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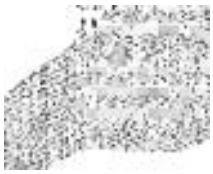

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The National Nuclear Energy Series: An Abridged Compilation

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Abstract

This report is a compilation of the volumes of the National Nuclear Energy Series (NNES). The report consists of: a selection of original prefaces from the NNES, a summary table of all of the NNES volumes, and a large appendix containing the table of contents of each volume.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the assistance of (in alphabetical order): Jack Carter (LANL Historian); Nancy Doran (PNNL); Lloyd Gnagey (formerly affiliated with Mound Laboratories); Shirley Gydesen (PNNL); Edward Hammel (LANL); Wayne Langenberg (ORNL); and Cliff Scroger (DOE Historian, Germantown).

TABLE OF CONTENTS

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ABOUT THIS COMPILATION

This report is a compilation of the volumes of the National Nuclear Energy Series (NNES). The report consists of: a selection of original prefaces from the NNES, a summary table of all of the NNES volumes, and a large appendix containing the table of contents of each volume.

The National Nuclear Energy Series (NNES) was originally planned in 1945 as a means for obtaining a comprehensive formal record of the results of research and development programs and resulting scientific and technical advances that were accomplished by the Manhattan District. It was also visualized as a continuing program to record the results of the work of the Project when the Atomic Energy Commission assumed control. The NNES preface and the Introductory Note to NNES Division IV provide considerable historical insight into the intent of the series, and are reproduced in this report.

Perhaps the most interesting information in the NNES is that discussing early work in uranium enrichment and reactor theory. Many volumes on these subjects are of an engineering nature, providing significant theoretical and practical details. Most of these volumes were originally classified. Some, notably those discussing electromagnetic isotope separation, have since been declassified; others, mainly those discussing gaseous diffusion, remain classified at the date of this report.

The Introduction to the NNES, which appears in each NNES volume and is reproduced in this report, states that the NNES was expected to consist of approximately 100 volumes when completed, but none of the individual NNES volumes list these 100 volumes. Because of the unique and historic nature of the information in the NNES and its relevance to nuclear proliferation, we believed that it would be useful to the community to identify and catalog all volumes of the NNES.

The unclassified NNES volumes are well known in the open literature. Indeed, MIMC (then a division of Pergamon Press) has made the unclassified volumes available on microfilm. (The Kansas State University Library, Manhattan KS, has a complete set of these films.)

The classified (as well as the unclassified) NNES volumes are catalogued in USAEC Report TID-373, which is a largely accurate representation of the final status of the NNES. However, TID-373 lists proposed volumes that were never actually written, and there a small number of volumes that were later written but are not listed in TID-373 because they had not yet been proposed. Additionally, both TID-373 and the preface to NNES Division IV imply that the Los Alamos Technical Series (LATS) was intended to become NNES Division V. However, for security (classification) reasons, the LATS is not catalogued in TID-373.

As a result of this research, we identified 62 unclassified volumes, 17 classified volumes, and 21 volumes that were proposed but apparently never written. There are an additional 14 classified volumes in the LATS. Of the 21 unwritten volumes, some were intended to be compilations of individual papers, and sufficient proposed table-of-contents information exists for five of those volumes that they could be compiled.

Appendix F of this report reproduces the unclassified and OUO tables of contents of the NNES volumes. It is because of the omission of classified information that this volume is entitled AN ABRIDGED COMPILATION. A classified companion report to this report includes the classified titles and tables of contents.

REFERENCES

Outline of Volumes in the National Nuclear Energy Series, Technical Information Service, Oak Ridge, TN, report TID-373 (Jan. 1953) (S).

Outline of Volumes in the National Nuclear Energy Series, Technical Information Service, Oak Ridge, TN, report TID-373 (Suppl.) (Jan. 1953) (S). This report includes only the classified titles and tables of contents of NNES, division II.

NNES Published Declassified Volumes, Technical Information Service, Oak Ridge, TN, report TID-5103 (1953) (U). This volume is a subset of TID-373.

Edward F. Hammel, Documents and Related Materials Associated with the Contents and the Origin of the Los Alamos Technical Series, Los Alamos National Laboratory, report LA-13100-H (April 1996), and references therein.

Nancy P. Orlando, James R. Brangan, and Jonathan Wise, The National Nuclear Energy Series: A Compilation, Sandia National Laboratories, report SAND99-1113 (May 1999) (SRD)

Pergamon Microforms International Marketing Company (MIMC), (Elmsford NY) advertisement. This ad is reproduced in E.F.Hammel, LA-13100-H.

R.E. Zirkle, National Nuclear Energy Series, Division IV: Arrangement of Collected Papers in Radiobiology for Publication, Argonne National Laboratory, report ANL-5003494; AEC report DE85003494 (March 1948). All information in this report is also included in TID-373.

APPENDIX A: NNES Preface

This volume is one of a series which has been prepared as a record of the research work done under the Manhattan Project and the Atomic Energy Commission. The name Manhattan Project was assigned by the Corps of Engineers, War Department, to the far-flung scientific and engineering activities which had as their objective the utilization of atomic energy for military purposes. In the attainment of this objective, there were many developments in scientific and technical fields which were of general interest. The National Nuclear Energy Series (Manhattan Project Technical Section) is a record of these scientific and technical contributions, as well as of the developments in these fields which are being sponsored by the Atomic Energy Commission.

The National Nuclear Energy Series, when completed, is expected to consist of approximately 100 volumes. These will be grouped into ten divisions, as follows:

Division	I	- Electromagnetic Separation Project
Division	II	- Gaseous Diffusion Project
Division	III	- Special Separations Project
Division	IV	- Plutonium Project
Division	V	- Los Alamos Project
Division	VI	- University of Rochester Project
Division	VII	- Materials Procurement Project
Division	VIII	- Manhattan Project
Division	IX	- Thermal Diffusion Project
Division	X	- Centrifuge Project

Soon after the close of the war the Manhattan Project was able to give its attention to the preparation of a complete record of the research work accomplished under Project contracts. Writing programs were authorized at all laboratories, with the object of obtaining complete coverage of Project results. Each major installation was requested to designate one or more representatives to make up a committee, which was called first the Manhattan Project Editorial Advisory Board and later simply the Project Editorial Advisory Board. This group was planned to coordinate the writing programs at all installations and to act as an advisory group in all matters affecting the Project-wide writing program.

The names of the Board members and of the installations which they represented are as follows:

Atomic Energy Commission	
Public and Technical Information Service	Alberto F. Thompson
Technical Information Division, Oak Ridge Extension	Brewer F. Boardman
Office of New York Operations	Charles Slesser, J. H. Hayner, W. M. Hearon*
Brookhaven National Laboratory	Richard W. Dodson
Carbide & Carbon Chemicals Corporation (K-25)	R. B. Korsmeyer, W. L. Harwell, D. E. Hull, Ezra Staple
Carbide & Carbon Chemicals Corporation (Y-12)†	Russell Baldock
Clinton Laboratories ¥	J. R. Coe
General Electric Company, Hanford	T. W. Hauff
General Electric Company, Knolls Atomic Power Laboratory	J. P. Howe
Kellex Corporation	J. F. Hogerton, Jerome Simson, M. Benedict
Los Alamos	R. R. Davis, Ralph Carlisle Smith
National Bureau of Standards	C. J. Rodden
Plutonium Project	
Argonne National Laboratory	R. S. Mulliken, H. D. Young
Iowa State College	F. H. Spedding
Medical Group	R. E. Zirkle
SAM Laboratories §	G. M. Murphy
Stone & Webster Engineering Corporation	B. W. Whitehurst
University of California	R. K. Wakerling, A. Guthrie
University of Rochester	D. R. Charles, M. J. Wantman

* Represented Madison Square Area of the Manhattan District.

† The Y-12 plant at Oak Ridge was operated by Tennessee Eastman Corporation until May 4, 1947, at which time operations were taken over by Carbide & Carbon Chemicals Corporation

¥ Clinton Laboratories was the former name of the Oak Ridge National Laboratory.

§ SAM (Substitute Alloy Materials) was the code name for the laboratories operated by Columbia University in New York under the direction of Dr. H. C. Urey, where much of the experimental work on isotope separation was done. On Feb. 1, 1945, the administration of these laboratories became the responsibility of Carbide & Carbon Chemicals Corporation. Research in progress there was transferred to the K-25 plant at Oak Ridge in June, 1946, and the New York Laboratories were then closed.

Many difficulties were involved in preparing a unified account of Atomic Energy Project work. For example, the Project Editorial Advisory Board was the first committee ever organized with the representatives from every major installation of the Atomic Energy Project. Compartmentation for security was so rigorous during the war that it had been considered necessary to allow a certain amount of duplication of effort rather than to permit unrestricted circulation of research information between certain installations. As a result, the writing programs of different installations inevitably overlapped markedly in many scientific fields. The Editorial Advisory Board has exerted itself to reduce duplication in so far as possible and to eliminate discrepancies in factual data included in the volumes of the NNES. In particular, unified Project-wide volumes have been prepared on Uranium Chemistry and on the Analysis of Project Materials. Nevertheless, the reader will find many instances of differences in results or conclusions on similar subject matter prepared by different authors. This has not seemed wholly undesirable for several reasons. First of all, such divergencies are not unnatural and stimulate investigation. Second, promptness of publication has seemed more important than the removal of all discrepancies. Finally, many Project scientists completed their contributions some time ago and have become engrossed in other activities so that their time has not been available for a detailed review of their work in relation to similar work done at other installations.

The completion of the various individual volumes of the series has also been beset with difficulties. Many of the key authors and editors have had important responsibilities in planning the future of atomic energy research. Under the circumstances, the completion of this technical series has been delayed longer than its editors wished. The volumes are being released in their present form in the interest of presenting the material as promptly as possible to those who can make use of it.

As many as possible of the volumes have been declassified for general distribution. Reproduction of this classified edition has been approved only for limited circulation within the Atomic Energy Project, and circulation of this edition must be closely limited to facilities and personnel definitely associated with work done for the Atomic Energy Commission. The negatives from which the limited edition is prepared will be preserved and will be available for publication of a public edition at such time as such action is determined to be consistent with the national security.

The Editorial Advisory Board

APPENDIX B: NNES Division IV Foreward

Since the discovery of practical means of utilizing the energy of the atomic nucleus, a large and complex atomic energy industry has begun in the United States. As a result of conditions in the world, external to the United States, the requirements of national security have been paramount in our development of this industry thus far. Constant and increasing attention, however, has been given to the problems of economic nuclear power and to the medical and industrial applications of radioactive materials with a view toward "improving the public welfare, increasing the standard of living, strengthening free competition in private enterprise, and promoting world peace." To this end the Atomic Energy Commission has sought the most effective means to accelerate the practical exploitation of nuclear data by American science and industry. The National Nuclear Energy Series is designed to provide for scientists and engineers as comprehensive a source of such data as is possible. The scope of the information presented in these volumes is a measure of American achievements to date in the field of atomic science.

Lewis L. Strauss, Chairman
U.S. Atomic Energy Commission

APPENDIX C: Plutonium Project Record Foreward

(reproduced from NNES – IV – 12)

This report is a technical account of information collected while developing methods for producing plutonium. Some of the information deals directly with nuclear physics and chemistry. Most of it is related rather to technical processes that needed to be performed in preparation for making the plutonium. These publications represent selections from the great mass of current reports, made on the basis of their value to basic science and technology.

The current technical reports, written during the war years, were essential to the active work of the plutonium project. They supplied needed data and calculations to those who were planning the new processes. Selecting from this mass of records the most reliable data and presenting them in a useful form has been an enormous task, for which the writers and editors of these volumes deserve the sincere thanks of their scientific colleagues. Many fields of science and technology will develop more rapidly because of this knowledge.

The efforts of the men who did this research resulted in the successful production of atomic bombs, which shortened the war and saved the lives of many of their comrades. But in the long view of history it is probable that the major human heritage from their work will not be this quick victory. It may not even be the useful applications of atomic energy, which was first presented as a Promethean gift to man. It is not likely that the scientific information in these pages may be the starting point to new reaches of knowledge, which will give to man an understanding that will truly enrich his life

Arthur H. Compton

Important phases of the work of the Metallurgical Project that are not reported in the PPR but will be reported elsewhere in the NNES are as follows: (1) Division VII, the report of the Materials Procurement Project, includes certain early work on process metallurgy. (2) The Division VIII NNES volumes on Analytical Chemistry, which developed from two volumes originally planned as part of the PPR, contain much Metallurgical Project work, including one complete Collected Papers volume. (3) The Division VIII NNES volumes on Uranium Chemistry, which were planned and carried out under the supervision of the PPR editorial group, likewise contain much Metallurgical Project work, including one complete Collected Papers volume.

History and Plan of the Plutonium Project Record. During the war years the scientific and technical work of the Metallurgical Project and its associated laboratories was described currently in a series of reports called the "C reports." The work up to July 1, 1945 was described in some 3,000 reports. After that date the Clinton Laboratories reports became a separate series, but reports of the other units of the former Metallurgical Project continued to be issued as C reports. Most of the C reports were preliminary or semifinal reports. The main consideration during the wartime development was speed of issue and distribution.

As the mass of scientific and technical knowledge obtained on the Project piled up, an increasing need was apparent for its digestion into survey or summary form. In partial answer to this need, an editorial group was set up in the spring of 1943 to organize a Project Handbook. Although never fully completed because of the engrossment of authors in immediately urgent tasks, and because of the transfer of many of them to other sites, enough of the Project Handbook was finished to be of real value.

By the summer of 1944, the Metallurgical Project had largely concluded its major task, that of providing the scientific and pilot-plant know-how for the design of the large-scale Hanford Plutonium Plant. The time seemed ripe to plan a series of volumes in which the Project's fund of accumulated scientific and technical knowledge would be recorded. These would replace the often sketchy and sometimes mutually contradictory C reports and fill many gaps of unwritten knowledge. In the early planning, Laurence L. Quill as Chief of the Editorial Section of the Project Information Division during the summer of 1944, Eugene Rabinowitch, and H. H. Goldsmith made important contributions. After several committee meetings, a plan for the preparation of a Metallurgical Project Record was approved by the Project Director in the fall of 1944. Later, in 1945, the name was changed to Plutonium Project Report or Record (PPR).

When the PPR was organized, rigid compartmentation was still in effect between the Metallurgical Project and the other Manhattan District projects. Members of each project were in general not supposed to know even the major objectives or main outlines of the other projects. The PPR had therefore to be planned as an independent entity. Nevertheless, at its inception the idea was firmly held that later on the Record should become part of a larger series covering the work of all the atomic energy projects. This idea was repeatedly advocated and led in late 1945 to the plan for the

work of the PPR, as part of the NNES, was taken over by the Technical Information Division of the Atomic Energy Commission, at Oak Ridge, Tenn.

In addition to those named above, many other project members worked together in planning the PPR. After the general plans were made, the actual work of preparing the various volumes was in the hands of the volume editors, volume editorial committees, and authors, as described in the prefaces of the individual volumes.

Robert S. Mulliken
Editor-in-Chief
Plutonium Project Record

APPENDIX E: Summary of National Nuclear Energy Series Volumes

Volume	Title	Authors	Classification Initial/Current	Comments
	DIVISION I - ELECTROMAGNETIC SEPARATION PROJECT University of California Radiation Laboratory Section. Editor, R.K. Wakerling			
I-1	Vacuum Equipment and Techniques	A. Guthrie R.K. Wakerling	U	Published 1949 (McGraw-Hill).
I-1 Ch. 6	Chapter 6. Operational Techniques	W.E. Bush	S/U	Published 1952 (USAEC). Additional chapter of NNES-I-1. Report BP-45.
I-2	Magnets and Magnetic Measuring Techniques	A. Guthrie R.K. Wakerling	S/U	Published 1949 (USAEC). Report TID-5215.
I-3	Electrical Circuits for Calutrons	R.K. Wakerling A. Guthrie	S/U	Published 1949 (USAEC). Report TID-5216.
I-4	Electromagnetic Separation of Isotopes in Commercial Quantities	R.K. Wakerling A. Guthrie	S/U	Published 1951 (USAEC). Report TID-5217.
I-5	The Characteristics of Electrical Discharges in Magnetic Fields	A. Guthrie R.K. Wakerling	U	Published 1949 (McGraw-Hill).
I-6	Sources and Collectors for Use in Calutrons	R.K. Wakerling A. Guthrie	S/U	Published 1949 (USAEC). Report TID-5218.
	Tennessee Eastman Corporation Section. Editors, Russell Baldock and H. Wesley Savage			
I-7	Separation of Isotopes in Calutron Units	H. Wesley Savage	S/U	Published 1951 (USAEC). Report TID-5233.
I-8	Problems of Physics in the Ion Source	Arthur H. Barnes S.M. MacNeille Chauncey Starr	S/U	Published 1951 (USAEC). Report TID-5219.
I-9	High-Voltage Problems	J.D. Trimmer Harry Pearlman	S/U	Published 1951 (USAEC). Report TID-5211.
I-10	Electrical Equipment for Tanks and Magnets	C.R. Baldock E.D. Hudson	S/U	Published 1952 (USEAC). Report TID-5214.
I-11	Vacuum Problems and Techniques	C.E. Normand Frank A. Knox G.W. Monk Alan J. Samuel W.R. Perret	S/U	Published 1950 (USEAC). Report TID-5210.

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Volume	Title	Authors	Classification Initial/Current	Comments
II-16-Appx. C	Appendix C. Absorption of Fluorine and Uranium Hexafluoride by Sodium Carbonate Solutions	G.G. Joris C.D. Compton	S/U	Published 1949 (USAEC). Additional appendix to NNES-II-16. No evidence that Appendices A or B exist.
	DIVISION III - SPECIAL SEPARATION PROJECTS Editor: George M. Murphy			
III-1B	The Theory of Isotope Separation as Applied to the Large-Scale Production of U^{235}	Karl P. Cohen	U	Published 1951 (McGraw-Hill). This volume is an unclassified abridged version of NNES-III-1A.
III-2	Spectroscopic Properties of Uranium Compounds	G.H. Dieke A.B.F. Duncan	U	Published 1949 (McGraw-Hill).
III-3	Chemical Separation of the Uranium Isotopes	Clyde A. Hutchinson, Jr.	S/U	Published 1952 (USAEC). Report TID-5224.
III-4A	Physical Properties and Analysis of Heavy Water	Isidor Kirshenbaum	U	Published 1951 (McGraw-Hill).
III-4B	Utilization of Heavy Water	Isidor Kirshenbaum	S/U	Published 1951 (USAEC). Report TID-5226.
III-4C	Bibliography of Research on Heavy Hydrogen Compounds	Alice H. Kimball	U	Published 1949 (McGraw-Hill).
III-4D	Laboratory Studies for Separation Processes	Maxwell L. Eidinoff George G. Joris Ellison H. Taylor Hugh S. Taylor Harold C. Urey	S/U	Published 1951 (USAEC). Report AECD-4238.
III-4E	Commercial Production of Heavy Water	James. O. Maloney Harold S. Ray	S/U	Published 1951 (USAEC).
III-4F	Production of Heavy Water	George M. Murphy Harold C.Urey Isidor Kirshenbaum	U	Published 1955 (McGraw-Hill).

Volume	Title	Authors	Classification Initial/Current	Comments
III-5	Separation of the Boron Isotopes	George M. Murphy	S/U	Published 1952 (USAEC). Report TID-5227.
III-6	Special Separations at the National Bureau of Standards	George M. Murphy Samuel L. Madorsky	S/U	Published 1952 (USAEC).
	DIVISION IV - PLUTONIUM PROJECT RECORD Editors, Robert S. Mulliken and Hoylande D. Young			
IV-1	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-2A	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-2B	General Nuclear Physics: Collected Papers	G.S. Goldhaber	U (planned)	Proposed volume. Per note in copy of TID-373 held by DOE historian (Germantown), this volume was not published. Gertrude Scharff Goldhaber was affiliated with Brookhaven National Laboratory.
IV-3A	Neutron Diffusion and Pile Theory: Pile Physics and Design	A.M. Weinberg	S (planned)	Proposed volume; no evidence that it was written or published. Alvin Martin Weinberg was affiliated with Univ. of Chicago.
IV-3B	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-4	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-7	N/A	N/A	N/A	No evidence that this volume was ever proposed.

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Volume	Title	Authors	Classification Initial/Current	Comments
IV-14B	The Transuranium Elements: Research papers	Glenn T. Seaborg Joseph J. Katz Winston M. Manning	U	Published 1949 as two books (McGraw-Hill).
IV-15A	The Bismuth Phosphate Separation Process: Survey Volume	I. Perlman	S (planned)	Proposed volume; no evidence that it was written or published.
IV-15B	The Bismuth Phosphate Separation Process: Collected Papers	I. Perlman	S (planned)	Proposed volume; no evidence that it was written or published.
IV-16A	Alternate Processes for the Separation of Plutonium	Harrison S. Brown Winston M. Manning	S (planned)	Proposed volume; no evidence that it was written or published.
IV-16B	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-17A	Production and Separation of U^{233}: Survey	Glenn T. Seaborg Leonard I. Katzin	S/U	Published 1951 (USAEC). Report TID-5222.
IV-17B	Production and Separation of U^{233}: Collected Papers	Leonard I. Katzin	S/U	Published 1952 as two books (USAEC). Report TID-5223.
IV-18A	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-18B	Refractories: Collected Papers	J.C. Warner Leo Brewer	U (planned)	Proposed volume; no evidence that it was written or published.
IV-19A	N/A	N/A	N/A	No evidence that this volume was ever proposed.
IV-19B	The Chemistry and Metallurgy of Miscellaneous Materials: Thermodynamics	Lawrence L. Quill	U	Published 1950 (McGraw-Hill).
IV-19B-Revision	The Chemistry and Metallurgy of Miscellaneous Materials: Thermodynamics. Revision.	Leo Brewer	U	Report UCRL-2854 (11/1955) "Heats of Sublimation of the Elements."
IV-19C	The Chemistry and Metallurgy of Miscellaneous Materials	Lawrence L. Quill	U	Published 1955 (McGraw-Hill). Report TID-5212.

Volume	Title	Authors	Classification Initial/Current	Comments
IV-20	Industrial Medicine of the Plutonium Project: Survey and Collected Papers	Robert S. Stone	U	Published 1951 (McGraw-Hill).
IV-21A	N/A	N/A	N/A	Per preface in NNES-IV-20, NNES-IV-22B, and NNES-IV-23, this volume was abandoned.
IV-21B	N/A	N/A	N/A	Per preface in NNES-IV-20, NNES-IV-22B, and NNES-IV-23, this volume was abandoned.
IV-22A	N/A	N/A	N/A	Per preface in NNES-IV-20, NNES-IV-22B, and NNES-IV-23, this volume was abandoned.
IV-22B	Biological Effects of External X and Gamma Radiation: Part I	Raymond E. Zirkle	U	Published 1954 (McGraw-Hill).
IV-22C	Biological Effects of External X and Gamma Radiation: Part II	Raymond E. Zirkle	U	Published 1956 (McGraw-Hill). Report TID-5220.
IV-22D	Biological Effects of Fast and Slow Neutrons	Raymond E. Zirkle Marjory Lawson	U (planned)	Proposed volume. Per note in copy of TID-373 held by DOE historian (Germantown), this volume was not published, but intended TOC information exists.
IV-22E	Biological Effects of External Beta Radiation	Raymond E. Zirkle	U	Published 1951 (McGraw-Hill).
IV-22F	Metabolism and Biological Effects of Internal Emitters	Raymond E. Zirkle Marjory Lawson	U (planned)	Proposed volume. Per note in copy of TID-373 held by DOE historian (Germantown), this volume was not published, but intended TOC information exists.
IV-22G	Metabolism and Biological Effects of Internal Emitters	Raymond E. Zirkle Marjory Lawson	U (planned)	Proposed volume. Per note in copy of TID-373 held by DOE historian (Germantown), this volume was not published, but intended TOC information exists.

Volume	Title	Authors	Classification Initial/Current	Comments
IV-22H	Metabolism and Biological Effects of Internal Emitters	Raymond E. Zirkle Marjory Lawson	U (planned)	Proposed volume. Per note in copy of TID-373 held by DOE historian (Germantown), this volume was not published, but intended TOC information exists.
IV-22I	Histopathology of Irradiation from External and Internal Sources	William Bloom	U	Published 1948 (McGraw-Hill).
IV-23	Toxicology of Uranium: Survey and Collected Papers	A. Tannenbaum	U	Published 1951 (McGraw-Hill).
	DIVISION V - LOS ALAMOS PROJECT Editors, Robert R. Davis and Ralph Carlisle Smith			
V-1	Electronics: Experimental Techniques	William C. Elmore Matthew Sands	U	Published 1949 (McGraw-Hill). Also published as Los Alamos Technical Series, Vol. 1, Part 1.
V-2	Ionization Chambers and Counters: Experimental Techniques	Bruno B. Rossi Hans H. Staub	U	Published 1949 (McGraw-Hill). Also published as Los Alamos Technical Series, Vol. 1, Part 2.
V-3	Miscellaneous Physical and Chemical Techniques of the Los Alamos Project	Alvin C. Graves Darol K. Froman	U	Published 1952 (McGraw-Hill). Also published as Los Alamos Technical Series, Vol. 1, Part 3.
V-4	Introduction to the Theory of Neutron Diffusion	Kenneth M. Case Frederic de Hoffmann George Placzek	U	Published 1953 (LASL), but not identified as part of NNES. Also published as Los Alamos Techical Series, Vol. 4. Also published as Report LAMD-1273.
	DIVISION V - THE LOS ALAMOS TECHNICAL SERIES			
LATS-1	Experimental Techniques	Darol K. Froman	U	Internal report 1949, 1952 (LASL). Also published as NNES-V-1, NNES-V-2, and NNES-V-3.

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Volume	Title	Authors	Classification Initial/Current	Comments
LATS-4	Introduction to the Theory of Neutron Diffusion	George Placzek	U	Internal report 1953 (LASL). See also NNES-V-4.

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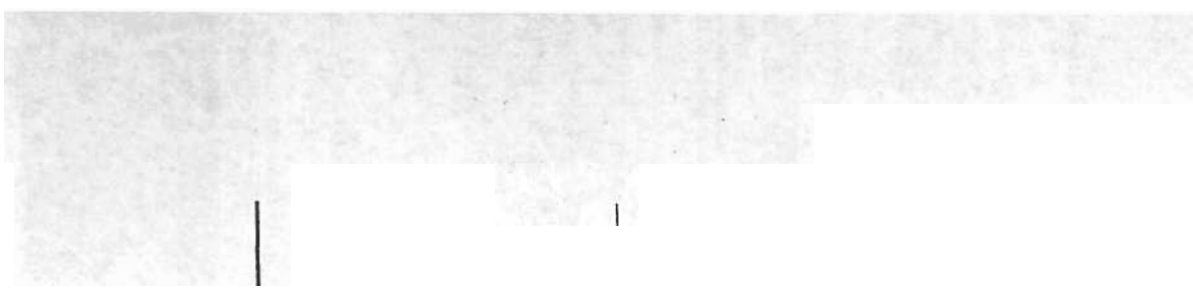
DIVISION VI - UNIVERSITY OF ROCHESTER PROJECT
Editors, Donald D. Charles and Andrew H. Dowdy

VI-1	Pharmocology and Toxicology of Uranium Compounds	Carl Voegtlin Harold C. Hodge	U	Published 1949 (books 1 & 2) and 1953 (books 3 & 4) (McGraw-Hill).
VI-2	Biological Effects of External Radiation	H.A. Blair	U	Published 1954 (McGraw-Hill).
VI-3	Biological Studies with Polonium, Radium, and Plutonium	Robert M. Fink	U	Published 1950 (McGraw-Hill).

DIVISION VII - MATERIALS PROCUREMENT PROJECT
Editor, Charles Slesser

VII-1	Preparation, Properties, and Technology of Fluorine and Organo Fluoro Compounds	Charles Slesser	U	Published 1951 (McGraw-Hill).



Volume	Title	Authors	Classification Initial/Current	Comments
VIII-5	The Chemistry of Uranium. Part I. The Element, Its Binary and Related Compounds	Joseph J. Katz Eugene Rabinowitch	U	Published 1951 (McGraw-Hill).
VIII-6	Chemistry of Uranium	Joseph J. Katz Eugene Rabinowitch	U (planned)	We suspect that this was intended to be The Chemistry of Uranium. Part II, but there is no evidence that this volume was written.
VIII-6-paper A7	The System Uranium-Nitrogen			Internal report 1946 (USAEC). Pergamon ad lists this as a distinct part of NNES, but it is actually NNES-VIII-7-paper 6.
VIII-7	Chemistry of Uranium: Collected Papers	Joseph J. Katz Eugene Rabinowitch	U	Published 1958 as two books (USAEC). Based on titles listed in TID-373, we conclude that this report was intended to be NNES-VIII-7. Report TID-5290.
VIII-8	Medical Effects of the Atomic Bomb in Japan	Ashley W. Oughterson Shields Warren	U	Published 1956 (McGraw-Hill).
	DIVISION IX - THERMAL DIFFUSION PROJECT			
IX-1	Liquid Thermal Diffusion	Philip H. Abelson Nathan Rosen John I. Hoover	S/U	Published 1951 (USAEC). Report TID-5229.
	DIVISION X - CENTRIFUGE PROJECT			
X-1	Developments in the Centrifuge Separation Project	J.W. Beams A.C. Hagg E.V. Murphree	S/U	Published 1951 (USAEC). Report TID-5230.

APPENDIX F: NNES Tables of Contents

NNES - I - 1

VACUUM EQUIPMENT AND TECHNIQUES

Edited by A. Guthrie and R. K. Wakerling

Published 1949
McGraw-Hill Book Company, Inc., New York
264 pages plus xvii pages

Chapter 6 published 4/1952 - Secret, declassified 4/1956
33 pages

NNES – I – 2

MAGNETS AND MAGNETIC MEASURING TECHNIQUES

Edited by A. Guthrie and R. K. Wakerling

Report Number: TID-5215
Published 1949 – Secret, declassified 4/1955
USAEC Technical Information Service, Oak Ridge
231 pages

NNES – I – 3

ELECTRICAL CIRCUITS FOR CALUTRONS

Edited by R. K. Wakerling and A. Guthrie

Report Number: TID-5216
Published 1949 – Secret, declassified 4/1955
USAEC Technical Information Service, Oak Ridge
300 pages

NNES – I – 4

ELECTROMAGNETIC SEPARATION OF ISOTOPES IN COMMERCIAL QUANTITIES

Edited by R. K. Wakerling and A. Guthrie

Report Number: TID-5217
Published 1951 – Secret, declassified 5/1955
USAEC Technical Information Service, Oak Ridge
456 pages

NNES – I – 5

THE CHARACTERISTICS OF ELECTRICAL DISCHARGES IN MAGNETIC FIELDS

Edited by A. Guthrie and R. K. Wakerling

Published 1949
McGraw-Hill Book Company, Inc., New York
376 pages plus xviii pages

NNES – I – 7

SEPARATION OF ISOTOPES IN CALUTRON UNITS

Edited by H. Wesley Savage

Report Number: TID-5233
Published 1951 – Secret, declassified 2/1960
USAEC Technical Information Service, Oak Ridge
437 pages

(Continued)

Part IV – Liners
Edited by J. S. Hood

Part V – Stable-Isotope Separation
Edited by C. P. Keim

NNES – I – 8

PROBLEMS OF PHYSICS IN THE ION SOURCE

By Arthur H. Barnes, S. M. MacNeille, and Chauncey Starr
Edited by H. Wesley Savage

Report Number: TID-5219
Published 1951 – Secret, declassified 5/1955
USAEC Technical Information Service, Oak Ridge
294 pages plus viii pages

NNES – I - 9

HIGH-VOLTAGE PROBLEMS

By J. D. Trimmer and Harry Pearlman
Edited by H. Wesley Savage

Report Number: TID-5211
Published 1951 – Secret, declassified 1/1954
USAEC Technical Information Service, Oak Ridge
246 pages

NNES – I – 10

ELECTRICAL EQUIPMENT FOR TANKS AND MAGNETS

Edited by C. R. Baldock and E. D. Hudson

Report Number: TID-5214
Published 1952 – Secret, declassified 6/1955
USAEC Technical Information Service, Oak Ridge
425 pages

NNES – I - 11

VACUUM PROBLEMS AND TECHNIQUES

By C. E. Normand, Frank A. Knox, G. W. Monk, Alan J. Samuel, and W. R. Perret

Report Number: TID-5210
Published 1950 – Secret, declassified 6/1954
USAEC Technical Information Service, Oak Ridge
265 pages plus v pages

NNES – I – 12

CHEMICAL PROCESSING EQUIPMENT: ELECTROMAGNETIC SEPARATION PROCESS

Edited by G. A. Akin, H. P. Kackenmaster, R. J. Schraeder, J. W. Strohecker, and R. E. Tate

Report Number: TID-5232
Published 1951 – Secret, declassified 2/1960
USAEC Technical Information Service, Oak Ridge
506 pages

(Continued)

NNES – I – 14B

STONE AND WEBSTER ENGINEERING CORPORATION CONTRIBUTION TO THE ELECTROMAGNETIC SEPARATION PROJECT, PART II. GENERAL ENGINEERING DEVELOPMENT

Chief Editor: B. W. Whitehurst
Edited by: R. E. Argersinger, C. T. Chave, J. O'R. Coleman, R. L. Geddes, and G. R. Strandberg

Unpublished Draft 10/14/1946 – Secret, declassified (unknown date)
USAEC Technical Information Service, Oak Ridge

(Continued)

V Field Problems

1. Development and Construction of the Townsite and Central Facilities
   by G. E. Crosby
2. Construction Problems in Connection with the Electromagnetic Process Plant for the Production of U-235
   by W. L. Sheets and H. J. Sykes
3. The Cleaning of Fabricated Piping
   by W. L. Sheets
4. Shops and Unusual Shop Duties
   by W. L. Sheets and B. W. Whitehurst
5. Atomic Bomb Engineering
   by A. C. Klein
6. Miles of Glass Piping
   by B. W. Whitehurst

NNES – 1 – 15B

STONE AND WEBSTER ENGINEERING CORPORATION CONTRIBUTION TO THE ELECTROMAGNETIC SEPARATION PROJECT, PART II. CHEMICAL ENGINEERING

Chief Editor: B. W. Whitehurst
Edited by: R. E. Argersinger, C. T. Chave, J. O'R. Coleman, R. L. Geddes, and G. R. Strandberg

Unpublished Draft 10/14/1946 – Secret, declassified (unknown date)
USAEC Technical Information Service, Oak Ridge
502 pages

(Continued)

Chapter		Report No.
X	Special Chemical Equipment	
	1. The Application of Tantalum to Certain Unit Processes in the Purification and Recovery of Uranium Salts by F. L. Hunter (Fansteel Metallurgical Corp.)	
	2. Electrical Precipitation Installation for the High Efficiency Recovery of UCl_5 Fume by H. J. White (Research Corp.)	

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(b)(2)High

(b)(2)High

(b)(2)High

NNES – II – 14

ISOTOPIC ANALYSIS

Edited by George M. Murphy and A. M. Wald

Published 1951 – Secret, declassified 8/1991
USAEC Technical Information Service, Oak Ridge
412 pages

(b)(2)High

(b)(2)High

(b)(2)High

NNES – II – 16

ENGINEERING DEVELOPMENTS IN THE GASEOUS DIFFUSION PROCESS

Edited by Manson Benedict and Clarke Williams

Published 1949
McGraw-Hill Book Company, Inc., New York
129 pages plus xx pages

Appendix C published 1946 – Secret, declassified 1/1956

Although no appendices appear in this volume, Appendix C appeared in a separate paper. We have found no evidence for the existence of Appendices A & B.

NNES – III – 1B

THE THEORY OF ISOTOPE SEPARATION AS APPLIED TO THE LARGE-SCALE PRODUCTION OF U^{235}

By Karl P. Cohen
Edited by George M. Murphy

Main Report Number: MDDC-1138
Published 1951
McGraw-Hill Book Company, Inc., New York
165 pages plus xviii pages

NNES – III – 2

SPECTROSCOPIC PROPERTIES OF URANIUM COMPOUNDS

By G. H. Dieke and A. B. F. Duncan

Main Report Number: MDDC-688
Published 1949
McGraw-Hill Book Company, Inc., New York
290 pages plus xviii pages

NNES – III – 3

CHEMICAL SEPARATION OF THE URANIUM ISOTOPES

By Clyde A. Hutchinson, Jr.
Edited By George M. Murphy

Report Number: TID-5224
Published 1952 – Secret, declassified 3/1960
USAEC Technical Information Service, Oak Ridge
193 pages plus v pages

NNES – III – 4A

PHYSICAL PROPERTIES AND ANALYSIS OF HEAVY WATER

By Isidor Kirshenbaum
Edited by Harold C. Urey and George M. Murphy

Published 1951
McGraw-Hill Book Company, Inc., New York
438 pages plus xv pages

Addendum Published 5/25/1951 – Secret, declassified, 3/1957
Report Number: TID-5028

NNES – III – 4B

UTILIZATION OF HEAVY WATER

By Isidor Kirshenbaum
Edited by George M. Murphy and Harold C. Urey

Report Number: TID-5226
Published 1951 – Secret, declassified 4/1957
USAEC Technical Information Service, Oak Ridge
208 pages

NNES – III – 4C

BIBLIOGRAPHY OF RESEARCH ON HEAVY HYDROGEN COMPOUNDS

Compiled by Alice H. Kimball
Edited by Harold C. Urey and Isidor Kirshenbaum

Main Report Number: AECD-1975
Published 1949
McGraw-Hill Book Company, Inc., New York
350 pages plus xv pages

NNES – III – 4D

LABORATORY STUDIES FOR SEPARATION PROCESSES

By Maxwell L. Eidinoff, George G. Joris, Ellison H. Taylor, Hugh S. Taylor, and Harold S. Urey
Edited by George M. Murphy, Harold C. Urey, and Isidor Kirshenbaum

Report Number: AECD-4238
Published 1951 – Secret, declassified 4/1957
USAEC Technical Information Service, Oak Ridge
406 pages

NNES – III – 4F

PRODUCTION OF HEAVY WATER

Edited by George M. Murphy, Harold C. Urey, and Isidor Kirshenbaum

Published 1955
McGraw-Hill Book Company, Inc., New York
394 pages plus xvii pages

NNES – III – 6

SPECIAL SEPARATIONS AT THE NATIONAL BUREAU OF STANDARDS

Edited by George M. Murphy and Samuel L. Madorsky

Published 1952 – Secret, declassified w/deletions (1951)
USAEC Technical Information Service, Oak Ridge
340 pages

(b)(2)High

(b)(2)High

NNES – IV – 8

OPTICAL INSTRUMENTATION

Edited by George S. Monk and W. H. McCorkle

Published 1954
McGraw-Hill Book Company, Inc., New York
262 pages plus xxv pages

(Continued)

NNES – IV – 9

RADIOCHEMICAL STUDIES: THE FISSION PRODUCTS

Edited by Charles D. Coryell and Nathan Sugarman

Published as 3 Books
McGraw-Hill Book Company, Inc., New York
2086 plus xv pages.
Book 1 (1951) - pages 1-516 pages plus xxx pages
Book 2 (1952) - pages 517-1315 plus xvi pages
Book 3 (1953) - pages 1316-2086 plus xix pages

Paper		Report No.
	Part I – Counting Techniques	
1	Angular Dependence of β-Ray Intensity from Radioactive Sources; Effect on Determination of Geometry Factor by N. Elliott, D. W. Engelkemeir, and W. Rubinson	AECD-2559-A
2	An Analysis of β-Ray Scattering Phenomena in Sources and Absorbers by N. Elliott and E. Shapiro	AECD-2559-B
3	An Analysis of the Effects on Absorption Curves of Scattering of β Radiation by Absorbers by T. B. Novey and N. Elliott	AECD-2559-C
4	Investigation of the Effects on β Counting of Self-Scattering Due to Source Weight by D. W. Engelkemeir, J. A. Seiler, E. P. Steinberg, and L. Winsberg	AECD-2559-D
5	Variation of the Amount of Backscattering with Thickness and Atomic Weight of the Backscatterer for β Radiation of Several Maximum Energies by D. W. Engelkemeir, J. A. Seiler, E. P. Steinberg, L. Winsberg, and T. B. Novey	AECD-2559-E
6	Theoretical Study of β-Absorption Curves and Correlation with Feather Method of β-Energy Determination by T. B. Novey, E. P. Steinberg, N. E. Ballou, G. W. Campbell and L. Winsberg	AECD-2559-F
7	Construction and Use of an Ionization Chamber with Electrometer Tube Amplifier by M. S. Freedman	AECD-2549-A
8	Low-Absorber Counters by N. Elliot, W. H. Sullivan, N. R. Sleight, E. M. Gladrow, S. Raynor, and M. S. Freedman	MDDC-1344-A
9	Preparation of Absolute β-Counting Standards by T. B. Novey, D. W. Engelkemeir, and P. W. Levy	AECD-2559-G
10	Correlation of Methods for the Determination of Absolute Thermal-Neutron Flux by T. B. Novey	AECD-2559-H

(Continued)

Paper		Report No.
11	Relation between Range and Energy of β Particles by L. E. Glendenin and Charles D. Coryell	AECD-2559-I
	Part II – Chemical Studies at Tracer Levels	
12	Coseparation of Aqueous Barium Ion with Solid Lanthanum Fluoride by H. Gest, N. E. Ballou, B. M. Abraham, and Charles D. Coryell	MDDC-1344-B
13	Coseparation of Aqueous Fluozirconate Ion with Solid Lanthanum Fluoride by H. Gest, W. H. Burgus, and T. H. Davies	AECD-2560
14	Coseparation of Aqueous Fission Products with Manganese Dioxide by H. Gest and L. E. Glendenin	MDDC-1344-C
15	Szilard-Chalmers Reactions. I. Principles of the Enrichment by A. W. Adamson and R. R. Williams, Jr.	MDDC-1055 (ANL-HDY-182)
16	Szilard-Chalmers Reactions. II. Enrichment of Antimony Activity by R. R. Williams, Jr., G. H. Jenks, W. B. Leslie, J. W. Richter, and Q. V. Larson	MDDC-1072 (ANL-HDY-183)
17	Szilard-Chalmers Reactions. III. Enrichment of Iron Activity by E. R. Tompkins, W. E. Cohn, A. W. Adamson, and R. R. Williams, Jr.	MDDC-1281
18	Valence States of Fission Selenium and Tellurium in Aqueous Solutions by C. W. Stanley and T. H. Davies	AECD-2549-B
19	Exchange among Several States of Iodine and the Chemical States of Radioiodine from Tellurium Decay by W. H. Burgus and T. H. Davies	AECD-2549-C
20	Chemical Consequences of Isomeric Transition in Tellurium by R. R. Williams, Jr.	MDDC-1571
21	Chemical Effects of Nuclear Transformations. I. β Decay of Lanthanum to Cerium of Mass 143 by H. Gest, R. R. Edwards, and T. H. Davies	AECD-2559-J
22	Chemical Effects of Nuclear Transformations. I. β Decay of Selenium to Bromine by R. R. Edwards, H. Gest and T. H. Davies	AECD-2549-D
23	Properties of Bromine at Tracer Concentrations by R. R. Edwards and T. H. Davies	MDDC-640
	Part III – Remote-Control Techniques	
24	Flow-Type Ionization Chamber by E. R. Tompkins	AECD-2549-E
25	A Double-Seat Glass Valve Useful in Remote-Control Chemical Systems by H. A. Levy	MDDC-1344-D
26	A Magnetically Controlled Glass Valve by L. G. Stang and H. A. Levy	MDDC-1344-E
27	A Glass Reaction Vessel for Remote-Control Operations by L. G. Stang and H. A. Levy	MDDC-1344-F

(Continued)

Paper		Report No.
28	Glass Solution Distributors for Remote-Control Operations by L. G. Stang and H. A. Levy	AECD-2549-F
29	A Polarographic Cell for Use in Remote-Control Systems by C. M. Nelson, D. N Hume, and H. A. Levy	AECD-2549-G
30	A Remotely Controlled Glass Apparatus for Dissolving Uranium Metal by L. S. Goldring, E. L. Brady, and H. A. Levy	AECD-2562
31	A Remotely Controlled Continuous Ether-Extraction Apparatus by G. H. Jenks and C. V. Cannon	MDDC-1344-G
32	Remotely Controlled Equipment for Fission-Product Separations by Ion Exchange by M. B. Hawkins, R. E. Garber, and E. R. Tompkins	AECD-2646
33	A Laboratory for Research Operations at High Levels of Radioactivity by H. A. Levy	AECD-2549-H
	Part IV – Studies of the Fission Process	
34	Estimates of Amount of Radiation and of Accompanying Energy Liberation from Fission Products by L. B. Borst	AECD-2559-K
35	Decay of Gross Fission Products after Short Irradiations. I. Electroscope Studies of β Activity by N. Elliott and Nathan Sugarman	AECD-2698
36	Decay of Gross Fission Products after Short Irradiations. II. Counter Studies of γ Activity by Nathan Sugarman, S. Katcoff, N. Elliott, and J. D. Knight	AECD-2611
37	Decay of Gross Fission Products after Short Irradiations. III. Counter Studies of γ Activity and Energy by Nathan Sugarman, S. Katcoff, B. Finkle, N. Elliott, and J. D. Knight	AECD-2637
38	Decay of Gross Fission-Product β Activity after Intermediate Irradiations by J. D. Knight	AECD-2559-L
39	Comparison of Gross Fission-product Decay with Decay of the Sum of the Separated Fission Products (I) by Charles D. Coryell, E. L. Brady, N. E. Ballou, W. H. Burgus, G. W. Campbell, D. W. Engelkemeir, L. E. Glendenin, and T. B. Novey	AECD-2559-M
40	Comparison of Gross Fission-Product Decay with Decay of the Sum of the Separated Fission Products (II) by W. Rubinson, R. P. Metcalf, J. A. Seiler, E. P. Steinberg, and L. Winsberg	MDDC-1769-A
41	Direct Calorimetric Study of Fission-Product Decay in Active Slugs by R. A. Day and C. V. Cannon	MDDC-1769-B
42	Calculation of γ Wattage Escaping from the Slug in the Calorimetric Experiments by K. Way	MDDC-1769-B
43	Rate of Decay of Fission Products by K. Way and E. P. Wigner	MDDC-1194

(Continued)

Paper		Report No.
65	Search for Gas Ancestry of Some Fission Products by E. L. Brady and Nathan Sugarman	MDDC-614-G
66	Studies of Some Short-Lived Krypton and Xenon Fission Products by C. R. Dillard, R. M. Adams, H. Finston, and A. Turkevich	MDDC-614-H
67	Determination of Gas Half-Lives by the Charged-Wire Technique (I) by R. Overstreet and L. Jacobson	MDDC-614-I
68	Determination of Gas Half-Lives by the Charged-Wire Technique (II) by C. R. Dillard, R. M. Adams, H. Finston, and A. Turkevich	MDDC-614-J
69	Discovery of ~10y Kr^{85} in Fission by E. J. Hoagland and Nathan Sugarman	MDDC-614-K
70	Quantitative Studies of the Neutron Activation of Krypton by E. J. Hoagland and Nathan Sugarman	MDDC-614-L
71	Identification and Yield of 19.5d Rb^{86} in Fission by M. H. Feldman and L. E. Glendenin	AECD-2550-B
72	Characteristics of 2.7h $Sr^{(92)}$ by S. Katcoff and E. J. Hoagland	MDDC-614-M
73	Fission Yield of 2.7h $Sr^{(92)}$ and Radiations of 3.5h $Y^{(92)}$ by E. J. Hoagland and S. Katcoff	MDDC-614-N
74	Characteristics and Decay Relations of 9.7h Sr^{91} and 51m Y^{91m} by B. Finkle, S. Katcoff, and Nathan Sugarman	MDDC-614-O
75	Characteristics of 57d Y^{91} by N. E. Ballou, T. B. Novey, D. W. Engelkemeir, E. L. Brady, and J. A. Seiler	MDDC-1774-C
76	Characteristics of 53d Sr^{89} by T. B. Novey, D. W. Engelkemeir, E. L. Brady, and L. E. Glendenin	MDDC-1774-D
77	Identification of Sr^{90} and Y^{90} in Uranium Fission by R. W. Nottorf	MDDC-1774-E
78	Further Studies on Sr^{90} and Y^{90} by L. E. Glendenin and Charles D. Coryell	MDDC-1774-F
79	Fission Yield of 20m Y by C. R. Dillard, R. M. Adams, H. Finston, and A. Turkevich	MDDC-614-P
80	Discovery and Characterization of the 10h Y Fission Product by N. E. Ballou	MDDC-1774-G
81	Note on the Mass Number of 10h $Y^{(93)}$ by B. Selikson and J. M. Siegel	AECD-2668
82	Preliminary Study of the 17h Zr^{97} Chain by E. L. Brady	MDDC-1694-D
83	Energies of Radiations of 17h Zr^{97} and 75m Nb^{97} by S. Katcoff and B. Finkle	MDDC-614-Q
84	Discovery of Long-Lived Zirconium and Niobium in Uranium Fission by B. L. Goldschmidt and I. Perlman	MDDC-614-R
85	Characteristics and 65d Zr by Chemical Study by E. L. Brady, D. W. Engelkemeir, and E. P. Steinberg	MDDC-614-S
86	Note on the β and γ Energies of 65d Zr and 35d Nb by Coincidence Counting by A. C. G. Mitchell and L. J. Brown	MDDC-614-T

(Continued)

Paper		Report No.
87	The β-Ray Spectrum of 65d Zr by V. A. Nedzel	MDDC-614-U
88	Characteristics of 35d Nb by Chemical Study by D. W. Engelkemeir, E. L. Brady, and E. P. Steinberg	MDDC-614-V
89	Note on the Spectrum of 35d Nb by Coincidence Counting by D. W. Engelkemeir	MDDC-614-W
90	β-Ray Spectrum of 35d Nb by V. A. Nedzel	MDDC-614-X
91	Mass Assignment of the Chain 65d Zr^{95}-35d Nb^{95} and Notes on Other Niobium Activities by L. Jacobson and R. Overstreet	MDDC-614-Y
92	Existence of an 80h to 85h Nb in Uranium Fission by D. W. Engelkemeir and E. L. Brady	MDDC-614-Z
93	Characteristics of 90h Nb^{95m} by Chemical Study by E. P. Steinberg	MDDC-614-AA
94	Spectrometer Examination of 90h Nb by J. S. Levinger	MDDC-614-BB
95	Characteristics of 67h Mo^{99} and Absence of Long-Lived Molybdenum by S. Katcoff	MDDC-1694-E
96	Note on the Fission Yield of 67h Mo^{99} by B. Finkle, E. J. Hoagland, S. Katcoff, and Nathan Sugarman	AECD-2626
97	Absence of Long-Lived Molybdenum in Fission by J. A. Swartout	MDDC-1694-F
98	Half-Life and Radiations of 5.9h 43^{99m} by L. E. Glendenin	MDDC-1774-H
99	Discovery of ~10^6y $Tc^{(99)}$ (I) by D. C. Lincoln and W. H. Sullivan	MDDC-1774-I
100	Discovery of ~10^6y $Tc^{(99)}$ (II) by R. P. Schuman	MDDC-1694-G
101	Note on the Radiations of ~10^6y $Tc^{(99)}$ by L. E. Glendenin	MDDC-1694-H
102	Discovery of Long-Lived Ruthenium Activities in Uranium Fission by B. L. Goldschmidt and I. Perlman	MDDC-1694-I
103	Long-Lived Ruthenium-Rhodium chains in Fission by L. E. Glendenin and E. P. Steinberg	AECD-2550-C
104	Identification of 4h Ru-34h Rh Chain in Slow-Neutron Fission by N. R. Sleight	MDDC-1694-J
105	Characterization of 4.5h Ru Produced in Fission by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-K
106	Characterization of the 36.5h Rh Daughter of 4.5h Ru from Fission by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-L
107	Identification and Mass Assignment of 4.5h Ru^{105}-36.5h Rh^{105} Decay Chain in Neutron- and Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-M
108	Characterization of the 4.5h Ru^{105} Produced in Neutron- and Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-N

(Continued)

Paper		Report No.
109	Characterization of the 36.5h Rh Daughter of 4.5h Ru Produced in Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-O
110	Identity of the 4.5h Ru-36.5h Rh Decay Chain Produced in Fission and in Neutron- and Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-P
111	Identification, Characterization, and Mass Assignment of a 42d Ru Activity in Neutron- and Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-Q
112	Identity of the ~30d Ru from Fission with the 42d Ru^{103} Produced in Neutron- and Deuteron-Bombarded Ruthenium by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-R
113	The 57m Rh Activity and Its Ruthenium Parent by W. H. Sullivan, N. R. Sleight, and E. M. Gladrow	MDDC-1694-S
114	Search for β Radiation of 1.0y Ru^{106} by N. R. Sleight, T. B. Novey, and L. E. Glendenin	AECD-2550-D
115	Short-Lived Ruthenium-Rhodium Decay Chains by L. E. Glendenin	MDDC-1694-T
116	Note on the 9h Activity in Fission by N. E. Ballou	MDDC-1694-U
117	Absence of Long-Lived Rhodium in Fission (I) by J. A. Seiler and L. Winsberg	MDDC-614-CC
118	Absence of Long-Lived Rhodium in Fission II. Upper Limit to the Fission yield of 210d Rh^{102} by J. A. Swartout and W. H. Sullivan	MDDC-1694-V
119	Palladium-Silver Chains in Fission by J. A. Seiler	MDDC-614-DD
120	Absence of Long-Lived Palladium Isotopes in Fission (I) by J. A. Seiler	MDDC-614-EE
121	Absence of Long-Lived Palladium Isotopes in Fission. (II) Search for Pd^{107} by L. E. Glendenin	MDDC-1694-W
122	Absence of Long-Lived Palladium Isotopes in Fission. (III) by D. C. Lincoln	AECD-2550-E
123	Characteristics of 7.6d Ag^{111} by E. P. Steinberg and L. E. Glendenin	MDDC-1774-J
124	Characteristics of 43d Cd^{115} by L. Seren, D. W. Engelkemeir, H. N. Friedlander, S. H. Turkel, and W. J. Sturm	MDDC-1694-X
125	Study of 43d Cd^{115} in Fission by R. P. Metcalf	MDDC-614-FF
126	Note on the Occurrence of 43d Cd^{115} in Plutonium Fission by L. E. Glendenin	AECD-2550-F
127	Study of the Chain 2.33d Cd^{115}-4.5h In^{115m} by R. P. Metcalf	MDDC-614-GG
128	Study of the Chain 2.83h Cd^{117}-1.95h In^{117} by R. P. Metcalf	MDDC-614-HH
129	Isotopes of Tin in Fission by J. A. Seiler	MDDC-614-II

(Continued)

Paper		Report No.
130	Study of Long-Lived Tin in Fission by G. R. Leader	MDDC-1694-Y
131	Characteristics of 93h Sb^{127} by N. R. Sleight and W. H. Sullivan	MDDC-1694-Z
132	Study of Long-Lived Antimony in Fission (I) by G. W. Campbell, N. R. Sleight, and W. H. Sullivan	AECD-2550-G
133	Study of Long-Lived Antimony in Fission (II) by G. R. Leader and W. H. Sullivan	AECD-2557
134	Study of Long-Lived Antimony in Fission (III) by C. W. Stanley and L. E. Glendenin	MDDC-1694-AA
135	The β and γ Radiations from the Chain 77h Te-2.4h I by T. B. Novey, W. H. Sullivan, Charles D. Coryell, A. S. Newton, N. R. Sleight, and O. Johnson	AECD-2548-A
136	Radiations from the Isomeric Pair, 32d Te^{129m}-72m Te^{129} by T. B. Novey	MDDC-1694-BB
137	Fission Yield of 30h Te^{131m} by S. Katcoff	MDDC-1779-A
138	Characteristics of 54m I by S. Katcoff, B. Finkle, E. J. Hoagland, Nathan Sugarman, L. E. Glendenin, and R. P. Metcalf	MDDC-1774-K
139	Characteristics of Some Iodine Isotopes Produced in Fission by W. H. Sullivan, O. Johnson, and R. Nottorf	AECD-2548-B
140	Characteristics of 6.7h I^{135} (I) by L. E. Glendenin and R. P. Metcalf	AECD-2548-C
141	Characteristics of 6.7h I^{135} (II) by S. Katcoff, C. R. Dillard, H. Finston, B. Finkle, J. A. Seiler, and Nathan Sugarman	MDDC-1779-B
142	Characteristics of 22h I^{133} by W. H. Sullivan and S. Katcoff	MDDC-1779-C
143	Characteristics of 8.0d I^{131} by S. Katcoff, B. Finkle, Nathan Sugarman, L. E. Glendenin, and L. Winsberg	MDDC-1694-CC
144	Search for Long-Lived Iodine by G. R. Leader and W. H. Sullivan	MDDC-1694-DD
145	Characteristics of 9.2h Xe^{135} (I) by A. S. Newton, W. H. Sullivan, O. Johnson, and R. Nottorf	AECD-2548-D
146	Characteristics of 9.2h Xe^{135} (II) by E. J. Hoagland and Nathan Sugarman	MDDC-1694-EE
147	Independent Fission Yield of 9.2h Xe^{135} by E. J. Hoagland and Nathan Sugarman	AECD-2574
148	Half-Life and Radiations of 13m Xe^{135m} by T. B. Novey and J. D. Knight	MDDC-1694-FF
149	Characteristics of 5.3d Xe^{133} (I) by N. Elliott	MDDC-1774-L
150	Characteristics of 5.3d Xe^{133} (II) by D. W. Engelkemeir and Nathan Sugarman	MDDC-1779-D
151	Radiation Characteristics of 33y Cs^{137} by L. E. Glendenin and R. P. Metcalf	MDDC-1779-E
152	Estimation of the Half-Life of 33y Cs^{137} by L. E. Glendenin and R. P. Metcalf	MDDC-1779-F

(Continued)

Paper		Report No.
176	Fission Yield of 33h Ce^{143} by S. Katcoff, B. Finkle, and Nathan Sugarman	MDDC-1774-U
177	Cerium and Praseodymium Activities of Masses 141 and 143 by N. E. Ballou and W. H. Burgus	MDDC-1774-V
178	Discovery of 14d Pr in Fission by N. E. Ballou	MDDC-1694-LL
179	Characteristics of 13.8d Pr^{143} by N. E. Ballou, W. H. Burgus, and J. A. Marinsky	MDDC-1694-MM
180	Characteristics of 28d Ce^{141} by W. H. Burgus and N. E. Ballou	MDDC-1694-NN
181	Fission Yields of Members of Chain 141 by A. Goldstein, R. P. Schuman, and W. Rubinson	MDDC-1505-A
182	Independent Fission Yield of 33h Ce^{143} by R. P. Schuman	MDDC-1505-B
183	Search for 140d Ce^{140m} from the Decay of La^{140} by J. A. Seiler and L. Winsberg	MDDC-1505-C
184	Characteristics of 275d Ce^{144} by W. H. Burgus, L. Winsberg, J. A. Seiler, and W. Rubinson	MDDC-1694-OO
185	Discovery of 17.5m Pr^{144} by A. S. Newton, A. Kant, and R. E. Hein	MDDC-1505-D
186	Study of the _ Radiations of 17.5m Pr^{144} by J. A. Seiler and L. Winsberg	MDDC-1505-E
187	Spectrometric Work on the Chain 275d Ce^{144}-17.5m Pr^{144} by V. A. Nedzel	MDDC-1594-PP
188	Absence of Long-Lived Daughters of Long-Lived Cerium Isotopes by N. E. Ballou	MDDC-1694-QQ
189	Discovery of a Long-Lived Rare-Earth Activity by N. E. Ballou	MDDC-1694-RR
190	Further Study of the Long-Lived Rare-Earth Activity in Fission by J. A. Seiler and L. Winsberg	MDDC-1505-F
191	Identification and Characterization of 11d Nd^{147} by J. A. Marinsky and L. E. Glendenin	AECD-2548-F
192	Identification and Characterization of ~4y Pm^{147} by J. A. Marinsky and L. E. Glendenin	MDDC-1774-W
193	Discovery, Identification, and Characterization of 47h $Pm^{(149)}$ by J. A. Marinsky and L. E. Glendenin	MDDC-1774-X
194	Study of Neodymium and Promethium Activities Induced by Neutron Irradiation of Neodymium by J. A. Marinsky and L. E. Glendenin	AECD-2548-G
195	Study of 47h $Sm^{(153)}$ in Fission by L. Winsberg	MDDC-1505-G
196	Study of 25m $Sm^{(155)}$ in Fission by L. Winsberg	MDDC-1694-SS
197	Study of 60m $Eu^{(158)}$ and 15.4h $Eu^{(157)}$ Activities in Fission by L. Winsberg	MDDC-1774-Y
198	Study of the Fission Chain 10h $Sm^{(156)}$-15.4d $Eu^{(156)}$ by L. Winsberg	MDDC-1774-Z
199	Study of 2y Eu^{155} in Fission by L. Winsberg	MDDC-1774-AA

(Continued)

Paper		Report No.
218	Fission Yields of U^{238} by D. W. Engelkemeir, J. A. Seiler, E. P. Steinberg, and L. Winsberg	AECD-2555
219	Summary of Results of Fission-Yield Experiments by E. P. Steinberg and M. S. Freedman	AECD-2555
220	Thermal-Neutron Absorption Cross Sections of Unstable Nuclei I. Introduction by S. Katcoff	AECD-2567-A
221	Thermal-Neutron Absorption Cross Sections of Unstable Nuclei. II. 75m Kr^{87} by Nathan Sugarman and A. Turkevich	AECD-2567-B
222	Thermal-Neutron Absorption Cross Sections of Unstable Nuclei. III. 17.5m Rb^{88} by S. Katcoff	AECD-2567-C
223	Thermal-Neutron Absorption Cross Sections of Unstable Nuclei. IV. 85m Ba^{139} by S. Katcoff	AECD-2567-D
224	Thermal-Neutron Absorption Cross Sections of Unstable Nuclei. V. 53d Sr^{89} by S. Katcoff	AECD-2567-E
225	Preliminary Study of the Fission Products of Thorium by N. E. Ballou, W. H. Burgus, J. B. Dial, L. E. Glendenin, H. Finston, M. Ravely, B. Schloss, and Nathan Sugarman	MDDC-1694-TT
	Part VI – Radiochemistry of the Fission-Product Elements	
226	Procedure for Isolation of Zinc Activities in Fission by J. M. Siegel and L. E. Glendenin	MDDC-1223-A
227	Procedure for Isolation of Gallium Activities in Fission by J. M. Siegel and L. E. Glendenin	MDDC-1223-B
228	Procedure for Isolation of Germanium and Arsenic Activities in Fission by L. Winsberg	MDDC-1223-C
229	Determination of Selenium Activities in Fission by L. Winsberg and L. E. Glendenin	MDDC-1223-D
230	Note on the Preparation of Carrier-Free Selenium Tracer by Using a Szilard-Chalmers Reaction by H. Gest and R. R. Edwards	MDDC-1223-E
231	Determination of Bromine Activity in Fission by E. L. Brady and G. W. Campbell	MDDC-1223-F
232	Improved Determination of Bromine Activity in Fission by L. E. Glendenin, R. R. Edwards, and H. Gest	MDDC-1223-G
233	Note on Preparation of Carrier-Free Bromine Tracer from Deuteron-Bombarded Selenium by R. Overstreet and L. Jacobson	MDDC-1223-H
234	Note on Reactions of Tracer Bromine. Exchange with Silver Bromide and Lack of Exchange with Bromate Ion by R. R. Edwards and H. Gest	MDDC-1223-I
235	Studies of the Separation of Rubidium from Fission Material by H. B. Evans and R. P. Schuman	MDDC-1493-A
236	Determination of Strontium and Barium Activities in Fission by L. E. Glendenin	MDDC-1223-J

(Continued)

Paper		Report No.
237	Note on the Determination of Strontium as the Carbonate by E. J. Hoagland	MDDC-1493-B
238	Preparation of Carrier-Free Strontium and Barium Tracers by Use of Lead Nitrate and Lead Chromate Precipitations by L. E Glendenin	AECD-2552-A
239	Some Unit Operations for Preparation of Carrier-Free Strontium by P. C. Tompkins, L. Wish, and J. X. Khym	AECD-2552-B
240	Procedures for Separation of Carrier-Free Strontium and High-Specific-Activity Barium from Uranyl Nitrate by Means of Lead Sulfate by P. C. Tompkins, A. Broido, G. W. Parker, E. R. Tompkins, W. E. Cohn., W. Kisieleski, and R. D. Finkle	AECD-2552-C
241	Preparation of Carrier-Free Strontium Tracer From Deuteron-Bombarded Rubidium by R. Overstreet, L. Jacobson, K. Scott, and J. G. Hamilton	MDDC-1223-K
242	Phosphate Method for the Determination of Zirconium and Niobium Activities in Fission by E. L. Brady and D. W. Engelkemeir	MDDC-1223-L
243	Oxalate Method for the Determination of Zirconium and Niobium Activities in Fission by E. P. Steinberg	MDDC-1223-M
244	Note on Comparison of Phosphate and Oxalate Methods for Determination of Zirconium Activity in Fission by E. L. Brady	MDDC-1223-N
245	Determination of Zirconium Activity in Fission by the Barium Fluozirconate Method by D. N. Hume	MDDC-1223-O
246	Determination of Zirconium Activity in Solutions Containing Lanthanum by D. N. Hume, M. Humphrey, and C. I. McCabe	MDDC-1223-P
247	Comparison of Oxalate and Fluoride Methods for Determination of Zirconium Activity in Fission by D. E. Waters and D. N. Hume	MDDC-1223-Q
248	Note on Analytical Methods for the Determination of Short-Lived Zirconium and Niobium Activities in Fission by S. Katcoff, B. Finkle, and E. J. Hoagland	MDDC-1223-R
249	Preparation of Carrier-Free Zirconium Tracer by N. E. Ballou	MDDC-1223-S
250	Preparation of Carrier-Free Zirconium-Niobium Tracer by J. A. Marinsky, D. N. Hume, and N. E. Ballou	MDDC-1223-T
251	Preparation of Carrier-Free Zirconium and Niobium Tracer by R. Overstreet and L. Jacobson	MDDC-1223-U
252	Note on Removal of Zirconium and Niobium from Amberlite Resin Absorbent by D. N. Hume	MDDC-1223-V
253	Determination of Niobium Activity in Fission by L. E. Glendenin	MDDC-1223-W
254	Preparation of Niobium Tracer by Coseparation with Manganese Dioxide by L. E. Glendenin and H. Gest	MDDC-1223-X

(Continued)

Paper		Report No.
255	Improved Preparation of Carrier-Free Niobium Tracer With Manganese Dioxide by J. M. Siegel, W. P. Bigler, and D. N. Hume	MDDC-1223-Y
256	Determination of Molybdenum Activity in Fission by J. B. Dial	MDDC-1493-C
257	Improved Determination of Molybdenum Activity in Fission by N. E. Ballou	MDDC-1493-D
258	Determination of Technetium and Ruthenium Activities in Fission by L. E. Glendenin	MDDC-1493-E
259	Improved Determination of Technetium Activity in Fission by L. E. Glendenin	MDDC-1493-F
260	Improved Determination of Ruthenium Activity in Fission by L. E. Glendenin	MDDC-1223-Z
261	Preparation of Carrier-Free Ruthenium Tracer by D. N. Hume	MDDC-1223-AA
262	Determination of Rhodium Activity in Fission (I) by J. A. Seiler	MDDC-1493-G
263	Determination of Rhodium Activity in Fission (II) by N. E. Ballou	MDDC-1493-H
264	Determination of Palladium Activity in Fission by J. A. Seiler	MDDC-1493-I
265	Determination of Palladium, Cadmium, and Indium Activities in Fission by L. E. Glendenin	MDDC-1493-J
266	Determination of Silver Activity in Fission by T. B. Novey	MDDC-1493-K
267	Improved Determination of Silver Activity in Fission by L. E. Glendenin	MDDC-1223-BB
268	Determination of Cadmium Activity in Fission by R. P. Metcalf	AECD-2552-D
269	Determination of Tin Activity in Fission by J. A. Seiler	MDDC-1223-CC
270	Determination of Antimony Activity in Fission (I) by J. A. Seiler	MDDC-1493-L
271	Determination of Antimony Activity in Fission (II) by C. W. Stanley and L. E. Glendenin	MDDC-1493-M
272	Radiochemical Determination of Total Antimony Tracer Activity and Differential Sb(III) and Sb(V) Activities by W. F. Boldridge and D. N. Hume	AECD-2552-E
273	Determination of Tellurium Activity in Fission by T. B. Novey	MDDC-1493-N
274	Improved Determination of Tellurium Activity in Fission by L. E. Glendenin	MDDC-1493-O
275	Preparation of Carrier-Free Tellurium Tracer by Use of Selenium Carrier by L. E. Glendenin	MDDC-1493-P
276	Preparation of Carrier-Free Tellurium Tracer by L. Jacobson and R. Overstreet	MDDC-1493-Q
277	Determination of Iodine Activity in Fission by G. W. Campbell and E. L. Brady	MDDC-1493-R
278	Improved Determination of Iodine Activity in Fission by L. E. Glendenin and R. P. Metcalf	MDDC-1493-S

(Continued)

Paper		Report No.
279	Interchange of Radioactive Iodine with Carrier Iodine by L. E. Glendenin, R. P. Metcalf, T. B. Novey, and Charles D. Coryell	AECD-2556-A
280	Determination of Fission Iodine in Uranium Metal by S. Katcoff, C. R. Dillard, H. Finston, B. Finkle, J. A. Seiler, and Nathan Sugarman	MDDC-1493-T
281	Note on Preparation of Carrier-Free Iodine Tracer from Deuteron-Bombarded Tellurium by R. Overstreet and L. Jacobson	MDDC-1493-U
282	Preparation of Carrier-Free Iodine by D. S. Ballantine	AECD-2556-B
283	Perchlorate Method for the Determination of Cesium Activity in Fission by L. E. Glendenin and C. M. Nelson	AECD-2556-C
284	Bismuth Iodide Method for the Determination of Cesium Activity in Fission by H. B. Evans	AECD-2556-D
285	Preparation of Carrier-Free Cesium Tracer by Use of Ammonium Carrier by L. E. Glendenin and C. M. Nelson	AECD-2556-E
286	Note on Preparation of Carrier-Free Cesium Tracer by R. Overstreet and L. Jacobson	MDDC-1493-V
287	Preparation of Carrier-Free 10d Cs^{131} Tracer by B. Finkle and W. E. Cohn	AECD-2556-F
288	Determination of Barium Activity in Fission by L. E. Glendenin	AECD-2556-G
289	Separation of Lead Carrier from Active Barium by Carbon Tetrachloride Volatilization by N. Elliot	AECD-2556-H
290	Note on Rapid Determination of Yttrium Activity in Fission by C. R. Dillard, R. M. Adams, H. Finston, and A. Turkevich	MDDC-1493-W
291	Determination of Cerium Activity in Fission by W. H. Burgus and D. W. Engelkemeir	AECD-2531-A
292	Determination of Rare-Earth Activities in Fission by N. E. Ballou	AECD-2531-B
293	Note on Rapid Determination of Cerium Activity in Fission by R. P. Schuman	MDDC-1493-X
294	Improved Determination of Cerium and Other Rare-Earth Activities in Fission by W. F. Boldridge and D. N. Hume	AECD-2531-C
295	Cerous-Ceric Ion Exchange by J. A. Seiler, W. Rubinson, and R. R. Edwards	AECD-2531-D
296	Rapid Separation of Lanthanum and Yttrium Groups of Rare Earths by N. E. Ballou	AECD-2530-A
297	Behavior of Neodymium, Promethium, Samarium, and Europium in Lanthanum-Yttrium Separations with Potassium Carbonate by J. A. Marinsky	AECD-2530-B
298	Separation of Lanthanum, Praseodymium, and Neodymium by Potassium Carbonate by J. A. Seiler	MDDC-1493-Y

(Continued)

(Continued)

NNES – IV – 10A

THE EFFECT OF RADIATION ON WATER AND AQUEOUS SOLUTIONS OF INORGANIC SUBSTANCES

By A. O. Allen

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Published 1944 – Secret, declassified 12/1955
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METALLURGY OF URANIUM AND ITS ALLOYS

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207 pages

NNES – IV – 14A

THE ACTINIDE ELEMENTS

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870 pages plus xxx pages

(Continued)

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THE TRANSURANIUM ELEMENTS: RESEARCH PAPERS

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Part I – pages 1-859 plus xxxvi pages
Part II – pages 861-1733 plus xii pages

(Continued)

Paper		Report No.
4.110	Absorption Spectra of Hydrochloric Acid Solutions of Plutonium Peroxide by H. H. Hopkins, Jr.	MDDC-1258
5.5	Solubilities of Plutonium Trichloroacetate in Various Reagents by W. C. Beard, Jr.	AECD-2586
6.01	The Solubility of Plutonium (IV) Phosphates and the Phosphate Complexes of Plutonium (IV) by E. L. King	AECD-2521
6.02	A Study of the Peroxides of Plutonium by J. W. Hamaker and C. W. Koch	AECD-2493
6.1a	The Vapor Pressure of Plutonium Halides by T. E. Phipps, G. W. Sears, R. L. Seifert, and O. C. Simpson	AECD-2609
6.1b	The Volatility of Plutonium Dioxide by T. E. Phipps, G. W. Sears, and O. C. Simpson	AECD-2608
6.2	Alkali Plutonium (IV) Sulfates by H. H. Anderson	AECD-2489
6.5	Preparation and Properties of Plutonium Silicides by E. F. Westrum, Jr.	MDDC-1393
6.6	Peroxides of Plutonium and Thorium by D. E. Koshland, Jr., J. C. Kroner, and L. Spector	MDDC-1268
6.7	Preparation and Properties of Plutonium Chlorides and Oxychlorides by B. M. Abraham, B. B. Brody, N. R. Davidson, F. Hagemann, L. Karle, Joseph J. Katz, and M. J. Wolf	MDDC-1574
6.8	Preparation and Properties of Plutonium Tribromide and Oxybromide by N. R. Davidson, F. Hagemann, E. K. Hyde, Joseph J. Katz, and I. Sheft	MDDC-1578
6.9	Alkali Plutonium (IV) Fluorides by H. H. Anderson	MDDC-1362
6.10	Note on the High-temperature Hydrolysis of Plutonium Oxychloride by B. M. Abraham and N. R. Davidson	MDDC-1359
6.11	Studies in the Dry Chemistry of Plutonium Fluorides by S. Fried and N. R. Davidson	MDDC-1250
6.13	Dicesium Plutonium (IV) Hexachloride and Related Compounds by H. H. Anderson	MDDC-1129
6.14	Plutonium (IV) Sulfate Tetrahydrate and Basic Sulfate by H. H. Anderson	MDDC-1427
6.15	Plutonium Ferricyanides and Ferrocyanides by H. H. Anderson	MDDC-1434
6.16	Cesium, Rubidium, and Ammonium Plutonium (III) Sulfate Hydrates by H. H. Anderson	MDDC-1128
6.17	Potassium Plutonium (III) Sulfates by H. H. Anderson	MDDC-1693
6.18	Preparation and Properties of Some Plutonium Sulfides and Oxysulfides by B. M. Abraham, N. R. Davidson, and E. F. Westrum, Jr.	AECD-1788
6.19	Thallous and Sodium Plutonium (III) Sulfates by H. H. Anderson	MDDC-1407

(Continued)

Paper		Report No.
6.20	The Effect of Potassium and Lanthanum Ions on the Solubility of Plutonium (IV) Fluoride by M. Cefola and C. Smith	MDDC-1366
6.21	Some Plutonium Fluorides and Iodates by H. H. Anderson	MDDC-1130
6.23	Note on Barium Plutonate (Mono- or Polyplutonate) by R. E. Connick and W. H. McVey	MDDC-335
6.24	Equilibrium in the Vapor-phase Hydrolysis of Plutonium Tribromide by I. Sheft and N. R. Davidson	MDDC-1712
6.25	Equilibrium in the Vapor-phase Hydrolysis of Plutonium Trichloride by I. Sheft and N. R. Davidson	MDDC-1713
6.29	Note on the Preparation of Plutonium Ferrocyanide by M. Cefola	MDDC-1135
6.33	Note on the Preparation of Plutonium (III) Oxalate by R. L. Patton	MDDC-1631
6.34	Preparation of Crystalline Plutonium (IV) Phosphate by C. Smith	AECD-2266
6.37	Preparation of Some Organic Derivatives of Plutonium by R. L. Patton	AECD-2500
6.38	Composition of Plutonium (IV) 8-Hydroxyquinolate by R. L. Patton	MDDC-1385
6.39	Preparation and Composition of Plutonium (IV) Acetylacetonate by J. S. Dixon and C. Smith	MDDC-1205

Part II

6.40	The Thermodynamic Properties and Equilibria at High Temperatures of the Compounds of Plutonium by L. Brewer, L. Bromley, P. W. Gilles, and N. L. Lofgren	AECD-2661
6.50	The Effect of Hydrochloric Acid Concentration on the Heat of Solution of Thorium Tetrachloride by E. F. Westrum, Jr. and H. P. Robinson	AECD-2554
6.51	A Semi-microcalorimeter for Precise Thermochemical Measurements by E. F. Westrum, Jr. and H. P. Robinson	AECD-2520
6.52	The Heat of Formation of Plutonium Trifluoride by E. F. Westrum, Jr., and L. Eyring	AECD-2529
6.53	The Heat of Formation of Plutonium Trichloride by E. F. Westrum, Jr., and H. P. Robinson	AECD-2526
6.54	The Dependence of the Heat of Solution of Plutonium Trichloride on the Concentration of Hydrochloric Acid by H. P. Robinson and E. F. Westrum, Jr.	AECD-2238
6.55	The Heat of Formation of Plutonium Tribromide by E. F. Westrum, Jr.	AECD-2525
6.56	The Heat of Formation of Plutonium Oxychloride by E. F. Westrum, Jr., and H. P. Robinson	AECD-2527
6.57	The Preparation and Properties of Plutonium Oxides by E. F. Westrum, Jr.	AECD-2528
6.60	Preparation of Plutonium Nitride by B. M. Abraham, N. R. Davidson, and E. F. Westrum, Jr.	MDDC-1640

(Continued)

Paper		Report No.
16.4	Note on Back-scattering of Pu^{239} Alpha Particles from Platinum Sample Plates by J. H. Parsons, O. Flatau, J. K. East, R. Dandl, and C. J. Borkowski	MDDC-1384
16.6	Apparent Specific Activity of Uranium in a 2π-geometry Chamber by B. B. Cunningham, A. Ghiroso, and A. H. Jaffey	MDDC-1202
16.7	An Emanation Method for Radium Analysis by P. Fineman, B. B. Weissbourd, H. H. Anderson, J. Sedlet, D. P. Ames, and T. P. Kohman	AECD-2602
16.8	A 48-channel Pulse-height Analyzer for Alpha-energy Measurements by A. Ghiorso, A. H. Jaffey, H. P. Robinson, and B. B. Weissbourd	AECD-2508
16.55	Theoretical Calculations Concerning Back-scattering of Alpha Particles by J. A. Crawford	AECD-2034
17.1	The Spectrum of Plutonium by H. W. Dodgen, J. Chrisney, and G. K. Rollefson	AECD-2256
17.4	The Quantitative Micro Determination of Plutonium by C. W. Koch	MDDC-1376
19.1	The Tracer Chemistry of Americium and Curium in Aqueous Solutions by S. G. Thompson, L. O. Morgan, R. A. James, and I. Perlman	AECD-1907
19.2	The First Isolation of Americium in the Form of Pure Compounds; Microgram-scale Observations on the Chemistry of Americium by B. B. Cunningham	AECD-1879
19.3	Tracer Chemistry of Actinium by C. K. McLane and S. Peterson	AECD-2497
19.4	Thermal Neutron Fission Properties of Ac^{227}, Ra^{223}, and Ra^{228} by S. Peterson and A. Ghiorso	AECD-2514
19.5	Thermal Neutron Fission Properties of Ra^{226} by D. Ames and A. Ghiorso	MDDC-1360
19.6	Separation of Actinium from Rare Earths Using Ion-Exchange Resin by C. K. McLane and S. Peterson	AECD-2498
19.7	Preparation of Radioactively Pure $Ac^{228}(MsTh_2)$ Tracer by C. K. McLane and S. Peterson	MDDC-1742
19.8	Preparation of Carrier-free $Ac^{228}(MsTh_2)$ Tracer by S. Peterson	MDDC-1709
19.9	Transmutation of Radium to Actinium (Ac^{227}) by S. Peterson	MDDC-1501
19.10	Alpha Branching of Ac^{227} by S. Peterson and A. Ghiorso	MDC-1743
19.11	Products of the Deuteron and Helium-ion Bombardments of Pa^{231} by D. W. Osborne, R. C. Thompson, and Q. Van Winkle	AECD-2539
19.12	Half Life of Th^{227} (Radioactinium) by S. Peterson and A. Ghiorso	AECD-2501
19.13	Nuclear Properties of U^{223}: A New Fissionable Isotope of Uranium by Glenn T. Seaborg, J. W. Gofman, and R. W. Stoughton	MDDC-787

(Continued)

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PRODUCTION AND SEPARATION OF U^{233}: SURVEY

Edited by Glenn T. Seaborg, Leonard I. Katzin

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NNES – IV – 17B

PRODUCTION AND SEPARATION OF U^{233}: COLLECTED PAPERS

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USAEC Technical Information Service, Oak Ridge
Book 1-pages 1-410 plus x pages
Book 2-pages 411-728 plus v pages

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THE CHEMISTRY AND METALLURGY OF MISCELLANEOUS MATERIALS: THERMODYNAMICS

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McGraw-Hill Book Company, Inc., New York
329 pages plus xxii pages

Revision published by L. Brewer, HEATS OF SUBLIMATION OF THE ELEMENTS, Report Number: UCRL-2854, 11/1955

Paper		Report No.
1	Investigations in the Liquid-Solid Equilibria of the Two-component Systems Composed of the Bromides and Iodides of Strontium and Barium by E. D. Eastman, N. C. Melchior, and A. E. Stickland	MDDC-438-A
2	Temperature-Composition Diagrams of Metal-Metal Halide Systems by E. D. Eastman, D. D. Cubicciotti, and C. D. Thurmond	MDDC-438-B
3	The Thermodynamic and Physical Properties of the Elements by Leo Brewer	MDDC-438-C
4	Thermodynamic and Physical Properties of Nitrides, Carbides, Sulfides, Silicides, and Phosphides by Leo Brewer, L. A. Bromley, P. W. Gilles, and N. L. Lofgren	MDDC-438-D
5	The Thermodynamic Properties of Common Gases by Leo Brewer	MDDC-438-E
6	The Thermodynamic Properties of the Halides by Leo Brewer, L. A. Bromley, P. W. Gilles, and N. L. Lofgren	MDDC-438-F
7	The Fusion and Vaporization Data of the Halides by Leo Brewer	MDDC-438-G
8	The Thermodynamic Properties of Molybdenum and Tungsten Halides and the Use of These Metals as Refractories by Leo Brewer, L. A. Bromley, P. W. Gilles, and N. L. Lofgren	MDDC-438-H
9	The Heats of Formation of CeS, Ce_3S_4, and Ce_2S_3 at 25° C by M. W. Evans	MDDC-438-I
10	The Heat of Reaction of the Cerous-Ceric Couple in 0.5 Molal Perchloric Acid at 25° C by B. J. Fontana	MDDC-438-J

NNES – IV – 20

INDUSTRIAL MEDICINE OF THE PLUTONIUM PROJECT: SURVEY AND COLLECTED PAPERS

Edited by Robert S. Stone

Published 1951
McGraw-Hill Book Company, Inc., New York
511 pages plus xxiv pages

(Continued)

NNES – IV – 22B

BIOLOGICAL EFFECTS OF EXTERNAL X AND GAMMA RADIATION: PART I

Edited by Raymond E. Zirkle

Published 1954
McGraw-Hill Book Company, Inc., New York
530 pages plus xxvi pages

(Continued)

Paper		Report No.
11	Comparative Effectiveness and Additivity of Fission Neutrons, Gamma Rays, and Beta Rays on Drosophila Eggs by G. E. Stapleton and Raymond E. Zirkle	MDDC-584
12	The Radiobiological Importance of Specific Ionization by Raymond E. Zirkle	MDDC-444

Part III – Radiobiology Collected Papers

1	Acute Lethal Action of Slow Neutrons on Mice by Raymond E. Zirkle, E. F. Riley, Jr., and G. E. Stapleton	
2	Activity in Tissues Induced by Slow-neutron Bombardment by H. J. Curtis and J. Teresi	
3	Acute Histopathological Effects of Single Doses of Slow Neutrons on Mice by R. S. Snider	AECD-2326
4	Delayed Effects of Single Doses of Slow Neutrons on Mice by P. S. Henshaw, R. S. Snider, E. F. Riley, Jr., G. E. Stapleton, and Raymond E. Zirkle	MonH-117
5	Effects of Periodic Doses of Slow Neutrons on Mice by P. S. Henshaw, R. S. Snider, E. F. Riley, Jr., G. E. Stapleton, and Raymond E. Zirkle	MDDC-754

NNES – IV – 22E

BIOLOGICAL EFFECTS OF EXTERNAL BETA RADIATION

Edited by Raymond E. Zirkle

Published 1951
McGraw-Hill Book Company, Inc., New York
242 pages plus xxv pages

NNES – IV – 22F

METABOLISM AND BIOLOGICAL EFFECTS OF INTERNAL EMITTERS

Edited by Raymond E. Zirkle and Marjory Lawson

Based on handwritten notes in the copy of TID-373 held by the DOE Historian in Germantown, this volume was never published. Information intended for this volume is listed in the table of contents below.

(Continued)

Paper		Report No.
	III. Effects on Weight and Food Intake by R. H. Snyder, G. Sacher, and J. Teresi	MDDC-1343
	IV. Lethal Action and Clinical Symptons by R. D. Finkle, R. H. Snyder, and W. E. Kisieleski	MDDC-1207
	V. Effect on the Hematological Constituents of the Peripheral Blood by L. O. Jacobson	MDDC-1261
11	Acute Radiotoxicity of Injected Ce^{144} in the Rat by D. S. Anthony and Katherine A. Lathrop	MDDC-1326
12	Acute Radiotoxicity of Injected Y^{91} by D. S. Anthony	MDDC-1240
13	Metabolism and Lethal Action of Injected P^{32} in Mice by D. S. Anthony and R. H. Snyder	MDDC-881
14	The Deposition of Plutonium and Certain Fission Products in Bone as a Decontamination Problem	AECD-2483
	I. Factors Affecting the Absorption of Radioactive Strontium from the Gut by D. H. Copp, D. M. Greenberg, and J. G. Hamilton	
	II. Factors Affecting the Retention of Injected Radioactive Strontium by D. H. Copp, D. M. Greenberg, and J. G. Hamilton	
	III. Effect of Age and Dietary Calcium on Radioactive Sr, Y, Ce, and Pu by D. H. Copp, M. J. Chace, and J. G. Hamilton	
	IV. Effect of Treatment on Chronic Elimination of Radioactive Sr, Y, Ce, and Pu by D. H. Copp, L. Van Middlesworth, E. M. Cuthbertson, M. J. Chace, and J. G. Hamilton	
	V. Uptake of Radioactive Sr, Y, and Pu in Healing Fracture Callus by L. Van Middlesworth, D. H. Copp, and J. G. Hamilton	
	VI. Effects of Severe Phosphorous Deficiency by D. H. Copp, M. J. Chace, and J. G. Hamilton	
	VII. Bone Radioautographs of Radioactive Sr, Y, Ce, Zr, and Pu by Dorothy Axelrod, D. H. Copp, and J. G. Hamilton	

NNES – IV – 22G

METABOLISM AND BIOLOGICAL EFFECTS OF INTERNAL EMITTERS

Edited by Raymond E. Zirkle and M. Lawson

Based on handwritten notes in the copy of TID-373 held by the DOE Historian in Germantown, this volume was never published. Information intended for this volume is listed in the table of contents below.

(Continued)

Paper	Report No.	
	V. The Effect of Ingested Plutonium by R. H. Snyder, B. Lawrence, and R. D. Finkle	
	VI. The Hematological Effects of Parenterally Administered Plutonium by L. O. Jacobson and E. L. Simmons	
26	The Effect of Plutonium on Tissue Metabolism of Rats by E. S. G. Barron, R. Abrams, R. D. Finkle, and R. P. Rhoades	MDDC-1653
27	Combination of Plutonium with Plasma Proteins by J. Muntz and E. S. G. Barron	MDDC-1268

NNES – IV – 22H

METABOLISM AND BIOLOGICAL EFFECTS OF INTERNAL EMITTERS

Edited by Raymond E. Zirkle and M. Lawson

Based on handwritten notes in the copy of TID-373 held by the DOE Historian in Germantown, this volume was never published. Information intended for this volume is listed in the table of contents below.

(Continued)

NNES – IV – 22I

HISTOPATHOLOGY OF IRRADIATION FROM EXTERNAL AND INTERNAL SOURCES

Edited by William Bloom

Major Report Number: MDDC-488
Published 1948
McGraw-Hill Book Company, Inc., New York
808 pages plus xxv pages

(Continued)

NNES – IV – 23

TOXICOLOGY OF URANIUM: SURVEY AND COLLECTED PAPERS

Edited by Albert Tannenbaum

Published 1951
McGraw-Hill Book Company, Inc., New York
333 pages plus xxvi pages

NNES – V - 1

ELECTRONICS: EXPERIMENTAL TECHNIQUES
(Los Alamos Technical Series – Volume I, Part I)

Edited by William C. Elmore and Matthew Sands

Published 1949
McGraw-Hill Book Company, Inc., New York
417 pages plus xviii pages

NNES – V – 2

IONIZATION CHAMBERS AND COUNTERS: EXPERIMENTAL TECHNIQUES
(Los Alamos Technical Series – Volume I, Part II)

Edited by Bruno B. Rossi and Hans H. Staub

Published 1949
McGraw-Hill Book Company, Inc., New York
243 pages plus xviii pages

NNES – V – 3

MISCELLANEOUS PHYSICAL AND CHEMICAL TECHNIQUES OF THE LOS ALAMOS PROJECT

(Los Alamos Technical Series – Volume I, Part III)

Edited by Alvin C. Graves and Darol K. Froman

Published 1952
McGraw-Hill Book Company, Inc., New York
323 pages plus xiii pages

NNES – V – 4
NNES – V – LATS – IV

INTRODUCTION TO THE THEORY OF NEUTRON DIFFUSION
(Los Alamos Technical Series – Volume IV)

Edited by K. M. Case, F. de Hoffmann, and G. Placzek

Published 1953
Los Alamos Scientific Laboratory, Los Alamos, NM
174 pages plus viii pages

Section — Report No.

Part A - Introduction

1 Definitions

Part B – Propagation in the Absence of Scattering Collisions
Chapter I – Streaming in Vacuum

2 Continuity Equation
3 Source-Free Streaming
4 Sources

Chapter II – Purely Absorbing Medium

5 Consequences of the Continuity Equation
6 Point Source
7 Plane Source
8 Shell Source
9 Remarks on the Reciprocity Theorem
10 Escape Probabilities
- 10.1 Chord Method
- 10.2 Slab and Sphere
- 10.3 Infinite Cylinder
- 10.4 Hemisphere
- 10.5 Oblate Spheroid
- 10.6 Discussion of Results

Part C. – One-Velocity Theory of Neutron Diffusion
Chapter III – Equations for a General Medium

11 The Transport Equation and Some of Its Properties
12 Integral Equations

Chapter IV – Uniform Infinite Medium with Isotropic Scattering

13 Source-Free Solution
14 Isotropic Point Source
15 Isotropic Plane Source
16 Anisotropic Sources
- 16.1 Anisotropic Plane Source
- 16.2 Anisotropic Point Source

(Continued)

Chapter V – Application of the Results Obtained for the Uniform Infinite Medium to the Solution of Finite Problems

Volume II is expected to contain the following sections (Probably Never Published)

NNES – VI – 3

BIOLOGICAL STUDIES WITH POLONIUM, RADIUM, AND PLUTONIUM

Edited by Robert M. Fink

Published 1950
McGraw-Hill Book Company, Inc., New York
411 pages plus xvi pages

NNES – VII – 1

PREPARATION, PROPERTIES, AND TECHNOLOGY OF FLUORINE AND ORGANIC FLUORO COMPOUNDS

Edited by Charles Slesser; Associate Editor, Stuart R. Schram

Published 1951
McGraw-Hill Book Company, Inc., New York
868 pages plus xxiii pages

(Continued)

NNES – VII – 2A

URANIUM TECHNOLOGY: GENERAL SURVEY

By J. E. Vance and J. C. Warner
Edited by L. G. Bassett and A. M. Wald

Report Number: TID-5231
Published 1951 – Secret, declassified, 7/1960
USAEC Technical Information Service, Oak Ridge
238 pages

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(b)(2)High

(b)(2)High

(b)(2)High

(b)(2)High

(b)(2)High

NNES – VII – 3

POLONIUM

Edited by Harvey V. Moyer

Report Number: TID-5221
Published 1956
USAEC Technical Information Service, Oak Ridge
392 pages plus x pages

POLONIUM, CHAPTER 14, THE PRODUCTION OF POLONIUM

by J. W. Wright and G. D. Nelson

Report Number: TID-5316
Published 1955 – Secret, declassified 1960
69 pages

(Continued)

NNES – VIII – 1

ANALYTICAL CHEMISTRY OF THE MANHATTAN PROJECT

Edited by C. J. Rodden, N. H. Furman, E. H. Huffman, T. D. Price, L. L. Quill and J. I. Watters

Published 1950
McGraw-Hill Book Company, Inc., New York
748 pages plus xx pages

Chapter 41
Published 4/1946 - Secret, declassified
23 pages

(Continued)

NNES – VIII – 5

THE CHEMISTRY OF URANIUM. PART I. THE ELEMENT, ITS BINARY AND RELATED COMPOUNDS

By Joseph J. Katz and Eugene Rabinowitch

Published 1951
McGraw-Hill Book Company, Inc., New York
609 pages plus xxi pages

Paper		Report No.
33	Thermodynamic Properties and Equilibriums of Uranium Halides, Oxides, Nitrides, and Carbides at High Temperatures by Leo Brewer, LeRoy A. Bromley, Paul W. Gilles, and Norman L. Lofgren	
34	Charge on Uranium (VI) in Acid Solution and Activity of Uranium (VI) – TTA Chelate in Benzene Solutions of TTA by Edward L. King	
35	Heats of Reaction of the Oxidation-Reduction Couples H_2O-H_2O_2, Fe^{+2}-Fe^{+3}, Ce^{+3}-Ce^{+4}, and U^{+4}-UO_2^{+2} by B. J. Fontana	
36	Heats of Reaction of the Aqueous Uranium Oxidation-Reduction Couples by B. J. Fontana	
37	Note on the Separation of Hydrogen Fluoride from Uranium Hexafluoride by Aristid V. Grosse	
38	A Method for Handling and Purifying UF_6 in Glass Vessels by Means of Alkali Fluoride Getters by Aristid V. Grosse	
39	Exchange of Uranium Between UF_4 and UF_6 by Aristid V. Grosse	
40	UF_5, A New Fluoride of Uranium by Aristid V. Grosse	
41	Note on the Use of Silica-free Glasses for Handling Anhydrous Hydrogen Fluoride and Uranium Hexafluoride by Aristid V. Grosse	
42	Structure of Uranium Hexafluoride as Determined by the Diffraction of Electrons on the Vapor by S. H. Bauer	
43	Analysis of X-ray Powder Diffraction Data on Crystalline Uranium Hexafluoride by S. H. Bauer	
44	The Structure of Crystalline Rubidium Uranyl Nitrate by J. L. Hoard and J. D. Stroupe	
45	The Structure of Crystalline Uranium Hexafluoride by J. L. Hoard and J. D. Stroupe	
46	Attempted Preparation of a Volatile Uranium Carbonyl by George Calingaert, Harold Soroos, Frederick J. Dykstra, Vincent Hnizda, and John V. Capinjola	
47	Thermal Electromotive Force of Uranium Against Platinum by H. E. Cleaves and A. I. Dahl	
48	Low-temperature Heat Capacities, Enthalpies, and Entropies of UF_4 and UF_6 by Ferdinand G. Brickwedde, Harold J. Hoge, and Russell B. Scott	
49	Properties of Uranium Pentaethoxide by T. I. Taylor, E. R. Smith, J. L. Torgesen, H. Matheson, and J. K. Taylor	
50	Electromotive Force in Hydrochloric Acid Solution of the Reaction Between Chlorine and Uranous Chloride and Between Hydrogen and Uranyl Chloride by John Keenan Taylor and Edgar Reynolds Smith	
51	Dipole Moment and Molecular Structure of Uranium Hexafluoride by Charles P. Smyth and N. Bruce Hannay	

(Continued)

NNES – VIII – 8

MEDICAL EFFECTS OF THE ATOMIC BOMB IN JAPAN

Edited by Ashley W. Oughterson and Shields Warren

Published 1956
McGraw-Hill Book Company, Inc., New York
477 pages plus xvi pages

NNES – IX – 1

LIQUID THERMAL DIFFUSION

Report Number: TID-5229
Edited by Philip H. Abelsom, Nathan Rosen, and John I. Hoover

Published 1951 – Secret, declassified, 6/1957
USAEC Technical Information Service, Oak Ridge
176 pages plus 4 pages

Sandia National Laboratories
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P.O. Box 5800
Albuquerque, NM 87185-1207

June 4, 1999

Distribution:

Re: Transmittal of Report SAND99-1114, "The National Nuclear Energy Series: An Abridged Compilation"

Enclosed is a copy of the subject report prepared by Nancy Orlando-Gay, James Brangan, and Jonathan Wise of Sandia National Laboratories. This report summarized the current status of the National Nuclear Energy Series, which is a 1950's era technical history of the scientific and engineering advances made as part of the Manhattan project.

This report was prepared under the auspices of the Nuclear Transfer and Supplier Policy Division (NN-43) of the Department of Energy, Ms. Trisha Dedik, Director. Comments or questions regarding this report are welcome and may be directed to James Brangan at (505)-844-1832 or to Jonathan Wise at (505)-844-8547.

Sincerely,

Randall K. King

Randall K. King
Export Control Program Manager

Enclosure: As stated