-1844, 13-14; M-CN-1854, 15-16; M-CN-1884, 11;  
 M-CN-2016, CN-2014, 2-15, F1-11; CSN-1281m, 7-8

. . . . .  
 . . . . .  
 . . . . .

33.

B

Reaction of Pb and Be sulfates with  $\text{CCl}_4$ , CC-2220, 2-4  
 Summation study, CC-342-F, 4-6; CC-389-B, 4, 6-10; CC-465-B, 4-8, 11-13;  
 CC-579, 3-9; CC-643, 1, Fl-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11;  
 CC-2658, 2-24  
 Th fission, CC-793, 17-20  
 Tracer preparation, CC-1050, 3-5; CN-2563, 2-23, Fl-10; CN-2827, 2-35, Fl-30  
 Weight in pile material, CN-1044, 4-8; CL-697 III D, 4, 1-2  
 Wet fluoride process, decontamination, CN-528, 9-13; CN-722, 1-3

## Beta Activity

Accumulation in He pile, CC-418-B, 6-8  
 Activities induced in solid residues from Columbia River Water, CC-1308, 2-8  
 Adsorption process, CN-1839, 1-15  
 $\text{BiPO}_4$  process, decontamination, CN-576, 1-7; CN-692, 41-45; CN-933, 5-10;  
 CN-989, 10-14; CN-1044, 11-17; CN-1309, 1-27; CN-1311, 1-16  
 Chains of gaseous ancestry, CC-1394, 3-4; CC-1805, 1-16  
 Energy generation curves, CC-579, 10; CC-829, 1, F2, 5; CC-1042, 1-33;  
 CL-697, III D, 6, 3-5, 18-31  
 In air-cooled pile, CC-465-B, 18-19  
 In homogeneous slurry pile, CC-988, 8-9; CC-1142, 20  
 Pu fission, M-CN-1654, 10  
 Short bombardments, beta decay, CC-529, 5-14  
 Summation study, CC-342-F, 3; CC-389-B, 4-5; CC-465-B, 4-6, 11-13; CC-579, 3-5, 7;  
 CC-643, 1; CC-851, 5-8, 11; CC-1394, 3; CC-1683, 4; CC-1767, 3; CN-1911, 9-11;  
 CC-1993, 6-7; CN-2126, 13-14; CC-2379, 11; CC-2658, 2-23  
 Th fission products, CP-844, 1-11  
 Water from pile, induced activities, CC-1306, 1-7

## Beta Particles, M-CC-1602, 19-36

Counting geometry, CC-851, 14-27  
 Energy dissipation in active slugs, CC-2176, 1-13  
 Factors affecting counting of  $\gamma$  rays, MUC-NS #187, 1-3  
 Half-thickness, ranges and energies of fission products, CCN-2010, 1-5  
 Magnetic lens spectrometer, CP-2569, 2-20; CP-2590, 2-26; CP-3102, 2-14,  
 Fl-12  
 Plotting absorption curves, MUC-NS #199, 1-2  
 Preparation of standards, CP-1156, 1-5  
 Range-energy relations, C-200, 3-4; CC-579, 16-19  
 Relation between range and mass absorption coefficient, CP-2984, 2  
 Scattering and adsorption, CC-529, 17-27; CC-851, 14-27; CC-1112, 21; CC-1204  
 19-36; CC-1683, 7; CCN-1919, 1-7  
 Standard absorption curves of longer-lived isotopes, MUC-NS #230, 1-6, Fl-26

Beta-ray Spectrometers, CC-793, 23-27; CC-1546, 2; CP-2263, 1-10; CP-2569, 2-20  
 Comparison with absorption method, CC-2310, 8-9  
 Measurements, CP-2160, 12-15; CC-2283, 2-3, 14-16; CP-2569, 2-20; CP-2590, 2-26;  
 CC-2775, 1-10; CP-3102, 2-14, Fl-12

## Bismuth Phosphate

Attempted electrophoresis studies, CN-933, 27  
 Bismuth and phosphate equilibria, CC-1205, 46-55

: : : :  
 : : : :  
 : : : :  
 : : : :

B - C

34

Bismuth Phosphate (cont'd)

Crystal studies, CN-1044, 9-10; CN-1214, 3-8; CN-1332, 16; CC-1394, 2  
 CC-1546, 4-5; CC-1683, 2-3; CC-2379, 12-15  
 Process, CN-692, 41-45; CN-850, 1-14; CN-933, 3-27; CN-989, 6-14;  
 CN-1044, 9-18; CN-1051, 13-21; CN-1113, 29-42; CN-1141, 9-23;  
 CN-1205, 44-66; CN-1214, 3-13; CN-1307, 1-12; CN-1309, 1-27; CN-1311, 1-16;  
 CN-1332, 3-17; M-CN-1414, 13; M-CN-1424, 13-14; CN-S-1843, 1-28; CN-1998,  
 8-11; CN-2126, 9-13; CC-2379, 12-15; CC-2485, 7-8  
 Analysis of process solutions, CC-988, 3; CL-CDC #4, 1-50; MUC-NS #190, 1-8;  
 CN-1312, 2-135; CN-2815, 2-74  
 Solubility, CN-933, 11-22; CN-989, 6-9; CN-1044, 9-10; CN-1141, 18-19;  
 M-CN-1414, 14; M-CN-1424, 13-14; M-CN-1434, 19; CC-1546, 4-5;  
 CC-1683, 2-3; CC-1767, 4; CN-1863, 1-40; CN-2027, 1-16; CN-2126, 11-13;  
 CN-2195, 1-28; CC-2379, 12-15; CC-2485, 8  
 Surface area measurement, M-CN-1424, 13-14

**Brenestrahlung**

Contribution to fission activity, CC-851, 5-6  
 Lead absorption data, CC-529, 21; MUC-NS #187, 1-3

**Bromine**

$^{82}_{34}\text{Br}$  exchange studies, MonN-2, 7  
 $^{83}_{34}\text{Br}$  exchange and valence studies, CN-2819, 12; MonN-6, 9; MonN-2, 7;  
 MonN-15, 12  
 Fission yield in  $\text{U}^{235}$ , CC-258-D, 2; CC-1331, 10-18, 22  
 Fission yield in  $\text{Pu}^{239}$ , CN-1958, 1-8  
 Half-life, CC-196-E, 1; C-200, T1; CC-1331, 14, 17  
 Independent yield along chain, MonN-15, 12-13  
 $^{84}_{33}\text{mBr}$  fission yield, CC-258-D, 2; CC-1331, 10-18, 22  
 Half-life and beta energy, CC-196-E, 1; C-200, T1; CC-1394, 3;  
 CC-2310, 52-54  
 $^{86}_{55}\text{Br}$ , CP-1967, 2-4  
 Analytical procedure, CC-238-D, 3; CC-971, 32-33; CN-1850, 18;  
 CL-697, III D, 7, 4  
 Available information on fission isotopes, C-200-T1; MUC-CDC, #80, II, III;  
 CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Thorium fission, CC-920, 24-27, 35-42  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

**C**

Cadmium, CC-1204, 22-26  
 $^{115}_{48}\text{Cd}$ , CN-2126, 3; CC-2379, 4; CC-2310, 131-139  
 Fission yield in  $\text{U}^{235}$ , CC-2310, 131-139; CN-2799, 2  
 Fission yield in  $\text{Pu}^{239}$ , CN-2799, 2  
 $^{115}_{48}\text{Cd}$ , M-CN-1844, 13; CP-1903, 1-11; CN-1911, 3; CC-2310, 126-130  
 Fission yield in  $\text{U}^{235}$ , CN-1911, 3; CC-2310, 126-130  
 Fission yield in  $\text{Pu}^{239}$ , CN-1958, 1-8  
 Gamma energy, addendum to CP-1903, 1  
 Standard beta absorption curve, MUC-NS #230, 4, F10  
 $^{117}_{48}\text{Cd}$ , CN-2126, 3; CC-2379, 4; CC-2310, 140-144  
 Fission yield in  $\text{U}^{235}$ , CC-2310, 140-144  
 Analytical procedures, MUC-NS #230, 1-2; CL-697, III D, 7, 14; MUC-WR #340, 8;  
 CN-1312, 49-54, 121-122; CC-2310, 126-134

## Cadmium cont'd

Available information on fission isotopes, C-200, T2; CL-697, III D, 1-2, 1-14;  
CL-CDC #8, 1-10

Calcium, Absence of Triple Fission Products, CC-1767, 6-7; CC-2310, 24-25

Capture, Monitoring of St. Louis Cyclotron, CN-771, 1-23

Capture to Fission Ratio, CC-465-B, 8-10; CN-528, 2-8; CN-989, 3-5; CN-1141, 5-8;  
CN-1911, 4; CN-1917, 1-4; CN-1998, 5; CN-2044, 1-10; CF-2773, 2-15

Carbon<sup>14</sup> in Cyclotron Bomberded UNH, CC-680, 30-31

Carbon Monoxide and Dioxide from Heated Graphite, CT-482-F, 1-3

Carbonyl, Cr(CO)<sub>6</sub>, Mo(CO)<sub>6</sub>, W(CO)<sub>6</sub>, CC-144  
Possibility of preparation of U(CO)<sub>6</sub>, CC-144

Ceric Phosphate, CN-1113, 38-39; CN-1998, 8-10

## Cerium, CC-579, 15

<sup>140d</sup><sup>140g</sup>, Absence in fission, CC-1142, 27; CSN-1281m, 7; CC-2485, 2-3;

CC-2310, 209

<sup>28d</sup><sup>141</sup>, CC-188-E, 1-2; CC-465-B, 24

Chains of gaseous ancestry, CC-1805, 1-16; CC-3146, 1-20

Daughter of short-lived La, CC-529, 57-59

Energy of radiations, CC-680, 13, 16-21

Energy generation curves, CC-1042, 1-2, 12-13, 30-32; CL-697, III D, 6, 1-31

Fission yield in U<sup>235</sup>, CN-2799, 2; CN-2929, 5

Fission yield in Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8; CN-2799, 2

Fission yield, variation with chain member, CN-2929, 3-4

From n and d irradiation, CC-465-B, 25; CC-529, 66-69

Mass assignment by spectrograph, CP-3295, 6-15

100-ton test, LA-290, 2-22

Range of fission recoils, CN-1998, 7; CC-2076, 1-17

Standard absorption curves, MUC-NS #230, 4, F21-22

Stable<sup>142</sup>, Absorption cross-section, CC-2739, 5

<sup>33h</sup><sup>143</sup>, CC-196-E, 2; CC-298-D, 5

Chains of gaseous ancestry, CC-465-B, 14-18; CN-2799, 7; CC-3146, 1-20

Energy of radiations, CC-298-D, 5; CC-680, 13, 16-21

Fission yield in U<sup>235</sup>, CC-1331, 10-16, 21-22; CN-2799, 2

Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2799, 2

From d and n irradiation, CC-465-B, 25; CC-529, 66-69

La parent, CC-529, 57-59; CN-2809, 8

Th fission, CC-920, 24-27

<sup>275d</sup><sup>144</sup>, CC-188-E, 1-2; CC-465-B, 24

Beta energy from 180° spectrometer, CP-2160, 12-15; CC-2283, 2-3, 8-10

Chains of gaseous ancestry, CC-1805, 1-16; CC-3146, 1-20

Energy generation curves, CC-1042, 1-2, 12-13, 30-32; CL-697, III D, 6, 1-31

Fission yield in U<sup>235</sup>, CN-2799, 2

Fission yield in Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8; CN-2799, 2

Gamma energy, CC-1683, 2; CN-2126, 2; CC-2310, 213-233; CC-2485, 2

Half-life, CC-2310, 210-212

CONFIDENTIAL

C

Cerium,  $^{144}_{58}\text{Ce}$  (cont'd)

July 16th nuclear explosion, determination of nuclear efficiency, LA-356, 2-45

Mass assignment by spectrograph, CP-3221, 3; CP-3295, 6-15

100-Ton test, LA-290, 2-22

Range of fission recoils, CN-1998, 7; CC-2076, 1-17

Standard absorption curves, MUC-NS #290, 4, F21-22

$^{145}_{58}\text{Ce}$ , CC-465-B, 22-23; CC-529, 59-65

Chains of gaseous ancestry, CN-2799, 7

$^{15m}_{58}\text{Ce}$  (146), CN-2929, 6

Absorption in  $\text{MnO}_2$ , M-CN-1424, 13; M-CN-1434, 18

Absorption process, CN-1839, 1-15; CC-2720, 2-27; CN-2827, 2-35, F1-30; CC-2829, 6-11

Analytical procedures, CC-258-D, 4; CC-971, 9-13; CC-1043, 4-6; CC-1142, 16-17

CL-CDC #4, 32-39; CN-1312, 65-91; M-CN-1404, 12; MUC-NS #190, 7; CN-1850, 23-26; CL-697, III D, 7, 23-25; CN-2815, 52-55; CC-2845, 2-12

ANALYSIS IN PROCESS SOLUTIONS, CN-1207, 44-47; CL-CDC #4, 32-39; CN-1312, 65-91; MUC-NS #190, 7; CN-2815, 52-55; CC-2845, 2-12

25 minute procedure, CC-2139, 3

Separation from other rare earths, iodate precipitation, CC-851, 32-35; CC-920, 29; CC-1050, 7-8; CC-2845, 2-12

Available information on fission isotopes, C-200, T3; MUC-CDC #80, III, IV; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10

and  $\gamma$  activity in pile products, CC-342-F, 4-6; CC-389-B, 4, 6-10

Energy generation curves, CC-579, 10; CC-829, 1, F1-6, II; CC-1042, 1-2, 12-13, 30-32; CL-697, III D, 6, 1-31

$\text{BiPO}_4$  process, decontamination, CN-576, 4-7; CN-692, 41-45; CN-850, 4-7; CN-933, 5-7; CN-1141, 21; CN-1309, 1-27; CN-1311, 1-16; CN-1332, 6-15, 17; CN-S-1843, 1-28

Cerous-ceric ion exchange, CC-1331, 38-42

Density of cerous phosphate, CN-2126, 11

Ghost parent of  $^{145}_{58}\text{Pr}$ , CC-1204, 13, 15

Long-lived activities,  $\beta$  energies, CC-188-E, 1-2

Masses 141, 143, 144, and 147 detected by mass spectrograph, CP-3028, 4; CP-3070, 4

Pr daughter of fairly long-lived Ce, CC-1112, 17

Pu fission, M-CN-1654, 10

Solubility of  $\text{CeF}_3$  in  $\text{HNO}_3$  solutions, M-CN-1414, 13

Summation study, CC-342-F, 4-6; CC-389-B, 4, 6-10; CC-465-B, 4-8, 11-13; CC-579, 3-9; CC-643, 1, F1-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11; CN-2126, 13-14; CC-2379, 11; CC-2658, 2-24

Tracer preparation, CC-851, 35-36; CC-1204, 19

-a-r-Y by Ce method, CC-1050, 6

Valence state, CN-2809, 8; CN-2819, 12

Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Wet fluoride process, decontamination, CN-722, 1-3

CONFIDENTIAL

. . . . .  
 . . . . .  
 . . . . .

## Cesium

10.2d<sup>131</sup>, CN-2799, 9; CC-3148, 2-17  
 Tracer preparation, MonC-10, 2-6  
 Long-lived<sup>135</sup>, CC-2219, 12-13  
 From I<sup>135</sup>, search CC-2310, 193-194  
 From Xe<sup>135</sup>, search, CC-2310, 195; CC-2485, 3  
 35y<sup>137</sup>,  $\beta$  energy, CC-298-D, 2, F4; CC-529, 52-54; CC-2379, 9  
 Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4  
 Fission yield in Pu<sup>239</sup>, CN-1958, 1-8  
 Gamma energy, CC-2379, 9  
 Half-life, CC-298-D, 2, F4; CC-529, 52-54; CN-1911, 2  
 Mass assignment, CC-2219, 12-14; CC-2310, 196-197; CC-2485, 3  
 Mass spectrograph, CP-3295, 8  
 Standard absorption curves, MUC-NS #230, 4, F15-16  
 33m<sup>138</sup>, CN-2799, 3  
 Gamma energy, CC-2219, 13  
 11d, CN-2799, 4-5  
 Adsorption process, CN-1839, 1-15; CN-2827, 2-35, F1-30  
 Analytical procedures, CC-238-D, 2, 5; CC-529, 52-54; CC#971, 2-3;  
 CN-1312, 60-64; M-CN-1404, 12; MUC-NS #183, 1-3; CN-1850, 27-38;  
 M-CN-1854, 15; CL-697, III D, 7, 20; MUC-WR #340, 11-13; CN-2815, 41-44  
 Analysis in process solutions, CN-1312, 60-64; M-CN-1404, 12;  
 CN-2815, 41-44  
 Cs silicotungstate, CC-238-D, 2, 6  
 Fast procedure free of Rb, CC-2739, 2; CN-2929, 7  
 Available information on fission isotopes, C-200, T3; MUC-CDC #80, TII, IV;  
 CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Chains of gaseous ancestry, CC-465-B, 14-18  
 Energy generation curves, CL-697, III D, 6, 1-31  
 Production of Cs isotopes by neutron activation, CC-2409, 1-12  
 Pu fission, M-CN-1654, 10  
 Summation study, CC-465-B, 4-6, 8; CC-579, 3-9; CC-643, 1; CC-85, 5-13;  
 CC-1394, 3; CN-1911, 9-11; CN-2126, 13-14; CC-2379, 11; CN-2658, 2-24  
 Tracer preparation, CN-2827, 2-35, F1-30  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

## Chlorine

33m<sup>34</sup>, CC-2605, 3-4, 10-11  
 Absence of triple fission products, CC-1767, 6-7; CC-2310, 22-23

Circuits, CT-959, 1-39; Addendum I to CT-959, 1; CP-1395, 2-10

Coincidence losses, CP-2582, 2-5

Columbia scaling, CT-959, 1-39; Addendum I to CT-959, 1

Fission chamber and circuit, CC-793, 6-9

Fission circuit, CP-1395, 8

Schloss-Robinson, Chicago, and Columbia scaling circuits, CP-1395, 2-10

## Columbium

90h<sup>95</sup>, Parentage, CC-1204, 13, 15; CN-1998, 2; CN-2126, 2; CC-2310, 95-101

Radiations, CC-418-B, 11-12; CC-1793, 5; CC-2775, 1-10; CC-2310, 95-101

Spectroscopier Examination, CC-2775, 1-10

35d<sup>95</sup>,  $\beta$  and  $\gamma$  energy, CC-418-B, 11-12; CC-826, 1-8; CP-1954, 17-18;

CC-2283, 2-3, 6-3; CP-2590, 5, 8

Chains of gaseous ancestry, CC-1805, 1-16

Coincidence counting, CC-2283, 2-3; CN-1911, 7-8

Growth, decay, and energetics, CC-1112, 4-8c

## Columbium (cont'd)

Homogeneous slurry pile, CC-1142, 21-22  
 Mass assignments by spectrograph, CC-1142, 1-17  
 Scattering, CCN-1919, 4, 7  
 Spectrometer measurements, CP-1954, 17-18; CC-2283, 2-3, 6-8; CP-2590, 6, 8  
 Standard absorption curves, MUC-NS #230, 4, F5-6  
 75m Cb (97), CC-258-D, 5; CC-2310, 90-94  
 Absence of fission isotopes, with half-lives between 75m and 35d, CC-1546, 5; CN-1998, 2  
 Adsorption process, CN-1839, 1-15; CN-2827, 2-35, F1-30  
 Analytical procedures, CC-418-B, 9; CC-971, 18-21; Addendum I to 971, 1-4; CC-988, 4-7; CC-1142, 13-14; CL-CDC #4, 21-23; CN-1312, 26-31; M-CN-1414, 15; CN-1850, 34-36; CN-1998, 5; CN-2126, 6; CL-697, III D, 7, 7-8; CN-2815, 31-33  
 Analysis in process solutions, CC-988, 3; CN-1113, 30-31; CL-CDC #4, 21-23; CN-1312, 26-31; CN-2815, 31-33  
 Available information on fission isotopes, C-200, T1; MUC-CDC #80, II, III; Available information on fission isotopes, C-200, T1; MUC-CDC #80, II, III; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 $\beta$  and  $\gamma$  activities in pile products, CC-342-F, 4-5; CC-389-B, 4, 6-10  
 Energy generation curves, CC-579, 10; CC-829, 1, F1-6, T1; CC-1042, 1-2, 9, 25-26; CL-697, III D, 6, 1-31  
 BiPO<sub>4</sub> process, decontamination, CN-576, 4-7; CN-692, 41-45; CN-933, 5-10; CN-1141, 14-18; CN-1309, 1-27; CN-1311, 1-16; CN-S-1843, 15-20  
 BiPO<sub>4</sub> scavenging, CN-1113, 32-34  
 Carrying by LaF<sub>3</sub>, CN-1141, 14-18; CN-1312, 74-81  
 Cb<sub>2</sub>O<sub>5</sub> scavenger, CN-1141, 21  
 MnO<sub>2</sub> scavenger, CN-1051, 19-21; CN-1113, 32-34; CN-1205, 61-62  
 Coseparation with LaF<sub>3</sub>, CN-1141, 14-18; CN-1312, 74-81  
 Fast neutron induced activities, CC-2299, 1-2  
 Gamma energy, CC-418-B, 11-13  
 Growth from Zr, CC-418-B, 11-13  
 Hydrolysis and complex ion formation, CN-S-1878, 1-14  
 Mass assignments, CC-1112, 4-8c  
 Pu fission, M-CN-1654, 10  
 Summation study, CC-342-F, 4-5; CC-389-B, 4, 6-10; CC-465-B, 4-8, 11-13; CC-579, 3-9; CC-643, 1, F1-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11; CN-2126, 13-14; CC-2379, 11, CC-2658, 2-24  
 Tracer preparation, CC-1112, 10-11; CN-1141, 22-23; CC-2009, 1-5; CN-2827, 2-35, F1-30  
 Extraction with chloroform and cupferron, M-CN-1654, 11; M-CN-1884, 12  
 Manganese dioxide for remote control, CC-2014, 1-13  
 Unsuccessful attempts, CC-1050, 7  
 Unsuccessful from amberlite resin absorbent, CC-1112, 11  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2  
 Wet fluoride process, decontamination, CN-722, 1-3

Copper<sup>64</sup> for testing  $\beta$ -ray Spectrograph, CC-793, 24

## Coseparation studies

Ba with LaF<sub>3</sub>, CN-528, 9-13; CC-680, 32-39; CN-1641, 11, FVI-VII  
 Surface reactions of Zr, Ba, and Te with LaF<sub>3</sub> and MnO<sub>2</sub>, CN-1641, 1-13  
 Zr and Cb with LaF<sub>3</sub>, CN-1141, 14-18; CN-1312, 74-81

## Counters

Determination of sign of  $\beta$  particles, CC-920, 51-52  
 Fission chamber and circuit, CC-793, 6-9  
 High efficiency  $\gamma$  counter, CC-1383, 9  
 Low absorption counter, CC-763, 3-5; CC-1380, 1-10  
 New soldering technique, M-CN-1654, 8-9  
 Plateaus, poor plateaus with thin window tubes, CP-1395, 3-4



. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

39.

C-F

C Counters (plateaus, cont'd)

[REDACTED]

Improvement by outgassing, CC-2379, 10  
 Solid dielectrics as ionizing media, CP-3050, 2-18

- Counting, CC-529, 17-27; CC-1204, 28-36; M-CN-1424, 15-16; M-CC-1602, 1-40;  
 CC-1683, 6-7; MUC-NS #199, 1-2; MUC-NS #230, 1-3; CN-2815, 4-18  
 Coincidence counting, CC-826, 1-8; CN-1911, 7-8  
 Coincidence errors, CC-529, 22  
 Coincidence losses in GM counting circuits, CP-2582, 2-5  
 Counting of  $\gamma$  rays, MUC-NS #187, 1-3  
 Geometry, CC-793, 12, 14-16; CC-851, 14-27; CC-1204, 28-36; CP-2825, 8-10  
 High efficiency  $\gamma$  counter, CC-1683, 8-9  
 Precision counting with GM counters, CC-1683, 8-9  
 Preparation of standards, CP-1156, 1-5; CP-2825, 8-10  
 Preparation of thin films, CN-3328, 2-46  
 Scattering of  $\beta$ 's, CC-529, 17-23; CC-1204, 28-36; CCN-1919, 1-7  
 Scattering of  $\gamma$ 's, CC-529, 17-23  
 Standard methods of obtaining and plotting absorption curves; MUC-NS #199,  
 1-2; MUC-NS #230, 1-3
- Cross-sections for neutrons, CP-2376, 1-25; CC-2485, 3, 5-6; CC-2739, 4-5  
 Stable nuclei, CP-2376, 1-25  
    $U^{236}$ , CC-2485, 7  
 Unstable nuclei, CC-2485, 3, 5-6; CC-2739, 4-5  
    $85m Ba^{139}$ , CN-2799, 8-9; CC-2708, 2-8  
   Pile poisoning due to short-lived fission products, CP-2192, 1-17  
    $55d Sr^{89}$ , CC-3059, 2-12  
    $9.2h Xe^{135}$ , CC-1993, 2-3; M-CN-2194, 17-18; CC-2485, 3, 5-6;  
   CP-2600, 2-10; CP-2620, 2-7; CP-2782, 2-15  
   Dependence on neutron temperature, CP-2805, 2-9

D Decontamination

$BiPO_4$  process, CN-576, 1-7; CN-692, 41-45; CN-850, 1-14; CN-933, 5-10;  
 CN-989, 10-14, 9-18; CN-1051, 14-21; CN-1113, 32-39; CN-1141, 9-21;  
 CN-1205, 61-64; CN-1214, 9-10; CN-1309, 1-27; CN-1332, 3-9b; CN-1839,  
 1-15; CN-S-1843, 1-28; CN-1311, 1-16  
 (Also under individual elements.)  
 Wet fluoride, CN-722, 1-3

Dosage, CN-528, 14-17; CC-2680, 7-8; CH-774, 2-5

$2.5h$  Dysprosium<sup>165</sup>,  $\gamma$  ray spectrum by means of thin magnetic lens spectrometer,  
 CP-3102, 14

E Electrophoresis Studies on  $BiPO_4$  Suspensions, CN-933, 27

Ether Extract, Radioactivity in, CC-1112, 13-14

Ether Extraction, Apparatus, CC-1204, 37-39

Europium, CC-579, 70-73

$2y^{155}$ , CC-2000, 1-9; CC-2310, 231-244  
 Fission yield in  $U^{235}$ , CC-2310, 231-244  
 Mass assignment by spectrograph, CP-3221, 4; CP-3295, 12-13

## Europium (cont'd)

- 15.4d (156). CC-1331, 26-29; CN-1911, 3; CC-2000, 1-9; CC-2310, 231-244  
 Fission yield in U<sup>235</sup>, CN-1911, 3; CC-2310, 231-244; CN-2799, 2  
 Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4  
 Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2799, 2  
 Standard absorption curves, MUC-NS #230, 4, F24-25  
 15.4h (157) and 60m (158), CN-2126, 4; CC-2310, 231-244  
 Fission yields in U<sup>235</sup>, CN-2126, 4; CC-2310, 231-244  
 Gamma energies of 15.4h Eu, CC-2485, 4  
 Adsorption process, CN-2827, 2-35, F1-30; CC-2829, 6-11  
 Analytical procedure, MUC-NS #200, 12-15; CL-697 III, D, 7, 26  
 Follows Y in La-Y separation, M-CN-2184, 10  
 Available information on fission isotopes, MUC-CDC #80 T IV; CL-697,  
 III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

## F

Feather Method of Determining Range and Energy, C-200, 3; CC-529, 24-27;  
 CC-579, 16-19; CC-763, 6-10

Ferrous Ion, Oxidation by HNO<sub>3</sub>, CN-850, 10-13; CN-933, 25-26.

## Fission

- Capture to fission ratio, CC-465-B, 8-10; CN-528, 2-8; CN-989, 3-5;  
 CC-1141, 5-8; CN-1911, 4; CN-1917, 1-4; CN-1998, 5; CN-2044, 1-10  
 Counting circuit, CC-793, 6-9; CP-1395, 8  
 Energy of fission, CC-1394, 2; CK-1806, 11; CF-2773, 2-15  
 Monitoring at St. Louis cyclotron, CN-771, 1-23

## Fission Products (for more information look under individual element)

- Adsorption process, CN-1839, 1-15; CN-1873, 2-118; CN-2827, 2-35, F1-30  
 Analytical procedures, CC-765, 2-31; CC-971, 1-36; CL-CDC #4, 1-50;  
 MUC-NS #200, 1-15; CN-1312, 2-135; CN-1850, 1-127; CL-697, III D, 7, 1-27;  
 MUC-WR #340, 1-17; CN-2815, 2-74  
 Available information on fission isotopes, C-200, T1-3; MUC-CDC #80, 1,  
 T1, TIV; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Behavior of minor fission elements in pyridine extraction of Rh,  
 M-CN-1854, 15  
 BiPO<sub>4</sub> process, decontamination, CN-576, 1-7; CN-692, 41-45; CN-850, 1-14;  
 CN-933, 5-10; CN-989, 10-14; CN-1044, 9-18; CN-1051, 14-21; CN-1113,  
 32-39; CN-1141, 9-21; CN-1205, 61-64; CN-1214, 9-10; CN-1309, 1-27;  
 CN-1311, 1-16; CN-1332, 3-9b  
 Effect of radiation, CN-1307, 1-12  
 Fission products of greatest process significance, CN-2815, 71-72  
 Chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26; CC-1331, 35-37;  
 CC-1394, 3-4; CC-1546, 2; CC-1767, 10; CC-1805, 1-16; CN-1998, 12-15;  
 CN-2126, 6-7; CN-2799, 7; CC-3146, 1-20  
 Large scale collection of fission products, CC-2998, 2-15  
 Chart of isotopes, CL-697, III C, 3.2, 51  
 Concentration of fission products by precipitation of uranium peroxide,  
 CC-1394, 4  
 Countercurrent ether extraction column, CN-1055, 2-3  
 Delayed neutrons, CK-2318, 1-12; CP-3094, 1-30; CP-3147, 1-8  
 Energy generation curves, CC-579, 10; CC-829, 1, FL-6, T1; CC-1042, 1-33;  
 CL-697, III D, 6, 3-5, 18-31; CC-3175, 1-13

## Fission Products (cont'd)

F

Factors affecting the determination of activities and energies,  
 CN-1998, 4

Fission chains with short-lived members, CN-2126, 5

Fission yields, CC-1394, 3; CN-1958, 1-8; CN-1998, 2-3; CN-2126, 2-4, 8-9;  
 CC-2379, 2-10; CC-2485, 2-6; CL-697, III D.1, 5-8; CN-2799, 2;  
 CN-2929, 2

Gross decay curves, long irradiations, CL-697, III D.6, 1-31  
 Short irradiations, CC-529, 5-14; CC-920, 9-23; CC-988, 10;  
 CC-1128, 3-7, Fl-13; M-CN-1634, 11

Gross half-life in pile products, CC-342-F, 2

Homogeneous slurry pile CC-988, 8-9; CC-1142, 18-22

Jentschke type experiment, CN-1840, 1-5

July 16th nuclear explosion, determination of nuclear efficiency,  
 LA-356, 2-45

Mass assignment by spectrograph, CP-2122, 1-2; CP-2927, 1-17; CP-3221, 3-4;  
 CP-3295, 2-15

100-ton trial, LA-282, 2-10; LA-282A, 2-3; LA-290, 2-22

Pile poisoning, CP-2192, 1-17; CP-2468, 2-23

Pu fission products, M-CN-1654, 10; CN-1840, 1-5; M-CN-1844, 13; CN-1911, 6

Positron emitters, absence in fission CC-920, 51-53; CC-2283, 14

Preparation of thin films, CN-3328, 2-46

Radiochemistry of the fission products (Ge to En), CC-2310, 31-244

Ranges of fission recoils, CK-1806, 1-14; CC-2076, 1-17

Rate of decay, CC-3032, 2-28, Fl-5

Remote-control concentration apparatus, CC-1112, 24-26

Short period delayed gammas from fission of  $U^{235}$ , LA-253, 2-15

Slow neutron activation cross-section, CP-2376, 1-26

Spectrometers, 180°, CP-2160, 12-15; CP-2263, 1-10; CC-2283, 2-3, 14-16  
 Thin magnetic lens, CP-2569, 2-20; CP-2590, 2-36; CP-31-2, 2-14, Fl-12

Standard absorption curves for longer-lived fission products,  
 MUC-NS #230, 1-6, Fl-26

Summation study, CC-342-F, 2-6; CC-389-B, 4-10; CC-465-B, 3-14;  
 CC-579, 3-9; CC-643, 1, Fl-3; CC-851, 5-13; CC-1394, 3; CC-1683, 4;  
 CC-1767, 3; CN-1911, 9-11; CC-1993, 6-8; CN-2126, 13-14; CC-2379, 11;  
 CC-2658, 1-24

Table of isotopes, CL-697, III C.3.1, 2-50

Tables of half-thicknesses, ranges and energies, CCN-2010, 1-5

Th fission CC-793, 17-21; CP-844, 1-11; CC-920, 24-27

Tracer preparation, CN-2827, 2-35, Fl-30

Various fission products, CC-529, 31-73; CC-680, 9-29; CC-920, 35-50;  
 CC-2310, 31-244

U fission products, CN-1840, 1-5

Weights of fission products in pile material, CN-1044, 4-8; CL-697, III D.4,  
 1-2

## Fission Recoils (also under individual element)

Activity in air, CC-680, 4-8  
 In graphite, CC-988, 11-12  
 In pile, CC-680, 4-8

Loss of energy at high temperatures, BM-73, 1-8

CONFIDENTIAL

## Fission Recoils (cont'd)

Ranges, CC-1546, 6; CC-1559, 1-5; CC-1683, 7; CC-1767, 2; CK-1806, 1-14; CN-1998, 7  
 As a function of mass number, CC-2076, 1-17  
 Factors affecting fission yield determination, CC-1767, 2  
 In photographic emulsion, LA-427, 2-7  
 In uranium oxide and gold, EM-691, 1-5  
 Stopping power of various substances, LA-64, 2-13

## Fission Yields (also under individual element)

Factors affecting yield determination, CN-2126, 5  
 By the recoil method, CC-1767, 2  
 $U^{235}$ , CC-2310, 10; CL-697, III D, 1, 5-8; CL-CDC #8, 1-10  
 Absolute yields, 12.5d  $Ba^{140}$ , CC-793, 6-16; CC-1331, 4-9  
 $^{77}Te^{(137)}$ , CC-793, 6-16  
 Relative yields, CC-529, 28-30; CC-920, 4-8; CC-1331, 10-22; CN-2799, 2  
 Variation with chain member, CN-2929, 3-4; MonN-15, 12-B  
 $U^{238}$ , relative yields, EM-429, 1-14; CC-2379, 5-6; CC-2485, 4  
 $Au^{239}$ , Absolute slow and fast yields, CN-2929, 2  
 Relative slow yields, CN-1840, 1-5; CN-1911, 6; CN-1958, 1-8; CN-2126, 8-9; CN-2799, 2

$^{18}F$  from n-Irradiated Li Salts containing Oxygen,  
 CC-2605, 2-3

CONFIDENTIAL

• • • • •  
• • • • •  
• • • • •  
• • • • •  
• • • • •

G

## Gadolinium

Weight in pile material, CN-1044, 4-8; CL-697, III D.4, 1-2

## Gallium

20m<sup>70</sup> from (n,  $\gamma$ ) on Ge, CN-2809, 9  
 14h<sup>72</sup>, CN-2809, 9; CC-2835, 2-14  
 Fission yield, CN-2809, 9; CC-2835, 2-14  
 Gamma ray spectrum by means of thin magnetic lens spectrometer,  
 CP-3102, 8, F4  
 Produced by (n,  $\gamma$ ) on Ge, CN-2809, 2-14  
 5h Ga<sup>73</sup>, CN-2586, 7; CN-2596, 10; CC-2835, 2-14  
 Fission yield, CN-2586, 7; CN-2596, 10; CC-2835, 2-14  
 Produced by (n,  $\gamma$ ) on Ge, CN-2809, 9  
 Analytical procedures, CC-2739, 3; CC-2836, 7-10  
 Available information on fission isotopes, CL-CDC #8, 1-10

## Gamma Radiation

Activities induced in solid residues from Columbia River water,  
 CC-1308, 2-8  
 Adsorption process, CN-1839, 1-15  
 Air-cooled pile, CC-465-B, 18-19  
 BiPO<sub>4</sub> process,  $\gamma$  decontamination, CN-576, 1-7; CN-933, 5-10; CN-989, 10-14;  
 CN-1044, 11-18; CN-1051, 14-21; CN-1309, 1-27; CN-1311, 1-16  
 Bremsstrahlung, CC-529, 21; CC-851, 5-6; MUC-NS #187, 1-3  
 Chains of gaseous ancestry, CC-1394, 3-4; CC-1546, 2; CC-1805, 1-16  
 Energy-absorption relations, C-200, 4-5; CC-529, 21-24  
 Energy generation curves, CC-579, 10; CC-829, 1; CC-1042, 1-31;  
 CC-2176, 1-13; CL-697, III D.6, 3-5, 18-31  
 Factors affecting counting of  $\gamma$  rays, MUC-NS #187, 1-3  
 Gamma curies in 30 day X slug, MUC-CDC #76, 1-2  
 Gamma dosage from Np<sup>239</sup>, Xe, and I, CN-528, 14-17  
 Homogeneous slurry pile, CC-988, 8-9; CC-1142, 20  
 Magnetic lens spectrometer, CP-2569, 2-20; CP-2590, 2-26; CP-3102,  
 2-14; F1-12  
 Measurement of  $\gamma$  radiation, M-CC-1602, 19-36  
 Pu fission, M-CN-1654, 10  
 Scattering, CC-529, 17-27  
 Self-absorption of  $\gamma$  energy in slug, M-CN-1634, 10  
 Short bombardments,  $\gamma$  decay, CC-920, 9-23; CC-988, 10; CC-1128, 3-7;  
 LA-253, 2-15  
 Short-lived activities in pile-bombarded water, CC-1306, 7  
 Standard absorption curves, MUC-NS #230, 1-6, F1-26  
 Standard methods of obtaining and plotting absorption curves,  
 CC-1683, 7; MUC-NS #199, 1-2  
 Summation study, CC-465-B, 11-13; CC-1394, 3; CC-1683, 4; CC-1767, 3;  
 CN-1911, 9-11; CC-1993, 6-7; CN-2126, 13-14; CC-2379, 11;  
 CC-2658, 2-24  
 Soft  $\gamma$ , CC-342-F, 5; CC-389-B, 6-7; CC-465-B, 6-7; CC-579, 5-6, 8;  
 CC-643, 1, F2; CC-851, 5-6, 8-9, 12  
 Hard  $\gamma$ , CC-342-F, 5; CC-389-B, 8-10; CC-465-B, 7-8; CC-579, 5-6, 9;  
 CC-643, 1, F3; CC-851, 5-6, 8, 10, 13  
 Tables of energies for fission product activities, CCM-2010, 1-5  
 Th fission, CP-844, 1-11

• • • • •  
• • • • •  
• • • • •  
• • • • •  
• • • • •

• • • • •  
• • • • •  
• • • • •  
• • • • •  
• • • • •

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

G - I

44.

**Germanium**

12h<sup>77</sup> and 2.1h<sup>(78)</sup>, CN-2126, 3-4; CC-2379, 5; CC-2310, 31-46  
 Fission yields, CC-2310, 31-46  
 Absence of long-lived Ge in fission, CN-1911, 3; CC-2310, 47  
 Analytical procedure, MUC-NS #200, 1-3; CL-697, III D, 7, 22  
 Available information on fission isotopes, CL-CDC #8, 1-10

**Gold Foils**

Flux measurements, CP-2825, 6-7  
 Preparation and handling, CP-2825, 10-11

**Graphite**

Effect of radiation, M-CN-1844, 15  
 Fission recoil, induced, and surface activities, CC-988, 11-13  
 Gases from graphite in presence and absence of U, CC-344-F, 8-9;  
 CT-393-D, 1; CT-482-F, 1-3

Growth Curves, General, CC-1204, 7-8

**H**

Hot Laboratory, CC-1112, 23-26; CC-1204, 37-39

**Hydrogen**

Capture by hydrogen in UNH, CN-771, 12-13  
 Gases from graphite, CT-482-F, 1-3

**I****Illinium**

2-3y<sup>147</sup>, M-C-11, 5-6; CC-680, 22-25; CC-2310, 227-230; CN-2809, 9;  
 CC-2829, 2-20  
 Chain relations, MonN-2, 7  
 Fission yield, CC-2829, 2-20  
 Mass assignment by spectrograph, CP-3221, 3; CP-3295, 6-12  
 Scattering of  $\beta$ 's, CCN-1919, 5, 7  
 47h<sup>(149)</sup>, CN-2839, 10; MonN-2, 7; MonN-15, 13  
 Fission yield, MonN-15, 13  
 From (n,  $\gamma$ ), CN-2809, 9  
 Mass assignment by spectrograph, CP-3295, 10-13  
 Adsorption column, CN-2809, 9; CN-2827, 2-35; FI-30; CC-2829, 2-30;  
 MonN-2, 7  
 Analytical procedure (cf Adsorption column above)  
 La group and Y, CN-2815, 56-61  
 Available information on fission, CL-697, III D, 1-2, 1-14;  
 CL-CDC #8, 1-10  
 Long-lived rare earth at mass 149 identified by spectrograph,  
 CP-3295, 10-13  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

**Indium**

4.5h<sup>115\*</sup> and 1.95h<sup>117</sup>, CN-2126, 3; CC-2379, 4; CC-2310, 131-144  
 Analytical procedure, CL-697, III D, 7, 15; CN-1312, 123  
 Available information on fission isotopes, MUC-CDC #80, T III;  
 CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .

.. .. .  
 O I T O  
 .. .. .

I

## Iodine

- 8d<sup>131</sup>, Activity as a function of time, CN-528, 14, 17  
 Fission yield in U<sup>235</sup>, CC-529, 28-30; CC-1331, 10-20, 22;  
 CN-2126, 8-9; CN-2799, 2  
 Fission yield in Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8; CN-2126, 8-9;  
 CN-2799, 2  
 Homogeneous slurry pile, CC-1142, 21-22  
 Lead absorption data, CC-529, 21-22  
 Ranges of fission recoils, CN-1998, 7; CC-2076, 1-17  
 Standard absorption curves, MUC-NS #230, 4, F13-14  
 2.4h (132), Capture to fission determination, CN-528, 5-6  
 Chain 77h Te → 2.4h I, CC-763, 1-21; CC-826, 1-8  
 Chemical states, MonN-6, 8  
 Fission yield, CC-529, 28-30  
 Homogeneous slurry pile, CC-1142, 21-22  
 22h<sup>133</sup>, Fission yield in U<sup>235</sup>, CC-1331, 10-20, 22; CN-2126, 8-9  
 Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2126, 8-9  
 22h Homogeneous slurry pile, CC-1142, 21-22  
 Standard  $\gamma$  absorption curve, MUC-NS #230, 4, F14  
 54m (134), Fission yield in U<sup>235</sup>, CC-1394, 3; CC-1546, 5  
 Fission yield in Pu<sup>239</sup>, CN-1958, 1-8  
 6.7h<sup>135</sup>, CC-2219, 1-14; CC-2310, 157-166; CC-2379, 7-8  
 Cs<sup>135</sup> from I<sup>135</sup>, search, CC-2310, 193-194  
 Chains of gaseous ancestry, CC-1142, 23-26  
 Fission yield in U<sup>235</sup>, CC-1331, 10-22; CN-2126, 8-9;  
 CSN-1281m, 9; CC-2219, 1-14; CC-2310, 157-166; CC-2379, 7-8;  
 CN-2799, 2  
 Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2126, 8-9; CN-2799, 2  
 Homogeneous slurry pile, CC-1142, 21-22  
 22s (137), CP-1967, 2-9  
 Adsorption process, CN-1839, 1-15  
 Analytical procedures, CC-238-D, 3; CC0971, 30-31; CN-1312, 55-59;  
 CN-1850, 43-44; CL-697, III D, 7, 19; MUC-WR #340, 10;  
 CC-2218, 1-7; CN-2815, 45-47;  
 Available information on fission isotopes, C-200, Te; MUC-CDC #80,  
 III, IV; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Behavior in other procedures, M-CN-1854, 14-15; M-CN-1884, 10  
 $\beta$  and  $\gamma$  activity in pile products, CC-342-F, 4-6; CC-389-B, 4-10  
 Energy generation curves, CC-829, 1, F1-6, T1; CC-1042, 1-2, 4, 16-17;  
 CL-697, III D, 6, 1-31  
 BiPO<sub>4</sub> process, CN-1311, 1-16  
 Chains of gaseous ancestry, CC-465-B, 14-18  
 Chemical state of fission I, CN-2819, 12  
 Exchange studies, CC-2218, 1-7; CN-2839, 9-10  
 No long-lived I found in fission, CN-1998, 2  
 Periods and energies, preliminary, CC-196-E, 2  
 Summation study, CC-342-F, 4-6; CC-389-B, 4-10; CC-465-B, 4-8, 11-13;  
 CC-579, 6; CC-643, F1-3; CC-1394, 3  
 Tracer preparation, M-CN-1854, 16  
 Volatilization during metal dissolving, CN-933, 23-24; CN-1615, 2-19  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Iron, Search for triple fission products, CC-1767, 6-7; CC-2310, 28-30

Isotopes, Chart, CL-697, III C, 1, 2, 50

Table, CL-697, III C, 3, 2, 50

CONFIDENTIAL

A - 1

46.

K Krypton

34h<sup>79</sup>, 81 and 4.6h<sup>85</sup>, from Kr(n, γ), cross-sections and radiations, CC-2891, 2-15  
 1.9h<sup>83</sup>, growth and decay of X-ray, MonN-2, 7  
 2.5, 85.87, CC-2310, 63-69; CC-2379, 2  
 Fission yield in U235, CC-2310, 63-69  
 From Kr(n, γ), cross-sections and radiations, CC-2891, 2-15  
 Mass assignment, CN-2799, 5  
 74m<sup>87</sup>, Cross-sections of unstable nuclei, CC-2485, 5-6  
 From Kr (n, γ), cross sections and radiations, CC-2891, 2-15  
 3h<sup>88</sup>, Cross sections of unstable nuclei, CC-2485, 5-6  
 155s<sup>89</sup> and 9.3s<sup>91</sup>, Half-lives, CC-2310, 55-62  
 3.0s<sup>(92)</sup> and 2.0s<sup>95</sup>, Half lives, CC-2310, 55-62; CC-2739, 6; CN-2799, 7  
 1.4s (ancestor of 20mY), Half-life, CN-2799, 7  
 Available information on fission isotopes, C-200, T1; MHC-CDC #8 T1, III; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26; CC-1331, 35-37; CC-1767, 10; CC-1805, 1-16; CN-1998, 12-15; CN-2126, 6-7; CC-2310, 55-62; CC-2739, 6; CN-2799, 7  
 Effect of viscosity on sweeping active gases from solution, CN-2929, 6  
 Gas-sweeping apparatus for large scale collection of fission products on a charged wire, C-2998, 2-15  
 Mass spectrographic analysis of fission Kr, BM-1120, 1-3; BM-1149, 1-8; BM-1248, 1-25  
 Removal from solution with carrier gases, MonP-5, 2-15; CC-3146, 1-20  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

L Lanthanum

40h<sup>140</sup>, β energy, CC-238-D, 3; CC-298-D, 2; CP-318, 1-9; CP-2590, 11, 14-17  
 Calibration of cyclotron apparatus for γ measurements, CC-920, 11-15  
 Ce<sup>140</sup> from La<sup>140</sup>, search, CC-1142, 27; CSN-1281m, 7; CC-2485, 2-3; CC-2310, 209  
 Chains of gaseous ancestry, CC-1805, 1-16  
 From cyclotron irradiation, CC-529, 55-56  
 γ energy, CC-208-L, 2; CC-298-L, 3; CC-298-D, 2; CP-318, 1-9; LMS-142, 1-6; M-CP-2203, 4; CP-2590, 11, 14-17; CN-2819, 13; CP-3102, 10, 19  
 Independent yield, CN-1998, 4; CN-2126, 5; CC-2310, 201-205  
 Magnetic lens spectrometer, M-CP-2203, 4; C-2590, 11, 14-17; CP-3102, 10, 19  
 Mass assignment by spectrograph, CP-3028, 4; CP-3295, 2-6, 13-14  
 Standard absorption curves, MUC-NS #230, 4; F19-205  
 System 12.5d Be<sup>140</sup> → 40h La<sup>140</sup>, CC-1204, 9-11; CC-1331, 43-44  
 Th fission, CC-920, 24-27  
 5.5h<sup>141</sup>, CC-298-D, 3  
 radiations, CC-2310, 206-208  
 Th fission, CC-920, 24-27  
 20m<sup>143</sup>, parent of 33h Ce<sup>143</sup>, CN-2809, 8  
 74m, not parent of 33h Ce<sup>143</sup>, CN-2809, 8  
 Adsorption process, C-2871, 1-15; CN-2833, 2-8; CC-2720, 2-27; CN-2827, 2-35; F1-30, 19-22, 29, 6-11



. . . . .  
 . . . . .  
 . . . . .

Lanthanum (cont'd)

L

Analytical procedures, CC-258-D, 4; CC-971, 14-17; CC-1043, 7;  
 CC-1142, 10-12, 17; CN-1312, 65-91; M-CN-1404, 12; CL-CDC #4, 32-41;  
 MUC-NS #190, 7-8; CN-1850, 48-50; CC-2570, 2-21; CL-697, III D.7,  
 22-25; CC-2720, 2-27; CN-2815, 56-61; CN-2827, 2-35, F1-30;  
 CC-2845, 12-13  
 Ammonium formate to separate La from Y, CC-851, 36-37  
 Analysis in process solutions, CN-1312, 65-91; CL-CDC #4, 32-41;  
 MUC-NS #190, 7-8; CN-2815, 56-61; CC-2845, 12-13  
 Fractionation of La group rare earth activities, CC-465-B, 19-21  
 Iodate separation of Ce from other rare earths, CC-851, 32-35  
 Rapid La-Y separation by  $K_2CO_3$ , CC-1204, 20-21; MUC-WR #340, 14;  
 CN-2929, 8-9  
 Rapid Pr-Nd separation, CC-920, 30-34  
 Separation of  $La(OH)_3$  from Ba, CC-227-E, 2  
 Unsuccessful methods of separating La from Pr, CC-1683, 4  
 Available information on fission isotopes, C-200, T3; MUC-CDC #80,  
 TII, IV; CL-697, III D.1-2, 1-14; CL-CDC #8, 1-10  
 $\beta$  and  $\gamma$  activity in pile products, CC-342-F, 4-6; CC-389-B, 4-10  
 Energy generation curves, CC-579, 10; CC-829, 1, F1-6, T1; CC-1042,  
 1-2, 11, 20-29; CL-697, III D.6, 1-31  
 $BiPO_4$  process, decontamination, CN-576, 4-7; CN-692, 41-45; CN-933, 5-10;  
 CN-1141, 21; CN-1309, 1-27; CN-1311, 1-16; CN-S-1843, 1-28  
 Carrying of Zr and Cb activities on  $LaF_3$  and  $La_2(C_2O_4)_3$ , M-CN-1414, 15  
 Ce daughters of short-lived La, CC-529, 57-59; CC-579, 315  
 Cerous-ceric exchange, effect of La, CC-1331, 40-41  
 Chains of gaseous ancestry, CC-465-B, 14-18  
 Insoluble carbonates, MonN-2, 8  
 La phosphate, density, CN-1998, 8-9  
 Formula, CN-2126, 10-11  
 Solubility, CN-2126, 10-11; CC-2379, 15; CC-2485, 8; CN-2898, 2-15  
 X-ray analysis, CN-1998, 8-9  
 Lead absorption data, CC-529, 21-22  
 Pu fission, M-CN-1654, 10  
 Preparation of active La, M-CN-1424, 16; M-CN-1614, 26; M-CN-1624, 24;  
 M-CN-1634, 10; M-CN-1654, 11; M-CN-1844, 13-14; M-CN-1854, 15-16;  
 M-CN-1884, 11; M-CN-2194, 14-15; CN-2196, 2-15, F1-11; CSN-1281a, 7-8  
 Summation study, CC-342-F, 4-6; CC-389-B, 4-10; CC-465-B, 4-8, 11-13;  
 CC-579, 3-9; CC-643, 1, F1-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11;  
 CN-2126, 2, 13-14; CC-2379, 11; CC-2658, 2-24  
 Tracer preparation, M-CN-2016, 11-12; CN-2827, 2-35, F1-30  
 La-Pr-Y, CC-1050, 6, 8  
 Weight in pile material, CN-1944, 4-8; CL-697, III D.4, 1-2  
 Wet fluoride process, decontamination, CN-722, 1-3

## Lanthanum Fluoride

Coseparation of Ba with  $LaF_3$ , CC-227-E, 2; CN-528, 9-13; CC-680, 32-39  
 Coseparation of Zr and Cb with  $LaF_3$ , CN-1312, 74-81; M-CN-1414, 15  
 La, fluoride, and hydroxide equilibria, CN-1205, 46-47, 56-60  
 Solubility in  $HNO_3$ , CN-1205, 46-47, 56-60; CN-1214, 11-13  
 Surface reactions of Zr, Ba, and Te with  $LaF_3$ , CN-1641, 1-13

. . . . .  
 . . . . .  
 . . . . .

CONFIDENTIAL

L- M

48.

Lauritsen Electroscope, CC-529, 17, 24-25

Lead

Lead Carbonate, Constitution, MonN-6, 11

Lithium, Activities from Tritium bombardment in Neutron Irradiated Li Salts,  
CC-2605, 1-11

M Magnetic Lens Spectrometer, CP-2569, 2-20; CP-2590, 2-26; CP-3102, 2-14, F1-12

Mass Spectrograph, CP-2122, 1-2; CP-2927, 2-17

Mass assignments of fission products, CP-3221, 3-4; CP-3295, 2-15

Ce isotopes, CP-3070, 4

Rare earths, CP-3028, 4; CP-3070, 4

55d Sr<sup>89</sup>, CP-2796, 19-20; CP-2928, 2-9

57d Y<sup>91</sup>, CP-2926, 16-17; CP-2928, 2-9

Mesurium (43), CC-579, 11, 14-15

5.9h<sup>99</sup>, half-life, CN-2839, 10

6d, absence of 60d, CC-529, 44

Analytical procedure, CC-971, 24-26; CN-1312, 49-54; CN-1850, 52;

CL-697, III D, 7, 10

Attempt to identify long-lived activity, CC-1050, 9

Available information on fission isotopes, C-200, T1; MUC-CDC #80, T1, III;

CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10

Th fission, CC-920, 24-27

Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Methane from Graphite, CT-482-F, 1-3

Molybdenum

67h<sup>99</sup>,  $\beta$  energy, CN-2126, 5; CC-2310, 102-105

Chains of gaseous ancestry, CC-3146, 1-20

Fission yield in U<sup>235</sup>, CN-2799, 2

Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4

Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2799, 2

Absolute slow and fast yields, CN-2929, 2

$\gamma$  ray spectrum by means of thin magnetic lens spectrometer,

CP-3102, 14

July 16th nuclear explosion, determination of nuclear efficiency,

La-356, 2-45

Absence in fission of long-lived Mo isotopes, M-CN-1844, 13;

CC-2310, 102-105

Analytical procedures, CC-971, 22-23; CN-1850, 56-57; CL-697, III D, 7, 9;

MUC-WR #340, 2-4; CN-1312, 43-54

Analysis in process solutions, CN-1312, 43-48

Available information on fission isotopes, C-200, T1; MUC-CDC #80, T1, III;

CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10

BiPO<sub>4</sub> process, decontamination, CN-1309, 5; CN-1311, 1-16

Cb isotopes from Mo, CC-2345, 1-17

CONFIDENTIAL

CONFIDENTIAL

. . . . .  
 . . . . .  
 . . . . .

M - N

49.

## Molybdenum (cont'd)

Energy generation curves, CC-579, 10; CC-829, 1, Fl-6, T1  
 Pu fission, M-CN-1844, 13; CN-1958, 1-8; CN-2799, 2; CN-2929, 2  
 Summation study, CC-342-E, 4-6; CC-465-B, 4-8, 11-13; CC-643, 1, Fl-3  
 Th fission, CC-920, 24-27  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

N

## Neodymium

11d<sup>147</sup>, M-CN-1654, 9-10; M-CN-2184, 11; CN-2809, 9; CC-2829, 2-20;  
 CN-2929, 5  
 Identification by adsorption column, CN-2809, 9; CC-2829, 2-20  
 Mass assignment, by spectrograph, CP-3221, 3; CP-3295, 6-12  
 1.8h (149) From fission yield, MonN-15, 13  
 from (n,  $\gamma$ ), CN-2809, 9; MonN-6, 9  
 Identified by adsorption column, MonN-6, 9  
 Adsorption process, CC-2720, 2-27; CN-2809, 9; CN-2827, 2-35, Fl-30;  
 CC-2829, 2-20  
 Analytical procedures, CC-2720, 2-27; CN-2815, 56-61; CN-2827, 2-35; Fl-30;  
 CC-2829, 2-20  
 Pr-Nd separation, CC-920, 30-34  
 Separation by K<sub>2</sub>CO<sub>3</sub>, CN-2929, 8-9  
 Available information on fission isotopes, MUC-CDC #80, TII; CL-697, III D,  
 1-2, 1-14; CL-CDC #8, 1-10  
 BiPO<sub>4</sub> process, decontamination, CN-692a 4k-45; CN-1141, 21  
 Isotope enrichment by adsorption columns as measured by mass spectrograph,  
 CF-3070, 4  
 Short-lived Nd daughter of long-lived Pr, absence, CC-465-B, 21  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Neptunium, MUC-CDC #80, TIV; CL-697, III D, 2, 10  
 2.2x10<sup>13</sup> y, production in piles, CC-1767, 9  
 2.0d<sup>238</sup>, conversion electrons perdisintegration, CC-3993, 5  
 Analytical procedures, CN-1850, 58; MonN-13, 2-19  
 Capture to fission ratio, CN-528, 7-8  
 Contamination in 11h Y fraction, CC-529, 39-40  
 Y dosage, CN-528, 14-15  
 homogeneous slurry pile, CC-1142, 18-19  
 Summation study, CC-465-B, 4-7; CC-643, 1, Fl-2  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

## Neutrons

Activities from tritium bombardment in neutron irradiated Li salts,  
 CC-2605, 1-11  
 Activation cross-sections, CP-2376, 1-25  
 Delayed neutrons from fission of U<sup>235</sup>, CP-3147, 1-8  
 From fission of U<sup>235</sup>, CP-1967, 2-9; CK-2310, 1-12; CP-3094, 1-30  
 From fission Pu<sup>239</sup>, CK-2318, 1-12  
 Determination of absolute neutron flux, CP-2825, 2-16  
 Induced radioactivity  
 In air, CC-465-B, 18-19  
 In water, CH-774, 2-5; CC-1306, 2-7  
 Monitoring at St. Louis cyclotron, CN-772, 1-23  
 Yield of U<sup>237</sup>, CC-529, 15-16

. . . . .  
 . . . . .  
 . . . . .

U. S. G. O.  
 O. I. D.

N - O - P

50.

Nitric Acid, Oxidation of Ferrous Ion, CN-850, 10-13

Nitrogen

$^{16}\text{S}$  in air from pile, CC-465-B, 18  
 In water, M-CN-1624, 23; CC-1631, 2-4, 8-10  
 Capture by nitrogen in UNH, CN-771, 12-13  
 $\text{C}^{14}$  from  $\text{N}^{14}$  in UNH, CC-680, 30-31  
 From urea in water, CC-1306, 1-7  
 Gases from graphite, CT-482-F, 1-3

Nuclear Efficiency

July 16th nuclear explosion, LA-356, 2-45  
 100-ton test, LA-282, 2-10; LA-282A, 2-3; LA-290, 2-22

O

Oxalic Acid

Activity in pile bombarded water, CC-1306, 1-7; M-CN-1414, 16  
 Activity in pile bombarded water, CC-1306, 1-7;

Oxygen

$^{19}\text{O}$  in air from pile, CC-465-B, 18-19  
 Capture by oxygen in UNH, CN-771, 12-13  
 Gases from graphite, CT-482-F, 1-3  
 Pile bombarded water, CC-1306, 1-7

P

P-9 (Homogeneous Slurry Pile), CC-988, 8-9; CC-1142, 18-22

Palladium, CC-1204, 22-26

13.4h  $^{109}\text{Pd}$ , CN-1911, 2-3; CC-2310, 110-124; CC-2379, 3  
 Fission yield in  $\text{U}^{235}$ , CN-1911, 2-3; CC-2310, 110-124; CN-2799, 2  
 Fission yield in  $\text{Pu}^{239}$ , CN-2799, 2  
 Absolute slow and fast yields, CN-2929, 2  
 21h  $^{112}\text{Pd}$ , CN-1911, 2-3; CC-2310, 110-124; CC-2379, 3  
 Fission yield in  $\text{U}^{235}$ , CN-1911, 2-3; CC-2310, 110-124; CN-2799, 2  
 Fission yield in  $\text{Pu}^{239}$ , CN-2799, 2  
 Analytical procedures, MUC-NS #200, 7; CL-697, III D, 7, 12; CN-1312, 49-54,  
 120-121  
 Available information on fission isotopes, MUC-CDC #80, TIII; CL-697, III D,  
 1-2, 1-14; CL-CDC #8, 1-10  
 Chemistry of gas and peroxide formation induced by radiation in water  
 solutions, CN-2809, 15; CN-2819, 20-21; CN-2839, 17-18; MonN-2, 16  
 Fast neutron fission, C-200, T2  
 Long-lived Pd isotopes, absence in fission, CC-1767, 8; M-CN-1344, 13;  
 CC-2310, 125  
 Very short-lived Pd daughter of  $^{57\text{m}}\text{Rh}$ , search for, CC-680, 13  
 Weight in pile material, CN-1044, 4-8; CL697, III D, 4, 1-2

Phosphorus

14.3d  $^{32}\text{P}$ , apparent  $\lambda$  activity, M-CN-1424, 16  
 As  $\beta$  source for determining counting geometry, CC-851, 14-27  
 $\text{P}^{33}$ , attempted preparation from tritium bombardment in neutron irradiated  
 Li salts, CC-2605, 5-6

Photoelectrons, CC-529, 19

U. S. G. O.

O. I. D.

U. S. G. O.  
O. F. I. O.

51.

P

File Poisoning by Fission Products, CP-2192, 1-17; CP-2468, 2-23  
 9.2h  $Xe^{135}$ , cross-section, CC-1993, 2-3; M-CN-2194, 17-18; CC-2379, 7-9;  
 CC-2485, 5-6; CP-2600, 2-10; CP-2620, 2-7; CP-2782, 2-5  
 Dependence on neutron temperature, CP-2805, 2-9  
 Short-lived fission products, CP-2192, 1-17

## File Studies, CC-1204, 27

Breeders and converters, A-670, 1-13  
 Physico-chemical problems associated with homogeneous piles,  
 A-670, 1-13; MonN-2, 8; MonN-15, 13-15

## Plutonium (refer also to Bismuth Phosphate Process)

Abstracts of analytical methods, CN-1850, 65-67  
 Adsorption process, CN-1873, 2-118; CN-2827, 2-35, F1-30  
 Calorimetric determination of product-power ratio and fission energy,  
 CF-2773, 2-15  
 Capture to fission ratio, CN-465-B, 8-10; CN-528, 2-8; CN-1141, 5-8;  
 CN-1911, 4; CN-1917, 1-4  
 Chains of gaseous ancestry, CC-3146, 1-20  
 Delayed neutron, CK-2318, 1-12  
 Energy of fission from recoil ranges, CK-1806, 11  
 Fission products, M-CN-1654, 10; CN-1840, 1-5; M-CN-1844, 13; CN-1911, 6  
 Fission yields, CN-1958, 1-8  
 Absolute slow and fast yields, CN-2929, 2  
 Relative slow yields, CN-2799, 2  
 Homogeneous slurry pile, CC-1142, 18-19  
 Jantschke type experiment, CN-1840, 1-5  
 July 16th nuclear explosion, determination of nuclear efficiency,  
 LA-356, 2-45  
 Monitoring at St. Louis cyclotron, CN-771, 1-23  
 100-ton test, LA-290, 2-22  
 Preparation of thin films, CN-3328, 2-46  
 Ranges of fission recoils, CK-1806, 1-14  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Pneumatic Transfer Tube at the Pile, CC-1112, 21-22

Positron Emitters, Absence in Fission, CC-920, 51-53; CC-2283, 14

## Praseodymium

13.5d<sup>143</sup>, CC-298-D, 3; CC-529, 70-73; CC-465-B, 23-24

Absence of  $\gamma$ , M-CN-1844, 13

Chains of gaseous ancestry, CC-1805, 1-16

Energy, CC-680, 13, 16, 20

Fission yield in  $Pu^{239}$ , CN-1958, 1-8

Fractionation into two activities, CC-465-B, 20-21

Identification, CC-389-B, 11-13; CC-465-B, 20-21; CC-529, 66-69

Mass assignment by spectrograph, CP-3295, 6-15

Standard  $\beta$  absorption curve, MUC-NS-#230, 4, F19, 23

Tracer preparation, MonC-11, 2-5

17.5m<sup>144</sup>, CC-465-B, 24

Chains of gaseous ancestry, CC-1805, 1-16

Identified as  $\gamma$  emitter in  $U^{238}$  chain, CC-2310, 213-223; CC-2485, 2

Mass assignment by spectrograph, CP-3295, 6-15

Spectrum by means of  $\beta$  spectrometer, CP-2160, 12-15; CC-2283, 2-3, 8-10

.. . . . .  
 : : : : :  
 : : : : :  
 : : : : :  
 : : : : :

P - R

## Frasesodymium (cont.)

4.5h (145), CC-298-D, 3; CC-529, 59-65  
 Radiations, CC-2310, 224-226  
 25m (146), CN-2799, 4; CN-2929, 6  
 55d, ghost Ce parent of 55d Fr, CC-1204, 13, 15  
 Adsorption process, CC-2720, 2-27; CN-2827, 2-35, Fl-30; CC-2829, 6-11  
 Analytical procedures, CC-389-B, 11-13; CC-920, 30-34; CC-971, 14-17;  
 CL-697, III D, 7, 23-25; CN-1312, 65-91; M-CN-1404, 12; CL-CDC #4, 32-41;  
 MUC-NS #190, 7-8; CC-2720, 2-27; CN-2815, 56-61; CN-2827, 2-35, Fl-30;  
 CC-2829, 6-11  
 Separation by  $K_2CO_3$ , MUC-VR #340, 14; CN-2929, 8-9  
 Unsuccessful methods of separating La from Fr, CC-1683, 4  
 Available information on fission isotopes, MUC-CDC #80, TII, IV;  
 CL-CDC #8, 1-10  
 $BiPO_4$  process, decontamination, CN-576, 4-7; CN-692, 41-45; CN-1309, 1-27  
 Ce in fission chains, CC-579, 15  
 Chains of gaseous ancestry, CC-465-B, 14-18  
 Daughter of fairly long-lived Ce, CC-1112, 17  
 Energy generation curves, CC-829, 1, Fl-6, T1; CC-1042, 1-2, 13, 32;  
 CL-697, III D, 6, 1-31  
 Pu fission, M-CN-1654, 10  
 Summation study, CC-389-B, 4-10; CC-465-B, 4-8, 11-13; CC-579, 3-5, 7;  
 CC-643, 1, Fl-3; CC-2658, 2-24  
 Tracer preparation, CN-2827, 2-35, Fl-30  
 La-Pr-Y, CC-1050, 6  
 "Trans-cerium" activities, CC-680, 22-25  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2  
 Wet fluoride process, decontamination, CN-722, 1-3

## Project Handbook

Information on fission products, CL-697, III C-D

## Protoactinium

Abstract of analytical methods, CN-1850, 70  
 Isolation of fission activities in Th fission, interference by, CC-793, 17-21

R

## Radiation Chemistry

Effect of radiation on  $BiPO_4$  process, CN-1307, 1-12  
 Effect on glass and masonite, CC-1109, 2-5; CC-1204, 40  
 Effect on water and aqueous solutions, CC-1310, 1-11; M-CN-1404, 11;  
 M-CN-1624, 23; CN-2809, 15; CN-2819, 20-21; CN-2839, 17-18; MonN-2, 16  
 Irradiation of  $Pb(NO_3)_2$  solution and graphite, CC-1204, 40  
 Reduction of dichromate ion by radiation, M-CN-1624, 26; M-CN-1634, 12;  
 M-CN-1654, 12; M-CN-1844, 15; M-CN-1854, 17

## Radium

## RaE

Analytical procedure, CP-2825, 7-10  
 Determination of geometry, CP-2825, 7-10  
 Preparation of reference standards, CP-2825, 7-10  
 Variation of  $\beta$  scattering as function of thickness of backscatterer,  
 CCN-1919, 2; 7  
 Isolation of isotopes in Th studies, CC-793, 17-21

SECRET

53.

R

## Rare Earths (also under individual elements)

Activities on W corrosion experimental pipe, M-CN-1624, 23  
 Activity in ether extract of irradiated UNM, CC-1112, 13-14  
 Activity on pile graphite, CC-988, 13  
 Adsorption process, CC-2720, 2-27; CN-2827, 2-35, F1-30; CC-2829, 2-20;  
 Analytical procedures, CC-920, 28-34; CC-971, 9-17; CC-1043, 4-7;  
 CC-1142, 8-12, 16-17; CL-CDC #4, 32-41; MUC-NS #190, 7-8; CL-697,  
 III D, 7, 23-25; CN-1312, 65-96; M-CN-1414, 15; CC-2720, 2-27;  
 CN-2815, 48-61; CN-2827, 2-35, F1-30; CC-2829, 2-20; CC-2845, 2-13  
 Analysis in process solutions, CC-988, 3; CN-1051, 13; CL-CDC #4,  
 32-41; MUC-NS #190, 7-8; CN-1312, 65-96; M-CN-1414, 15; CN-2815,  
 48-61  
 Y-LA-Pr-Nd separations by  $K_2CO_3$ , MUC-NS #340, 14; CN-2929, 8-9  
 $BiPO_4$  process, decontamination, CN-1309, 1-27; CN-1311, 1-16; CN-S-1843,  
 1-28  
 Carrying by  $BiPO_4$  and  $LaF_3$ , CN-1051, 18  
 Mass assignment by spectrograph, CP-3028, 4; CP-3070, 4; CP-3221, 3-4;  
 CP-3295, 2-15  
 Summary of rare earth fission problems, CC-529, 70-73  
 Th fission, rare earth separations, CC-793, 19-20  
 "Trans-cerium" activities (most of the unknown activities in these  
 references were later identified and are listed under the  
 appropriate element), MC-11, 5-6; CC-680, 22-25; M-CN-1424, 12;  
 M-CN-1634, 9; M-CN-1654, 9-10; M-CN-2034, 13; M-CN-2126, 2;  
 M-CN-2184, 11

## Recoil Products

In cooling gas, CC-465-B, 18-19  
 Amount in He pile, CC-418-B, 6-8  
 Apparatus, CC-258-D, 6; CA-287; CC-389-B, 15-19  
 Decay curves gas and solids, CC-389-B, 15-19  
 In water from AC pipes, CH-774, 2-5

## Rhodium, CC-680, 9-15; CC-1493, 1-63

$57m^{103}$ , CC-579, 11-13a; CC-1204, 13-15; CN-2596, 10-11  
 $36.5h^{105}$ , fission yield in  $Pu^{239}$ , CN-2799, 2  
 Th fission, CC-920, 24-27  
 $30s^{106}$ , CC-579, 11-13a; CC-920, 43, 47  
 Energy generation curves, CC-1042, 1-2, 6, 20-21; CL-697, III D, 6, 1-31  
 Radiations of 1.0y  $Ru^{106} \rightarrow 30s Rh^{106}$  chain, M-CC-1776, 1-3  
 $24m^{107}$ , M-CN-2184, 11  
 9h, M-CN-2034, 13  
 Analytical procedures, MUC-NS #200, 6; CL-697, III D, 7, 11; CN-1312,  
 49-54, 100-111; CN-1850, 72  
 Analysis in process solutions, CN-1312, 100-111  
 Behavior of I tracer, M-CN-1884, 10  
 Carrying of Rh activity by Rh carrier, CC-1767, 4  
 Extraction with pyridine, M-CN-1654, 9; M-CN-1854, 15  
 Separation of Rh from Te, M-CN-1404, 12; M-CN-1414, 14; CC-1546, 3;  
 M-CN-1614, 23; M-CN-1624, 22; M-CN-1634, 7-8  
 Available information on fission isotopes, MUC-CDC #80, TI, III;  
 CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 $BiPO_4$  process, CN-1309, 2; CN-1311, 1-16





U.S. GOVERNMENT  
 PRINTING OFFICE

55.

R - S  
~~SECRET~~

Short-lived contaminants, no interference, M-CN-2184, 10  
 Use of  $\text{NaBiO}_3$ , M-CN-2034, 12  
 Available information on fission isotopes, MUC-CFC #80, TI, III;  
 CL-697, III L, 1-2, 1-14; CL-CDC #8, 1-10  
 $\beta$  and  $\gamma$  activity in pile products, CC-342-F, 4-6; CC-389-B, 4, 6-10  
 $\text{BiPO}_4$  process, carrying by  $\text{BiPO}_4$ , CN-1205, 62-64  
 Decontamination, CN-576, 4-7; CN-692, 41-45; CN-850, 8-9, 11;  
 CN-933, 5-8, 10; CN-989, 14; CN-1141, 10-12, 21; CN-1309, 2-5;  
 CN-1311, 1-16  
 Survey of Ru decontamination, CN-1214, 9-10  
 Chemistry of Ru, CC-2828, 2-8  
 Contamination of 43 activities, CC-529, 44  
 Fast neutron fission, C-200, T2  
 Pu fission, M-CN-1654, 10; CN-1911, 6; CN-1958, 1-8; CN-2799, 2  
 Summation study, CC-342-F, 4-6; CC-389-B, 4, 6-10; CC-465-B, 4-8, 11-13;  
 CC-579, 3-9; CC-643, 1, F1-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11;  
 CN-2126, 13-14; CC-2379, 11; CC-2658, 2-24  
 Tracer preparation, CN-1141, 21  
 Carrier free, CC-1050, 7; CC-2828, 2-8  
 Volatilization during metal dissolving, CN-933, 23-24  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2  
 Wet fluoride process, decontamination, CN-722, 1-3

### 16 Samarium

Long-lived  $^{151}\text{Sm}$ , from (n,  $\alpha$ ) on Sm, MonN-15, 13  
 Mass assignment by spectrograph, CP-3221, 4; CP-3295, 10-13  
 $^{153}\text{Sm}$  (47h), CN-2799, 5-6; CC-2966, 2-13  
 Fission yield in  $\text{U}^{235}$ , CC-2966, 2-13  
 Fission yield in  $\text{Pu}^{239}$ , CN-2799, 2  
 Absolute slow and fast yields, CN-2929, 2  
 From (n,  $\gamma$ ) on Sm,  $\beta$  energy, CN-2809, 9  
 $\gamma$  spectrum by means of thin magnetic lens spectrometer, CP-3102,  
 11, F10  
 July 16th nuclear explosion, determination of nuclear efficiency,  
 LA-356, 2-45  
 $^{155}\text{Sm}$  ( $^{23}\text{m}$ ), from (n,  $\gamma$ ) on Sm, CN-2809, 9  
 $^{156}\text{Sm}$  (10h), direct verification in fission, CC-2966, 3-5, 12  
 From early separation of 15.4d  $\text{Eu}(^{156})$ , CC-2310, 233-234  
 Absence of 60d activity in neutron irradiated Sm, CP-2301, 22; CC-2966, 3  
 Adsorption process, CC-2720, 2-27  
 Analytical procedure, CC-2485, 6; MUC-WR ##40, 14-17; CC-2966, 4-5  
 Separation with Y in La-Y separation, M-CN-2184, 10  
 Available information on fission isotopes, CL-CDC #8, 1-10  
 "Trans-cerium" activities, CC-680, 22-25  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Scandium, Absence of Triple Fission Products, CC-1767, 6-7; CC-2310, 26-27

### Scattering

$\rho$  radiation, CC-529, 17-23; CC-851, 14-27; CC-1152, 21; CC-1204, 28-36;  
 CC-1683, 7; CCN-1919, 1-7  
 $\gamma$  radiation, CC-529, 17-23.

U.S. GOVERNMENT

PRINTING OFFICE

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

S

## Selenium

115d<sup>75</sup>, radiations and exchange studies, CN-2839, 9  
 18m<sup>79,81</sup>, presence in fission, extraction from 57m Se parent by  
 CS<sub>2</sub>, MonN-6, 9  
 Th fission, CC-920, 24-27  
 57m<sup>79,81</sup>, MonN-6, 9  
 25m<sup>83</sup>, chemical and exchange studies, CN-2819, 12; MonN-15, 12  
 γ radiations, MonN-2, 7  
 Half-life and energy, CN-2839, 10  
 Independent fission yield along chain, MonN-15, 12-13  
 Th fission, CC-920, 24-27  
 Absence in fission of Se isotopes with half-lives greater than 57 minutes,  
 CC-1683, 2; CC-1767, 8; M-CN-1844, 13; CN-1911, 3; CC-2310, 49-51  
 Analytical procedures, CL-CDC #4, 24-25, 29-31; MUC-NS #200, 4-5;  
 CL-697, III D, 7, 3; CN-1312, 49-54; 112-115  
 Contamination by Te, M-CN-1414, 14  
 Available information on fission isotopes, MUC-CDC #80, TI, III;  
 CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Chemical and exchange studies, CN-2819, 12; CN-2839, 9; MonN-2, 7;  
 MonN-15, 12  
 Discovery in U and Th fission, CC-920, 35-42  
 Szilard-Chalmers reaction to prepare tracer, MonN-6, 9; MonN-15, 12  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

## Short-lived Chains

Qualitative estimate of yield, CC-529, 13-14

## Silver

7.5d<sup>111</sup>, CC-1331, 23-25  
 Fission yield in U<sup>235</sup>, CN-1911, 3; CN-2799, 2  
 Fission yield in U<sup>238</sup>, CC-2379, 5-6; CC-2485, 4  
 Fission yield in Pu<sup>239</sup>, CN-1911, 6; CN-1958, 1-8; CN-2799, 2  
 Standard absorption curve, MUC-NS #230, 4, F9  
 3.2h<sup>112</sup>, CN-1911, 2-3; CC-2310, 110-124; CC-2379, 3  
 Analytical procedures, CC-971, 27; MUC-NS #184, 1-2; CL-697, III D, u, 13;  
 CN-1312, 49-54, 116-119  
 Behavior of I tracer, M-CN-1884, 10  
 Precipitation of Ag<sub>2</sub>S, M-CN-1844, 12  
 Available information on fission isotopes, MUC-CDC #80, TIII; CL-697, III D,  
 1-2, 1-14; CL-CDC #8, 1-10  
 Extraction of Ag in presence of ClO<sub>4</sub>, M-CN-1854, 15  
 Fast neutron fission, C-200, T2  
 Fission products in the Pb-Sb range, CC-1204, 22-26  
 Pu fission, M-CN-1654, 10; CN-1911, 6; CN-1958, 1-8; CN-2799, 2  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

Sodium, Pile Irradiation, M-CN-1424, 15

## Strontium

55d<sup>89</sup>, β backscattering, as a function of thickness of backscatterer,  
 CCN-1919, 3, 7

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .





Tellurium (cont'd)

Adsorption process, CN-1839, 1-15  
 Analytical procedures, CC-971, 23-29; CL-CDC #4, 24-25, 29-31; MUC-NS #190, 3-6; CL-697, III D, 7, 18; CN-1312, 39-42, 49-54; CN-1850, 82-83; CN-2185, 38-40  
 Analysis in process solutions, CC-988, 3; CL-CDC #4, 24-25, 29-31; MUC-NS #190, 3-6; CN-1312, 39-42; CN-2815, 38-40  
 Contamination, CC-1050, 10-10b; M-CN-1404, 12, M-CN-1854, 15  
 Rh hold-back effect in SO<sub>2</sub> reduction, M-CN-1414, 14  
 Separation from Rh, CN-1312, 100-111; M-CN-1404, 12; CC-1546, 3; M-CN-1614, 23; M-CN-1624, 22; M-CN-1634, 7-8  
 Available information on fission isotopes, C-200, T3; MUC-CDC #80, TII, IV; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 $\beta$  and  $\gamma$  activity in pile products, CC-342-F, 4-6; CC-389-B, 6-10  
 BiPO<sub>4</sub> process, decontamination, CN-576, 4-7; CN-692, 41-45; CN-933, 5-8; CN-1309, 2-5; CN-1311, 1-16  
 Carrying on MnO<sub>2</sub>, M-CN-1424, 13; CN-1641, 12  
 Chemical studies of radioactive Te, CN-2819, 12; MonN-2, 7; MonN-6, 708  
 Contamination in Cb coprecipitation on MnO<sub>2</sub>, CC-1112, 9-10  
 Contamination in Se procedure, M-CN-1414, 14  
 Contamination in Zr-Cb procedure, CN-1998, 3  
 Energy generation curves, CC-829, 1, Fl-6, T1; CL-697, III D, 6, 1-31  
 Homogeneous slurry pile, CC-1142, 21-22  
 Long-lived activities, CC-1050, 10-10b  
 Pu fission, M-CN-1654, 10  
 Preparation of I tracer from pile bombarded Te, M-CN-1854, 16  
 Short-lived activities, CC-196-F, 1; CSN-1281m, 7  
 Summation study, CC-342-F, 4-6; CC-389-B, 4, 6-10; CC-465-B, 4-8; CC-579, 3-9, CC-643, 1, Fl-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11; CN-2126, 13-14; CC-2379, 11; CC-2658, 2-24  
 Volatilization during metal dissolving, CN-933, 23-24  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2  
 Wet fluoride process, decontamination, CN-722, 1-3

## Thorium

Abstracts of analytical methods, CN-1850, 34  
 Th fission, CC-793, 17-21; CP-844, 1-11; CC-920, 24-27, 25-42

Thoron, Sweeping of Active Gases from Solution, CN-2929, 6

## Tin

10d(121), CN-1998, 3; CN-2126, 3; CC-2310, 145-154  
 Fission yield in U<sup>235</sup>, CN-2126, 3; CC-2310, 145-154  
 62h(123), CN-2126, 3; CC-2310, 145-154; CC-2379, 4  
 Fission yield in U<sup>235</sup>, CC-2310, 145-154; CN-2799, 2  
 Fission yield in Pu<sup>239</sup>, CN-2799, 2  
 70m(126), CN-2126, 3; CC-2310, 145-154; CC-2379, 4  
 Fission yield in U<sup>235</sup>, CC-2310, 145-154  
 Analytical procedures, MUC-NS #200, 8-9; CL-697, III D, 7, 16; CN-1312, 49-54  
 Available information on fission isotopes, MUC-CDC #80, TIII; CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Fission products in the Pd-Sb range, CC-1204, 22-26  
 Long-lived activity, possibility, CC-529, 48  
 Pu fission, M-CN-1844, 13; CN-2799, 2

## Triple Fission Products

Absence, CC-1767, 6-7; CN-1998, 3; CC-2310, 18-36  
 None observed in U<sup>235</sup> fission fragments in photographic emulsion,  
 LA-427, 2-7

## Tritium

Activities from tritium bombardment in n-irradiated Li salts,  
 CC-2605, 1-11  
 Preparation, M-CN-1844, 15; M-CN-2016, 12-13; M-CN-2184, 13;  
 M-CN-2194, 16-17; CSN-1281m, 9

## U

## Uranium

Mass 233, delayed neutrons, CP-3147, 1-8  
 Mass 235, available information on fission isotopes, CL-697, III D, 1-2,  
 1-14; CL-CDC #8, 1-10  
 Branching ratio of Be<sup>139</sup> and Be<sup>140</sup>, BM-429, 1-14  
 Calorimetric determination of product-power ratio and of fission  
 energy, CF-2773, 2-15  
 Capture to fission ratio, CC-465-B, 8-10; CN-528, 2-8; CN-989, 3-5;  
 CN-1141, 5-8; CN-1911, 4; CN-1917, 1-4; CN-1998, 5; CN-2044,  
 1-10; CF-2773, 2-15  
 Change in specific activity in enriched U sample, CC-1394, 2  
 Delayed neutrons, CK-2318, 1-12; CP-3094, 1-30  
 Jentschke type, experiment, CN-1840, 1-5  
 Range of fission recoils, LA-427, 2-7; CK-1806, 1-14  
 as a function of mass number, CC-2076, 1-17  
 Stopping power of various substances, LA-64, 2-13  
 Short-period delayed  $\gamma$ 's, LA-253, 2-15  
 Mass 236, CC-1204, 16-18  
 Absorption cross-section, CC-2485, 7; CP-3166, 1-10  
 6.8d<sup>237</sup>, coincidence experiments, CC-2739, 4  
 Ether extraction residues as source, M-CN-1414, 16  
 Half-life, energy, CC-724, 3-9  
 Production by cyclotron, CC-920, 49, 51; CC-1546, 2  
 Production in piles, CC-529, 15-16; CC-1331, 30-34; CC-1546, 2;  
 CC-1767, 9  
 Szilard-Chalmers methods for securing, CN-2819, 14; CN-2833, 2-14  
 Mass 238, branching ratio of Be<sup>139</sup> and Be<sup>140</sup>, BM-429, 1-14  
 Capture to fission ratio, cf. mass 235  
 Fission yields, CC-2379, 5-6; CC-2485, 4  
 23.5m<sup>239</sup>, AUC-CDC #80, TIV; CL-697, III D, 2, 10  
 Capture yield, CN-771, 3  
 Homogeneous slurry pile, CC-988, 8-9; CC-1142, 18-19  
 Monitoring at St. Louis cyclotron, CN-771, 1-23  
 UF<sub>6</sub> method of preparing enriched U<sup>239</sup>, M-CN-1614, 28; M-CN-1624,  
 25-26  
 Adsorption process, CN-2827, 2-35, FI-30  
 Analytical procedure, CN-771, 3  
 Counter current ether extraction column, CN-1055, 3  
 Homogeneous piles, physico-chemical problems, MonN-2, 8; MonN-6, 9-11;  
 MonN-15, 13-15  
 Hydrolysis and complex ion formation, CN-S-1878, 14-18  
 Preparation of thin films, CN-3328, 2-46  
 Uranium carbonyl, possibility of formation, C-144  
 Uranous sulfate, method of preparation, CN-1044, 18  
 Uranyl nitrate, mean activity coefficient, M-CN-1424, 14  
 Uranyl phosphate, solubility in UNH solutions, CN-2195, 1-28

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

U

Uranium X

Analytical procedures, CC-793, 22; CC-851, 28-31; CC-971, 34-36;  
 CC-1043, 7; CC-1142, 8-9, 17; CN-1312, 97-99; CP-2825, 7-10

β activity

Determination of coating thickness, MUC-CDC #7, 1-7  
 Geometry determination, UX as source, CC-851, 14-27;  
 CP-2825, 7-10

Preparation of reference standards, CP-2825, 7-10

Range of UX,  $\beta$ 's, MUC-CDC #7, 3

Standard  $\beta$  absorption curve, MUC-NS #230, 4, F26

UX<sub>2</sub> radiation, CC-1050, 11-12b

BiPO<sub>4</sub> process, decontamination, CN-692, 41-45; CN-1141, 9-10

Contribution to total activity, CC-465-B, 5-6

Ether extract of irradiated UNH, CC-1112, 13-14

Removal from pile material, CC-529, 15-16

Wet fluoride process, decontamination, CN-722, 1-3

Zr iodate as carrier, CC-920, 28-29

FWater

Activities induced in solid residues from Columbia River water,  
 CC-1308, 2-8

Chemistry of gas and peroxide formation induced by radiation,

CN-2809, 15; CN-2819, 20-21; CN-2839, 17-18; MonN-2, 16

Effect of radiation, CC-1310, 1-11; M-CN-1404, 11

Induced radioactivity, CH-774, 2-5; M-CN-1434, 17

Short-lived activities, CC-1306, 1-7; M-CN-1414, 16; M-CN-1624, 23;  
 CC-1631, 2-10

Recoil from Al pipes, CH-774, 2-5; CC-1631, 2-10

Wet Fluoride Process

Coseparation of Ba with LaF<sub>3</sub>, CN-528, 9-13; CC-680, 32-39

Decontamination, CN-722, 1-3

XXenon

<sup>34d</sup><sup>127</sup> energy of radiations, CC-389-B, 14

<sup>5.5d</sup><sup>133</sup>, CC-342-F, 6-8

Energy dissipation, CC-465-B, 13-14; CN-528, 14, 16-17

Half-life, CN-1998, 2; CN-2126, 2; CC-2310, 170-184

Radiations, CC-342-F, 7; CC-2310, 170-184

Yield, CC-342-F, 7

<sup>12n</sup><sup>135</sup> independent yield, branching ratio, CC-2379, 7-9

<sup>9.2h</sup><sup>135</sup>, branching ratio, CC-2379, 7-9

Cross-section, CC-1993, 2-3; CC-2187, 1-5; M-CN-2194, 17418;

CC-2485, 3, 5; CP-2600, 2-10; CP-2620, 2-7; CP-2782, 2-15

Dependence of cross-section on neutron temperature, CP-2805, 2-9

Fission yield in U<sup>235</sup>, CC-1993, 3; CN-2799, 2

Fission yield in Pu<sup>239</sup>, CN-2799, 2

Half-life and  $\beta$  radiations, CC-2310, 185-187; CC-2379, 7-9

Independent yield in fission, CC-2310, 188-192; CC-2379, 7-9;

CN-2799, 8; CC-2007, 2-9

File poisoning due to short lived fission products, CP-2192, 1-17

Search for Cs<sup>135</sup> from Xe<sup>135</sup>, CC-2310, 195

. . . . .  
 . . . . .  
 . . . . .

. . . . .  
 . . . . .  
 . . . . .

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

S X

62.

## Xenon (cont'd)

Mass <sup>136</sup>, cross-section, CC-2310, 196-197; CC-2485, 3, 5  
 3.4m<sup>137</sup>, mass assignment of <sup>135</sup>Ce<sup>137</sup>, CC-2310, 196-197  
 41s<sup>139</sup>, half-life, CN-1911, 5; CC-2310, 167-169  
 16s<sup>140</sup>, half-life, CC-2310, 167-169  
 ~1.3s<sup>143</sup>, half-life, CN-2799, 7  
 ~0.8s (145) (ancestor of 1.8h Ce (145)), CN-2799, 7  
 Adsorption on charcoals at room temperature, CC-3106, 1-18  
 Analytical procedures, abstracts, CN-1850, 93  
     Separation from Kr, CC-2310, 63-64  
 Available information on fission isotopes, C-200, T3; MUC-CDC #80, TII, IV;  
     CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10  
 Chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26;  
     CC-1331, 35-37; CC-1767, 10; CC-1805, 1-16; CN-1911, 5;  
     CN-1998, 12-15; CN-2126, 6-7; CC-2310, 167-169; CN-2799, 7;  
     CC-3146, 1-20  
 Diffusion in UU in temperature range from 925°C to 1100°C, CP-3028, 5  
 Elementary distribution up to 110 days cooling, CC-465-B, 4-7  
 Mass spectrographic analysis of Xe from fission, BM-1149, 1-8;  
     BM-1248, 1-25  
     Isotopic abundances and some relative branching chain ratios,  
     for U<sup>235</sup> fission, BM-1120, 1-9  
 Production of Xe isotopes by neutron activation, CC-2409, 1-12  
 Sweeping from solution, MonN-2, 16-17; MonP-5, 2-15  
     Apparatus for large-scale collection of fission products on a  
     charged wire, CC-2998, 2-15  
     Effect of viscosity, CN-2929, 6  
     From solutions of U and Pu, CC-3146, 1-20  
     Off gas activities from metal solution step, CN-1615, 2-19  
 Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2

## X-Radiation

Energy-absorption curves, C-200, 4-5

Y

## Yttrium

60h<sup>90</sup>, amount of  $\beta$  backscattering as a function of thickness of  
     backscatterer, CCN-1919, 6-7  
      $\beta$  spectrum by 1800 spectrometer, CC-2283, 2-6  
     Chains of gaseous ancestry, CC-1805, 1-16; CC-3146, 1-20  
     Fission yield in U<sup>235</sup>, CC-529, 28-30  
     Produced by Zr (n,p), M-CN-1404, 12  
 51m<sup>91</sup>, branching ratio, radiations, CC-2310, 74-84; CC-2379, 9-10  
 57d<sup>91</sup>,  $\beta$  energy, CC-298-D, 4  
     Branching ratio, CC-2310, 74-84; CC-2379, 9-10  
     Chains of gaseous ancestry, CC-465-B, 14-18; CC-1331, 35-37; CC-1805  
     1-16  
     Dissipation of energy, CC-465-B, 11-13  
     Fast neutron induced activities in Ce, CC-2299, 1-2  
     Fission yield in U<sup>235</sup>, CC-529, 28-30; CC-920, 4-8; CN-2799, 2  
     Fission yield in Pu<sup>239</sup>, CN-1958, 1-8; CN-2799, 2  
     Mass assignment by spectrograph, CF-2926, 16-17;  
     CP-2928, 2-3, 6-9  
     100-ton test: L4-290, 2-22  
     Standard  $\beta$  absorption: MUC-NS #230, 4, F2



. . . . .  
 . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

Y

63.

## Yttrium (cont'd)

- 3.5h<sup>(92)</sup>, chains of gaseous ancestry, CC-465-B, 14-18; CN-2126, 6-7;  
 CC-2310, 44-61; CN-2799, 7; CC-3146, 1-20  
 Energies of radiations, CN-2126, 5; CC-2310, 83-89  
 Fission yield in U<sup>235</sup>, CN-2126, 5; CC-2310, 88-89  
 Half-life, CC-298-D, 4  
 Th fission, CC-920, 24-27
- 11h<sup>95</sup>, chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26;  
 CC-1331, 35-37; CC-1805, 1-16; CC-2310, 55-62; CN-2799, 7;  
 CC-3146, 1-20  
 Evidence for chain 11h Y → 65d Zr, CC-529, 39-43  
 Half-life, CC-298-D, 4  
 Homogeneous slurry pile, CC-1142, 21-22  
 Th fission, CC-920, 24-27
- 20m, CC-2310, 85-87; CC-2379, 10  
 Chains of gaseous ancestry, CN-2799, 7  
 Fission yield in U<sup>235</sup>, CC-2310, 85-87; CC-2379, 10
- Adsorption process, CC-2720, 2-27; CN-2827, 2-35, F1-30; CC-2829, 6-11
- Analytical procedures, CC-258-D, 4; CC-971, 14-17; CC-1043, 7; CC-1142,  
 10-12, 17; CL-CDC #4, 32-41; MUC-NS #190, 7-8; CN-1312, 65-91;  
 M-CN-1404, 12; CN-1850, 94-96; CL-697, III D, 7, 23-25; CN-2815,  
 56-61; CC-2845, 12-13  
 Ammonium formate to separate La from Y, CC-851, 36-37  
 Analysis in process solutions, CL-CD #4, 32-41; MUC-NS #190, 7-8;  
 CN-1312, 65-91; CN-2815, 56-61; CC-2845, 12-13  
 Fast procedure, CC-2310, 85-87  
 Iodate separation of Ce from other rare earths, CC-851, 32-35;  
 CC-2845, 2-13  
 K<sub>2</sub>CO<sub>3</sub> digestion, rapid La-Y separation, CC-1204, 20-21  
 Separation of Eu and Sm with Y, M-CN-2184, 10  
 Separation of Y from Nd and Pr, CN-2929, 9
- Available information on fission isotopes, C-200, T1; MUC-CDC #80,  
 T1, III, CL-697, III D, 1-2, 1-14; CL-CDC #8, 1-10
- β and γ activity in pile products, CC-342-F, 4-6; CC-389-B, 4, 6-10
- BiPO<sub>4</sub> process, decontamination, CN-576, 4-6; CN-692, 41-45; CN-939, 5-7;  
 CN-1141, 21; CN-1309, 1-27; CN-1332, 6-14
- Chains of gaseous ancestry, CC-465-B, 14-18; CC-1142, 23-26; CC-1331,  
 35-37; CC-1805, 1-16; CC-3146, 1-20
- Energy generation curves, CC-579, 10; CC-829, 1, F1-6, T1; CC-1042,  
 1-2, 14, 33; CL-697, III D, 6, 1-31
- Pu fission, M-CN-1654, 10; CN-1958, 1-8; CN-2799, 2
- Purity of stock solutions, radioactive tests, CC-465-B, 22
- Summation study, CC-342-F, 4-6; CC-389-B, 4-10; CC-465-B, 4-8;  
 CC-579, 3-9; CC-643, 1, F1-3; CC-851, 5-13; CC-1394, 3; CN-1911, 9-11;  
 CN-2126, 13-14; CC-2379, 11; CC-2658, 2-24
- Th fission, CC-920, 24-27
- Tracer preparation, CC-1050, 6, 8; CN-2827, 2-35, F1-30
- Weight in pile material, CN-1044, 4-8; CL-697, III D, 4, 1-2
- Wet fluoride process, decontamination, CN-722, 1-3

. . . . .  
 . . . . .  
 . . . . .  
 . . . . .





UNCLASSIFIED

031710

DOCUMENT ROOM

REC. FROM *[Signature]*

DATE MAR 12 1948

REC. NO. REC. ✓

UNCLASSIFIED

031710  
~~SECRET~~