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REPOSITORY DOE-OHRE

COLLECTION PLUTONIUM INJECTION

BOX NO. 1

FOLDER Center for Human Radiobiology (40-010)

8001000

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

file
40-010

Telephone: 312-972-7678

February 27, 1986

Dr. Robert G. Thomas
ER-72
GTN
Mail Stop G236
U.S. Department of Energy
Washington, D. C. 20545

Bob
Dear Dr. Thomas:

With respect to your telephone inquiry relating to plutonium studies in the Environmental Health Section (previously Center for Human Radiobiology), I refer you back to the factsheet furnished Dr. Thiessen in 1984 (copy enclosed).

I had follow-up completed on cases Cal-III and HP-6. Case Cal-III died in 1984 of causes not reasonably relatable to plutonium. Case HP-6 is living as of several days ago. Both the interviewer who contacted the household, and a review of the case file, suggest that the functioning of this subject is such that direct contact is contraindicated. I hope this is of some assistance to you.

Best personal wishes.

Sincerely yours,

James H. Stebbings, Sc. D.
Epidemiology Group Leader

JHS:llf

Enclosures

cc w/enc.: H. Drucker, BIM
E. Huberman, BIM
D. T. Goldman, DOE-CH

MICROFILMED
FEB 04 1987
CMC RECORDS

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40-010

ARGONNE
NATIONAL
LABORATORY

INTRA-LABORATORY MEMO

November 27, 1985

TO: E. Huberman

FROM: R. A. Schlenker RAS

SUBJECT: Freedom of Information Act Request

We have been unable to locate the memo from Rowland to Schultz dated December 21, 1972 which you requested about 5:15 p.m. yesterday following the receipt of a letter from D. T. Goldman to A. Schriesheim concerning this matter. As today is the last business day before the deadline, December 2, further search is not possible without missing the deadline. Locating this memo is complicated by the fact that Rowland retired about two years ago and Schultz is dead.

Other intra-laboratory memos on the 18 plutonium research subjects referred to in the Goldman letter, mention them by name and give personal information about them. The release of such documents would be a violation of the patients' privacy and the right-to-privacy is protected by law. It would also constitute a violation of normal ethical practice in the handling of patient medical records.

The subjects referred to have been studied by several organizations since the mid 1940s. Non-personal information can be found in the scientific literature. A good review and guide to the literature up to the time of its publication can be found in Patricia W. Durbin, "Plutonium in Man: A New Look at the Old Data," pp.469-530, Radiobiology of Plutonium, Edited by Betsy J. Stover and Webster S.S. Jee, Published by the J. W. Press, Department of Anatomy, University of Utah, Salt Lake City, 1972.

lw

DEC 04 1985

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40-910

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439
Telephone 312/972-4146

July 23, 1984

RECEIVED
JUL 25 1984
J. R.

Dr. Jacob Thiessen
Mailstop E-201, Human Health Studies
Office of Health and Environmental Research
Office of the Environment
U.S. Department of Energy
Washington, D. C. 20545

SUBJECT: Congressional Investigation into Health and Safety Policies of the Department of Energy (DOE)

Dear Dr. Thiessen:

In response to Dr. C. W. Edington's memorandum of June 27, 1984, on the above subject, I have enclosed a factsheet on "Plutonium Studies at the Center for Human Radiobiology (CHR)." The factsheet is in the format requested by Dr. Edington.

Please let me know if you need more information or documentation.

Sincerely yours,

A. F. Stehney
Environmental Research Division

AFS:pat
Enclosures

cc: H. Drucker
H. J. Rauch
P. Failla
P. F. Gustafson
E. Huberman
J. Rundo

MAR 05 1986

8001003

Project Name:
Plutonium Studies at the Center for Human Radiobiology (CHR)

Date Started: 2 January 1973
Date Terminated: Ongoing

Principal Investigators: R. E. Rowland, A. F. Stehney

Objectives of Test:

1. To determine the excretion rate of plutonium 27 years after injection.
2. To determine the retention and body distribution of plutonium.

Short Description:

In 1945-1947, 18 hospital patients of limited life expectancy were injected with plutonium in order to obtain information about the retention and organ distribution of plutonium. An important objective was to determine the relationship between the body content and the rate of excretion in order to provide data for estimating the body content of plutonium from measurements of plutonium in excreta (bioassay). The results of this study were described in Report LA-1151 (1950).[1]

The data in LA-1151 were reviewed in a manuscript prepared by P. W. Durbin for publication in the 1972 volume, Radiobiology of Plutonium.[2] Tissue and bone samples had been obtained at autopsy from six of the cases at times ranging from 5 days to 456 days after injection, and the longest collection time for excreta was about 5 years. In addition to preparing the manuscript, Durbin traced the later history of the cases and discovered that four were still living in 1972.

The Center's direct knowledge of the plutonium injection cases dates from December 13, 1972, when Dr. Durbin brought her records to CHR for possible further follow-up. The Center then undertook to determine excretion rates in study subjects who were still alive and to exhume deceased subjects in order to determine the amounts and body distribution of plutonium. During 1973, CHR obtained metabolism samples from three living patients, obtained permission to exhume from next of kin of three deceased patients, and disinterred and transferred to CHR the remains of one of these deceased. The metabolism samples (blood and excreta) were taken at Strong Memorial Hospital (SMH), Rochester, New York.

In 1974, the U.S. Atomic Energy Commission (AEC) reviewed the origins and subsequent follow-up of the plutonium studies. On December 31, 1974, the AEC authorized CHR to proceed with the program of study of the living patients who were injected with plutonium during 1945-1947 and of the bodies of deceased individuals from that group for whom legal consent for examination is obtained.

Follow-up Data:

Table 1 summarizes CHR follow-up activities and last known status (July 5, 1984) for each of the plutonium injection cases.

CHR personnel have published 10 reports on results obtained by study of these cases.[3-12] Copies of these reports are attached.

8001004

Table 1. Plutonium injection cases: Summary of CHR activities and last known status (July 5, 1984).

Old Case Number	CHR Case Number	CHR Activities	Status
Cal-I	40-001	10/16/75: Exhumed cremains Aug 78: Returned	Died 1/9/66
Cal-II	40-002	No contacts; said to have died in Australia	Died 1/6/47
Cal-III	40-003	6/11/73: Examined at CHR 6/23-26/77: Metabolism study at SMH	Living 10/19/83
Chi-1	40-004	6/10/75: Exhumed Apr 78: Returned	Died 10/3/45
Chi-2	40-005	No contacts; cremation ashes scattered	Died 1/13/46
Chi-3	40-006	No contacts; case unidentified	Lost to study, 1946
HP-1	40-007	1973: Next of kin refused permission to exhume	Died 1/12/60
HP-2	40-008	1973: Next of kin refused permission to exhume	Died 4/4/48
HP-3	40-009	1/28-2/18/73: Metabolism study and radioactivity measurement at SMH 1/23-24/79: Metabolism study at SMH	Died after 6/5/81
HP-4	40-010	9/24/73: Exhumed Jul 75: Returned	Died 4/29/47
HP-5	40-011	1973: Next of kin refused permission to exhume	Died 4/29/46
HP-6	40-012	2/14/73: Metabolism study at SMH 6/21-7/1/73: Metabolism study at SMH	Living 12/30/74
HP-7	40-013	1973 and 1977: Next of kin refused permission to exhume	Died 10/27/46
HP-8	40-014	No contacts	Died 11/22/75
HP-9	40-015	5/18/78: Exhumed Jul 81: Returned	Died 7/2/47
HP-10	40-016	No contacts	Died 6/2/57
HP-11	40-017	No contacts	Died 2/26/46
HP-12	40-018	No contacts	Died 4/13/53

References:

1. W.H. Langham, S.H. Bassett, P.S. Harris and R.E. Carter. Distribution and excretion of plutonium administered to man. Los Alamos Scientific Laboratory, LA-1151 (September 1950).

2. P.W. Durbin. Plutonium in man: a new look at the old data. In The Radiobiology of Plutonium, B.J. Stover and W.S.S. Jee (eds.), The J.W. Press, Salt Lake city, UT, pp. 469-537 (1972).

3. J. Rundo, P.M. Starzyk, J. Sedlet, R.P. Larsen, R.D. Oldham and J.J. Robinson. The excretion rate and retention of plutonium 10,000 days after acquisition. In Diagnosis and Treatment of Incorporated Radionuclides, Proc. Seminar, Vienna, 8-12 December 1975, IAEA, Vienna, pp. 15-22 (1976).

4. R.E. Rowland and P.W. Durbin. Survival, causes of death, and estimated tissue doses in a group of human beings injected with plutonium. In The Health Effects of Plutonium and Radium, Proc. Symp. Sun Valley, Idaho, 6-9 October 1975, W.S.S. Jee (Ed.), The J.W. Press, Salt Lake City, UT, pp. 329-342 (1976).

5. R.A. Schlenker, B.G. Oltman, and H.T. Cummins. Microscopic distribution of ^{239}Pu deposited in bone from a human injection case. In The Health Effects of Plutonium and Radium, Proc. Symp. Sun Valley, Idaho, 6-9 October 1975, W.S.S. Jee (Ed.), The J.W. Press, Salt Lake City, UT, pp. 437-450 (1976).

6. J. Rundo and F.H. Ilcewicz. Blood content and excretory plasma clearance of plutonium 10^4 days after injection. Abstracts of Papers-22nd Ann. Mtg. Health Phys. Soc., Atlanta, 3-8 July 1977, Pergamon Press, NY, p.26 (1977); Health Phys. 33, 668 (1977).

7. R.E. Rowland. The risk of bone sarcoma from plutonium-239. In Biological Implications of Radionuclides Released from Nuclear Industries, Proc. Symp., Vienna, 26-30 March 1979, Vol. II, IAEA, Vienna, pp. 211-224 (1979).

8. R.P. Larsen, R.D. Oldham, and R.E. Toohey. Macrodistribution of plutonium in the human skeleton. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 191-197 (1981).

9. J. Rundo. The late excretion of plutonium following acquisition of known amounts. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 253-260 (1981).

10. R.A. Schlenker and B.G. Oltman. Plutonium microdistribution in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 199-206 (1981).

8001006

11. R.A. Schlenker and B.G. Oltman. Uranium concentrations in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 473-476 (1981).

12. R.E. Toohey, C.G. Cacic, R.P. Larsen, and R.D. Oldham. The concentration of plutonium in hair following intravenous injection. Health Phys. 40, 881-886 (1981).

Attachments:
Reprints of references 3-12 are attached.

MAR 05 1986

8001007

PRIVACY ACT MATERIAL REMOVED

40-010

Department of Energy
Argonne Area Office
9800 South Cass Avenue
Argonne, Illinois 60439

RECEIVED
1985 NOV 26 PM 12:51
BIO-MED RESEARCH

NOV 21 1985

Dr. Alan Schriesheim, Director
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, Illinois 60439

Dear Dr. Schriesheim:

SUBJECT: FREEDOM OF INFORMATION ACT (FOIA) REQUEST DATED OCTOBER 30, 1985, DOCKET NO. 11048504D

The enclosed FOIA request is for a copy of a memo from R. E. Rowland to H. A. Schultz dated December 21, 1972, which discusses records of 18 plutonium research subjects. The requestor is also asking for any supporting documentation and any subsequent memos regarding the subject.

Due to statutory time limitations for responding to FOIA requests, we must have your response no later than December 2, 1985.

Sincerely,

Thomas J. Balcerak

for David T. Goldman
Area Manager

Enclosure:
As Stated

cc: A. Zilberstein, ANL, w/enclosure
R. E. Rowland, Princeton, KY, w/enclosure
BIM, w/enclosure

DEC 04 1985

8001008

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40-010

THE KNOXVILLE JOURNAL

A GANNETT NEWSPAPER
P.O. BOX 911
KNOXVILLE, TENNESSEE 37901

1985 NOV -4 PM 3:39

Oct. 30, 1985

Mr. Ronald Turner
MA-232.1
U.S. Department of Energy
Freedom of Information and Privacy Act Branch
1000 Independence Ave. S.W.
Washington, D.C. 20585

To the FOI Officer:

This request is made under the federal Freedom of Information Act, 5 U.S.C. 552.

Please send me copies of Memorandum, dated 12-21-72, from Dr. R.E. Rowland to H.A. Schultz, senior staff assistant, Records and Data Processing, Center for Human Radiobiology, Argonne National Lab. Memo discusses instructions from Rowland to Schultz on records of 18 plutonium research subjects. Records were transferred to Schultz for his disposition. Please include any supporting documentation and any subsequent memos regarding this subject.

As you know, the FOI Act provides that if portions of a document are exempt from release, the remainder must be segregated and disclosed. Therefore, I will expect you to send me all nonexempt portions of the records which I have requested, and ask that you justify any deletions by reference to specific exemptions of the FOI Act. I reserve the right to appeal your decision to withhold any materials.

I promise to pay reasonable search and duplication fees in connection with this request. However, if you estimate that the total fees will exeed $50, please notify me so that I may authorize expenditure of a greater amount.

I am prepared to pay reasonable search and duplication fees in connection with this request. However, the FOI Act provides for waiver or reduction of fees if disclosure could be considered as "primarily benefiting the general public." I am a journalist employed by The Knoxville Journal and intend to use the information I am requesting as the basis for a planned article. Therefore, I ask that you waive all search and duplication fees. If you deny this request, however, and the fees will exceed $50, please notify me of the charges before you fill my request so that I may decide whether to pay the fees or appeal your denial of my request for a waiver.

DEC 04 1985

As I am making this request as a journalist and this information is of timely value, I will appreciate your calling me by telephone, rather than by mail, if you have any questions. Thanks and I will look forward to your reply within 10 business days, as required by law.

Sincerely,

Randell Bell

Randell Be[illegible], reporter
(615) 522-4141 Ext. 422

8001009

DOE F 1325.8
(7-79)

40-010

U.S. DEPARTMENT OF ENERGY

memorandum

DATE November 12, 1985

REPLY TO ATTN OF MA-232.1 -Joan Ogbazghi

SUBJECT Freedom of Information Request #1104850SD

TO Jane Monhart, CH Operations Office

Attn Bernie Russ

The attached Freedom of Information (FOI) request is being sent to you for action as the records requested appear to be principally within the purview of your organization. If our determination is incorrect, please inform me immediately to whom you are forwarding this request.

If other divisions, offices or field organizations also have records relevant to this request, you as the appropriate FOI Office are responsible for requesting their participation and for coordinating the response. It is important that an appropriate response be forwarded to the requester within 10 working days as failure to act can be deemed a denial.

On the reverse side of this memorandum, a "Reminder of Procedures for Handling FOI Requests" should assist your staff. If you have any questions, I can be reached on FTS 252-5955.

John H. Carter
Chief of FOI and Privacy Acts
Activities Branch
Division of Reference and
Information Management

Attachment

DEC 04 1985

8001010

40-010

POOR QUALITY ORIGINAL

November 14, 1985

Mr. Randall Beck
The Knoxville Journal
P.O. Box 911
Knoxville, TN 37901

Re: 110463098
110465078
110465088
110465228

Dear Mr. Beck:

Your October 30, 1985, Freedom of Information requests (copies enclosed) addressed to the U.S. Department of Energy were received on November 8, 1985, and have been sent to our Freedom of Information Officers at our Chicago, Oak Ridge, Richland and San Francisco Operations Offices. They will correspond directly with you about your requests.

In compliance with the Freedom of Information Act, the 10 day response period will begin when the offices designated above have received your requests. If you need further assistance, please contact Jane Hombert, Chicago Operations Office, 9800 South Cass Avenue, Argonne, IL 60439, (312) 972-2076; Wayne Range, Oak Ridge Operations Office, P.O. Box E, Room 1012, Oak Ridge, TN 37831, (615) 576-0885; Gail M. Bakkan, Richland Operations Office, 825 Jadwin Avenue, P.O. Box 550, Richland, WA 99352, (509) 376-8274; Elsie Mutobo, San Francisco Operations Office, 1333 Broadway, Wells Fargo Building, Oakland, CA 94612, (415) 273-4358.

We have assigned the above referenced numbers to your requests and ask that you refer to these in any future correspondence.

Sincerely,

Original signed by John H. Carter

John H. Carter
Chief of FOI and Privacy Acts
Office of Administrative Services

cc: Official File Copy
Action Officer &
Official File (RF)
Project 2932
MA-232.1:JBO:sjb:26025:11/13/85

POOR QUALITY ORIGINAL

DEC 04 1985

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ARGONNE NATIONAL LABORATORY
U of C-AUA-USERDA

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

March 3, 1976

In order to complete our records on _____ I would greatly appreciate it if you would complete the attached form and send it back in the enclosed envelope.

I am sorry to have to trouble you about this but there are a couple of hospital records which would be of great value for us to see, and the institutions are becoming very careful to safeguard the privacy of such material.

Thank you very much.

Faithfully yours,

Austin M. Brues, M.D.
Medical Director

AMB:jmt
Enc.

bcc: CHR-RR ✓
J. E. Farnham
A. F. Stehney

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8001012

CENTER FOR HUMAN RADIOBIOLOGY
9700 S ...s Avenue, Argonne, Illinois 60439 Tel. 312-739-77... Ext. 4625

ARGONNE NATIONAL LABORATORY
U of C-AUA-USERDA

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

PRIVACY ACT MATERIAL REMOVED

March 3, 1976

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I am sorry to have to trouble you about this but there are a couple of hospital records which would be of great value for us to see, and the institutions are becoming very careful to safeguard the privacy of such material.

Thank you very much.

Faithfully yours,

Austin M. Brues, M.D.
Medical Director

AMB:jmt
Enc.

bcc: CHR-RR
J. E. Farnham
A. F. Stehney

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CENTER FOR HUMAN RADIOBIOLOGY
9700 S. ; Avenue, Argonne, Illinois 60439 Tel. 312-739-77 xt. 4625

w< (front page)

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ARGONNE NATIONAL LABORATORY
U of C-AUA-USAEC

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

August 31, 1973

Dear

Many thanks for your letter giving the estimate for the cost of disinterring and reinterring the remains of . The charges as listed in your letter are acceptable to us.

Enclosed you will find the permission forms signed by and by which were mentioned in my letter to you of August 8, 1973.

Please be sure to get in touch with Mr. Joseph E. Farnham of our staff to arrange a mutually convenient time for the disinterment. His address and phone number are:

Center for Human Radiobiology
Radiological and Environmental
Research Division
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439
Tel: 312-739-2326

Sincerely yours,

Mary Margaret Shanahan

RECEIVED
CHR RECORDS
SEP 6 1973

s
encs.
xc: M.H.Chalfen
A.F.Stehney
J.E.Farnham

SOUTHWEST FIELD STATION
5619 ast Monterosa St., Phoenix, Arizona 85018 Tel. 602-9-5600

01014

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PRIVACY ACT MATERIAL REMOVED { 40-010 (Yo Case) — EXH Pu

ARGONNE NATIONAL LABORATORY of C-AUA-USAEC

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

August 8, 1973

This will confirm my recent telephone conversation with a member of your staff regarding the exhumation of who died April 29, 1947

We have on hand signed permission forms from the brother and sister of , her two nearest-of-kin (of Rochester, New York, and of Tucson, Arizona). I would appreciate receiving from you at your earliest convenience an estimate of the cost of exhuming remains and shipping them by air to:

Mr. Joseph E. Farnham
Center for Human Radiobiology
Radiological and Environmental Research Division
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

According to Cook County, Illinois, regulations, the Ziegler case must be sealed prior to shipment to O'Hare Airport, Chicago.

The undertaker who will handle the arrangements on the Illinois end is

RECEIVED
CHR RECORDS
AUG 14 1973

Since our studies, which are sponsored by the U. S. Atomic Energy Commission, take a number of months it will be necessary to close the grave once the remains have been removed, and to reopen it when the remains are returned for reburial.

001015

SOUTHWEST FIELD STATION
5615 [illegible]st Monterosa St., Phoenix, Arizona 85018 Tel. 602-[illegible]-5600

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PRIVACY ACT MATERIAL REMOVED

We hope that your charges and those of the cemetery can be kept to a minimum since, as you probably know, government research funds are quite limited these days.

Upon receipt of your estimate of the cost of this exhumation we will notify you of its acceptance and we will want to arrange in advance the date for the work to be done since one of our staff will be present at the time of the exhumation.

Please address your reply to me at the address given at the bottom of the first page of this letter.

Sincerely yours,

s

(Miss) Mary Margaret Shanahan
Deputy Director
M.I.T. Radioactivity Center

xc: M.H.Chalfen
A.F.Stehney
J.E.Farnham
V.Markiewicz
J.Lieben

8001016

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8001017

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40-0106

RECEIVED
CHR RECORDS

DECLASSIFIED
MAR 8 1977

DECLASSIFIED

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This is a Joint Report from the Los Alamos Scientific Laboratory of the University of California and the Atomic Energy Project of the University of Rochester School of Medicine and Dentistry.

The Report covers a Cooperative Research Project initiated under the supervision of the Manhattan Engineer District and completed under Contract No. W-7401-Eng-49 and Contract No. 7405-Eng-36 for the Atomic Energy Commission.

September 20, 1950 LA - 1151

DISTRIBUTION AND EXCRETION OF PLUTONIUM ADMINISTERED INTRAVENOUSLY TO MAN

Work Performed By:

Helen M. Baldwin
Samuel H. Bassett
Jeanne Carritt
Robert Fink
W. W. Foreman
David Goldring
Joe W. Howland
Leonard S. Kogan
Wright H. Langham
Elizabeth Maxwell
Arthur Murray, III
Anne Perley
Hannah Silberstein
Helen E. Van Alstine
Christine Waterhouse

Report Written By:

Wright H. Langham*
Samuel H. Bassett**
Payne S. Harris***
Robert E. Carter*

Classification cancelled or changed to OFFICIAL USE ONLY
(Insert appropriate Classification)
by authority of Ltr - 2/25/54
(Person authorizing change) (Date)
by R. C. L.
(Signature of person making the change and date thereof)

* Los Alamos Scientific Laboratory of the University of California, Los Alamos, New Mexico
** Formerly of the University of Rochester, presently with the Atomic Energy Project, U. C. L. A., Beverly Hills, California.
*** Public Health Service, U. S. A. (Stationed at Los Alamos, New Mexico)

HEALTH AND BIOLOGY

ACKNOWLEDGEMENT

The authors wish to acknowledge the invaluable aid and interest of a number of persons who directly or indirectly contributed to the execution of these studies and the completion of this report.

Dr. Stafford L. Warren was primarily responsible for the initiation of the program under the Manhattan Engineer District.

Drs. W. S. McCann, A. H. Dowdy, W. F. Bale, Harold Hodge and L. H. Hempelmann participated in the early planning of the work and frequently made general and specific decisions which contributed much to the success of the program.

Dr. Hymer Friedell and Dr. Fred Bryan were of great assistance as representatives of the office of the Medical Director of the Manhattan District.

Drs. J. G. Hamilton, Jack Schubert, E. R. Russell, Austin Brues and H. M. Parker contributed some of the information used in this report and in some cases reviewed parts or all of the manuscript.

Drs. L. H. Hempelmann, T. N. White, Frederick Reines, E. C. Anderson, J. T. Brennan and G. W. Taylor reviewed the report and contributed many constructive criticisms.

STATUS VERIFIED UNCLASSIFIED
Penn. J. W. Murphy - ADC-AN
6/5/96
DATE

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8001018

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Fig. 1 Nuclear Track Autoradiograph Showing Localization of Plutonium in the Bone of the Rat. (A. Williams, J. Wellnitz; Photomicrography by Los Alamos Photographic Laboratory).

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8001019

DISTRIBUTION AND EXCRETION OF PLUTONIUM ADMINISTERED INTRAVENOUSLY TO MAN

I. INTRODUCTION

It is now a well established fact that the deposition of radioactive material (Ra, its isotopes and daughter products) in the skeletal system of radium dial painters was responsible for the bone necrosis, radiation osteitis, osteogenic sarcoma and other pathological changes in bone which characterize the condition commonly known as chronic radium poisoning.

Hamilton and co-workers (1) were the first to demonstrate that plutonium, like radium, concentrates in the skeletal system of the rat. Numerous reports have emphasized that bone is a major site of plutonium deposition regardless of the animal species, the valence state of the material or the route of administration (2), (3a, b, c). Autoradiographic studies of the mode of deposition of plutonium in bone (4), (5), (6), (7) showed that it was deposited in a pattern quite different from that of radium. The latter element tends to be incorporated into the bone salts exclusively and becomes buried in the calcified structure in the manner to be expected from a member of the calcium family in the periodic table. Plutonium, however, shows some deposition in soft tissues (especially in the liver) and a remarkable affinity for the non-calcified, non-cartilaginous areas of bone. The material is highly localized in the epiphyseal line, the periosteum and the endosteum so that localization is predominately in regions of trabecular bone (See Fig. 1, frontpiece). The general conclusion was that the mode of deposition of plutonium made it potentially more hazardous than radium. Although there is only limited proof that the above conclusion is justified, it must be considered when evaluating the potential chronic toxicity of the material.

Subsequent experiments with rodents by Brues, Lisco and Finkel (8) and others (9) have demonstrated that plutonium is quite effective in producing pathological changes in bone including osteogenic sarcoma (See Fig. 2).

Brues (10) compared the relative chronic toxicity of equivalent microcurie amounts of plutonium and radium by following 1000 rats, 600 mice throughout life and 37 rabbits for over 400 days. A comparison of survival time, radiographically determined bone damage, pathological fractures and bone tumors in these animals appeared to bear out a plutonium-radium chronic toxicity ratio of 12-15/1 on the basis of injected dose or about 4-5/1 on the basis of retained material.

The above observations and the experiences of the radium dial industry have emphasized the necessity of employing extremely rigid control over all plutonium operations. The major health problem associated with plutonium processing is, of course, the possibility that small amounts of plutonium accumulated in the skeletal systems of workers may, over a period of from ten to thirty years, cause bone changes similar to those observed in chronic radium poisoning. The possibility is serious enough to justify the adoption of a rigid maximum permissible body burden as is currently done with radium.

Only recently the subcommittee on internal radiation tolerances of the National Bureau of Standards established a tentative maximum permissible body content of 2.5 μc (0.032 μc) for plutonium. This value was adopted immediately by the Division of Biology and Medicine of the Atomic Energy Commission as the official maximum permissible tolerance for plant personnel (11).

Adequate information as to the fixation and excretion of plutonium by man is essential to the evaluation and interpretation of the maximum permissible body tolerance. More specifically such studies seem highly important for the following purposes:

1. To minimize the degree of uncertainty inherent in extrapolating the vast amount of animal experimental data to man.

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2. To provide the best possible quantitative basis for the diagnosis of degree of exposure of personnel to plutonium.
3. To determine the degree of fixation of plutonium by man and establish criteria for the period of retirement from further exposure of workers having received a maximum permissible dose.
4. To provide more extensive and quantitative data on the deposition and excretion of plutonium by man as a basis for future consideration of maximum permissible body tolerance.

Need for the above information was recognized several years ago. It was also recognized that such information could be obtained only by administering small tracer amounts of plutonium to persons with a relatively short life expectancy. The first tracer study was initiated April 10, 1945 (12). Shortly thereafter, both the Chicago and Berkeley groups initiated similar studies (13), (14).

This report is the final presentation of the results of twelve plutonium tracer cases studied as a joint project of the Los Alamos Scientific Laboratory of the University of California and the Atomic Energy Project of the University of Rochester School of Medicine and Dentistry.

The results of the studies conducted by the Berkeley and Chicago groups are correlated with the present ones providing a collection of data from sixteen cases.

In addition to the twelve tracer cases mentioned above, the Los Alamos Scientific Laboratory has had approximately six years experience with exposure problems associated with the processing of large amounts of plutonium.

Wherever applicable, the Laboratory's experiences with the exposure of personnel are used to enlarge and supplement the data collected from the plutonium tracer studies presented in this report.

II. METHODS

A. Selection and Description of Subjects

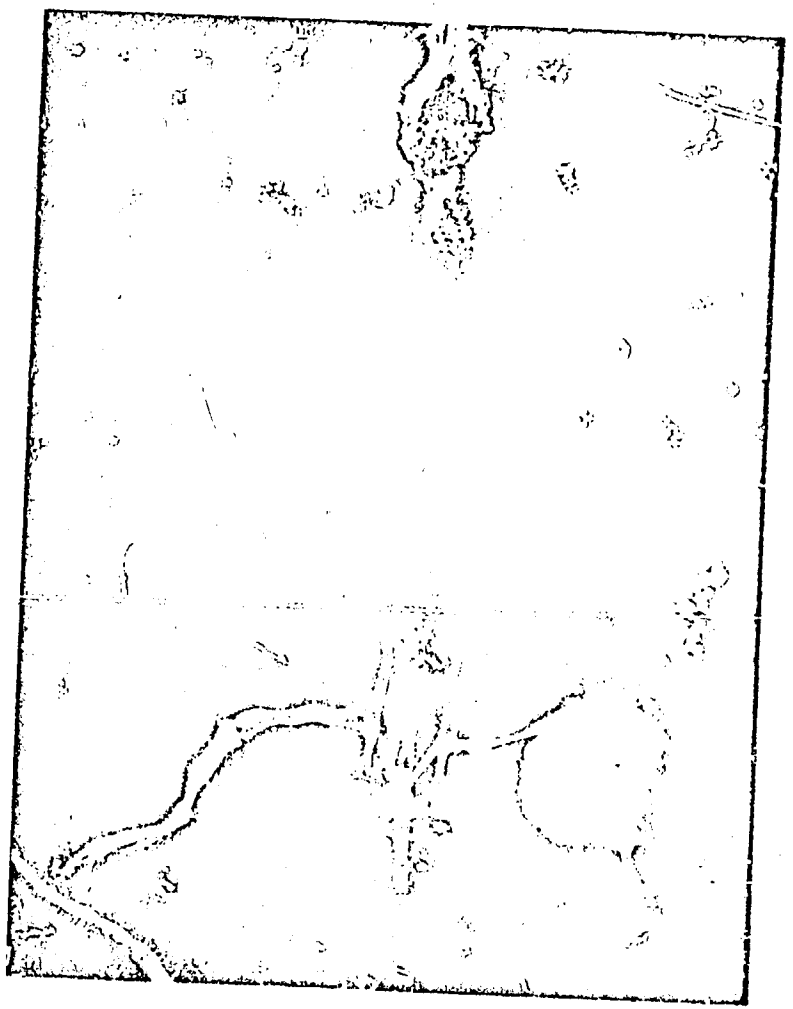
The life expectancy of the individual was carefully considered as a basis of selection of subjects for study. As a rule, the subjects chosen were past forty-five years of age and suffering from chronic disorders such that survival for ten years was highly improbable. By adhering to these criteria, the possibility of late radiation effects developing would be avoided. Furthermore, an opportunity to obtain post-mortem material within a few months, or at most a few years, would be much greater.

Of twelve patients chosen, ten were past the age of forty-five. One was only eighteen years old, and has since died of Cushing's Syndrome. Up to the time of this report, and approximately five years since the initiation of the first study, five subjects are known to have died of their diagnosed illness. Autopsies and tissue samples were obtained from only three of the five terminated cases.

Brief summaries of the medical histories of the subjects of these studies are as follows:

Hp-1

This patient, a sixty-seven year old white male with a nine year history of peptic ulcer, was admitted to the hospital following a severe gastrointestinal hemorrhage. The presence of a duodenal ulcer was confirmed by x-ray examination and a traction diverticulum of the esophagus was noted. Clinical diagnoses included duodenal ulcer, gastrointestinal hemorrhage with secondary anemia, and esophageal diverticulum.



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Hp-2

This patient, a forty-nine year old white male, was a known hemophiliac and entered the hospital on this occasion for the thirty-eighth time. Symptoms referable to hypertension had been present for three years. Clinical diagnoses on this admission included hemophilia, essential hypertension with hypertensive cardiovascular disease and coronary insufficiency, and chronic arthritis.

Hp-3

This patient, a forty-nine year old white female, was admitted to the hospital with complaints of pigmentation of the skin, pruritic dermatitis and dependent edema. Initial clinical studies were carried out in November and December 1945, at which time diagnoses of hepatitis of unknown etiology and hypoproteinemia were made. She was admitted for follow-up examination in October 1946, when she appeared in good health.

Hp-4

This patient, an eighteen year old white female, had a history of Cushing's Syndrome since 1941. Her admission in October 1947 was the fifth period of hospitalization. Chief complaints on this occasion were referable to hypertension and osteoporosis. The clinical diagnoses were basophile adenoma of the pituitary gland with hypertension, hypertensive heart disease, nephropathy with uremia, osteoporosis, and a staphylococcic infection of the urinary tract. The patient ran a down hill course until death in uremia occurred in April 1947. Diagnoses at autopsy included basophile adenoma of the pituitary gland, atrophy of the thyroid gland, hypertrophy of the adrenals, hypertrophy of the left ventricle, hypoplasia of the uterus and ovaries, osteoporosis of the spine and pelvis, and chronic nephritis.

Hp-5

This patient, a fifty-six year old white male, was admitted to the hospital in November 1945 with complaints of generalized weakness and difficulty in walking and swallowing of three years duration. The clinical diagnosis was amyotrophic lateral sclerosis. Death occurred in April 1946. The diagnoses at autopsy included amytrophic lateral sclerosis, bronchopneumonia, generalized arteriosclerosis, renal cysts and adenoma of the right kidney.

Hp-6

This patient, a forty-five year old white male with a history of Addison's disease since January 1945, was admitted to the hospital on December 14, 1945, for treatment of numerous infected lesions of the eyelids and toes. He responded to conservative treatment and studies began during convalescence. On readmission in June 1947, his condition was essentially unchanged.

Hp-7

This patient, a fifty-nine year old white female who had been previously treated for heart disease and hyperthyroidism, was hospitalized on January 21 1946, for cardiac decompensation. The clinical diagnoses were rheumatic heart disease with mitral insufficiency and auricular fibrillation, and toxic nodular goiter. She expired in October 1946. Permission for autopsy was withheld, but the probable cause of death was lobar pneumonia.

Hp-8

This patient, a forty-one year old white female, had a history of scleroderma since January 1945, and a duodenal ulcer first diagnosed in 1944. The clinical diagnoses on this admission were scleroderma and duodenal ulcer.

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Hp-9

This patient, a sixty-six year old white male, was admitted to the hospital in March 1946 with a history of generalized dermatitis and weakness of eighteen months duration. A diagnosis of dermatomyositis was made. The patient expired in July 1947. Diagnoses at autopsy included generalized muscular atrophy, dermatitis, purulent bronchitis and bronchopneumonia, hypertrophy and dilatation of the heart, and chronic passive congestion of the liver and spleen.

Hp-10

This patient, a fifty-two year old negro male, was admitted to the hospital on March 24, 1946, in acute congestive heart failure. A history of heart disease since 1926 was obtained, and his history included both rheumatic fever and luetic infection. The clinical diagnoses on this admission included rheumatic heart disease, latent treated syphilis and ethmoidal and frontal sinusitis.

Hp-11

This patient, a sixty-eight year old white male with history of alcoholism and dietary inadequacies for many years, was admitted to the hospital on December 12, 1945, with complaints of dyspnea and abdominal swelling. He expired on February 26, 1946, and diagnoses at autopsy were cirrhosis of the liver, ascites, and thrombosis of the portal vein.

Hp-12

This patient, a fifty-three year old colored male, was hospitalized on March 25, 1945, following an automobile accident in which he sustained comminuted fractures of the left femur and right patella and a transverse fracture of the right radius and ulna. Physical findings of note included a left lenticular cataract and marked hypertrophic and atrophic arthritic changes in both knees, together with osteochondromatosis of the left knee.

B. Management of Subjects and Collection of Samples

Ten of the twelve patients were cared for in the special metabolic ward of Strong Memorial Hospital. The general management of the ward patients was as follows:

A control period of about ten days was utilized to instruct the patient in the quantitative collection of urine and fecal specimens. During this period all necessary adjustments to ward routine and all necessary modifications in diet were completed. After the patient had proven himself capable of cooperation, a series of control urine and fecal samples were collected for the purpose of "blank" determinations by the method of plutonium analysis. Preceding the injection of plutonium and again at termination, physical and laboratory examinations were conducted on each subject.

Blood samples were drawn into dry sodium citrate as an anticoagulant. Samples of 15 ml were taken before administration of plutonium and at four hours, one day, three days, six days, ten days, fifteen days, etc., post injection.

Urine samples were collected directly into half-gallon fruit jars and preserved with formaldehyde. The urine was usually collected in 24 hour periods except on the day the plutonium was given. During the first day it was collected in two 12 hour periods.

Fecal samples were collected in three-liter beakers. The patient was instructed to empty the bladder before defecation to avoid admixture of urine and feces. As a rule feces were pooled during intervals of four days, except immediately after the plutonium was given when the first two stools were collected separately. All samples were preserved by boiling for ten minutes with 6 N HCl.

Tissue samples of from 25 to 150 g were obtained at autopsy and preserved in 80 per cent alcohol.

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C. Administration of Plutonium

The plutonium solution used in these studies was prepared by dissolving 5.0 mg of spectrographically pure plutonium metal in 1.0 ml. of 2 N HNO_3. The solution was assayed for plutonium by alpha counting. An appropriate aliquot of the plutonium solution was placed in a 10 ml volumetric flask and diluted to volume with sterile 0.4% per cent sodium citrate·$2H_2O$. The solution prepared in the above manner had a pH of approximately 5.5 and the plutonium was in the form of Pu^{+4}-complex.

The technique of injection and the method of assay of the injected dose were as follows: One syringe was filled with sterile saline and a 22-gauge needle attached. The other syringe was filled with 0.5 ml of the plutonium solution and the needle used for filling the syringe was discarded. The needle of the syringe containing sterile saline was introduced into a cubital vein and the saline slowly injected to insure unrestricted entry into the vein. The syringe was then carefully detached from the needle, which was still in the vein, and the syringe containing the plutonium injection solution was substituted. The plutonium solution was injected rapidly after which the syringe was rinsed once by drawing it full of the patient's blood and discharging the blood back into the vein.

The same syringe and needle used to inject the patient was used to measure 0.5 ml aliquots of the plutonium solution into each of four volumetric flasks. The washing of the syringe and the other essential steps of the injection technique were duplicated. The contents of each flask was diluted to volume with 2 N HCl and a suitable aliquot of each evaporated directly on platinum discs and assayed for alpha activity. The average of the four assays was taken as the amount of plutonium administered to the patient. The average standard deviation for each set of four results was 3.0 per cent. The amount of material received by each subject and the date of injection are presented in Table 1.

TABLE 1

AMOUNT OF PLUTONIUM ADMINISTERED TO SUBJECTS VIA INTRAVENOUS INJECTION* AND THE DATE OF ADMINISTRATION

Designation of Subject	Date of Injection	μg Pu Injected**
Hp- 1	October 16, 1945	4.6
Hp- 2	October 23, 1945	5.1
Hp- 3	November 27, 1945	4.9
Hp- 4	November 27, 1945	4.9
Hp- 5	November 30, 1945	5.1
Hp- 6	February 1, 1946	5.3
Hp- 8	February 8, 1946	6.3
Hp- 9	March 9, 1946	6.5
Hp-10	April 3, 1946	6.3
Hp-11	July 16, 1946	6.1
Hp-12	February 20, 1946	6.5
	April 10, 1945	4.7

* Pu was administered as Pu^{+4}-citrate in 0.5 ml of 0.4% solution sodium citrate·$2H_2O$.

** Average standard deviation of determination of dose was 2.0 per cent.

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D. Analytical Procedures

All urine samples were analyzed for plutonium using the cupferron extraction procedure developed at the Los Alamos Scientific Laboratory for the determination of exposure of laboratory personnel (15).

Fecal samples were analyzed by a modification of the cupferron procedure published earlier (16).

Blood and other tissue samples were "ashed" either in a muffle furnace or with conc. HNO_3 and H_2O_2. The ash solution was analyzed for plutonium by the cupferron extraction procedure in exactly the same manner employed for the analysis of urine ash solutions.

III. RESULTS

A. Clinical Observations

Acute toxic effects from the small doses of plutonium administered in these studies were neither expected nor observed.

As seen from the summaries of case histories (Pages 10 - 14), the subjects used in this study were suffering from a variety of conditions. In most cases, however, kidney and liver function appeared to be essentially normal. There were two notable exceptions.

Hp-4 was suffering from Cushing's Syndrome and chronic nephritis. The highly abnormal condition of this subject was accompanied by higher plutonium content in blood and urine and apparently a slower rate of plutonium fixation in bone. In fact, several of the urine analyses were ruled non-representative on the basis of the Chauvenet criterion.

Hp-11 was moribund at the time plutonium was administered. Therefore, no plutonium excretion values were obtained. Anatomical diagnosis revealed cirrhosis of the liver with associated ascites, which indicated marked impairment of liver function.

The data in Table 2 summarize some of the clinical laboratory observations. These data show no consistent trends in hemoglobin, red blood cell count, white blood cell count and differential count as a result of the injection of approximately 5 μg of plutonium. The rise in hemoglobin and red blood cell count in Hp-12 probably was a result of therapeutic measures. The observations in Table 2 were quite in accord with those made by Russell and Nickson (13) who collected excellent clinical laboratory data from two cases following administration of plutonium. One individual received 6.5 μg of plutonium and was followed for 155 days. Another subject received 95 μg of plutonium and was followed for seven days. No alterations attributable to plutonium were found in the constituents of the peripheral blood of either patient.

In the present series clinical evidence suggestive of liver damage did not appear. While specific tests of liver function were not as a rule listed in the protocols, the possibility that injury to this organ might appear was considered.

Admittedly the observations made during this study provide no evidence of what may happen in 10-30 years. It may be said, however, that these studies and those of other investigators indicate that the intravenous injection of a single dose of 5 to 100 μg of plutonium was without acute subjective or objective clinical effects.

B. Deposition of Plutonium in the Body

Since the beginning of this study, four of the subjects (Hp-4, 5, 7 and 9) have died as a result of their diagnosed illness. Another subject, Hp-11, was in the terminal phase at the time of injection. Autopsy and tissue samples were obtained in only three of the five cases. Two bone specimens were obtained from Hp-12 during open reduction of fractures and a number of his teeth were obtained at a later date. Blood samples were obtained from all

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TABLE 2

CLINICAL DATA ON SUBJECTS RECEIVING INTRAVENOUS INJECTION OF APPROXIMATELY 5 μg OF PLUTONIUM AS Pu^{+4} CITRATE

PATIENT CODE	SEX	AGE	WT kg	Pu ADMIN AMT μg	Pu ADMIN DATE	LABORATORY STUDIES* DATE	HGB g %	RBC x 10^{-6}	WBC x 10^3	PMN %	LYMPHS %	EOS %	BASO %	MONO %	UREA Cl mg %	BUN mg %	NPN mg %
Hp-1	M	67	70.3	4.6	10-11	10-4	13.9	4.47	7.1	71	19	1	0	9	96	21	-
						10-19	12.7	4.39	7.0	54	34	4	1	7	99	23	-
Hp-2	M	49	69.0	5.1	10-23	10-6	15.0	4.7	9.65	57	28	11	0	2	96	25	-
						11-7	14.5	4.1	7.05	68	22	8	0	2	99	23	-
Hp-3	F	49	69.9	4.9	11-27	11-2	14.5	4.3	5.7	59	32	2	0	1	96		34
						12-16		5.6	6.8	69	25	0	1	5			51
Hp-4	F	18	55.5	4.9	11-27	10-30	15.6	5.3	10.0	77	20	0	1	2			
						3-21	16.0		6.9	74	22	0	0	4			
Hp-7	F	58	68.0	6.3	2-8	1-23	12.6	3.26	4.75	64	24	3	0	6	94		26
						2-27			9.25	64	25	0	0	9			
Hp-9	F	41	54.4	6.5	3-9	2-22	13.0	4.7	9.5	73	22	0	0	13	85	30	50
						8-21	14.5	4.05	11.9	88	12	0	0	0			
Hp-9	M	66	63.0	6.3	4-3	3-13	12.3	3.9	6.25	70	17	0	0	13	72		
						4-2	12.3	4.1	7.1	61	9	12	1	17			
Hp-10	M	45	69	6.1	7-16	7-9	14.3	5.5	5.65	31	52		2	7	95	11	22
						8-13				42	45	3	2	8	92		
Hp-12	M	53	-	4.7	4-9	5-4	8.9	2.85	5.6	74	18			6		53	64
						7-3	13.5	4.51	4.3	32	64			4		12	37

*Explanation of Symbols: HGB Hemoglobin; RBC Red Blood Cell Count; WBC White Blood Cell Count; PMN Polymorphonuclear Cells; LYMPHS Lymphocytes; EOS Eosinophiles; BASO Basophiles; MONO Monocytes; BUN Blood Urea Nitrogen; NPN Non-Protein Nitrogen; UREA Cl Urea Excretion in Per Cent of Normal at One Hour

subjects before plutonium injection and at frequent intervals thereafter. All tissue samples were analyzed for plutonium by the cupferron extraction procedure subsequent to ashing.

The data in Table 3 show the results of analyses of the various samples for plutonium. The results obtained by Russell and Nickson (13) (referred to as Chi. I, II, III) and Hamilton et al (14) (referred to as Cal. I) are presented also. Two important points must be kept in mind when considering these data: (1) The samples of human tissues were, for obvious reasons, rather unsatisfactory. In most cases they were too small, poorly representative and were usually what could be obtained under the circumstances rather than what were desired; (2) The subjects were chronically ill and/or elderly and the results may not represent exactly the distribution of plutonium in tissues of healthy persons of average working age. These data, however, are all that are available and, therefore, must provide the basis for our present concept of the distribution of plutonium in the organs and tissues of man. They must also provide a basis for comparison with the results obtained from the numerous studies of plutonium deposition in experimental animals.

1. Deposition in the Skeleton

Animal experiments (1) (2) reveal that approximately 60 per cent of plutonium injected as PuO_2^{++} and Pu^{+4} - citrate is localized in bone. If the vertebra, sternum and whole rib are taken as representative bones of the skeleton, and the average plutonium content 1.0(0.5)7 g),

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TABLE 3

DISTRIBUTION OF PLUTONIUM IN HUMAN TISSUES FOLLOWING INTRAVENOUS INJECTION OF PLUTONIUM SALTS

Tissue[2]	Subject[1] and % of Injected Dose g of Tissue								Rel. Pu Affinity[3]	Org. Wt./g[4]	Calc. % Organ
	Hp-5	Hp-9	Hp-11	Ca. I	Chi. II	Hp-12	Cal. I	Av. % g			
Bone Marrow	..	..	0096	.0153	0210	..	0290	0187	12.4	3,000	(56.1)[8]
Radius (Frag. head)	..	..	..	..	..	.0187	..	..	..	..	..
Liver	.0320	0144	0053	.0139	0024	..	..	0138	9.1	1,700	23.1
Rib (Cortex)	..	..	..	0015	0196	..	.0170	.0127	9.1	..	..
Patella	..	..	..	..	..	.0169	..	..	..	..	..
Vertebra	.0071	0040	.0070	..	..	..	..	0073	5.2		..
Sternum	.0070	..	0100	.0044	..	..	..	0071	5.1	10,000	65.7[5]
Rib (Whole)	.0050	0038	0068	..	..	..	..	.0052	3.7		..
Periosteum (Ri.	..	..	..	.0043	.0019	..	0048	.0037	2.6	..	..
Spleen	.0007	.0015	.0048	.0024	.0014	..	0019	.0021	1.5	200	0.4
Kidney	0002	.0002	.0015	.0004	.0004	..	..	.0015	1.0	300	0.4
Thyroid	0001	..	.0009	..	0034	..	..	0014	1.0	30	..
Adrenal	.0004	..	0042	..	..	..	..	.0013	1.0	14	..
Lung	.0005	..	0018	0006	.0018	..	..	.0011	0.8	950	1.0
Pancreas	.0002	0002	..	..	.0022	..	..	0009	0.6	65	..
Gonads	0003	..	0012	.0034	0009	..	..	0007	0.5	..	..
Lymph Node	..	..	..	.0014	0001	..	..	0007	0.5	700	0.5
Teeth (Av. of 7)	..	..	..	..	..	.0003	..	..	..	..	..
Heart	0330	.0000	..	.0003	.0011	..	..	0003	0.2	350	0.1
Large Intestine	0002	..	.0004	..	.0001	..	..	0002	0.1	2,300	0.5
Small Intestine	.0001	..	.0005	..	.0001	..	..	.0002	0.1	..	..
Muscle and Skin	.0000	..	.0002	.0002	.0001	..	..	.0001	0.1	38,500	3.9
Blood	..	..	..	..	..	..	..	..	..	5,400	0.2[8]
Balance	..	..	..	..	..	..	..	.0001[7]	..	9,600	0.9
Total	..	..	..	..	..	..	..	..	..	70,500	98.7

[1] The various subjects received the following doses of plutonium: Hp-5 5 µg, Hp-9 - 8.3 µg, Hp-11 - 6.5 µg, Chi. I - 8.5 µg, Chi. II - 94.9 µg, Hp-12 - 4.7 µg, Cal. I - 103 µg

[2] Tissues were examined at the following times after injection: Hp-5 151 days, Hp-9 456 days, Hp-11 5 days, Cal. I 155 days, Chi. II 16 days, Hp-12 5 days, Cal. I 4 days

[3] Calculated by dividing % g of tissue on % g of body weight if a unit dose of Pu was equally distr. in a 70 Kg. man.

[4] Hermann Lisco, Memorandum to AEC, July 21, 1947, Project Standard Man

[5] Assumption made that vertebra, sternum and whole rib represent average bone of skeletal system.

[6] Bone marrow not included in total recovery because bone samples were not freed of marrow before analysis

[7] Balance assumed to have same Pu content as muscle

[8] Value for blood taken at 30 day point, Fig. 3

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multiplied by the skeletal weight of the "Standard Man" (17), then 65.7 per cent of the injected dose is the estimated amount of plutonium in the skeleton of a 70 kg man. Although the latter value was established rather arbitrarily, it is in good agreement with the value expected from animal experiments.

The data in Table 3 indicate a rather high plutonium content in bone marrow. The average of four determinations from three different laboratories was 0.0187 per cent of the injected dose per gram of marrow. On the basis of 3000 g of bone marrow, there would be 56 per cent of the injected dose concentrated in the marrow of a 70 kg man. Animal studies do not show appreciable concentrations of plutonium in the marrow. The major areas of plutonium concentration in rats and mice are the endosteum, periosteum and the epiphyseal line. It is quite possible that the samples of human marrow were too small to be representative, containing endosteum or spicules, or that the high deposition was an indication of an age factor related to the fact that the epiphyses of man unlike those of the rat unite at maturity.

2. Deposition in the Liver

The average plutonium deposition in the liver for the five cases was 0.0136 per cent of the injected dose per gram, which corresponds to 23.1 per cent of the dose in a 1700 gram liver (Standard Man). Table 4 presents the liver data in more detail, including the two cases reported by the Chicago investigators (13).

TABLE 4

LIVER DEPOSITION OF PLUTONIUM ADMINISTERED INTRAVENOUSLY TO MAN

Subject	Days After Injection	Liver Wt. in Grams	% of Dose per Gram	% of Dose per Organ
Hp-5	151	1340	.0320	42.8
Hp-9	456	1600	.0144	23.0
Hp-II[1]	5	2325	.0053	12.3
Chi. I[3]	155	2050	.0139	28.5
Chi. II[2,3]	16	1110	.0024	2.7
AVERAGE	156	1641	.0136	21.9

[1] Hp-II was in terminal phase of illness; plutonium deposition probably low because of severe cirrhosis of the liver.

[2] Chi.-II was in terminal phase of adenocarcinoma; plutonium deposition probably low because of metastases to the liver.

[3] Russell, E.R. and Nickson, J.J. (13)

Two cases (Hp-II and Chi.-II) were in the terminal phase of illness at the time plutonium was administered. Both showed advanced liver disease. The values for plutonium deposition in the liver of these cases is highly questionable. The results in the other three cases, however, were rather striking. As pointed out by Russell and Nickson (13), the content of

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plutonium in the liver was much higher than was to be expected from results in experimental animals. Even though one of their cases survived 155 days after receiving plutonium in the +6 valence state (a form known to give low liver deposition in rats (1) (2)), 28.5 per cent of the injected dose was found in the liver. Subject Hp-5 had 42.8 per cent of the plutonium injected as Pu^{+4}-citrate deposited in the liver after 151 days. The third case (Hp-9) survived 156 days and had 23.0 per cent of the injected material deposited in the liver. Considering the elapsed time after injection, the plutonium content of the liver in the two latter cases was even higher than that observed by Russell and Nickson (13). The apparent higher deposition in the latter cases might indicate the destruction of the Pu^{+4}-citrate complex by the human liver. The results compare favorably with those obtained when rats were injected with uncomplexed quadrivalent plutonium ion (1), (2), (3). The limited data presented in Table 4 indicated rather strongly that the retention of plutonium by the liver may be much greater for man than for rats and mice, and may be of the order of 20 - 40 per cent of the injected dose during the first year. A comparison of the survival times and the amounts of plutonium deposited in the livers of Hp-5 and Hp-9 seems to indicate a "plutonium retention half-time" in the liver of one year or greater for man as compared to 40 - 60 days for rats.

3. Concentration in Blood

The data in Table 5 show the concentration of plutonium in blood at various times after the intravenous injection of approximately 5 μg of plutonium as Pu^{+4}-citrate. The results are expressed in per cent of the injected dose in the total blood volume. The blood was assumed to be 7.7% per cent of the total body weight (17).

The individual observations varied widely, especially during the first four days. The mean values, however, fell on a smooth curve (shown in Fig. 3).

The drop in blood plutonium content was very rapid at first, and reflected the very rapid rate of fixation of the material in the body. The mean blood concentration 4 hours after injection was 35.7 per cent, at one day 15.7 per cent, at 10 days 1.2 per cent. Thirty days after injection the blood concentration of plutonium read from the curve in Fig. 3 was only 0.3 per cent of the injected dose in the total blood volume. The extremely small amount of plutonium in the circulating blood eliminates blood analysis by the usual counting procedures as a means of diagnosing the degree of exposure of personnel. The application of techniques employing the counting of alpha tracks registered by alpha sensitive nuclear track photographic emulsions may prove possible.

4. Deposition in Other Organs

The amounts of plutonium deposited in organs and tissues other than skeleton, liver and blood were rather small. When the per cent per organ was calculated, based on the organ weight of the "Standard Man", the results were in reasonable agreement with what was anticipated from animal experiments. The data showing the per cent of dose per gram of organ and per cent per organ are given in Table 3 (Page 18). The kidney and spleen each had an estimated average plutonium content of 0.4 per cent of the injected dose per organ.

The relative affinity of the various tissues for plutonium was calculated by dividing the per cent of the dose per gram of organ by the per cent of the dose per gram of body weight when the material was assumed to be equally distributed in a 70 kg man.

The bone, bone marrow and liver were the only tissues that showed a relative plutonium affinity appreciably greater than unity. The spleen was 1.5; all other tissues and samples were 1.0 or less. Obviously the skeletal system and liver are the tissues of major interest when considering the plutonium tolerance, as these two organs alone account for 90 per cent or more of the total plutonium in the entire body.

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TABLE 5

PLUTONIUM CONTENT OF BLOOD SAMPLES* FOLLOWING INTRAVENOUS INJECTION OF APPROXIMATELY 5 μg OF PLUTONIUM AS Pu^{+4}-CITRATE

DAYS AFTER INJECTION	PATIENT CODE AND PER CENT OF INJECTED DOSE IN TOTAL BLOOD VOLUME*											AVERAGE
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	
1/6	46.02	-	28.32	83.31	31.51	36.70	32.17	37.64	40.83	51.57	5.31	35.7
1	21.83	19.35	-	-	6.23	10.97	16.40	14.51	12.39	24.66	-	15.7
2	-	8.38	11.56	-	-	-	-	-	-	-	-	9.97
3	-	10.03	-	10.64	1.16	2.04	6.97	4.94	6.22	20.06	-	8.62
4	-	-	4.22	-	-	-	-	-	-	-	-	
5	-	-	-	-	0.66	-	-	-	-	-	-	
6	3.30	4.25	2.17	6.14	-	1.00	2.06	2.07	3.91	4.91	-	3.4
8		2.32	1.42	-	-			-	-	-	-	1.9
9	-	-	-	4.60	-	-	-	-	-	-	-	-
10	1.42	-	-	-	0.39	0.38	1.13	1.37	2.21	1.72	-	1.2
13	-	-	0.61	2.34	-	-	-	-	-	-	-	1.5
15	-	-	-	-	0.11	1.26	0.66	0.71	1.42	1.02	-	.70
17	-	-	0.51	1.45	-	-	-	-	-	-	-	1.0
22	-	0.70	-	-	0.16	0.25	-	-	-	-	-	.36
23	-		0.25	0.72	-	-	-	-	-	-	-	.48
29	-	-	-	-	-	-	0.37	-	-	-	-	
30	-	-	-	-	-	-	-	-	-	0.36		
31	-	-	-	-	-	-	-	-	-	-	-	
36	-	-	-	-	-	-	-	-	0.42	-	0.51	
42	-	-	-	-	-	-	-	0.17	-	-	-	
46	-	-	-	-	-	-	-	-	-	-	0.45	

*Total Weight of Blood Taken as 7.7% of Total Body Weight.

C. Excretion of Plutonium

1. Urinary Excretion

The urinary excretion of plutonium was studied in eleven of the subjects following the intravenous injection of approximately 5 μg of plutonium as Pu^{+4} in 0.4 per cent solution of sodium citrate·$2H_2O$. With the exception of the first day, urine from all subjects was collected in 24 hour samples through 22 days post injection. After 22 days the collection of 24 hour urine samples was continued as long as the patients were available for study. It was not possible to retain the subjects as long as was desired and the major weakness in these results is the short time interval over which the studies were continued. Two subjects were followed 22 days, one for 23 days, one for 27, and the remainder for 30 days or longer after injection. The Chicago cases (13) were followed for 16, 140, and 186 days and the California case (14) was followed for a period of 341 days. Because of the great importance of measurements at longer time intervals, the Chicago and California data have been incorporated with

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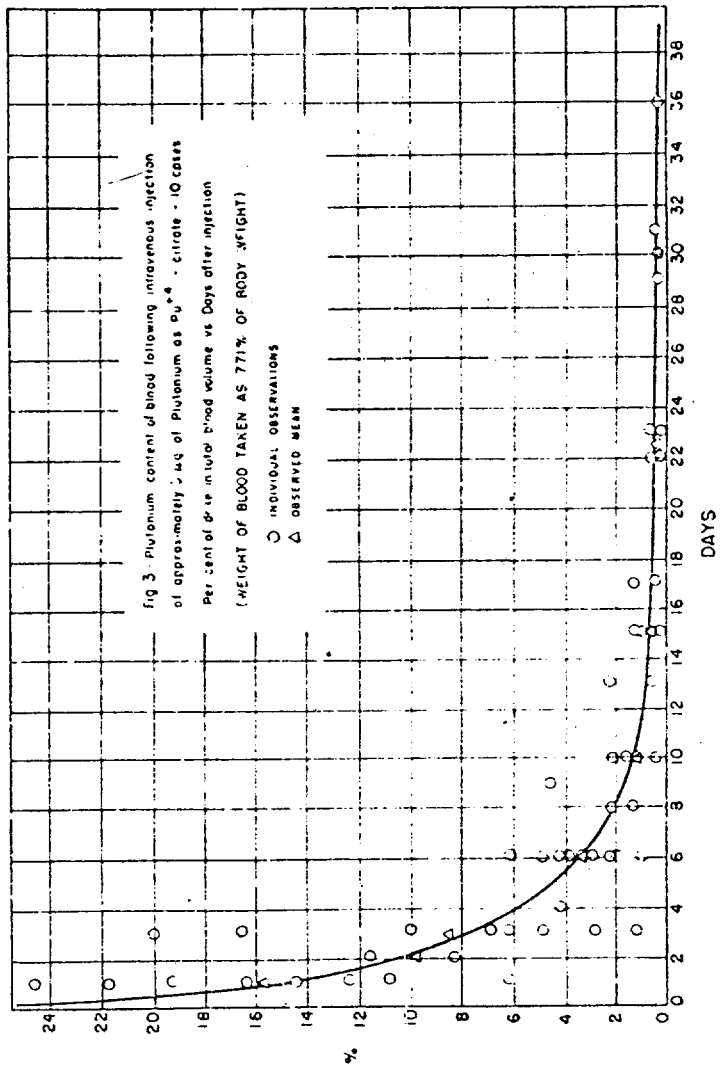
Fig 3 Plutonium content of blood following intravenous injection of approximately 1 mg of Plutonium as Pu^{+4} - citrate - 10 cases
Per cent of the initial blood volume vs Days after injection
(WEIGHT OF BLOOD TAKEN AS 7.1% OF BODY WEIGHT)
○ INDIVIDUAL OBSERVATIONS
△ OBSERVED MEAN
%
DAYS

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the data from these studies. The results of all urine analyses through 138 days post-injection are given in Table 6. Results are expressed as per cent of injected dose excreted per day.

The means, revised to date, and standard deviations for the daily urinary excretion of plutonium from 9 to 136 days post-injection are given in Table 7. The equation of best fit for the observed means is a logarithmic function:

$$Y = aX^{-b} \qquad [1]$$

where Y is the amount of plutonium (expressed as per cent of injected dose) excreted in a single day, X is the time of observation in days post-injection, and a and b are constants derived from the observed data by the method of least squares. Solution gives the following expression for the best curve to fit for the urinary excretion of plutonium utilizing all available data from 0 to 138 days post-injection:

$$Y_u = 0.23\ X^{-0.77} \qquad [2]$$

The agreement between observed mean values and the derived expression for the urinary excretion of plutonium through 138 days post-injection is illustrated graphically in Fig. 4. In this graph the circles represent the observed means and the solid line represents the derived expression. The agreement is fairly good. The overall standard error of estimate, S_{YX}, (determined by the usual methods of correlation analysis) was ± 32 per cent. The largest contributions to the standard error of estimate come from the 0 to 10 day portion of the curve and from the latter portion where there is an increased scatter of points because of the decrease in number of observations. Actually, attempts at curvilinear regression line fitting indicate that the function $Y = aX^{-1}$ is the best curve for the 0 to 10 day period rather than the logarithmic curve presented. We believe this difference in functional relationship may be due to the clearance of the injected plutonium from the blood during this early period after injection.

Extrapolation of the derived expression beyond 138 days introduces increasing uncertainty with increasing values of X. In order to interpret the excretion results in standard terms, i.e. "biological half-life", despite the fact that the data are not fitted by a single exponential curve, we have chosen to determine $T_{1/2}$ by assuming exponential excretion beyond the limits of observation and estimating $T_{1/2}$ from the last point on the excretion curve (a single value of the ordinate). One may then assume the slope of the excretion curve to be zero at this point and calculate an absolute minimum value for the "biological half-time". For the above reasons it is important to supplement the urinary excretion data beyond 138 days to the greatest possible extent. Three additional groups of samples were obtained from two of the cases after the close of the experiment. One group of four consecutive daily urine samples was obtained from Hp-6 beginning on the 523rd day and another group beginning on the 1610th day after injection. The average daily urinary excretion of plutonium at 523 days was 0.002 per cent, and at 1610 days 0.0011 per cent of the injected dose. Four daily samples collected from Hp-3 beginning at 1943 days after injection showed an average daily urinary excretion of 0.0008 per cent of the injected dose.

In addition to the three groups of samples mentioned above a number of urine plutonium assays were made on workers at the Los Alamos Laboratory. A few of these individuals accumulated measurable amounts of plutonium during wartime operations. They were removed from further exposure to plutonium and occasional urine assays were made over a period of the next several months. The urine assays on three members of this group are given in Table 8. Since these individuals received unknown exposure doses via the usual routes of entry over an indefinite time, the results are not analogous to a single intravenous injection of a known amount of plutonium. However, the inclusion of these individuals has been attempted in order to extend the excretion curve. An attempt has been made to interpret their

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TABLE 6

INDIVIDUAL URINARY EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION[1] TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY														
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi.-I[2]	Chi.-II[2]	Chi.-III[2]	Cal.-I[3]
1	.181	.473	.549	.440	.296	-	.217	.377	.183	.416	.101	.837	2.531*	.16	.480
2	.148	.294	.289	.236	.168	.218	.212	.232	.065	.330	.163	.182	.153	.11	.150
3	.114	.174	.112	.221	.077	.127	.137	.138	.069	.215	.048	.063	.184	.06	.120
4	.084	.133	.107	.133	.052	.111	.098	.140	.066	.170	.078	.077	.133	.07	.11
5	.069	.118	.078	.118	.030	.076	.060	.083	.047	.049	.065	.036	.032	.04	.277
6	.066	.061	.043	.119*	.020	.057	.050	.078	.052	.060	.044	.0254	.029	.042	-
7	.062	.062	.043	.077	.033	.044	.045	.066	.050	.070	.056	.0234	.034	.034	-
8	.055	.048	.048	.081	.026	.043	.037	.057	.032	.065	.040	.0227	.033	.035	.018
9	.061	.048	.022	.095*	.027	.032	.013	.047	.032	.051	.043	-	.027	.019	.069
10	.045	.036	.027	.081*	.022	.021	.023	.030	.035	.044	.038	.0042*	.034	.030	.026
11	.040	.048	.027	.075*	.021	-	.012	.044	.026	.041	.038	.0097	.047	.019	.036
12	.038	.037	.015	.072*	.026	.024	.019	.023	.030	.038	.027	.0095	.041	.034	.020
13	.034	[illegible]	.020	.067*	.023	.023	.019	.037	.027	.023	.030	.0736	.018	.034	-
14	.035	.036	.020	.058*	.016	.020	.013	.037	.030	.029	.039	.007	.034	.008	-
15	.034	.039	.028	.050	.015	.022	.012	.037	.030	.025	.029	.0053	.036	.014	.013
16	.038	.024	.024	.023	.020	.017	.012	.020	.049*	.021	.023	.0100	.012	.004	.018
17	.027	.027	.021	.032	.020	.013	.011	.033	.038	.023	.029	-	.028	-	.0046
18	.027	.020	.017	.037	.020	.015	.011	.029	.027	.021	.026	-	.028	-	.010
19	.020	.019	.018	.032	.018	.015	.010	.031	.029	.019	.029	.0032	.019	-	.008
20	.017	.021	.012	.025	.021	.013	.009	.032	.029	.018	.032	.0093	.038	-	.0048
21	.017	.017	.019	.029	.020	.012	.010	.029	.032	.022	.025	.0076	.032	-	.0017
22	.018	.015	.014	.022	.018	.013	.013	.021	.032	.018	.025	.0145	.027	-	.0090
23	.025	.016	.014	.014	-	-	.008	.021	.033	.018	.039	.0151	.029	-	.0091
24	.021	.014	-	-	-	-	.008	.025	.032	.018	.023	.0138	.020	-	.0078
25	.013	.014	-	.013	-	-	.004	.023	.029	.016	.021	.0128	.148*	-	.011
26	-	.017	-	.011	-	-	.007	.022	.032	.018	.023	.0175	.034	-	.0022
27	-	.008	-	.008	-	-	.008	.028	.032	.014	.017	.0151	.043*	-	.0044
28	-	.003	-	-	-	-	.006	.023	.024	.013	.034	.0187	.034	-	.0074
29	-	.009	-	-	-	-	.006	.019	.025	.014	.023	.0138	.042	-	.0043
30	-	.008	-	-	-	-	.006	.021	.023	.014	.021	.0151	.034	-	.0069
31	-	.007	-	-	-	-	.005	.017	.025	-	.021	.010	.027	-	.0077
32	-	.007	-	-	-	-	.007	.018	.024	-	.012	.010	.020	-	.0063
33	-	.009	-	-	-	-	.006	.015	.022	-	.037*	.017	.011	-	.0073
34	-	.009	-	-	-	-	.006	.015	.020	-	.020	.0139	.008	-	.0084
35	-	-	-	-	-	-	.009	-	.022	-	.026	.0127	.009	-	.0089
36	-	-	-	-	-	-	.008	.015	.032	-	.018	.0165	.015	-	.0079
37	-	-	-	-	-	-	.006	.011	-	-	.033*	.0111	.011	-	.0083
38	-	-	-	-	-	-	-	.016	-	-	.018	.0174	.009	-	.0085
39	-	-	-	-	-	-	-	.012	-	-	.021	.0112	.008	-	.0094
40	-	-	-	-	-	-	-	.017	-	-	.019	.0072	.009	-	.0073
41	-	-	-	-	-	-	-	.019	-	-	.013	.0092	.011	-	.0080
42	-	-	-	-	-	-	-	.014	-	-	.013	.0127	-	-	.0081
43	-	-	-	-	-	-	-	.016	-	-	.015	.0095	.017	-	.0076
44	-	-	-	-	-	-	-	.016	-	-	.015	.0031	-	-	.0055
45	-	-	-	-	-	-	-	.013	-	-	.017	.013	.018	-	.0063
46	-	-	-	-	-	-	-	.015	-	-	-	.012	-	-	.0073
47	-	-	-	-	-	-	-	.014	-	-	.015	-	.020	-	.0059
48	-	-	-	-	-	-	-	.014	-	-	.017	.0084	-	-	.0058
49	-	-	-	-	-	-	-	.018	-	-	.012	.0085	-	-	.0083
50	-	-	-	-	-	-	-	.014	-	-	-	.0054	.016	-	.0078
51	-	-	-	-	-	-	-	.019	-	-	-	.0077	-	-	.0083
52	-	-	-	-	-	-	-	-	-	-	.035	.0073	-	-	.0098
53	-	-	-	-	-	-	-	.013	-	-	.019	.0023	-	-	.0076
54	-	-	-	-	-	-	-	.013	-	-	.043	-	-	-	.0077
55	-	-	-	-	-	-	-	.015	-	-	.023*	.0073	.014	-	.0098
56	-	-	-	-	-	-	-	.013	-	-	.036	.003	-	-	.0084
57	-	-	-	-	-	-	-	.012	-	-	.018	.0075	-	-	.0090
58	-	-	-	-	-	-	-	.013	-	-	.036	.0094	-	-	.0058
59	-	-	-	-	-	-	-	.012	-	-	-	.011	-	-	.0098
60	-	-	-	-	-	-	-	.011	-	-	-	.0083	.022	-	.0067
61	-	-	-	-	-	-	-	.012	-	-	-	.0069	-	-	.0068
62	-	-	-	-	-	-	-	.010	-	-	-	.0092	-	-	.0058
63	-	-	-	-	-	-	-	.009	-	-	-	.0094	-	-	.0071
64	-	-	-	-	-	-	-	.012	-	-	-	.0071	-	-	.0042
65	-	-	-	-	-	-	-	.011	-	-	-	.0085	.034	-	.0042
66	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0047
67	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0064
68	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0068
69	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0078
70	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0100
71	-	-	-	-	-	-	-	-	-	-	-	.0096	-	-	.0073
72	-	-	-	-	-	-	-	-	-	-	-	.0089	.014	-	.0082
73	-	-	-	-	-	-	-	-	-	-	-	.0063	-	-	.0089

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TABLE 6 (Contd)

INDIVIDUAL URINARY EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION[1] TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY														
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi.-I[2]	Chi.-II[2]	Chi.-III[2]	Cal.-I[3]
74	-	-	-	-	-	-	-	-	-	-	-	.010	-	-	.0078
75	-	-	-	-	-	-	-	-	-	-	-	.013	-	-	.0081
76	-	-	-	-	-	-	-	-	-	-	-	.0081	-	-	.0061
77	-	-	-	-	-	-	-	-	-	-	-	.0043	-	-	.0068
78	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0071
79	-	-	-	-	-	-	-	-	-	-	-	.0052	-	-	.0065
80	-	-	-	-	-	-	-	-	-	-	-	.0048	.034	-	.0043
81	-	-	-	-	-	-	-	-	-	-	-	.0043	-	-	.0033
82	-	-	-	-	-	-	-	-	-	-	-	.002	.018	-	.0083
83	-	-	-	-	-	-	-	-	-	-	-	.0041	-	-	.0043
84	-	-	-	-	-	-	-	-	-	-	-	.0029	-	-	.0021
85	-	-	-	-	-	-	-	-	-	-	-	.007	-	-	-
86	-	-	-	-	-	-	-	-	-	-	-	.0046	-	-	.0100
87	-	-	-	-	-	-	-	-	-	-	-	.0076	-	-	[illegible]
88	-	-	-	-	-	-	-	-	-	-	-	.0086	-	-	.0087
89	-	-	-	-	-	-	-	-	-	-	-	.0049	-	-	.0071
90	-	-	-	-	-	-	-	-	-	-	-	.0032	.017	-	.0077
91	-	-	-	-	-	-	-	-	-	-	-	.0076	-	-	.0082
92	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0071
93	-	-	-	-	-	-	-	-	-	-	-	.008	-	-	.0060
94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0071
95	-	-	-	-	-	-	-	-	-	-	-	.0093	.017	-	.0053
96	-	-	-	-	-	-	-	-	-	-	-	.011	.015	-	.0042
97	-	-	-	-	-	-	-	-	-	-	-	.0052	-	-	.0057
98	-	-	-	-	-	-	-	-	-	-	-	.012	.012	-	.0053
99	-	-	-	-	-	-	-	-	-	-	-	.008	-	-	.0070
100	-	-	-	-	-	-	-	-	-	-	-	.0098	-	-	.0081
101	-	-	-	-	-	-	-	-	-	-	-	.005	-	-	.0033
102	-	-	-	-	-	-	-	-	-	-	-	.009	.006	-	.0040
103	-	-	-	-	-	-	-	-	-	-	-	.008	-	-	.0070
104	-	-	-	-	-	-	-	-	-	-	-	.0066	-	-	.0051
105	-	-	-	-	-	-	-	-	-	-	-	.018	-	-	.0058
106	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0048
107	-	-	-	-	-	-	-	-	-	-	-	.0098	-	-	.0060
108	-	-	-	-	-	-	-	-	-	-	-	.0063	.008	-	.0052
109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0044
110	-	-	-	-	-	-	-	-	-	-	-	.0036	-	-	.0018
111	-	-	-	-	-	-	-	-	-	-	-	.0061	-	-	.0043
112	-	-	-	-	-	-	-	-	-	-	-	.018	-	-	.0051
113	-	-	-	-	-	-	-	-	-	-	-	.0095	.007	-	.0036
114	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0039
115	-	-	-	-	-	-	-	-	-	-	-	.0145	.008	-	.0043
116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0047
117	-	-	-	-	-	-	-	-	-	-	-	.0069	-	-	.0023
118	-	-	-	-	-	-	-	-	-	-	-	.0035	-	-	.0039
119	-	-	-	-	-	-	-	-	-	-	-	.0066	-	-	.0036
120	-	-	-	-	-	-	-	-	-	-	-	.0051	.007	-	.0025
121	-	-	-	-	-	-	-	-	-	-	-	.0041	-	-	.0047
122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0039
123	-	-	-	-	-	-	-	-	-	-	-	.0116	-	-	.0014
124	-	-	-	-	-	-	-	-	-	-	-	.0069	-	-	.0039
125	-	-	-	-	-	-	-	-	-	-	-	.0109	.009	-	.0036
126	-	-	-	-	-	-	-	-	-	-	-	.0027	-	-	.0032
127	-	-	-	-	-	-	-	-	-	-	-	.008	.011	-	.0040
128	-	-	-	-	-	-	-	-	-	-	-	.0073	-	-	.0019
129	-	-	-	-	-	-	-	-	-	-	-	.0052	-	-	.0034
130	-	-	-	-	-	-	-	-	-	-	-	.0034	-	-	.0014
131	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0011
132	-	-	-	-	-	-	-	-	-	-	-	.0065	.008	-	.0034
133	-	-	-	-	-	-	-	-	-	-	-	.0068	-	-	.0037
134	-	-	-	-	-	-	-	-	-	-	-	.0061	-	-	.0037
135	-	-	-	-	-	-	-	-	-	-	-	.011	.007	-	.0028
136	-	-	-	-	-	-	-	-	-	-	-	.0064	-	-	.0036
137	-	-	-	-	-	-	-	-	-	-	-	.0071	-	-	.0032
138	-	-	-	-	-	-	-	-	-	-	-	.0073	.009	-	.0010

* Values eliminated from revised mean on basis of the Chauvenet Criterion.

(1) All cases except Chi-I, 2, 3 and Cal-I received Pu^{+4} in .4 per cent $Na_3C_6H_5O_7 \cdot 2H_2O$ solution. The latter cases received PuO_2^{++}.

(2) Russell, E. R., Nickson, J. J., Argonne National Laboratory Report CH-3607 and unpublished data.

(3) Hamilton, J. G., et al, Report No. CH-3[illegible].

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TABLE 7

MEANS*, REVISED MEANS, AND STANDARD DEVIATIONS OF URINARY, FECAL, AND URINARY PLUS FECAL EXCRETION OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF INJECTED DOSE)

DAYS POST INJECTION	URINARY EXCRETION Mean %/Day	URINARY EXCRETION Revised Mean %/Day	URINARY EXCRETION Standard Deviation	FECAL EXCRETION Mean %/Day	FECAL EXCRETION Revised Mean %/Day	FECAL EXCRETION Standard Deviation	URINARY & FECAL EXC. Mean %/Day
1	.5178	.3628	.614	.1553	.1988	.1168	.5616
2	.1974	-	.070	.2458	-	.1230	.4252
3	.1266	-	.052	.2275	-	.0905	.3541
4	.0962	-	.041	.1842	-	.1155	.2804
5	.0652	-	.030	.1582	-	.0857	.2234
6	.0540	.0490	.026	.1096	-	.0440	.1586
7	.0501	-	.022	.0766	-	.0401	.1267
8	.0440	-	.022	.0717	-	.0412	.1157
9	.0424	.0384	.023	.0647	-	.0415	.1031
10	.0355	.0341	.018	.0538	-	.0385	.0860
11	.0350	.0319	.018	.0566	-	.0360	.0885
12	.0300	.0270	.016	.0568	-	.0351	.0838
13	.0307	.0279	.013	.0512	-	.0354	.0791
14	.0274	.0250	.014	.0453	.0386	.0301	.0636
15	.0253	-	.012	.0438	.0370	.0286	.0623
16	.0219	.0199	.011	.0617	.0296	.1090	.0495
17	.0236	-	.0092	.0402	.0285	.0411	.0521
18	.0219	-	.0078	.0377	.0268	.0394	.0487
19	.0190	-	.0081	.0278	-	.0188	.0466
20	.0200	-	.0101	.0274	-	.0169	.0474
21	.0155	-	.0093	.0263	-	.0183	.0458
22	.0186	-	.0083	.0243	-	.0182	.0431
23	.0203	-	.0105	.0224	-	.0156	.0427
24	.0179	-	.0077	.0211	.0167	.0141	.0346
25	.0279	.0159	.0142	.0199	.0145	.0180	.0304
26	.0172	-	.0088	.0211	.0160	.0158	.0332
27	.0178	.0149	.0126	.0163	.0119	.0120	.0268
28	.0180	-	.0092	.0153	.0122	.0140	.0302
29	.0153	-	.0074	.0180	-	.0146	.0333
30	.0154	-	.0072	.0179	-	.069	.0333
31	.0150	-	.0086	.0191	-	.0119	.0341
32	.0128	-	.0067	.0188	-	.031	.0316
33	.0155	.0125	.0102	.0192	-	.011	.0317
34	.0125	-	.0056	.0192	-	.011	.0317
35	.0138	-	.0083	.0201	-	.012	.0339
36	.0143	-	.0056	.0151	-	.0091	.0294
37	.0114	.0091	.0062	.0183	-	.0119	.0274
38	.0138	-	.0043	.0181	-	.0121	.0319
39	.0119	-	.0055	.0079	-	.0044	.0198
40	.0119	-	.0058	.0088	-	.0031	.0207
41	.0120	-	.0044	.0087	-	.0032	.0207
42	.0120	-	.0027	.0082	-	.0040	.0202
43	.0130	-	.0040	.0079	-	.0031	.0209
44	.0094	-	.0059	.0094	-	.0015	.0188
45	.0135	-	.0050	.0087	-	.0049	.0222
46	.0114	-	.0041	.0088	-	.0053	.0202
47	.0137	-	.0058	.0084	-	.0072	.0221

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TABLE 7 (Contd)

MEANS*, REVISED MEANS, AND STANDARD DEVIATIONS OF URINARY, FECAL, AND URINARY PLUS FECAL EXCRETION OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF INJECTED DOSE)

DAYS POST INJECTION	URINARY EXCRETION Mean %/Day	URINARY EXCRETION Revised Mean %/Day	URINARY EXCRETION Standard Deviation	FECAL EXCRETION Mean %/Day	FECAL EXCRETION Revised Mean %/Day	FECAL EXCRETION Standard Deviation	URINARY & FECAL EXC. Mean %/Day
43	.0108	-	.0056	.0067	-	.0018	.0175
49	.0114	-	.0062	.0064	-	.0028	.0178
50	.0113	-	.0059	.0060	-	.0028	.0173
51	.0094	-	.0032	.008	-	-	.0174
52	.0173	-	.0154	.010	-	-	.0273
53	.0104	-	.0074	.010	-	-	.0204
54	.0212	-	.0189	.0069	-	.0047	.0281
55	.0178	.0115	.0144	.010	-	-	.0215
56	.0146	-	.0149	.010	-	-	.0246
57	.0106	-	.0056	.0070	-	-	.0175
58	.0161	-	.0136	.0057	-	.0019	.0217
59	.0109	-	.010	.0070	-	-	.0176
60	.0115	-	.0074	.0070	-	-	.0185
61	.0085	-	.0029	.0080	-	-	.0165
62	.0083	-	.0021	.0064	-	.0023	.0147
63	.0087	-	.0007	.008	-	-	.0167
64	.0078	-	.0041	.008	-	-	.0158
68	.0089	-	.0028	.0063	-	-	.0152
70	.0120	-	.0028	.0045	-	-	.0165
74	.0090	-	.0022	.0050	-	-	.0140
78	.0107	-	.0050	.0033	-	-	.0140
79	.0059	-	.0022	.0055	-	.0007	.0114
80	.0111	-	.0110	.0055	-	.0007	.0166
81	.0048	-	.0010	.0055	-	.0007	.0103
82	.0093	-	.0081	.0051	-	.0009	.0144
83	.0055	-	.0022	.0060	-	-	.0115
84	.0026	-	.0010	.0060	-	-	.0086
85	.0070	-	-	.0060	-	-	.0130
86	.0073	-	.0036	.0050	-	-	.0123
90	.0093	-	.0071	.0042	-	-	.0133
94	.0071	-	-	.0040	-	-	.0111
98	.0101	-	.0044	.0050	-	-	.0151
100	.0079	-	.0028	.0058	-	-	.0135
102	.0070	-	.0026	.0038	-	-	.0108
106	.0081	-	.0022	.0043	-	-	.0104
108	.0068	-	.0021	.0038	-	-	.0106
112	.0101	-	.0071	.0021	-	-	.0122
116	.0047	-	-	.0029	-	-	.0076
120	.0039	-	.0023	.0032	-	-	.0071
126	.0035	-	.0010	.0030	-	-	.0065
130	.0034	-	.0028	.0037	-	-	.0071
136	.0041	-	.0022	.0034	-	-	.0075
138	.0058	-	.0042	.0025	-	-	.0083

* Cases of Russell and Nickson and Hamilton, et al used in computing means where applicable.

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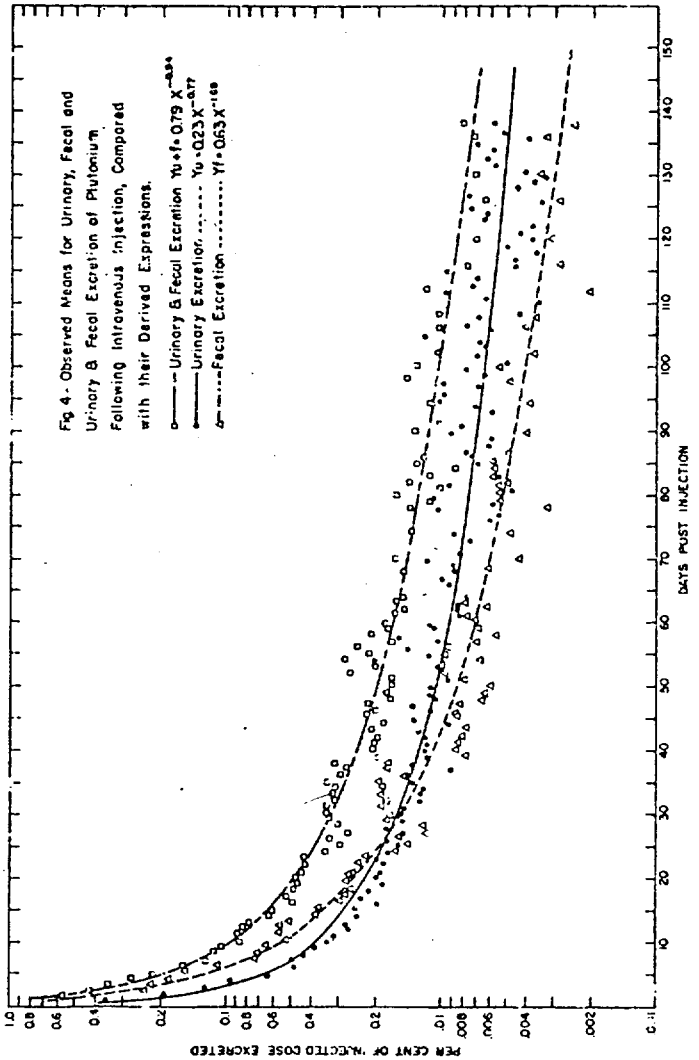

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chronic variable exposure dose in terms of an effective single dose given at some effective time between the limits of exposure. This interpretation was accomplished by fitting the slopes of the urinary excretion curves of these individuals to the slope of the 138 day curve in the following manner: If $Y_u = 0.23\ X^{-0.77}$ gives the per cent (Y_u) of a single dose excreted on day X, then $0.0023\ DX^{-0.77}$ is the expression for the measured activity, i.e., counts per minute, excreted on day X when the single dose (D) is expressed in the same units. If the assumption is made that a chronic variable exposure dose may be represented by a single effective dose (D_E) then the activity (Y_q) in the sample excreted q effective days after this single dose is given by the expression

$$Y_q = 0.0023\ D_E\ q^{-0.77} \qquad [3]$$

The activity (Y_{q+a}) of the sample excreted on q+a days after the single dose (there being no exposure between q and q+a) is given by the expression

$$Y_{q+a} = 0.0023\ D_E\ (q+a)^{-0.77} \qquad [4]$$

Dividing 3 by 4 and solving for q gives

$$q = \frac{a}{\left(\frac{Y_q}{Y_{q+a}}\right)^{1.30} - 1} \qquad [5]$$

q then is the effective time of exposure and its substitution in [3] gives the effective dose D_E, as follows:

$$Y_q = 0.0023\ D_E \left[\frac{a}{\left(\frac{Y_q}{Y_{q+a}}\right)^{\frac{1}{0.77}} - 1}\right]^{-0.77}$$

$$D_E = 434.8\ Y_q \left[\frac{a}{\left(\frac{Y_q}{Y_{q+a}}\right)^{1.30} - 1}\right]^{0.77} \qquad [6]$$

This expression gives an approximation of the total body burden of a person chronically exposed to plutonium. The body burden is expressed in terms of a single effective dose as determined from two urinary excretion measurements (Y_q and Y_{q+a}) taken sufficiently far apart (with no exposure between) so that the two measurements are significantly different.

The method of interpretation given above was applied to the urinary plutonium excretion data from three Los Alamos personnel and their average total plutonium body content approximated in terms of an effective dose at some effective time (q). The effective doses for W. B. G., W. A. B. and D. L. W. were estimated at 1.3 μg, 1.2 μg, and 1.0 μg respectively at respective effective times of 37, 53, and 42 days before the first urine assay used in the calculation. Assuming the above doses, all urinary excretion data (Table 8) collected from these persons were used to adjust the experimental urinary excretion curve [2] extending it to 1750 days again using least squares analysis. The adjusted expression is

$$Y_{ua} = 0.20\ X^{-0.74} \qquad [7]$$

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TABLE 8

PLUTONIUM URINE ASSAYS ON LOS ALAMOS PERSONNEL AFTER REMOVAL FROM FURTHER PLUTONIUM EXPOSURE

W. B. G.			W. A. B.			D. L. W.		
Days[1]	c/m/24-hr.[2]	P.Error[3]	Days[1]	c/m/24-hr.[2]	P.Error[3]	Days[1]	c/m/24-hr.[2]	P.Error[3]
1	8.4	0.53	1	213	0.60	1	15.8	0.58
27	6.0	0.51	20	11.6	0.94	21	8.4	0.82
104	5.5	0.50	45	8.2	0.52	94	3.9	0.48
205	6.4	0.51	193	7.7	0.51	118	3.5	0.48
251	4.6	0.49	370	6.7	0.50	195	3.2	0.48
315	3.7	0.48	1480[4]	1.2	0.17			
387	3.8	0.48						
450	3.3	0.48						
598	2.4	0.47						
652	1.4	0.46						
707	1.9	0.47						
734	1.4	0.46						
798	0.9	0.46						
831	1.3	0.46						
947	2.1	0.47						
1022	0.9	0.46						
1044	1.9	0.47						
1142	1.3	0.48						
1203	1.1	0.48						
1294	1.3	0.47						
1322	0.8	0.46						
1348	0.8	0.46						
1378	0.7	0.46						
1448	0.7	0.46						
1574	0.3	0.45						
1638	0.6	0.46						
1698	1.1	0.46						

W. A. B. - D_E[5] = 1.2 μg
W. B. G. - D_E = 1.3 μg
D. L. W. - D_E = 1.0 μg

(1) Days after removal from further plutonium exposure.

(2) Alpha counts per minute per 24-hour urine sample at 50 per cent counting geometry.

(3) Probable error calculated from empirical formula derived specifically for the cupferron extraction procedure for determining plutonium in urine (15).

(4) Result due to H. M. Parker in private communication to N. E. Bradbury, July 7, 1949.

(5) Estimated by equation [6] Page 29.

Figure 5 shows the adjusted curve through 1750 days represented as a heavy broken line. The points representing the three sets of data collected from Hp-3 and Hp-6 beyond 138 days after injection are shown on the graph as triangles. Points originating from the urine assays of the three Los Alamos workers are shown as circles and the theoretical curve [2] through 1350 days is given as a heavy solid line for comparison. The standard error of estimate for the adjusted expression is 42 per cent due largely to the poorer fit during the first few days and to the small number of observations during the later time period.

Integration of the expression $Y_{ua} = 0.20\ X^{-0.74}$ between the limits of $X = 1/2$ and $X = (n+1/2)$ gives the area (A_{ua}) under the urinary excretion curve which represents the total per cent of the injected dose of plutonium excreted in the urine up to and including the nth day after injection.

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$$A_{ua} = 0.20 \int_{1/2}^{n+1/2} X^{-0.74}\, dX = \frac{0.20}{0.26}\left[(n+1/2)^{0.26} - (1/2)^{0.26}\right]$$

$$= 0.77\,(n+1/2)^{0.26} - 0.64 \qquad [8]$$

When n = 1750 days, A_{ua} (the total amount of plutonium excreted in the urine through 1750 days) is only 6.3 per cent of the total injected dose.

2. Fecal Excretion

The same cases used for urinary excretion studies were used for the study of fecal elimination of plutonium following intravenous administration of Pu^{+4} - citrate. Fecal samples were collected daily for the first few days. Later stools were pooled at four day intervals because of the uncertainty of obtaining representative 24-hour samples. Plutonium analyses were made on aliquots of each specimen using methods described earlier. The results of analysis of individual fecal specimens are given in Table 9. Results are expressed as per cent of the administered dose excreted per day. Fecal excretion data could be obtained for only one of the cases (Chi.-1) reported by Russell and Nickson (13). The original data were no longer available and it was necessary to read individual values from the graph given in their report. The original fecal excretion data were not available for the one case studied

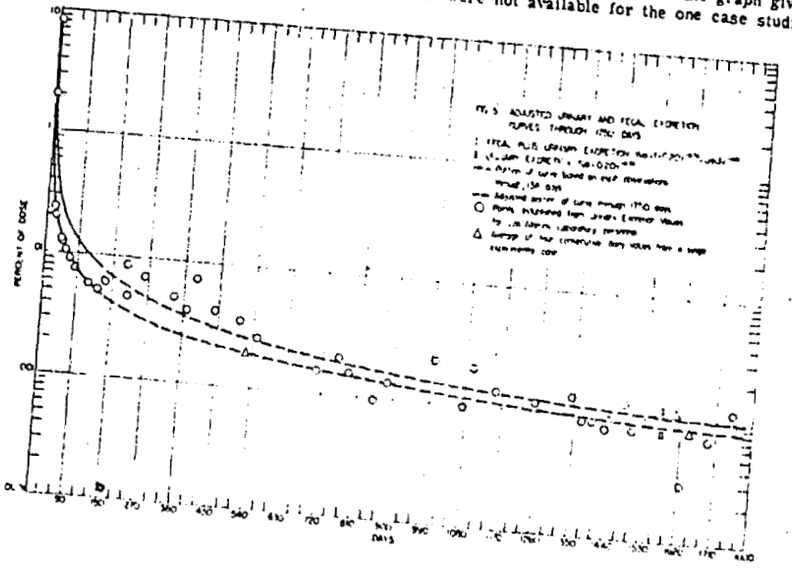

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TABLE 8

INDIVIDUAL FECAL EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION[1] TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY											
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi-1[2]
1	.052*	.204	.018*	.134	.004*	.085	.147	.178	.333	.087	.370	.250
2	.221	.204	.157	.274	.311	.085	.120	.266	.389	.087	.370	.466
3	.241	.204	.157	.274	.311	.179	.087	.210	.389	.087	.297	.294
4	.050	.317	.065	.306	.185	.179	.080	.080	.131	.110	.297	.380
5	.105	.317	.099	.306	.110	.179	.055	.080	.131	.110	.183	.223
6	.046	-	.070	.126	.110	.179	.055	.080	.131	.110	.183	.116
7	.021	-	.070	.126	.110	.037	.055	.080	.131	.110	.020	.083
8	.021	.120	.070	.126	.064	.037	.055	.070	.131	.034	.020	.112
9	.021	.120	.070	.126	.051	.037	.032	.070	.131	.034	.020	-
10	.021	.084	.027	.117	051	.037	.032	.070	.131	.034	.020	.021
11	.046	.084	.027	.117	.052	.023	.032	.070	.118	.034	.020	-
12	.046	.084	.027	.117	.052	.023	.032	.045	.118	.034	.020	.083
13	.046	.084	.027	.117	.032	.023	.023	.045	.118	.034	.020	.045
14	.046	.062	.023	.085	.032	.023	.023	.045	.118*	.022	.020	.044
15	.035	.062	.023	.085	.032	.015	.023	.045	.118*	.022	.023	.042
16	.035	.062	.023	.040	.017	.015	.023	.032	.414*	.022	.023	.034
17	.035	.062	.023	.040	.017	.015	.016	.032	.157*	.022	.023	-
18	.035	.055	.018	.040	.017	.015	.016	.025	.157*	.022	.023	.031
19	.015	.055	.018	.028	.017	.015	.016	.025	.055	.012	.053	.027
20	.015	.055	.018	.028	.020	.015	.016	.025	.055	.012	.053	.019
21	.015	.055	.018	.028	.020	.010	.008	.025	.055	.012	.053	.019
22	.015	.022	.006	.028	.020	.010	.008	.045	.055	.012	.053	.018
23	.017	.022	.006	.028	-	-	.008	.045	.052	.012	.026	.010
24	.017	.022	-	-	-	-	.008	.009	.052*	.012	.026	.023
25	-	.022	-	-	-	-	.011	.009	.052*	.006	.026	.012
26	-	.021	-	-	-	-	.011	.009	.052*	.006	.026	.023
27	-	.021	-	-	-	-	.011	.009	.043*	.006	.016	.0083
28	-	-	-	-	-	-	.011	.009	.043*	.006	.016	.0089
29	-	-	-	-	-	-	-	.009	.043	.006	.016	.0158
30	-	-	-	-	-	-	-	.018	.043	.006	.016	.0063
31	-	-	-	-	-	-	-	.018	.035	-	.016	.0074
32	-	-	-	-	-	-	-	.018	.035	-	.016	.0062
33	-	-	-	-	-	-	-	.018	.035	-	.016	.0079
34	-	-	-	-	-	-	-	.018	035	-	.016	.0079
35	-	-	-	-	-	-	-	.018	.035	-	.022	.0054
36	-	-	-	-	-	-	-	.018	-	-	.022	.0054
37	-	-	-	-	-	-	-	.028	-	-	.022	.0050
38	-	-	-	-	-	-	-	.028	-	-	.022	.0042
39	-	-	-	-	-	-	-	.011	-	-	-	.0047
40	-	-	-	-	-	-	-	.011	-	-	-	.0066
41	-	-	-	-	-	-	-	.011	-	-	-	.0064
42	-	-	-	-	-	-	-	.011	-	-	-	.0053
43	-	-	-	-	-	-	-	.011	-	-	.008	.0047
44	-	-	-	-	-	-	-	.011	-	-	.008	.0092
45	-	-	-	-	-	-	-	.014	-	-	.008	.0042
46	-	-	-	-	-	-	-	.014	-	-	.008	.0033
47	-	-	-	-	-	-	-	.014	-	-	-	.0028

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TABLE 8 (Contd)

INDIVIDUAL FECAL EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION[1] TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY											
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi-1[2]
48	-	-	-	-	-	-	-	.008	-	-	-	.0054
49	-	-	-	-	-	-	-	.008	-	-	-	.0047
50	-	-	-	-	-	-	-	.008	-	-	-	.0040
51	-	-	-	-	-	-	-	.008	-	-	-	-
52	-	-	-	-	-	-	-	.010	-	-	-	-
53	-	-	-	-	-	-	-	.010	-	-	-	-
54	-	-	-	-	-	-	-	.010	-	-	-	.0038
55	-	-	-	-	-	-	-	.010	-	-	-	-
56	-	-	-	-	-	-	-	.010	-	-	-	-
57	-	-	-	-	-	-	-	.007	-	-	-	-
58	-	-	-	-	-	-	-	.007	-	-	-	.0043
59	-	-	-	-	-	-	-	.007	-	-	-	-
60	-	-	-	-	-	-	-	.007	-	-	-	-
61	-	-	-	-	-	-	-	.008	-	-	-	-
62	-	-	-	-	-	-	-	.008	-	-	-	.0048
63	-	-	-	-	-	-	-	.008	-	-	-	-
64	-	-	-	-	-	-	-	.008	-	-	-	-
68	-	-	-	-	-	-	-	-	-	-	-	.0083
70	-	-	-	-	-	-	-	-	-	-	-	.0045
74	-	-	-	-	-	-	-	-	-	-	-	.0950
78	-	-	-	-	-	-	-	-	-	-	-	.0033
79	-	-	-	.006	-	-	.005	-	-	-	-	-
80	-	-	-	.006	-	-	.005	-	-	-	-	-
81	-	-	-	.006	-	-	.005	-	-	-	-	-
82	-	-	-	.006	-	-	.005	-	-	-	-	.0042
83	-	-	-	-	-	-	.006	-	-	-	-	-
84	-	-	-	-	-	-	.006	-	-	-	-	-
85	-	-	-	-	-	-	.006	-	-	-	-	-
88	-	-	-	-	-	-	-	-	-	-	-	.0050
90	-	-	-	-	-	-	-	-	-	-	-	.0042
94	-	-	-	-	-	-	-	-	-	-	-	.0040
98	-	-	-	-	-	-	-	-	-	-	-	.0050
100	-	-	-	-	-	-	-	-	-	-	-	.0056
102	-	-	-	-	-	-	-	-	-	-	-	.0038
106	-	-	-	-	-	-	-	-	-	-	-	.0043
108	-	-	-	-	-	-	-	-	-	-	-	.0038
112	-	-	-	-	-	-	-	-	-	-	-	.0021
118	-	-	-	-	-	-	-	-	-	-	-	.0029
120	-	-	-	-	-	-	-	-	-	-	-	.0032
126	-	-	-	-	-	-	-	-	-	-	-	.0030
130	-	-	-	-	-	-	-	-	-	-	-	.0037
136	-	-	-	-	-	-	-	-	-	-	-	.0034
138	-	-	-	-	-	-	-	-	-	-	-	.0025

*Values eliminated from revised mean on basis of the Chauvenet Criterion.

[1] All cases except Chi-1 received Pu^{+4} in 0.4 per cent $Na_3C_6H_5O_7 \cdot 2d_2O$ Solution.

[2] Russell, E.R., Nickson, J.J., Argonne National Laboratory Report CH-3607.

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by Hamilton and co-workers (14) and it was not feasible to include their results. The present report of the fecal elimination of plutonium is, therefore, confined to twelve cases.

The means, revised means, and standard deviations for the daily fecal excretion of plutonium from 0 to 138 days post injection are given in Table 7 (Page 26). The best curve of fit for the observed means was established by the method of least squares and was found to be:

$$Y_f = 0.63\,X^{-1.09} \qquad [9]$$

with a standard error of estimate of 28 per cent. In the above expression Y_f is the amount of plutonium excreted in the feces on a specific day (expressed as per cent of the injected dose) and X is the day of measurement in days after injection. The agreement between the observed values and the derived expression is shown graphically in Fig. 4 (Page 28). In this figure the derived expression is represented by a heavy broken line and the observed points are represented as open triangles. The fecal excretion of plutonium in per cent of the injected dose excreted per day is plotted against time in days.

No representative fecal excretion data beyond 138 days were available from Los Alamos personnel because of small but significant contamination of feces from swallowed material removed from the lungs of the workers by ciliary action. One may ask why the small amount of lung contamination does not prevent the use of the urinary excretion results from these workers to adjust the 138 day urinary excretion curve to 1750 days. This material does not reach the absorbing area of the lung and is not absorbed appreciably from the gastrointestinal tract (probably less than 0.01 per cent). The small amount of material which has reached the alveoli is being absorbed into the blood at an infinitesimal rate. Of the amount absorbed only a fraction of a per cent contributes to the daily urinary excretion.

Studies of the excretion of plutonium by mice, rats, rabbits and dogs (1), (2), (18), (19) showed the urinary excretion of all species was quite uniform. The plutonium excretion in the urine thirty to fifty days after injection was 0.01 - 0.02 per cent of the administered dose per day. The urinary/fecal excretion ratio varied widely, however, for the various species. The ratio was 1/10 - 15 for the rat and only 1/2 - 3 for the dog.

Russell and Nickson (13) reported a plutonium urinary/fecal excretion ratio of 3/1 in man based on the observation of one case through 140 days. The California group (14) reported an excretion ratio of 3-4/1 by one subject followed for 341 days.

The adjusted urinary excretion curve for 0 to 1750 days and the fecal excretion curve for 0 to 138 days may be solved for the urinary to fecal excretion ratio:

$$\frac{Y_{ua}}{Y_f} = \frac{0.20\,X^{-0.74}}{0.63\,X^{-1.09}} = 0.32\,X^{0.35} \qquad [10]$$

The urinary/fecal ratio is 1.8/1 at 138 days post injection and 4.4/1 at 1750 days when calculated from the above expression. Unfortunately no applicable fecal excretion data are available from the Los Alamos personnel to permit adjustment of the expression for fecal excretion beyond 138 days. If the urinary/fecal ratios at 138 and 1750 days are calculated from the unadjusted expressions (Y_u and Y_f) for both urinary and fecal excretion, the values are 1.7/1 and 3.9/1 respectively. Although extrapolation beyond 138 days is subject to increasing uncertainty with increasing values of X, the above values lead to the conclusion that the urinary/fecal plutonium excretion ratio is not constant, over the range (0-138 days) measured, but approaches 4/1 as a limit at some later time. The results obtained by Hamilton (14) on the case followed for 341 days seem to support the above conclusion.

The expression $Y_f = 0.63\,X^{-1.09}$ gives the amount of plutonium (expressed as per cent of injected dose) excreted in the feces on a particular day (X) after injection. Integration of the expression between the limits of $X = 1/2$ and $X = n+1/2$ gives the total per cent (A_f)

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of the injected dose excreted through day n:

$$A_f = .63 \int_{1/2}^{n+1/2} X^{-1.09}\,dX = -7.00\left[(n+1/2)^{-0.09} - (1/2)^{-0.09}\right]$$
$$= -7.00\,(n+1/2)^{-0.09} + 7.45 \qquad [11]$$

From the above expression $A_f = 2.96$ per cent through the first 138 days.

3. Total Excretion (Urine plus Feces)

From the practical point of view the total urinary plus fecal excretion rate of plutonium is extremely important. The summed elimination rate determines how long a worker should avoid further exposure to plutonium after having reached an accepted maximum permissible body level.

The observed mean urinary plus fecal plutonium excretion values are given in Table 7 (Page 26). Results are expressed as per cent of injected dose excreted per day. The means were obtained from the individual urinary excretion data from fifteen cases and the individual fecal excretion data from eleven. The results reported by the Chicago and California groups were used when available and applicable.

Application of the method of least squares gives the expression

$$Y_{u+f} = 0.79\,X^{-0.94} \qquad [12]$$

as the best curve of fit for the urinary plus fecal excretion data for 0 to 138 days. The standard error of estimate of the computation is 17 per cent. Y_{u+f} is the total plutonium excreted in feces plus urine on a particular day (expressed as per cent of injected dose) and X is the time after injection in days.

The observed means and derived expressions are compared graphically in Fig. 4 (Page 28). Observed values are represented by squares and the derived expression by the heavy broken line designated Y_{u+f}.

The expression $Y_{u+f} = 0.79\,X^{-0.94}$ represents the total excretion of plutonium only through the 138th day. Adjustment can be made, however, for urinary excretion measurements through 1750 days by summing the expression for fecal elimination [9] and the adjusted expression for urinary excretion [7].

$$Y_{ua+f} = Y_{ua} + Y_f = 0.20\,X^{-0.74} + 0.63\,X^{-1.09} \qquad [13]$$

This equation is adjusted to include all urinary excretion results from Los Alamos Laboratory personnel through 1750 days, and gives the total per cent of an injected dose of plutonium which may be excreted on a given day (X) after the time of injection.

The adjusted expression for total elimination rate (Y_{ua+f}) through approximately five years and the observed means are presented graphically in Fig. 5 (Page 31) for comparison with the adjusted urinary excretion rate (Y_{ua}) for the same time interval.

Integration of the adjusted expression for total elimination rate between $X = 1/2$ and $X = n+1/2$ days, gives the total amount of plutonium expected to be excreted up to and including day n

$$A_{ua+f} = 0.20 \int_{1/2}^{n+1/2} X^{-0.74}\,dX + .63 \int_{1/2}^{n+1/2} X^{-1.09}\,dX$$
$$= 0.77\,(n+1/2)^{0.26} - 7.00\,(n+1/2)^{-0.09} + 6.81 \qquad [14]$$

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Table 10 compares the observed and calculated values of total plutonium excretion for various time intervals using the integrated expression [14] .

These results emphasize the relatively slow rate of elimination of systemically deposited plutonium by man. According to these data only 8.7 per cent of a single injected dose is excreted in 1750 days (approximately 5 years).

TABLE 10

OBSERVED AND DERIVED TOTAL URINARY PLUS FECAL PLUTONIUM EXCRETION VALUES FOR VARIOUS TIMES AFTER ADMINISTRATION OF A SINGLE DOSE OF PLUTONIUM TO MAN

TIME AFTER INJECTION	PER CENT OF INJECTED DOSE	
	Observed	Calculated*
10 days	2.43	2.56
20 days	3.06	3.17
30 days	3.41	3.53
40 days	3.70	3.81
50 days	3.90	4.03
60 days	4.11	4.21
70 days	4.27	4.36
80 days	4.42	4.50
90 days	4.54	4.62
100 days	4.67	4.74
120 days	4.87	4.93
140 days	5.01	5.10
1 year		6.26
2 years		7.22
3 years		7.83
4 years		8.30
5 years		8.68
10 years		9.96
20 years		12.17

*Calculated from the integrated expression for adjusted urinary plus fecal excretion [14] . The calculated values appear higher than the observed values by a constant amount because of the decision to accept a poor curve fit during the first ten days (See Page 23).

IV. DISCUSSION

A. Distribution of Plutonium in Tissues and Organs of Man

Table 3 (Page 18) contains all available data (up to the time of this report) on the distribution of plutonium in the tissues and organs of man. These data were the results of analysis of a miscellaneous group of samples collected from seven human subjects. The subjects were elderly persons or persons suffering from an incurable chronic disease. The samples were often small and poorly representative and not obtained from the seven cases at comparable times after injection of the plutonium. These unavoidable difficulties must be recognized and accepted when considering the results. Despite the above difficulties, the data are extremely valuable as a supplement to a much greater and more reliable mass of data

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concerning the distribution of plutonium in the tissues and organs of laboratory animals. The data on man are in good agreement with results of similar studies in rats, mice, rabbits, and dogs. The good agreement permits the conclusion that there are no major differences in the quantitative distribution of plutonium in the tissues and organs of man and those of common laboratory animals with perhaps one exception - the liver. The results indicate that the retention of plutonium in the liver following its intravenous injection as Pu^{+4}-citrate complex and as plutonyl ion may be 20 - 40 per cent for man as compared to 10 per cent or less for rats. The "biological half-time" of plutonium in the liver of man is probably much greater than that for rats.

The average amount of plutonium found in vertebra, sternum and rib was 0.0065 per cent of the injected dose per gram of whole bone. Assuming vertebra, sternum and rib as representative of the entire skeleton, 66 per cent of the injected dose would be deposited in a 10 kg skeletal system (7 kg of bone, 3 kg of marrow) of a 70 kg man.

The observed concentration of plutonium in bone may be used to estimate the radiation dose received per gram of skeletal system when a "standard man" has accumulated the official maximum permissible plutonium body content of 0.5 μg (0.032 μc). Using the dosage rate formula: rep/day = 54 CE (where C = concentration of radioisotope in μc/g, E = energy of the radiation in Mev, and the rep = 93 ergs/g), the radiation dosage received per gram of skeleton from 0.032 μc of plutonium is as follows:

$$\text{rep/day} = 54 \times 6.6 \times 10^{-5} \times 0.032\ \mu c \times 5.15\ \text{Mev} = .00057$$

A similar calculation for the official maximum permissible radium content of 0.1 μc may be made for comparison. If 50 per cent of the radon from radium decay is retained in the body, then approximately 15 Mev of energy will be released in the body by the alpha particles per decay. If 100 per cent of the radium is deposited in a 10 kg skeletal system, then the radiation dosage in rep per day is given as follows:

$$\text{rep/day} = 54 \times 1 \times 10^{-5} \times 15 = 0.0081$$

According to the above calculation, the radiation dosage per gram of skeleton delivered by 0.1 μg of radium would be 14 times that delivered by the maximum permissible dose of plutonium if the two materials were distributed in a comparable manner in the skeleton. Autoradiographic studies show conclusively, however, that radium and plutonium do not distribute in a comparable manner. Plutonium is more localized and concentrates in the endosteal and periosteal surfaces. The choice of a more conservative body tolerance dose for plutonium was made to allow for its more specific localization in the skeletal system. It should be noted, however, that radium does not distribute uniformly throughout bone and Evans (20) has reported that analyses of bone samples from radium cases showed the radium to be unevenly distributed by as much as a factor of 10. It may be necessary, therefore, for plutonium to be concentrated by a factor of 140 over radium in order that 0.5 μg will give radiation intensities comparable to that which may occur with 0.1 μg of radium. Evans (21) has also pointed out that the presence of mesothorium in the radium responsible for the early radium poisoning cases may account for an additional safety factor of 5 in the 0.1 μg radium tolerance.

The above discussion supports the possibility that the 0.5 μg maximum permissible tolerance dose for plutonium is extremely conservative.

B. "Biological Half-Time" of Plutonium in Man

The "biological half-time" of plutonium in man can be estimated from the excretion data presented in this report. Although the adjusted urinary plus fecal excretion curve is (empirically at least) logarithmic in nature, it appears that the curve approaches an exponential for longer times. Such an exponential curve would be in keeping with the assumption that

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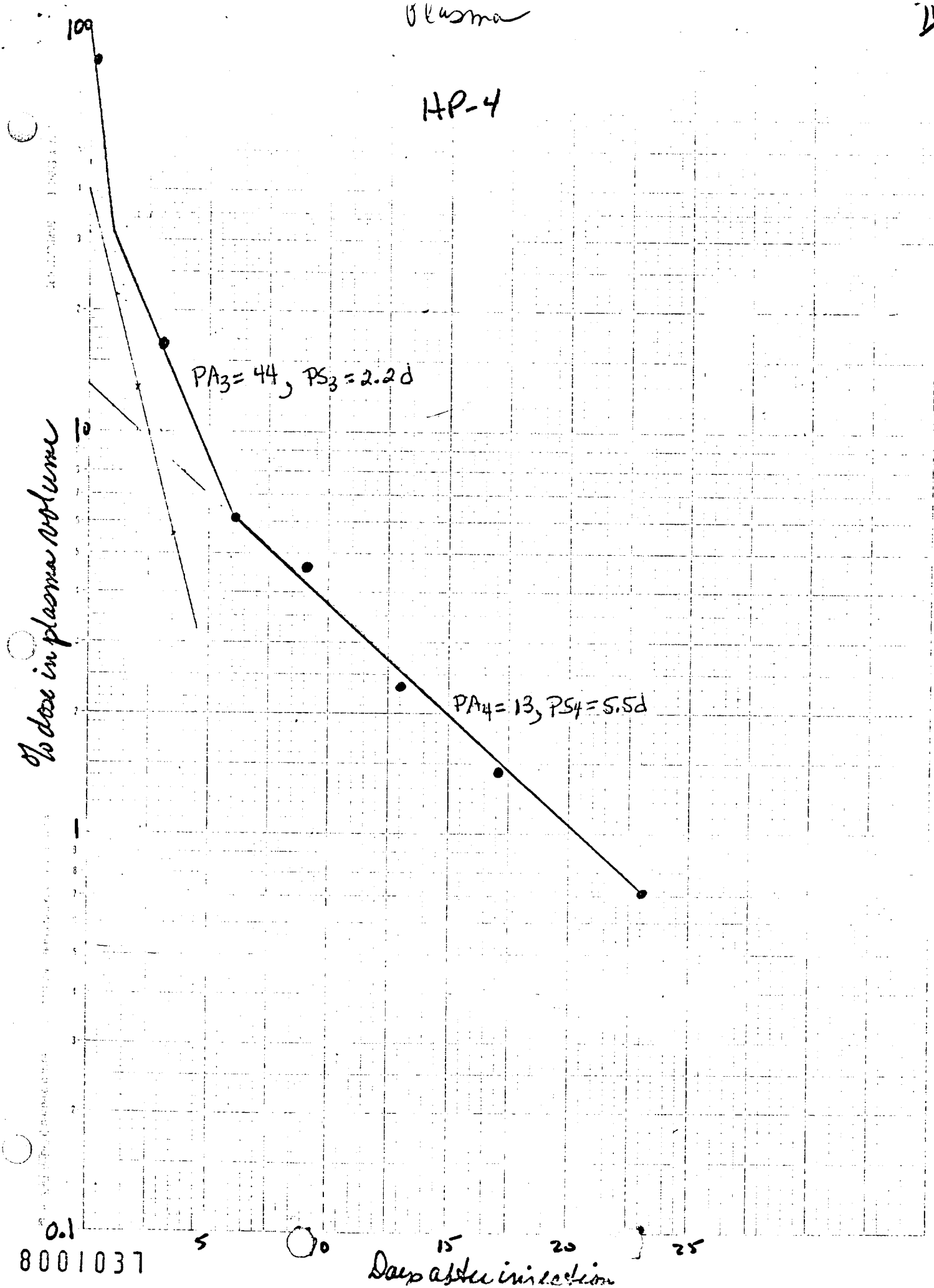

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metabolic processes are primarily first order reactions. Whatever the true process is, from the data and curves given in this report, it is possible to calculate the absolute minimum half-time of plutonium in the body. It is assumed (not unreasonably) that the excretion of the plutonium measured in terms of the amount in the body at a given time does not increase at some time. If one takes the last point on the combined urinary plus fecal excretion curve (a single value of the ordinate in Fig. 5) and assumes exponential excretion thereafter, an absolute minimum value is obtained for the biological half-time. On this figure, which is a plot of $\Delta C / C_0$ versus Δt exponential excretion would be represented by a straight line with zero slope. Examination of the adjusted curve shows that $0.001 \pm .00035$ per cent per day is excreted at 1750 days (approximately 5 years) after exposure. Up to five years 8.7 per cent of the total has been excreted. The time required to excrete an additional 41.3 per cent (assuming exponential excretion beyond 1750 days) is

$$\frac{41.3}{0.001 \pm 0.00035} = 41{,}300 \text{ days} = 113 \text{ years with limits of 84 and 175 years.}$$

Thus, the mean minimal biological half-time estimate is 118 years. From the above, one may conclude that the excretion coefficient is too small to be of any practical significance in elevating the maximum permissible dose of plutonium or in permitting the return to work of an individual who has reached the maximum permissible body burden. Once a worker is retired from work with plutonium because of a maximum tolerance exposure, it must be assumed that he is retired from such work for the balance of his lifetime.

C. Determination of Plutonium Body Burden from Urinary Excretion

In the determination of exposure doses by the use of excretion data, one is primarily concerned with three different situations. First is the case of a single acute exposure dose occurring at a known time. Second is the case of a variable chronic or subacute dose with only the total exposure time being known. Third is the case of a chronic invariant (usually low level) exposure dose with the time limits known.

The evaluation of the single acute exposure dose occurring at a known time is the basis of this paper. A urinary excretion curve through 138 days after a single acute exposure is given in Fig. 4 (Page 28). This curve has been extended beyond the observation limit to 1750 days (Fig. 5) by applying data collected on exposed personnel from the Los Alamos Laboratory. The method used to apply these data was explained earlier (Pages 23 and 29). It is worth noting that the difference between the adjusted curve and the extrapolated 138-day curve at 1750 days is less than the standard error of estimate of the former. This finding allows more confidence in further extrapolation beyond 1750 days post exposure. The calculation of the body burden from a single acute exposure is simple.

Since

$$Y_{ua}(\%) = 0.20\, X^{-0.74}$$

$$Y(c/m) = 0.0020\, D_E\, X^{-0.74}$$

Then

$$D_E = 500\, Y(c/m)\, X^{0.74} \qquad [15]$$

Thus, a single urine count, Y, made X days after an unknown single acute exposure, D_E, determines D_E in counts per minute. The exposure dose in μc or μg is easily determined if the counting geometry, etc., is known.

In the Los Alamos exposures, we have an illustration of the variable chronic exposure case with known time of exposure. Only under conditions of stress when safety factors of design may be exceeded will this type of exposure be seen. There are three methods of

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estimating the total exposure dose under such conditions. Past practice at the Los Alamos Laboratory was to assume that an individual contracted his total exposure dose on the last day of the exposure period. His total body burden was then determined by substitution in the urinary excretion formula as shown above. In this case, zero time is the last day of exposure. Obviously this method gives too low a value for the exposure dose as the estimated dose is directly proportional to time. A second method which has been used is exactly the same as the previous one except that zero time is taken as the first day of exposure which assumes that all of the dose was accumulated on exposure day one. It is evident that this estimate of total exposure is too high. The third method, which was used in this paper to determine the adjusted urinary excretion curve, is believed to more closely approximate the true situation. In this method it has been assumed that the total exposure dose may be represented by a single effective dose occurring at some effective time intermediate to the limits of exposure. The equations and steps to be followed with this method are shown on Pages 23 and 29. Ordinarily the first urine count is used to determine whether an individual should or should not be withdrawn from exposure. It is not used as one of the two significantly different dose determining counts. This is due to the fact that the initial withdrawal count may reflect the high urinary excretion resulting from the previous ten days exposure, and to the relatively high per cent excretion during the first 10 days post-exposure period. The high rate of elimination resulting therefrom may relatively obscure any exposure doses accumulated previous to that time.

The case of chronic invariant exposure is probably of primary interest. This is the type of exposure (within limits) that occurs in processing procedures in the plutonium industry in which air concentrations, etc., are rigidly controlled and the work is routine. An analysis of the general case is presented as follows:

If m = time of exposure in days, and

n = days from the beginning of an exposure to the time a urine analysis is made with n > m (preferably by more than 10 days)

then the counts per minute in the urine excreted on day n is:

$$Y_n = 0.0020 \left[D_1 n^{-0.74} + D_2 (n-1)^{-0.74} + D_3 (n-2)^{-0.74} + \cdots + D_m \left[n-(m-1) \right]^{-0.74} \right]$$

where D_1 is the exposure dose in counts per minute on exposure day 1,

D_2 is the exposure dose in counts per minute on exposure day 2,

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D_m is the exposure dose in counts per minute on exposure day m.

Considering the case in which we are interested, namely, $D_1 = D_2 \cdots = D_m = D_j$ (the constant daily exposure dose), then

$$Y_n = 0.002 D_j \left[n^{-0.74} + (n-1)^{-0.74} + \cdots + \left[n-(m-2) \right]^{-0.74} + \left[n-(m-1) \right]^{-0.74} \right]$$

Thus

$$D_j = \frac{Y_n}{0.0020 \left[n^{-0.74} + (n-1)^{-0.74} + \cdots + \left[n-(m-2) \right]^{-0.74} + \left[n-(m-1) \right]^{-0.74} \right]}$$

Considering the bracketed term in the denominator:

$$n^{-0.74} + (n-1)^{-0.74} + \cdots + \left[n-(m-1) \right]^{-0.74} =$$

$$(n-m+1)^{-0.74} + (n-m+2)^{-0.74} + \cdots + n^{-0.74}$$

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This term is similar to the infinite series r^{t} where r has the limiting values (n-m+1) and (n) and t = -0.74. The sum of the series $r^{-0.74}$ may be written:

$$\sum_{r=1}^{r=R} \frac{1}{r^{-0.74}} = \frac{1}{1^{0.74}} + \frac{1}{2^{0.74}} + \frac{1}{3^{0.74}} + \ldots\ldots + \frac{1}{R^{0.74}}$$

Thus we may write:

$$(n-m+1)^{-0.74} + (n-m+2)^{-0.74} + \ldots\ldots + n^{-0.74} = \sum_{r=(n-m+1)}^{r=n} \frac{1}{r^{0.74}}$$

$$= \sum_{r=1}^{r=n} \frac{1}{r^{0.74}} - \sum_{r=1}^{r=(n-m)} \frac{1}{r^{0.74}} = \sigma(n) - \sigma(n-m)$$

and on substitution

$$D_j = \frac{Y_n}{0.002\left[\sigma(n) - \sigma(n-m)\right]}$$

The following empirical formula* is good to 2 parts in 50 for r = 1 and to better than 1 part in 1000 for r > 5:

$$\sigma(r) = 3.8462\,(r+1/2)^{0.26} - 3.2880 \qquad [16]$$

Thus, on substitution we have:

$$D_j = \frac{Y_n}{0.002\left[3.8462(n+1/2)^{0.26} - 3.8462(n-m+1/2)^{0.26}\right]}$$

or

$$D_j = \frac{130\,Y_n}{\left[(n+1/2)^{0.26} - (n-m+1/2)^{0.26}\right]}$$

Since the total exposure dose = $mD_j = T_{D_m}$

$$T_{D_m} = \frac{130\,mY_n}{\left[(n+1/2)^{0.26} - (n-m+1/2)^{0.26}\right]} \qquad [17]$$

In addition to the empirical formula for $\sigma(r)$ a plot of the real values of $\sigma(r)$ versus (r) for values of r up to 90 days has been included (Fig. 6) from which the values of the sums may be read directly.

In the equation for T_{D_m} seven exposure days per week are assumed. The formula for T_{D_m} may be adjusted for six exposure days per week as follows:
We assume that exposure begins on the first working day of a week for simplicity.

Obviously the only days not contributing to exposure are those on which $D_j = 0$. In the six day week, therefore, $D_7 = D_{14} = D_{21} = \ldots\ldots D_{7a} = 0$ where a = number of weeks worked by the subject. Thus, the terms corresponding to D_7, D_{14}, D_{21} ..... etc., must be subtracted from the dose equation.

*Determined by Bengt Carlson of the Los Alamos Theoretical Division.

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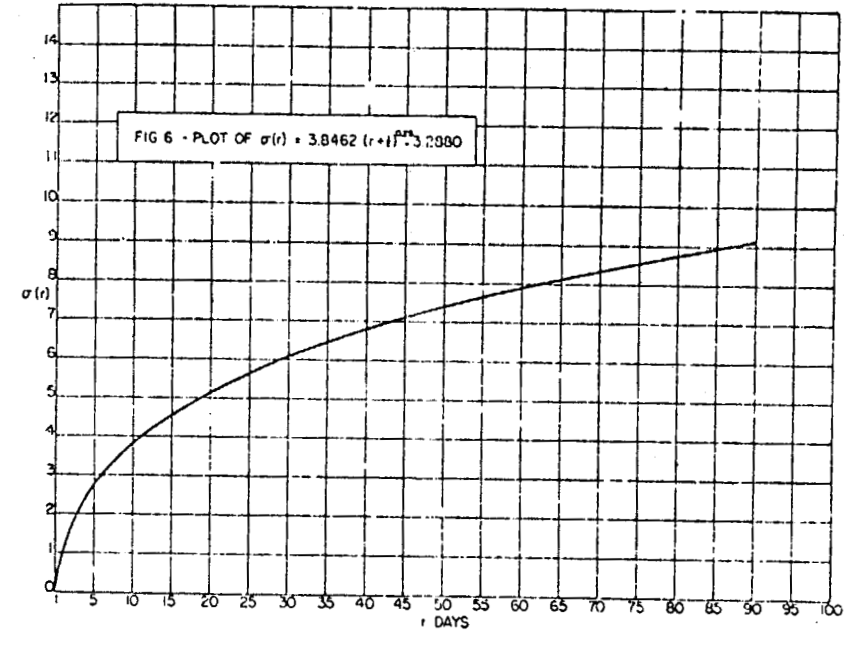

Hence:

$$D_j = \frac{Y_n}{0.002\left\{\left[\sigma(n) - \sigma(n-m)\right] - \left[(n-6)^{-0.74} + (n-13)^{-0.74} + (n-20)^{-0.74} + \ldots\right.\right.$$
$$\left.\left. \ldots + (n-7a+1)^{-0.74}\right]\right\}$$

And designating the total exposure dose for the six day week as $T_{D_{m_6}}$ then

$$T_{D_{m_6}} = \frac{500\,mY_n}{3.8462\left[(n+1/2)^{0.26} - (n-m+1/2)^{0.26}\right] - \left[(n-6)^{-0.74} + (n-13)^{-0.74} + (n-20)^{-0.74} + \ldots\right.}$$
$$\left. \ldots + (n-7a+1)^{-0.74}\right] \qquad [18]$$

Similarly for 5 exposure days per week

$$D_8 = D_7 = D_{13} = D_{14} = D_{20} = D_{21} = \ldots\ldots D_{7a-1} = D_{7a} = 0$$

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the total exposure dose $T_{D_{m_5}}$ =

$$\frac{500\ mY_n}{3.8462\left[(n+1/2)^{0.26}-(n-m+1/2)^{0.26}\right]-\left[(n-5)^{-0.74}+(n-6)^{-0.74}+(n-12)^{-0.74}+(n-13)^{-0.74}+\ldots\right.}$$

$$\left.\ldots+(n-7a+2)^{-0.74}+(n-7a+1)^{-0.74}\right]$$

In the preceding formulae exposure conditions were assumed to consist of an equal and constant daily exposure dose D_j equivalent to a single injected dose. Also, the constants 0.0020 and -0.74 were empirically established on the basis of data available at the time of this report. These values may change as more data become available.

A specific example of the application of the above dosage calculation is given below, using the expression for seven exposure days per week. In fact, the seven day exposure formula may be valid for either the five or six day week. Such would be the case if one considers that absorption from the lung is the primary source of contamination and that the equilibrium between the alveolar and blood plutonium concentration is not radically altered by the one or two day period of no exposure each week.

For purposes of presenting a specific example we may assume the following conditions:

Duration of exposure (m) = 330 days
Duration of time from beginning of exposure until urine sample taken (n) = 360 days
Counts per minute of urine sample (Y_n) = 2 c/m
The total body dose T_{D_m} may be calculated from the formula:

$$T_{D_m} = \frac{130 \times m \times Y_n}{\left[(n-1/2)^{0.26}-(n-m-1/2)^{0.26}\right]}$$

On substitution:

$$T_{D_m} = \frac{130 \times 330 \times 2}{\left[(360.5)^{0.26}-(30.5)^{0.26}\right]} = \frac{8.58 \times 10^4}{2.19} = 3.9 \times 10^4\ c/m$$

Assuming a 50 per cent counting geometry was used (1 μg = 7×10^4 c/m)

$$T_{D_m} = 0.56\ \mu g$$

V. SUMMARY

The distribution and excretion of plutonium administered intravenously to man has been studied. The data from twelve subjects have been correlated with similar data collected by other investigators, making a total of sixteen cases considered. The data have been supplemented further with observations made on three Los Alamos Laboratory personnel who absorbed measurable amounts of plutonium in the course of their work. The results of these studies may be summarized as follows:

1. Clinical observations and clinical data collected on the various subjects indicate that the intravenous injection of a single dose of 5 to 100 μg of plutonium is without acute subjective or objective clinical effects.
2. The analysis of tissues following the intravenous injection of plutonium showed that there was little difference in the mode of deposition of plutonium in man

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and in the common laboratory animals. As in the case of rats and other laboratory animals the skeletal system was the major site of plutonium deposition. Retention of plutonium by the liver of man seemed to be higher and the "biological half-time" in liver longer than for the more common laboratory animals.

3. Concentration of plutonium in the blood following intravenous injection drops very rapidly; only 0.3 per cent of the total injected dose was fixed in the total blood volume thirty days after injection.
4. The urinary excretion of intravenously administered plutonium was not exponential. Curvilinear regression line fitting showed that the urinary excretion through 138 days was best expressed by the fractional logarithmic function

$$Y_u = 0.23\ X^{-0.77}$$

In this expression Y_u is the per cent of the injected dose excreted in a single day and X is the time of observation in days post-injection. The standard error of estimate is 32%.

5. The above expression for the urinary excretion through 138 days was adjusted by including data collected on Los Alamos Laboratory personnel. This adjustment permitted the development of an expression for the urinary excretion of plutonium through 1750 days. The adjusted expression is:

$$Y_{ua} = 0.20\ X^{-0.74}$$

The standard error of estimate of the adjusted expression is 42 per cent.

6. The excretion of plutonium in the feces likewise was not exponential. Application of the method of least squares showed the best curve of fit for the fecal excretion of plutonium through 138 days was:

$$Y_f = 0.63\ X^{-1.09}$$

In this expression Y_f is the per cent of the injected dose excreted on a specific day and X is the time of measurement in days post-injection. The standard error of estimate of the above expression is 28 per cent.

7. The urinary to fecal plutonium excretion ratio obtained by solution of the above expressions for urinary and fecal excretion showed the urinary to fecal ratio was not constant. It was essentially 1:1 at 30 days and approached 4:1 at approximately five years.
8. The total (urine and fecal excretion) through 138 days was best expressed by the equation:

$$Y_{u+f} = 0.79\ X^{-0.84}$$

9. The total urine plus fecal excretion through 1750 days could be approximated by adding the expression for the fecal excretion through 138 days and the adjusted expression for the urinary excretion through 1750 days. The expression for the combined excretion is:

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$$Y_{ua+f} = 0.20\,X^{-0.74} + 0.63\,X^{-1.09}$$

in which Y_{ua+f} represents the per cent of the injected dose excreted in the urine plus feces on a specific day, and X designates the time of observation in days post-injection.

10. Integration of the above expression between the limits of 1/2 and n+1/2 days post-injection gives the following expression:

$$A_{ua+f} = 0.77\,(n+1/2)^{0.26} - 7.00\,(n+1/2)^{0.09} + 6.81$$

which represents the integrated amount of plutonium in per cent of the injected dose (A_{ua+f}) excreted up to and including the nth day after injection. Substitution in this expression showed that only 8.7 per cent of a single injected dose was excreted in approximately five years.

11. Application of the data of this report to the calculation of the "biological half-time" of plutonium in man gives a mean minimal "biological half-time" estimate of 118 years, with a variation of from 84 to 175 years.

12. The urinary excretion data of this report were applied to the diagnosis of exposure of personnel to plutonium. Three sets of exposure conditions were considered:

    (a) The application of plutonium urine analysis to estimate the total body dose following a single acute exposure occurring at a known time,

    (b) The application of plutonium urine analysis to estimate the total body burden of plutonium following variable chronic or sub-acute exposure with only the total exposure time being known and,

    (c) The application of urine analysis to estimate the total body burden following chronic invariant exposure (such as may occur in a carefully controlled routine plant process) with time of exposure known.

    Expressions for the calculation of body dose under the conditions set forth in (a), (b) and (c) are included in this report.

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REFERENCES

(1) Hamilton, J. G., Metallurgical Project Report 2383.

(2) Langham, W., et al, LA-549, J. Biol. Chem., 171, 273 (1947).

(3) (a) Finkle, R. D., et al, Metallurgical Project Report CN-3167; (b) Snyder, R. H., et al, Metallurgical Project Report CH-3763; (c) Painter, E. E., et al, Metallurgical Project Report CH-3858.

(4) Bloom, Wm., et al, Metallurgical Project Report CN-2212.

(5) Hamilton, J. G., Radiology 49, 325 (1947); New England J. Med., 240, 863 (1949).

(6) Copp, H. D., Axelrod, D. J. and Hamilton, J. G., Am. J. Roentgenol, 48, 10 (1947).

(7) Carter, R. E., Langham, W. H., unpublished studies, Los Alamos Sci Lab.

(8) Brues, A. M., Lisco, Hermann, Finkel, Miriam, USAEC Report MDDC-145; ibid, Radiology 48, 361 (1947).

(9) Carter, R. E., Langham, W.H., unpublished studies for Los Alamos Sci. Lab.

(10) Brues, A. M., Private Communication to W. Langham, Jan. 25, 1950.

(11) Warren, Shields, Communication to Carroll L. Tyler, Mar. 13, 1950.

(12) Langham, W. H., Metallurgical Project Report CN-3167.

(13) Russell, E. R., and Nickson, J. J., Argonne Ntl. Lab. Report CH-3807.

(14) Hamilton, J. G., Argonne Ntl. Lab. Report CH-3589.

(15) Langham, W. H., USAEC Report MDDC-1555.

(16) Maxwell, E., Fryxell, R., Langham, W. H., J. Biol. Chem. 172, 183 (1948).

(17) Lisco, Hermann, "Project Standard Man", Communication to AEC, July 21, 1947.

(18) Finkle, R. D., Jacobson, L. D., et al, Report No. CH-3783.

(19) Russell, E. R., Report No. CN-3167.

(20) Evans, R. D., Private Communication to W. Langham, Jan. 13, 1950.

(21) Evans, R. D., Private Communication to K. Z. Morgan, Feb. 4, 1950.

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July 21, 1947

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By J.K. Hartsock/c6 Date 5/10/74

Dr. Wright Langham
Post Office Box 1663
Los Alamos, New Mexico

Dear Wright:

I received your letters of July 15 and July 18 with regard to the H-P work. I think the data on H-P-4 are very interesting. Our renal function studies show that while the kidneys were excreting water and electrolytes, the glomerular filtration was very low, there was nitrogen retention and reduced renal plasma flow. The actual results were as follows on 26 March 1947:

		Normal Women
Glomerular Filtration	17.1 ml/min	117 ± 16
Renal Plasma Flow	44.5 ml/min	594 ± 102
Maximum Tubular Excretory Capacity	2.8 mg	77 ± 13
Non Protein Nitrogen of Blood	64 mg%	

Two possibilities suggest themselves to me:

(a) Plutonium complexed in the blood stream with globulin does not ordinarily pass the glomerular filter. In this case the filter was severely damaged and the globulin complex leaked through to be excreted in the urine.

(b) Plutonium complex escapes through the glomeruli of healthy kidneys but is taken up again as it passes through the tubules, in other words, plutonium is mostly re-absorbed as are chlorides for example. Of the two I should be inclined to favor (a).

You may recall that I was very anxious to do some studies on a man with nephritis who had marked protein uria. I still think that this should be done although there is no chance of getting at it under our present restrictions. Of course this may not be a renal effect at all. We are dealing here with an extraordinarily abnormal individual and it may be that we have run into something similar to what I was afraid we might encounter if we based our work on tumor patients.

According to current theory this girl should have had much less than the normal amount of osteoid in her bones – if that is where plutonium goes perhaps it maintained a higher level in the plasma because less was fixed in the skeleton.

I have two sets of meetings to attend in October so I don't know whether it will be possible to go to Oakridge. Perhaps it will if the dates do not conflict.

Sincerely yours,

Samuel H. Bassett

SHB:ma

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P. O. Box 1663

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IN REPLY
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July 15th, 1947

Dr. Samuel H. Bassett
The University of Rochester
School of Medicine and Dentistry
P. O. Box 287, Crittenden Station
Rochester 7, New York

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Dennis W Murphy AOC-AN 6/5/96
DATE

Dear Dr. Bassett:

I received your letter regarding Hp-9. I think the weights you sent will be satisfactory for the analysis. I will get someone started on them right away.

I am enclosing the analyses of the urine specimens collected from Hp-9 before and after treatment with citrate solutions. I think you will agree with me that it amounts to a nice set of negative results. Citrate seemed to make no difference whatsoever.

I am also sending you a few analyses on Hp-4. I am a bit concerned about the fact that these excretion rates are a factor of two to three above the theoretical excretion values according to the formulas developed for us by Helen Baldwin and Leonard Kogan of your statistics department.

Dr. Boller has written you regarding the things we would like to have on a physical examination of your subjects. Use your own discretion in regard to getting these examinations.

I was wrong about the date of the meeting at Oak Ridge. It is not in August, but in October.

You may be interested in reporting the effect of citrate on the excretion of plutonium and the deposition of plutonium in the body, as indicated by the data obtained on Hp-11, Hp-9 and Hp-5.

I have a complete record of the method of assay of the Hp solutions. I will write up this phase of the report.

Sincerely yours,

Wright H. Langham

WHL/ars

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Urinary Excretion of Plutonium by Hp-4

[Injected with 4.9 γ (344,200 c/m)]

Date and Period	Hours per Period	c/m per Period	c/m per 24 hrs.	% Injection Dose Per 24 hrs.
3-14-47 8 A.M. to 3-15-47 8 A.M.	24	22.8	22.8	0.007
3-15-47 8 A.M. to 3-16-47 8 A.M.	24	13.9	13.9	0.004
3-16-47 8 A.M. to 3-17-47 8 A.M.	24	22.2	22.2	0.006
3-17-47 8 A.M. to 3-18-47 8 A.M.	24	14.8	14.8	0.004
3-18-47 8 A.M. to 3-19-47 8 A.M.	24	10.1	10.1	0.003
3-19-47 8 A.M. to 3-20-47 8 A.M.	24	15.1	15.1	0.004

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Urinary Excretion of Plutonium by Rp-9

/Injected with 6.3γ (432,000 c/m) 7

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Date and Period	Hours per Period	c/m per Period	c/m per 24 hours	% Injection Dose Per 24 hrs.
5-2-47 8 A.M. to 5-3-47 8 A.M.	24	12.6	12.6	0.003
5-3-47 8 A.M. to 5-4-47 8 A.M.	24	8.6	8.6	0.002
5-4-47 8 A.M. to 5-5-47 8 A.M.	24	14.4	14.4	0.003
5-5-47 8 A.M. to 5-6-47 8 A .M.	24-	13.1	13.1	0.003
5-6-47 8 A.M. to 5-7-47 8 A.M.	24	12.3	12.3	0.003
5-7-47 8 A.M. to 5-8-47 8 A.M.	24	12.4	12.4	0.003
5-8-47 8 A.M. to 5-9-47 8 A.M.	24	26.2	26.2	0.006
5-9-47 8 A.M. to 5-10-47 8 A.M.	24	16.2	16.2	0.004
itrate-- 5-16-47 8 A.M. to 5-17-47 8 A.M.	24	7.6	7.6	0.002
" 5-17-47 8 A.M. to 5-18-47 8 A.M.	24	11.0	11.0	0.003
" 5-18-47 8 A.M. to 5-19-47 8 A.M.	24	16.9	16.9	0.004
" 5-19-47 8 A.M. to 5-20-47 8 A.M.	24	7.2	7.2	0.002
" 5-20-47 8 A.M. to 5-21-47 8 A.M.	24	10.8	10.8	0.003

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May 21, 1946

Dr. Wright Langham
c/o L. H. Hempelman
P. O. Box 1663
Sante Fe, New Mexico

STATUS VERIFIED UNCLASSIFIED
Dennis W Murphy, ADC-DNA 6/5/96 DATE

Dear Dr. Langham:

I think you will have my letter concerning the post mortem material before this one arrives. However, in case the letter of May 7th has been mislaid, I will explain the condition of the specimens again. The specimens from the intestine and liver were so large that they nearly filled the bottles and, although I took the precaution of adding 95% instead of 70% alcohol, there was still marked decomposition after two or 3 days. I opened these bottles cautiously after I saw that gas was accumulating in them and added a few ccs. of formalin to each and a little more alcohol in the hope that further decomposition would be prevented.

We were greatly rushed in obtaining this material and it was only by accident that we heard about the post mortem which was actually performed in another hospital. We arrived after all the dissection had been completed and only had about thirty minutes in which to get the material together. I believe that the weights on the labels of the jars and also included in the letter of May 7th are approximately correct. I suppose the best you can do would be to ash the entire specimen and take aliquots from the solution of ash. But why should I tell you how to do it?

There seems to have been some confusion as to when collections of feces began in the cases of Hp 4 and Hp 7. According to my records, Hp 4 was readmitted on March 12th, 1946. Urine was collected beginning 8 AM March 12th. However, fecal collections were not begun on this patient until 8 AM on March 13th. The record of collection is as follows:

Date	Wt. gms.	Time
2/13/46 (8 AM)	13.0	9:45 AM
2/13/46	47.3	7:30 PM
2/14/46	131.7	1:30 PM
2/14/46	30.9	8:40 PM
2/15/46	149.7	9:45 AM
2/15/46	94.4	12:35 PM
2/15/46	58.2	7:15 PM

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5/24/46 mgw

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This collection period closed at 8 AM on 2/17/46. The weight of the jar plus specimens was 1960 gms. The weight of the suspension was 1300 gms. Hp 7 was readmitted on 4/26/46 and the collection of urine was begun at 8 AM on this date. The collection of feces however was not begun until 8 AM on 4/27/46. Following is the list of the dates and amount of collection.

Date	Wt. gms.	Time
4/27/46 (8 AM)	210.3	9:00 AM
4/28/46	50.5	9:00 AM
4/29/46	109.1	9:40 AM
4/30/46	91.4	10:45 AM
5/1/46	-----	-------
5/1/46 (8 AM)	46.2	8:15 AM
5/1/46	195.2	10:15 AM
5/2/46	86.9	9:00 AM
5/3/46	181.7	9:15 AM
5/3/46	60.5	3:00 PM
5/4/46	-----	-------

You will see that these two collections represent two periods during the readmission of this subject. I believe that the time interval covered in the case of Hp 4 was seven 24 hr. periods and in the case of Hp 7 the fecal collections were split into two intervals, each consisting of four 24 hr. periods. In this case, 8 consecutive collections were made.

I have heard no objection as yet of my selection of Hp 10, so if I hear nothing further, I assume that silence gives consent.

Sincerely yours,

Samuel H. Bassett

SHB:rmh

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February 19, 1946

Dr. Wright Langham
% Dr. Louis Hempelmann
P. O. Box 1663
Santa Fe, New Mexico

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6/5/96
Dennis W Murphy-HQ-DOE
DATE

Dear Dr. Langham:

There are a few corrections which I regret to have to make especially since I feel they are the result of inadequate supervision on my part.

(1) The urine specimen on H.p. 6 was short 152 ml. during the 24 hr. period 2/11 - 2/12/46. Special renal function tests were performed on 2/11/46 and specimens used for the test were discarded.

(2) Twenty-four hour specimens were collected on H.p. 4 - on the following dates.

(a) 2/12 to 2/13
(b) 2/13 to 2/14
(c) 2/14 to 2/15
(d) 2/15 to 2/16
(e) 2/16 to 2/17

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Specimens (a) to (d) inclusive, were labeled incorrectly H.p. 3. You have not received any urine specimens from H.p. 3 since Jan. 11, 1946.

One specimen of blood was taken from H.p. 4 on 2/11/46.

One specimen of feces has been sent on H.p. 4 covering the interval 8 A.M., 2/13/46, to 8 A.M., 2/17/46. It may be of interest to you to know that the iron deficiency anemia from which H.p. 4 suffered when we made our previous observations, was corrected while at home by the administration of ferrous sulphate. The hemoglobin on this admission was 15 gm./100 ml. of blood. This subject received intramuscular injections of penicillin during this admission because

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By JKHunter 4/26 Date 5/10/7

12/4/46 mgw

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of a urinary tract infection. The diet was fairly high in calcium but not otherwise remarkable.

(3) We still have some trouble separating the urine and feces in the case of H.p. 7. Small amounts of urine are sometimes voided with the feces. It has been impossible to get an accurate estimate of just how much is added to the stools but it probably may be estimated as from 40 to 75 ml. a day.

I expect to have H.p. 8 underway sometime this week and H.p. 9 the week beginning Feb. 24.

I have your receipt for recent letter on code, received by your on Feb. 8, 1946. Have also returned bone photos.

No further information on P.p. 5 has come to my attention. I begin to think my prognosis in this case was too gloomy.

Sincerely yours,

Samuel H. Bassett

P. S. Your letter mentioning the presence of fig skins in the stool specimens arrived this morning. Neither patient is receiving figs. The diet of P.p. 7 contains canned peas which, if not well chewed, may appear in the stools. Daily menus are as follows:

Item	H.p.6 gms.	Item	H.p. 7 gms.
Banana	100	Grape fruit juice	239
Cornflakes	15	Oatmeal	20
Milk	300	Cream	60
Bread	40	Egg	50
Butter	20	Toast	30
Cocoa	107	Butter	15
Tenderloin	120	Steak	130
Potato	100	Potato	100
Spinach	100	Peas	100
Carrots	50	Celery	30
Peaches	100	Cream cheese	20
Ground meat	100	Banana	100
Macaroni	25	Rice	25
Tomatoes	100	Tomatoes	100
Orange sections	100	Ground meat	100
Lettuce	25	Cauli flower	75
Cup custard	100	Lettuce	20
Orange Juice	200	Applesauce	100
Lactose	20	Orange Sections	100
Graham Crackers	2	Sugar	15

In each instance, diets have been given since Jan. 24.

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December 5, 1945

Dr. Wright Langham
c/o Dr. L. H. Hempelman
P. O. Box 1663
Santa Fe, New Mexico

STATUS VERIFIED UNCLASSIFIED
Dennis M. Murphy, ADC-8N 6/5/76 DATE

Dear Dr. Langham:

After I had written my last letter a recheck of my file which is conveniently located in another building from the one in which I do most of my work, revealed that the data with respect to analytical procedure was included. I would think that in addition to its insolubility, iron might give trouble when it is necessary to extract the cupferron complex.

With regard to the barium sulphate it is possible that some was present in the intestinal tract of _____ at the time he was transferred to metabolism. No more was given, however, until after the termination of the experimental period.

Unfortunately _____ received a small amount of barium sulphate without my knowledge on one occasion, Oct. 30, 1945. It is just possible that the stools passed on 10/31/45 at 11:45 A.M. or on 11/2/45 at 10:15 A.M. and 11/4/45 at 10:10 A.M. (the last two comprise a pool) may be contaminated.

Our three current patients are:

HP 4 1. _____, age 18 yrs.

Diagnosis: Cushing's Syndrome.
(Hypertrophy of adrenal cortex)

Patient now shows:

Severe osteoporosis
Marked atrophic striations of skin
Hypertension, B.P. 150/100
Compensated glaucoma
Anemia Hb. , 9.0 gm/100 cc.
Facial hirsutism
Amenorrhea

11/1/45 - Urea clearance (maximum)
1st. hour - 38% of normal
2nd. hour - 52% of normal

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10/31/45 - Phenolsulphanphthalein excretion test of renal function.
Dye excreted in 30 minutes - 41%
" " (total in 2 hrs.) - 60%

11/27/45 - Non protein nitrogen 29 mg.%.

Urine collections began on 11/17/45
Fecal collections began on 11/8/45
Experimental period began on 11/27/45 at 11:12 A.M.

The excessively long control period was due to the fact that she developed a severe anemia after being admitted to the metabolic service. You already have data on this patient's diet.

HP 3 2. age 48.

Diagnosis, Hepatitis mild - cause undetermined
Hypoproteinemia - secondary to hepatitis

11/2/45 - R.B.C. 4.30 million/cu.mm.
W.B.C. 5,700/cu.mm.
Hb. 14.5 gm/100 ml.
Urine - normal clinical examination.

11/5/45 - Total serum protein 4.8 gm.%
11/13/45 " " " 5.5 gm.%
11/23/45 " " " 5.7 gm.%

Urea clearance

11/7/45 - 1st. hr. Standard Clearance 70% normal
2nd. hr. " " 64%
Blood urea nitrogen 13.2 mg.%
Non protein nitrogen 34 mg.%

Phenolsulphanphthalein excretion test

1st. 30 min. 50% dye excreted
2 hr. total 70 % " "

Icteric Index.

11/13/45 - 18 units
11/16/45 - 22 units
11/23/45 - 11 units

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Dr. Wright Langham
c/o D. L. Hempelman

11/30/45

H.P.-3 and H.P.-4 INJECTED TUESDAY, NOVEMBER TWENTY-SEVENTH.

H.P.-5 INJECTED FRIDAY, NOVEMBER THIRTIETH.

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS STAMPS

345

Robert M. Fink

To Langham 11-30-45

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TABLE 2

CLINICAL DATA ON SUBJECTS RECEIVING INTRAVENOUS INJECTION OF APPROXIMATELY 5 μg OF PLUTONIUM AS Pu^{+4} CITRATE

PATIENT CODE	SEX	AGE	WT. Kg.	Pu ADMIN AMT. μg	Pu ADMIN DATE	LABORATORY STUDIES* DATE	HGB g %	RBC x 10^{-6}	WBC x 10^{-3}	PMN %	LYMPHS %	EOS. %	BASO. %	MONO. %	UREA Cl. %	BUN	NPN
Hp- 1	M	67	70.3	4.6	10/16	10/4	13.9	4.47	7.1	71	19	1	0	9	96	21	-
						10/19	13.7	4.55	7.0	54	34	4	1	7	90	23	-
Hp- 2	M	49	69.0	5.1	10/23	10/6	15.0	4.7	9.05	57	28	8	0	2	58	25	-
						11/7	14.5	4.1	7.85	68	22	8	0	2	48	23	-
Hp-3	F	49	69.9	4.9	11/27	11/2	14.5	4.3	5.7	59	39	2	0	0	70	-	34
						12/16	-	5.6	6.8	69	25	0	1	5	-	-	31
Hp- 4	F	18	55.5	4.9	11/27	10/30	15.0	5.3	10.0	77	20	0	1	2	-	-	-
						3/21	16.0	-	6.9	74	22	0	0	4	-	-	-
Hp- 7	F	59	68.0	6.3	2/8	1/23	12.6	3.26	4.75	64	24	3	0	6	94	-	26
						2/20	-	-	5.25	64	25	0	0	9	-	-	-
Hp- 8	F	41	54.4	6.5	3/9	2/22	13.9	4.7	9.5	71	22	0	0	13	85	10	30
						8/21	14.5	4.05	11.9	88	12	0	0	0	-	-	-
Hp- 9	M	66	63.0	6.3	4/3	3/13	12.3	3.9	6.25	70	17	0	0	13	72	-	-
						1/25	12.3	4.1	7.3	61	9	12	1	17	-	-	-
Hp-10	M	52	71.0	6.1	7/16	7/9	13.3	5.5	5.65	31	52	5	2	7	87	11	22
						8/13	-	-	-	42	46	3	2	8	82	-	-
Hp-12	M	53	-	4.7	4/9	4/4	8.9	2.85	5.6	74	18	-	-	6	-	30	44
						7/3	13.5	4.51	4.3	32	64	-	-	4	-	12	37

*Explanation of Symbols: HGB = Hemoglobin; RBC = Red Blood Cell Count; WBC = White Blood Cell Count; PMN = Polymorphonuclear Cells; LYMPHS = Lymphocytes; EOS.= Eosinophiles; BASO. = Basophiles; MONO. = Monocytes; BUN = Blood Urea Nitrogen; NPN = Non-Protein Nitrogen; UREA Cl. = Urea Excretion in Per Cent of Normal at One Hour.

subjects before plutonium injection and at frequent intervals thereafter. All tissue samples were analyzed for plutonium by the cupferron extraction procedure subsequent to ashing.

The data in Table 3 show the results of analyses of the various samples for plutonium. The results obtained by Russell and Nickson (13) (referred to as Chi. I, II, III) and Hamilton et al (14) (referred to as Cal. I) are presented also. Two important points must be kept in mind when considering these data: (1) The samples of human tissues were, for obvious reasons, rather unsatisfactory. In most cases they were too small, poorly representative and were usually what could be obtained under the circumstances rather than what were desired; (2) The subjects were chronically ill and/or elderly and the results may not represent exactly the distribution of plutonium in tissues of healthy persons of average working age. These data, however, are all that are available and, therefore, must provide the basis for our present concept of the distribution of plutonium in the organs and tissues of man. They must also provide a basis for comparison with the results obtained from the numerous studies of plutonium deposition in experimental animals.

1. Deposition in the Skeleton

Animal experiments (1), (2) reveal that approximately 60 per cent of plutonium injected as PuO_2^{++} and Pu^{+4} - citrate is localized in bone. If the vertebra, sternum and whole rib are taken as representative bones of the skeleton, and the average plutonium content (.00657%/g),

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Dennis a Murphy, ADC
6/5/96
DATE

LA-1151

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TABLE 5

PLUTONIUM CONTENT OF BLOOD SAMPLES* FOLLOWING INTRAVENOUS INJECTION OF APPROXIMATELY 5 μg OF PLUTONIUM AS Pu^{+4} - CITRATE

DAYS AFTER INJECTION	PATIENT CODE AND PER CENT OF INJECTED DOSE IN TOTAL BLOOD VOLUME*										AVERAGE
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	
1/6	46.02	-	28.32	83.31	31.51	36.70	32.57	37.64	40.83	51.57	5.31	~~36.7~~ 44.2
1	21.83	19.35	-	-	6.23	10.97	16.40	14.51	12.39	24.66	-	15.7
2	-	8.38	11.56	-	-	-	-	-	-	-	-	9.97
3	-	10.03	-	16.64	1.16	2.94	6.97	4.94	6.22	20.06	-	8.62
4	-	-	4.22	-	-	-	-	-	-	-	-	4.9
5	-	-	-	-	0.66	-	-	-	-	-	-	-
6	3.30	4.25	2.17	6.14	-	1.00	2.96	2.07	3.91	4.91	-	3.4
8	-	2.32	1.42	-	-	-	-	-	-	-	-	1.9
9	-	-	-	4.60	-	-	-	-	-	-	-	-
10	1.42	-	-	-	0.39	0.38	1.13	1.37	2.21	1.72	-	1.2
13	-	-	0.61	2.34	-	-	-	-	-	-	-	1.5
15	-	-	-	-	0.11	0.26	0.66	0.71	1.42	1.02	-	.70
17	-	-	0.51	1.45	-	-	-	-	-	-	-	1.0
22	-	0.70	-	-	0.18	0.25	-	-	-	-	-	.38
23	-	-	0.25	0.72	-	-	-	-	-	-	-	.48
29	-	-	-	-	-	-	0.37	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	0.36	-	-
31	-	-	-	-	-	-	-	-	-	-	0.51	-
36	-	-	-	-	-	-	-	-	0.42	-	-	-
42	-	-	-	-	-	-	-	0.17	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	0.45	-

*Total Weight of Blood Taken as 7.7% of Total Body Weight.

C. Excretion of Plutonium

1. Urinary Excretion

The urinary excretion of plutonium was studied in eleven of the subjects following the intravenous injection of approximately 5 μg of plutonium as Pu^{+4} in 0.4 per cent solution of sodium citrate · $2H_2O$. With the exception of the first day, urine from all subjects was collected in 24 hour samples through 22 days post injection. After 22 days the collection of 24 hour urine samples was continued as long as the patients were available for study. It was not possible to retain the subjects as long as was desired and the major weakness in these results is the short time interval over which the studies were continued. Two subjects were followed 22 days, one for 23 days, one for 27, and the remainder for 30 days or longer after injection. The Chicago cases (13) were followed for 16, 140, and 186 days and the California case (14) was followed for a period of 341 days. Because of the great importance of measurements at longer time intervals, the Chicago and California data have been incorporated with

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6/5/96
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LA-1151
8001054

TABLE 6

INDIVIDUAL URINARY EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY														
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi-I[2]	Chi.-II[2]	Chi.-III[2]	Cal.-I[3]
1	.181	.472	.569	.440	.296	-	.217	.377	.160	.414	.101	.857	2.531*	.152	.480
2	.146	.294	.289	.236	.166	.216	.212	.232	.085	.330	.103	.182	.153	.167	.150
3	.114	.174	.112	.221	.077	.127	.137	.128	.069	.218	.088	.063	.184	.067	.120
4	.094	.123	.107	.132	.052	.111	.096	.140	.066	.170	.078	.077	.133	.033	.031
5	.069	.116	.078	.116	.030	.076	.069	.083	.047	.089	.068	.026	.032	.042	.037
6	.066	.061	.043	.119*	.020	.057	.059	.078	.052	.060	.044	.0256	.029	.042	-
7	.062	.062	.043	.077	.033	.044	.045	.066	.050	.079	.069	.0234	.024	.024	-
8	.055	.048	.049	.081	.026	.043	.037	.057	.032	.065	.080	.0227	.023	.025	.016
9	.051	.046	.022	.095*	.027	.032	.033	.047	.032	.051	.043	-	.027	.019	.069
10	.045	.038	.027	.081*	.022	.031	.023	.050	.035	.044	.038	.0082*	.034	.030	.026
11	.040	.048	.027	.075*	.021	-	.018	.044	.026	.041	.038	.0097	.047	.019	.036
12	.038	.039	.015	.072*	.026	.024	.019	.023	.030	.038	.027	.0095	.047	.014	.029
13	.034	.045	.020	.067*	.023	.023	.019	.037	.027	.029	.030	.0236	.018	.034	-
14	.035	.036	.020	.058*	.018	.020	.013	.035	.030	.029	.039	.007	.034	.009	-
15	.034	.039	.028	.050	.015	.022	.012	.035	.030	.025	.029	.0059	.026	.016	.013
16	.026	.024	.024	.033	.020	.017	.012	.036	.049*	.021	.023	.0109	.012	.004	.016
17	.027	.027	.021	.032	.020	.013	.011	.032	.038	.023	.029	-	.028	-	.0056
18	.026	.020	.017	.037	.020	.015	.011	.029	.027	.021	.026	-	.026	-	.010
19	.025	.019	.018	.032	.018	.015	.010	.031	.029	.017	.029	.0022	.015	-	.006
20	.017	.021	.012	.025	.021	.013	.008	.032	.029	.018	.032	.0093	.038	-	.0048
21	.017	.017	.019	.029	.020	.012	.010	.029	.032	.022	.025	.0076	.032	-	.0017
22	.016	.015	.014	.035	.018	.012	.013	.021	.032	.016	.025	.0145	.027	-	.0050
23	.025	.018	.014	.014	-	-	.008	.021	.032	.019	.039	.0151	.029	-	.0091
24	.021	.014	-	-	-	-	.008	.025	.032	.016	.023	.0128	.020	-	.0076
25	.013	.014	-	.011	-	-	.008	.023	.029	.016	.021	.0128	.148*	-	.011
26	-	.017	-	.011	-	-	.007	.022	.032	.016	.023	.0175	.024	-	.0022
27	-	.008	-	.008	-	-	.008	.028	.032	.014	.017	.0151	.043*	-	.0044
28	-	.009	-	-	-	-	.008	.023	.024	.013	.024	.0197	.034	-	.0074
29	-	.009	-	-	-	-	.008	.019	.025	.014	.023	.0138	.022	-	.0043
30	-	.008	-	-	-	-	.006	.021	.023	.014	.021	.0151	.024	-	.0069
31	-	.007	-	-	-	-	.005	.017	.025	-	.021	.010	.027	-	.0077
32	-	.007	-	-	-	-	.007	.016	.024	-	.012	.010	.020	-	.0063
33	-	.009	-	-	-	-	.006	.015	.022	-	.037*	.017	.011	-	.0073
34	-	.009	-	-	-	-	.006	.015	.020	-	.020	.0139	.008	-	.0084
35	-	-	-	-	-	-	.006	-	.022	-	.026	.0127	.009	-	.0069
36	-	-	-	-	-	-	.006	.015	.022	-	.018	.0165	.015	-	.0079
37	-	-	-	-	-	-	.006	.011	-	-	.023*	.0111	.011	-	.0063
38	-	-	-	-	-	-	-	.016	-	-	.016	.0174	.009	-	.0085
39	-	-	-	-	-	-	-	.012	-	-	.021	.0112	.009	-	.0064
40	-	-	-	-	-	-	-	.017	-	-	.019	.0072	.009	-	.0072
41	-	-	-	-	-	-	-	.019	-	-	.013	.0092	.011	-	.0080
42	-	-	-	-	-	-	-	.014	-	-	.013	.0127	-	-	.0081
43	-	-	-	-	-	-	-	.016	-	-	.015	.0095	.017	-	.0076
44	-	-	-	-	-	-	-	.014	-	-	.015	.0031	-	-	.0055
45	-	-	-	-	-	-	-	.013	-	-	.017	.013	.018	-	.0063
46	-	-	-	-	-	-	-	.015	-	-	-	.012	-	-	.0073
47	-	-	-	-	-	-	-	.014	-	-	.015	-	.020	-	.0059
48	-	-	-	-	-	-	-	.014	-	-	.017	.0064	-	-	.0059
49	-	-	-	-	-	-	-	.018	-	-	.015	.0063	-	-	.0063
50	-	-	-	-	-	-	-	.014	-	-	-	.0054	.018	-	.0078
51	-	-	-	-	-	-	-	.013	-	-	-	.007	-	-	.0082
52	-	-	-	-	-	-	-	-	-	-	.035	.0073	-	-	.0098
53	-	-	-	-	-	-	-	.013	-	-	.019	.0023	-	-	.0074
54	-	-	-	-	-	-	-	.013	-	-	.043	-	-	-	.0077
55	-	-	-	-	-	-	-	.015	-	-	.043*	.0073	.014	-	.0096
56	-	-	-	-	-	-	-	.013	-	-	.036	.003	-	-	.0064
57	-	-	-	-	-	-	-	.012	-	-	.018	.0075	-	-	.0050
58	-	-	-	-	-	-	-	.013	-	-	.036	.0094	-	-	.0058
59	-	-	-	-	-	-	-	.012	-	-	-	.011	-	-	.0098
60	-	-	-	-	-	-	-	.011	-	-	-	.0053	.022	-	.0067
61	-	-	-	-	-	-	-	.012	-	-	-	.0068	-	-	.0066
62	-	-	-	-	-	-	-	.010	-	-	-	.0092	-	-	.0058
63	-	-	-	-	-	-	-	.009	-	-	-	.0054	-	-	.0077
64	-	-	-	-	-	-	-	.012	-	-	-	.0071	-	-	.0042
65	-	-	-	-	-	-	-	.011	-	-	-	.0099	.024	-	.0042
66	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0047
67	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0064
68	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0068
69	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0070
70	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0100
71	-	-	-	-	-	-	-	-	-	-	-	.0093	-	-	.0072
72	-	-	-	-	-	-	-	-	-	-	-	.0089	.014	-	.0032
73	-	-	-	-	-	-	-	-	-	-	-	.0033	-	-	.0069

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80010552A-1151

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6/5/96
Dennis W Mueller ADC-BN DATE

TABLE 9

INDIVIDUAL FECAL EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION[1] TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY											
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi-5[2]
1	.052*	.204	.018*	.134	.004*	.085	.147	.178	.333	.087	.370	.250
2	.221	.204	.157	.274	.311	.085	.120	.266	.389	.087	.370	.465
3	.241	.204	.157	.274	.311	.179	.087	.210	.389	.087	.297	.294
4	.050	.317	.095	.306	.185	.179	.080	.080	.131	.110	.297	.380
5	.105	.317	.099	.306	.110	.179	.055	.080	.131	.110	.183	.223
6	.046	-	.070	.126	.110	.179	.055	.080	.131	.110	.183	.116
7	.021	-	.070	.126	.110	.037	.055	.080	.131	.110	.020	.083
8	.021	.120	.070	.126	.064	.037	.055	.070	.131	.034	.020	.112
9	.021	.120	.070	.126	.051	.037	.032	.070	.131	.034	.020	-
10	.021	.084	.027	.117	.051	.037	.032	.070	.131	.034	.020	.021
11	.046	.084	.027	.117	.052	.023	.032	.070	.118	.034	.020	-
12	.046	.084	.027	.117	.052	.023	.032	.045	.118	.034	.020	.003
13	.046	.084	.027	.117	.032	.023	.023	.045	.118	.034	.020	.045
14	.046	.062	.023	.085	.032	.023	.023	.045	.118*	.022	.020	.044
15	.035	.062	.023	.085	.032	.015	.023	.045	.118*	.022	.023	.042
16	.035	.062	.023	.040	.017	.015	.023	.032	.414*	.022	.023	.034
17	.035	.062	.023	.040	.017	.015	.016	.032	.157*	.022	.023	-
18	.035	.055	.016	.040	.017	.015	.016	.025	.157*	.022	.023	.031
19	.015	.055	.016	.028	.017	.015	.016	.025	.055	.012	.053	.027
20	.015	.055	.016	.028	.020	.015	.016	.025	.055	.012	.053	.019
21	.015	.055	.016	.028	.020	.010	.008	.025	.055	.012	.053	.019
22	.015	.022	.006	.028	.020	.010	.008	.045	.055	.012	.053	.018
23	.017	.022	.006	.026	-	-	.008	.045	.052	.012	.026	.010
24	.017	.022	-	-	-	-	.008	.009	.052*	.012	.026	.023
25	-	.022	-	-	-	-	.011	.009	.052*	.006	.026	.013
26	-	.021	-	-	-	-	.011	.009	.052*	.006	.026	.023
27	-	.021	-	-	-	-	.011	.009	.043*	.006	.016	.0083
28	-	-	-	-	-	-	.011	.009	.043*	.006	.016	.0069
29	-	-	-	-	-	-	-	.009	.043	.006	.016	.0158
30	-	-	-	-	-	-	-	.018	.043	.006	.016	.0063
31	-	-	-	-	-	-	-	.018	.035	-	.016	.0074
32	-	-	-	-	-	-	-	.018	.035	-	.016	.0062
33	-	-	-	-	-	-	-	.018	.035	-	.016	.0079
34	-	-	-	-	-	-	-	.018	.035	-	.016	.0079
35	-	-	-	-	-	-	-	.018	.035	-	.022	.0054
36	-	-	-	-	-	-	-	.018	-	-	.022	.0054
37	-	-	-	-	-	-	-	.028	-	-	.022	.0050
38	-	-	-	-	-	-	-	.026	-	-	.022	.0042
39	-	-	-	-	-	-	-	.011	-	-	-	.0047
40	-	-	-	-	-	-	-	.011	-	-	-	.0066
41	-	-	-	-	-	-	-	.011	-	-	-	.0064
42	-	-	-	-	-	-	-	.011	-	-	-	.0053
43	-	-	-	-	-	-	-	.011	-	-	.008	.0047
44	-	-	-	-	-	-	-	.011	-	-	.008	.0092
45	-	-	-	-	-	-	-	.014	-	-	.008	.0042
46	-	-	-	-	-	-	-	.014	-	-	.008	.0033
47	-	-	-	-	-	-	-	.014	-	-	-	.0028

LA-11151
8001056
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6/15/96
DATE

TABLE 9 (Contd)

INDIVIDUAL FECAL EXCRETION VALUES OF PLUTONIUM FOLLOWING INTRAVENOUS ADMINISTRATION(1) TO HUMAN SUBJECTS (EXPRESSED AS PER CENT OF DOSE EXCRETED PER DAY)

DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY											
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi-1
48	-	-	-	-	-	-	-	.008	-	-	-	.0054
49	-	-	-	-	-	-	-	.008	-	-	-	.0047
50	-	-	-	-	-	-	-	.008	-	-	-	.0040
51	-	-	-	-	-	-	-	.008	-	-	-	-
52	-	-	-	-	-	-	-	.010	-	-	-	-
53	-	-	-	-	-	-	-	.010	-	-	-	-
54	-	-	-	-	-	-	-	.010	-	-	-	.0038
55	-	-	-	-	-	-	-	.010	-	-	-	-
56	-	-	-	-	-	-	-	.010	-	-	-	-
57	-	-	-	-	-	-	-	.007	-	-	-	-
58	-	-	-	-	-	-	-	.007	-	-	-	.0043
59	-	-	-	-	-	-	-	.007	-	-	-	-
60	-	-	-	-	-	-	-	.007	-	-	-	-
61	-	-	-	-	-	-	-	.008	-	-	-	-
62	-	-	-	-	-	-	-	.008	-	-	-	.0048
63	-	-	-	-	-	-	-	.008	-	-	-	-
64	-	-	-	-	-	-	-	.008	-	-	-	-
68	-	-	-	-	-	-	-	-	-	-	-	.0063
70	-	-	-	-	-	-	-	-	-	-	-	.0045
74	-	-	-	-	-	-	-	-	-	-	-	.0050
78	-	-	-	-	-	-	-	-	-	-	-	.0033
79	-	-	-	.006	-	-	.005	-	-	-	-	-
80	-	-	-	.006	-	-	.005	-	-	-	-	-
81	-	-	-	.006	-	-	.005	-	-	-	-	-
82	-	-	-	.006	-	-	.005	-	-	-	-	.0042
83	-	-	-	-	-	-	.006	-	-	-	-	-
84	-	-	-	-	-	-	.006	-	-	-	-	-
85	-	-	-	-	-	-	.006	-	-	-	-	-
86	-	-	-	-	-	-	-	-	-	-	-	.0050
90	-	-	-	-	-	-	-	-	-	-	-	.0042
94	-	-	-	-	-	-	-	-	-	-	-	.0040
98	-	-	-	-	-	-	-	-	-	-	-	.0050
100	-	-	-	-	-	-	-	-	-	-	-	.0056
102	-	-	-	-	-	-	-	-	-	-	-	.0038
106	-	-	-	-	-	-	-	-	-	-	-	.0043
108	-	-	-	-	-	-	-	-	-	-	-	.0038
112	-	-	-	-	-	-	-	-	-	-	-	.0021
116	-	-	-	-	-	-	-	-	-	-	-	.0029
120	-	-	-	-	-	-	-	-	-	-	-	.0032
126	-	-	-	-	-	-	-	-	-	-	-	.0030
130	-	-	-	-	-	-	-	-	-	-	-	.0037
136	-	-	-	-	-	-	-	-	-	-	-	.0034
138	-	-	-	-	-	-	-	-	-	-	-	.0025

*Values eliminated from revised mean on basis of the Chauvenet Criterion.

(1) All cases except Chi-1 received Pu^{+4} in 0.4 per cent $Na_3C_6H_5O_7 \cdot 2d_2O$ Solution.

(2) Russell, E.R., Nickson, J.J., Argonne National Laboratory Report CH-3607.

8001057

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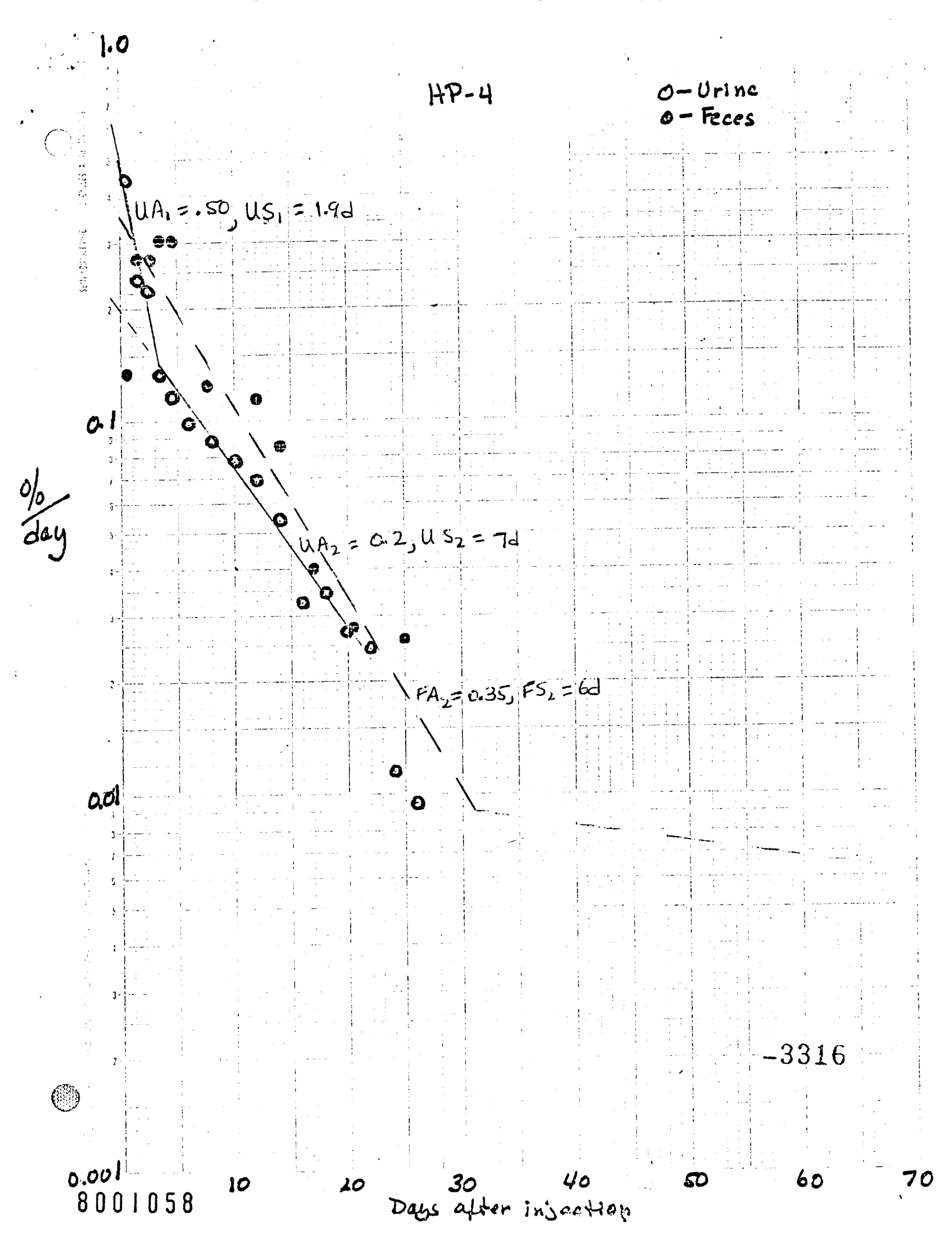

-3316

8001058

HISTORICAL

8001059

PRIVACY ACT MATERIAL REMOVED

.CENTER FOR HUMAN RADIOBIOLOGY

January 2, 1973

New York Death Record Search

Date of Birth:
Date of Death: 27 October 1946
Last known address: Stamford, New York

Date of Birth:
Date of Death: April 1947
Last known address:

Date of Birth: about 1880
Date of Death:
(Autopsy at Strong Memorial Hospital of the University of Rochester)

Date of Birth:
Date of Death: 2 July 1947
Last known address:

Date of Birth:
Date of Death: 26 February 1946
(Autopsy at Strong Memorial Hospital of the University of Rochester)

Requested by:
Harvey A. Schultz
Curator of Records
Center for Human Radiobiology

dk

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MICROFILMED

CENTER FOR HUMAN RADIOBIOLOGY

January 2, 1973

Bureau of Vital Records
State Department of Health
Albany, New York 12208

Gentlemen:

The Center for Human Radiobiology was established by the United States Atomic Energy Commission and given the responsibility of making a long-range study of persons who have been exposed to radioactive materials. We would like very much to have you search the official death records of New York for five names of persons who may have been exposed to such materials at sometime.

I have asked that a check be issued for advance payment of the search fee. Would you please send the results of your search to my personal attention at the address at the bottom of the page.

Many thanks for your cooperation with our long-range investigations.

Very truly yours,

Harvey A. Schultz
Curator of Records
Center for Human Radiobiology

dk

encl: List

Orig.: Purch. Dept.
cc: R. E. Rowland
A. F. Stehney

1901008

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RADIOLOGICAL AND ENVIRONMENTAL RESEARCH DIVISION, ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439 Telephone 312-739-7711

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CHR-RR

ARGONNE NATIONAL LABORATORY
U of C-AUA-USAEC

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

TO: M. M. Shanahan MIT Radioactivity Center

FROM: A. F. Stehney RER Division

SUBJECT: Exhumation of CHR cases with prefix number 40.

Enclosed are folders containing copies of all CHR information on ten radioactivity patients in the "40" series. These are all the cases in this series for which we now have death certificates.

Please take the necessary steps to locate relatives and obtain permissions to exhume any or all of these ten persons. It should be noted that we want to examine the remains in order to determine the microscopic distribution of residual radioactivity from past medical treatment.

Date

A. F. Stehney, Deputy Director
Center for Human Radiobiology

Today, I received from A. F. Stehney copies of folders for the following ten CHR cases:

40-001	40-005	40-008	40-011	40-015
40-004	40-007	40-010	40-013	40-017

Date

M. M. Shanahan, Deputy Director
MIT Radioactivity Center

dk

cc: R. D. Evans
R. E. Rowland
CHR Records Room

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8001062

CENTER FOR HUMAN RADIOBIOLOGY
9700 S. C. Avenue, Argonne, Illinois 60439 Tel. 312-739-771 xt. 4625

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Re:

Drove to Geneseo, N.Y., no listed in the phone book.
Drove to , met present owner, also secretary of . Only has records since 1950.

may have them, she lives on 25 Wadsworth Street. He did not know

Drove to above address, No, I don't have anything, don't know the people.

Drove to Townhall. Spoke to Town Clerk, Yes, I remember them. and his wife are dead. There was a son but I don't remember where he is, maybe the post office does.

Drove to the post office, no knowledge except they left long time ago. Went to the Bank, yes, one of the tellers may know. Talked to her. The moved to Their old address, has been torn down, later they moved to maybe knows. Called her, No, I don't know where is call , she may know. Called above, Yes, is in Rochester, Called Rochester Information: is listed - Did not call will check on next Rochester visit.

By: Jan Lieben, M.D.

dk

cc: A. M. Brues, M.D.
M. S. Littman, M.D.
M. M. Shanahan
A. F. Stehney

8001063

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ARGONNE NATIONAL LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

May 7, 1973

TO: CHR Records Room

FROM: Jan Lieben, M.D.

SUBJECT: Visits and phone calls

4-12-73 Re: Purcell.

Called undertaker in Rochester . Two calls, one request for information, second for reply.

All we have: He was the owner of a cigar store, he was single, he's buried on Lot 67, South 1 at Cemetery. was probably his mother, no other relatives listed.

Will check who else is buried at cemetery, there are 6 in the lot.

4-12-73:

Called re exhumation of his wife , both he and his daughter promised to sign forms for exhumation. We will now have to get permissions from the rest of family who have not signed as yet. Phone East Whittier, California.

4-29 and 4-30:

Visits re: , Batavia, N.Y., Stafford, N.Y. Geneseo, N.Y.

Drove to Batavia N.Y. re: , checked phone book none listed. Dr. Wilson Swasey is listed address - 207 Summit; 343-7227.

Drove to Stafford, N.Y. to post office. lives at on near Batavia, phone Drove to above address found her with difficulty, she is a niece by marriage. husband now 88 years old lives in the Genesee home in Bethany near Batavia is not too well. He would never permit an exhumation, and would be terribly upset. There are also several nephews and nieces all in the Batavia area: and in Bergen, N.Y, in Morganville. in Leroy on It was decided not to contact now but to check with in about a year and then maybe contact the nephews and nieces.

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40-010

ARGONNE NATIONAL LABORATORY

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INTRA-LABORATORY MEMO

May 10, 1973

TO: CHR Records Room

FROM: Jan Lieben, M.D.

SUBJECT: and and others

Visited , obtained permission to exhume his sister . The only other relative is his sister has lost touch, her last address was Tucson, Arizona. Her husband's name is . They are both teachers. He last heard from her about 5 years ago. She may be in Mexico. Husband taught in Junior High School or Junior College. He comes from Detroit, his father was a physician, the team physician for the Detroit Tigers.

There is another man from Geneseo an who went to Tucson. He may know where the are - if he can be located?

Re: has no information on him. is in an abandoned section of the cemetery.

Called four listed in Rochester phone book, nobody knows him.

Re: Nobody home.

Called then visited , Canandaigua. Yes, I am sister. I would give permission. The only other surviving relative is my sister who now lives on , Rochester, phone is living with the . Left exhumation forms, will talk to sister.

5-6-73. Re . Called Tucson phone information. is listed in Tucson

dk

cc: A. M. Brues, M.D.
M. S. Littman, M.D.
M. M. Shanahan
A. F. Stehney

8001065

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-26 (11-68)

PRIVACY ACT MATERIAL REMOVED

names of two well-known areas in Tucson as guides for reaching their home. They live two blocks west of Fort Lowell Park and two blocks away from the Tucson Medical Center.

sounds like an intelligent sophisticated man with a good sense of humor. He does not feel very close to the Rochester end of the family, saying simply that they have not had much education. He was not sure how much information would be able to give us about but he told me that had had Cushing's syndrome, some surgery had been done on the sella turcica, and "perhaps she even had some radioactive material given to her" but he was not absolutely sure of the latter. It seemed rather interesting that he should voluntarily bring up the matter of radioactive material.

RDE and I expect to visit the during the early part of June, and hopefully obtain permission for the exhumation of .

s
xc: M.H.Chalfen
A.F.Stehney
J.Lieben
R.D.Evans

8001066

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U of C-AUA-USAEC

CENTER FOR HUMAN RADIOBIOLOGY

Please reply to:
Southwest Field Station
M.I.T. Radioactivity Center
5619 E. Monterosa Street
Phoenix, Arizona 85018
Tel. 602-949-5600

May 12, 1973

MEMO TO: File

F R O M: Mary Margaret Shanahan

SUBJECT: , 40-010

In an effort to reach (, sister of the late) who was said to be living in Tucson, Arizona, I called the phone number given to me by Dr. Jan Lieben. The phone was answered by a man who eventually told me that his name was , his wife's name was but her maiden name was not , and that he had only recently been assigned the above telephone number.

Tucson directory assistance was then asked to check on a phone listing for . They could find no listing for but gave me 602-622-5547 as being listed in the name of . An attempt to reach this number resulted in my being told that this number was no longer assigned to anyone.

I then called , the Rochester, N.Y., telephone for , brother of and of . son answered the phone and sounded pleasant and intelligent. He gave me the last phone number that his family had for ., address . He stated that he was quite sure of the above information because he had personally (at age 18) called to notify her of her mother's death and funeral (which refused to attend, and which seems to be the source of bad feeling in the family). said he is now 26 years old, so the phone number was 8 years old.

On the chance that might have the correct number I called and had a lengthy and very pleasant conversation with , husband.

is an ardent and expert rug weaver, and at present is on a trip to Afghanistan in connection with her interest in rugs and other Afghanistan "trinkets". She is expected back in Tucson about May 25 or 26, at which time RDE and I will be at MIT.

readily agreed to a visit by RDE and me at any time which was convenient for us after our return from MIT He teaches school, which will be finished by the early part of June, and the have no plans to make any lengthy trips this summer. Their address is . gave me the

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MAY 22 1973

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is the son of a Detroit physician and teaches science to 7th and 8th-graders in one of the Tucson schools. The have two children, a son who is married and who was graduated from the University of Arizona last year majoring in anthropology and linguistics, and a daughter who is still in college.

MMS:mtb
xc: M. H. Chalfen
R. D. Evans
J. Lieben
A. F. Stehney

8001068

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60

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

July 11, 1973

MEMO TO: File

SNOP CODED

FROM: Mary Margaret Shanahan

MAR 6 1977

SUBJECT: Visit with re (40-010)

On Thursday, July 5th, Professor Robley D. Evans and I visited ( ), sister of - see memo to file dated May 12, 1973. The purpose of our trip was to obtain permission for the exhumation of remains.

Following a very friendly and relaxed conversation with Mr. and Mrs. , and an explanation of our research work, readily signed the permission forms.

In talking about , indicated that at the age of 9 had had a severe fall, landing on her head and also scraping her knee. The family was concerned only about the knee which was bleeding profusely, and got no medical attention for head. As grew older, it became clear that she had a serious medical problem which thought stemmed from the fall. was seen by many doctors, always being hospitalized at Strong Memorial in Rochester. Each doctor (or team of doctors) had a new suggestion for alleviating her problem, but none was successful. As a teenager, legs remained extremely thin and "underdeveloped", while her trunk took on the shape of a barrel.

The : turned out to be rather interesting characters. They live in a house on the edge of Tucson with a beautiful view of the Catalina mountain range. The house is in only a fair state of repair, the furniture is in various stages of rejuvenation, and the whole atmosphere is one of extreme casualness. Mrs. had just returned from a trip to Afghanistan where she went to see about the weaving done by the tribes in northern Afghanistan. Her main interest is in the most primitive type of weaving and she mentioned that the work which she saw being done in Brazil and Argentina several years ago was too advanced to be of interest to her. She weaves cloth for various shops in Tucson and Scottsdale, starting by spinning the wool. In one instance, a physician from Scottsdale who had heard about her work arrived at her home one day with a trash barrel filled with clippings from his Pyrenees dogs. Mrs. proceeded to spin and weave the clippings, making a cape for his wife and another garment for his aunt.

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8001069

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
RADIOACTIVITY CENTER Room 4-063
Cambridge, Massachusetts 02139 Tel. 617-253-

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CHR RECORDS
JUL 18 1973

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HAS

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

May 3, 1975

MEMO TO: File

F R O M: Robley D. Evans and M. M. Shanahan RDE. MMS.

SUBJECT: Report of Trip to Tucson, Arizona, re , 40-010

On Thursday, April 17, 1975 we drove to Tucson to discuss with Mr. and Mrs. of the preliminary results on the exhumed remains of Mrs. sister, .

Mr. and Mrs. and one of their daughters were at home when we arrived. Professor Evans described the studies which have been done thus far on remains, the preliminary results (see memo of 2/6/75, J. Rundo to R. E. Rowland), and also showed the the results of the in vivo studies done on as described for case HP-4 in Pat Durbin's chapter in The Radiobiology of Plutonium.

Both Mr. and Mrs. seemed very pleased to be kept informed of the progress of the studies on , and were not at all disturbed to learn that the material with which had been injected was a mixture of plutonium isotopes. They were pleased that scientifically useful information had been and is being obtained from these studies. During our previous visit (see memo dated 7/11/73, same subject) Mr. had told us that the family was aware that experimental work had been done on during her life in connection with her illness (Cushing's syndrome).

Mr. , who is a science teacher in one of the junior high schools in Tucson, then launched into a very long description of the current Tucson school system (school runs 12 months of the year, with the students going to school 9 weeks on and 3 weeks off, shifting classes and teachers several times during the 9 weeks of school, etc.). He seemed to despair of ever getting to know any of his students because they spent such a short part of their school year with him, or indeed of being able to get them to absorb anything which he tried to teach them relating to the sciences.

RDE:MMS
xc: M.H.Chalfen
A.F.Stehney
J.Lieben

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8001070

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
RADIOACTIVITY CENTER Room 4-063
Cambridge, Massachusetts 02139 Tel. 617-25 31

ARGONNE
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LABORATORY

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INTRA-LABORATORY MEMO

Received: May 14, 1975

TO: CHR Records Room

FROM: Jan Lieben, M.D.

SUBJECT: Rochester Plutonium Cases

5/10/75:

1) Re . Informed Mr.
Rochester, N. Y., phone , that his sister had plutonium injections, has been exhumed, and reinterred.* Thanked him for his help. Plutonium did not seem to register. He said he was glad to be of help.

2) Re . Drove to —now
, Batavia, ( ). Visited niece, ,
phone Learned that Mr. husband, celebrated his 90th birthday in better health. He's still in the nursing home so we'll have to continue to wait. She does not know whether family will go along with project. Batavia is mid-way between Rochester and Buffalo, N. Y.

3) Re . Called Mrs.
, Fairport, Rochester. "This is a bad time to discuss this — we have sickness in the family. Call me next time you are here."

JL:jmt

cc: A. M. Brues
J. E. Farnham
M. M. Shanahan
A. F. Stehney

* On 5/14/75, A. F. Stehney asked Dr. Lieben to inform that there had been a delay in returning his sister's body, but this would be done soon.

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ANL-26 (11-68)

ARGONNE
NATIONAL
LABORATORY

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INTRA-LABORATORY MEMO

Received: June 17, 1975

TO: CHR Records Room

FROM: Jan Lieben, M.D.

SUBJECT: Contacts

5/20/75:

1. Re [redacted] Called [redacted] to inform him that [redacted] had not been returned to cemetery, that I had misinformed him on 5/10/75. "Yes I was down there last Sunday and was wondering about that. Am glad you called." Informed him that she would be returned in a few weeks.

6/6/75:

2. Re [redacted]. Visited [redacted], grandson, at [redacted] Wisconsin, phone [redacted] and informed him of our interest to exhume his grandfather. Reason was that I did not know his father's age and father would discuss matter with son. No commitment was obtained.

6/7/75:

3. From Dallas I proceeded to Green Bay, Wisconsin and visited [redacted] at his apartment on [redacted] Wisconsin, [redacted]. Discussed our intent. He appeared sympathetic. His father was buried at [redacted]. He will go along if his brother in Montana will go along. We then called his brother in Homestead, Montana at my expense. He will think matters over. I am to send him the forms.

6/8/75:

4. Wrote letter and sent forms re exhumation of [redacted] to his son [redacted] in Homestead, Montana

JL:jmt

cc: A. M. Brues
J. E. Farnham
M. M. Shanahan
A. F. Stehney

8001072

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NL-26 (11-68)

ARGONNE NATIONAL LABORATORY

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INTRA-LABORATORY MEMO

November 4, 1977

MICROFILMED
MAR 08 1978
CHR RECORDS

TO: A. F. Stehney

FROM: J. L. Lieben

SUBJECT: Plutonium Exhumation Cases

Reference is made to your question, this date, regarding informing relatives of plutonium cases to be exhumed of the actual plutonium injections.

Re: _____ _____ (40-010)
In reviewing my records, I found that, shortly after having received instructions to inform survivors, I told Mr. (May 10, 1975) that his sister had had plutonium injections.

Re: _____ (40-015)
While this does not appear in my records, I do recall that I have informed all Mr. relatives, including and Mrs. , of the fact that plutonium injections had been given to .

Re: _____(40-003)
I also informed Mrs. and, during my last visit, the two brothers, , that Mrs. had received plutonium injections.

I did not go back to those relatives of cases that had refused exhumation permissions prior to 1975, namely _____(40-007), _____ (40-008), and _____ _____ (40-011).

In all future contacts with relatives of plutonium cases proposed for exhumation, I will make it a special point to inform them of their deceased relative's exposure and report this disclosure to file.

Jan Lieben

J. Lieben

JL/llw
xc: G. J. Hamilton
R. E. Rowland
CHR Records Room (7)

8001073

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L-26 (11-68)

HP-4
(JD)

PRIVACY ACT MATERIAL REMOVED

Name

Hospital No Strong Num. 180331

Date of birth

Date of injection - Nov. 27, 1945 4.9 μg ^{239}Pu (IV) citrate -

Age at injection

Date of death

Age at death Time after injection -

Death certificate No.

Hp-4

This patient, an eighteen year old white female, had a history of Cushing's Syndrome since 1941. Her admission in October 1945 was the fifth period of hospitalization. Chief complaints on this occasion were referable to hypertension and osteoporosis. The clinical diagnoses were basophile adenoma of the pituitary gland with hypertension, hypertensive heart disease, nephropathy with uremia, osteoporosis, and a staphylococcic infection of the urinary tract. The patient ran a down hill course until death in uremia occurred in April 1947. Diagnoses at autopsy included basophile adenoma of the pituitary gland, atrophy of the thyroid gland, hypertrophy of the adrenals, hypertrophy of the left ventricle, hypoplasia of the uterus and ovaries, osteoporosis of the spine and pelvis, and chronic nephritis. LA-1151

8001074

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34 11-27-45

P-03-31 Father

died

ustadm 3-13-47 Discha 3-29-47 to Dr. Homer Bell

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40-010

3

40-010

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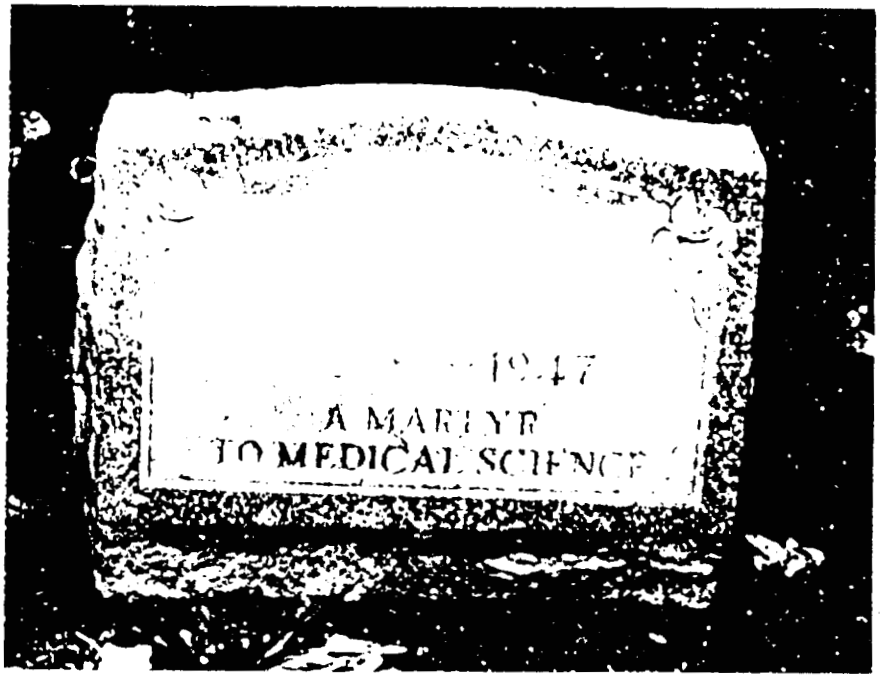
4

40-010



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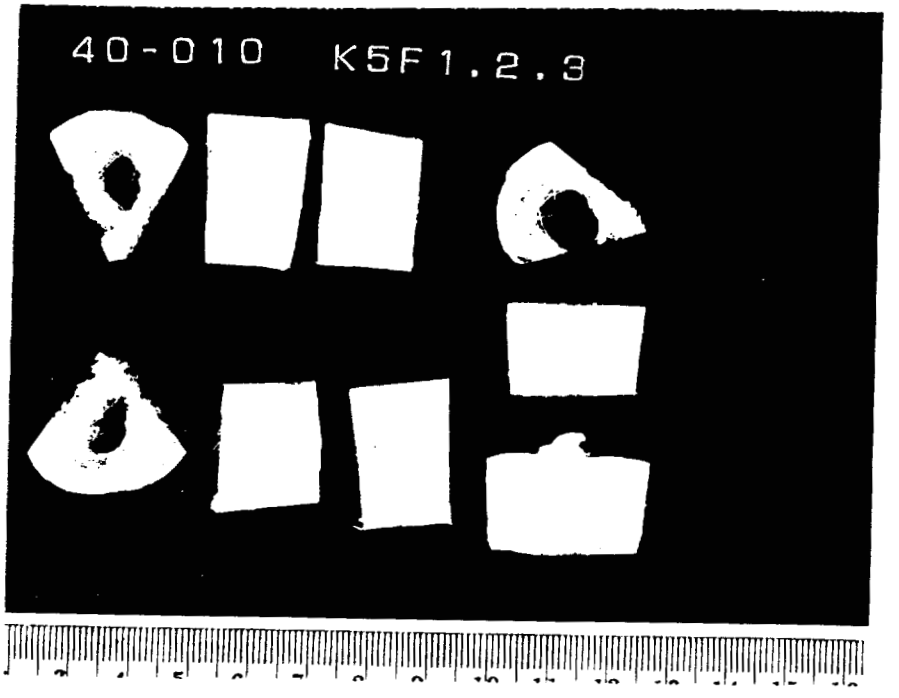
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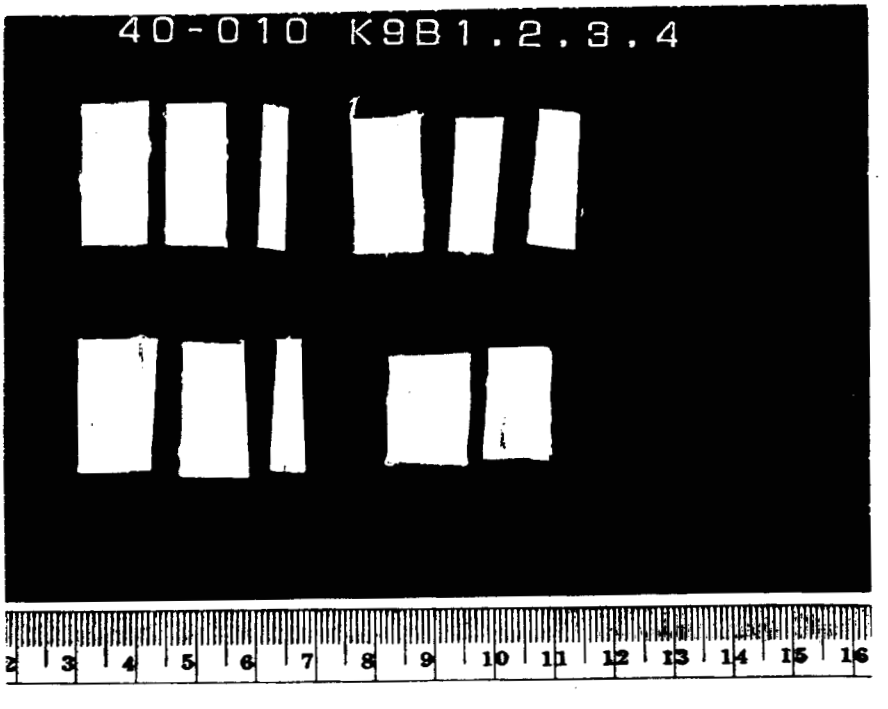
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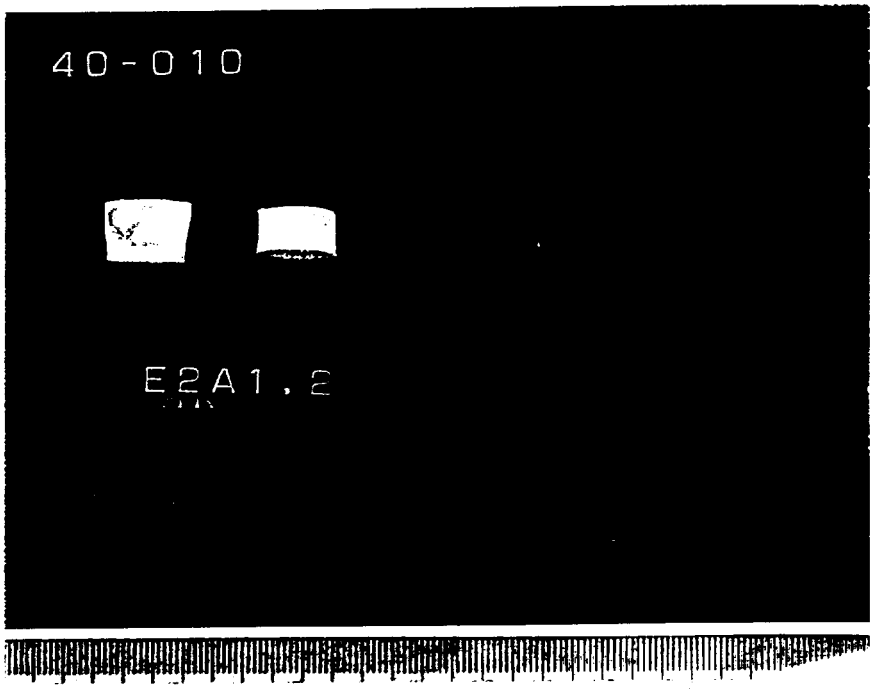
Endosteal
surfaces

Endosteal
surfaces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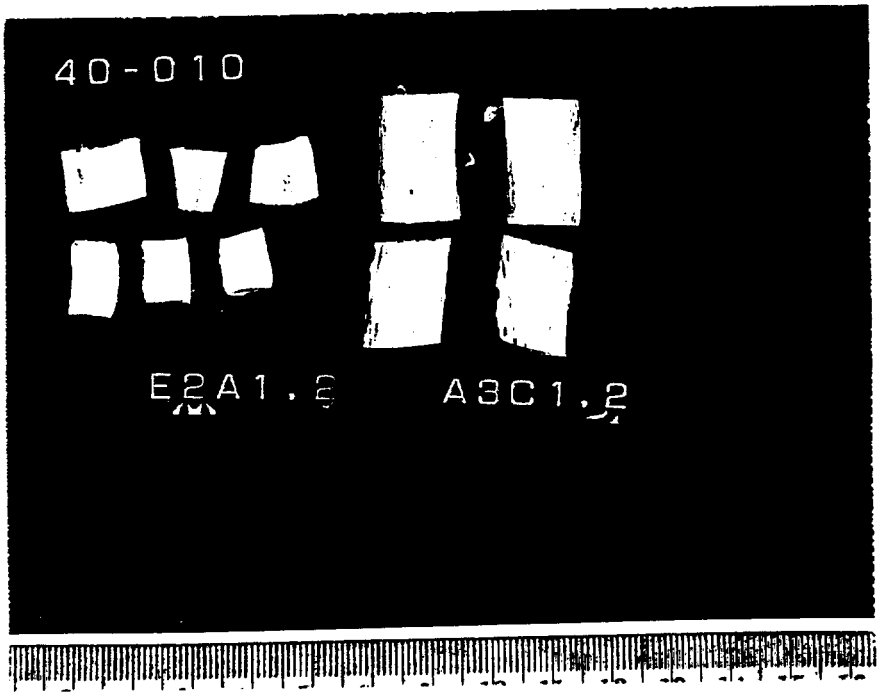
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Endosteal
Surfaces

Endosteal
Surfaces

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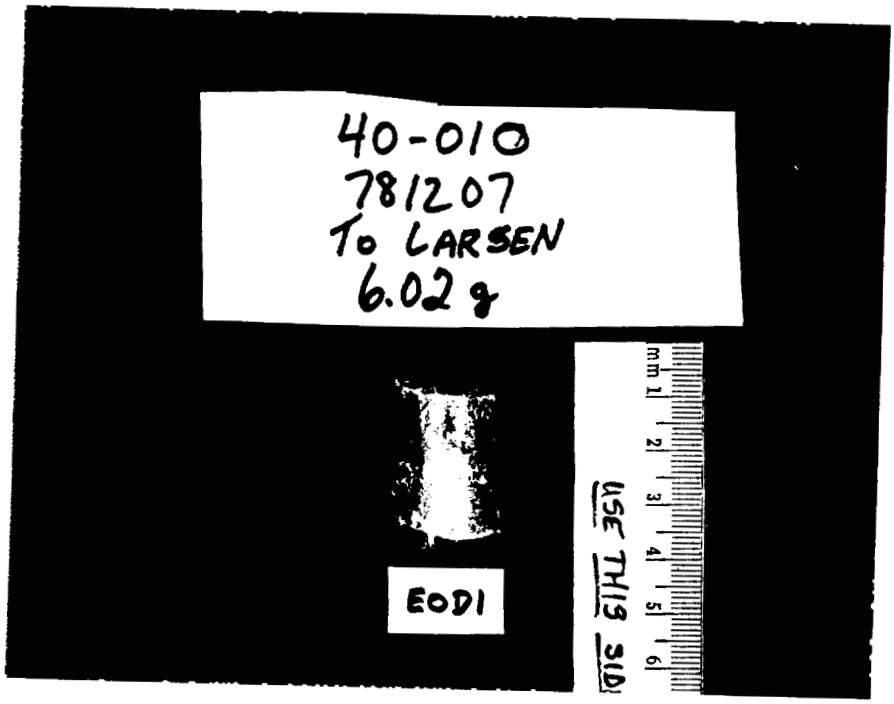
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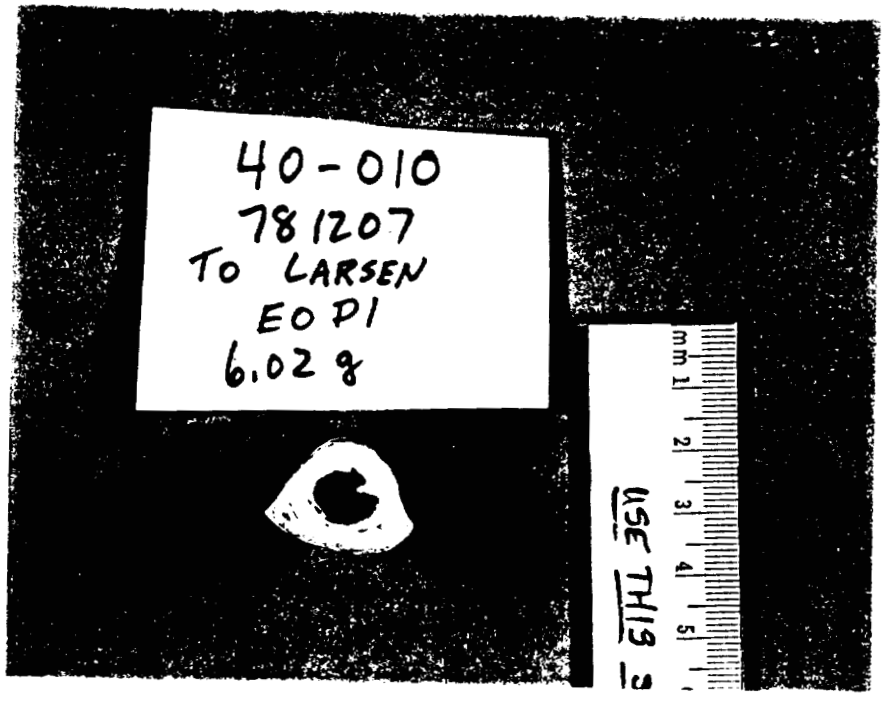
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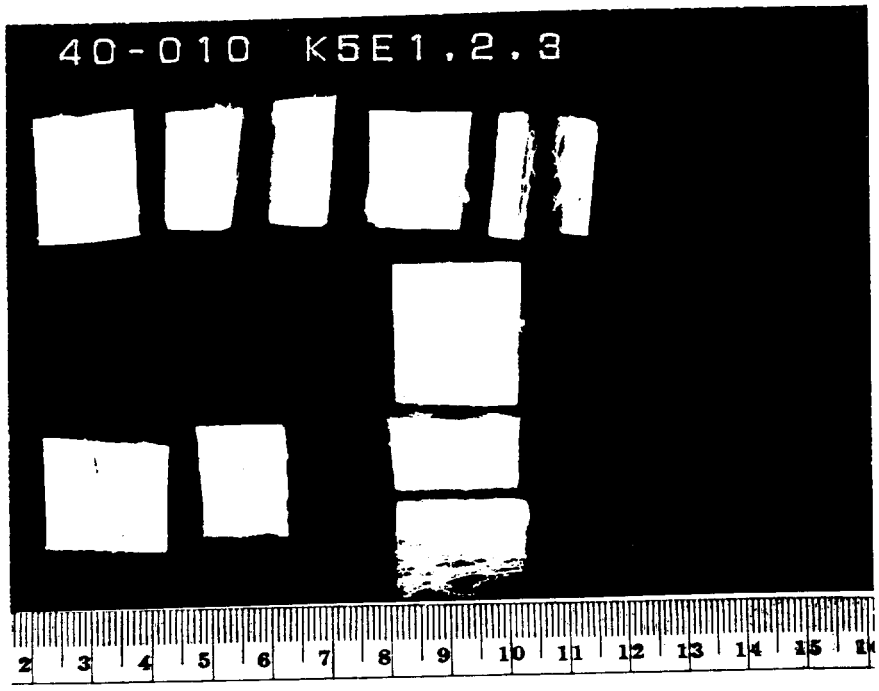

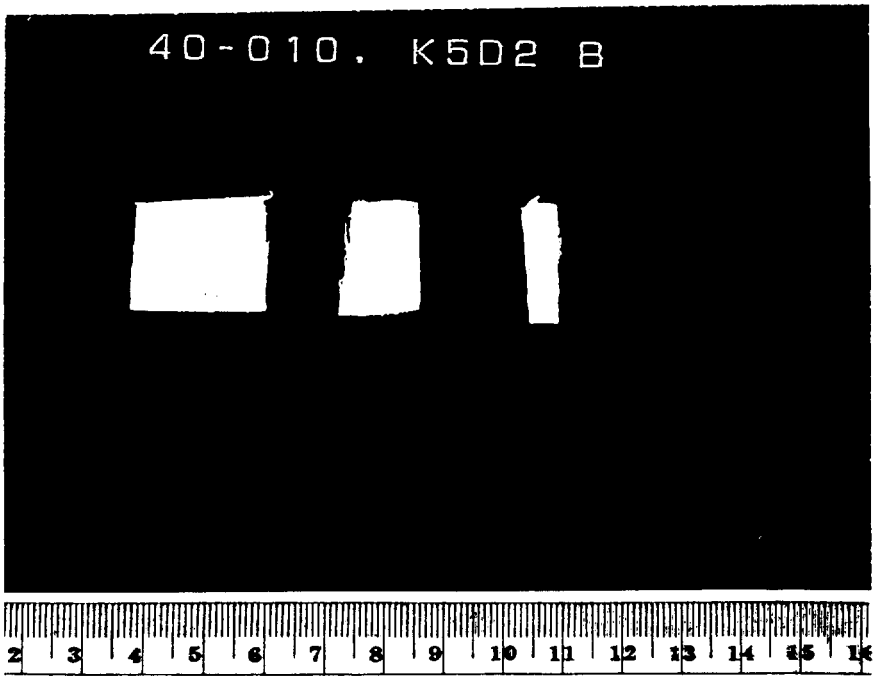

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Endosteal
Surfaces

Endosteal
Surfaces

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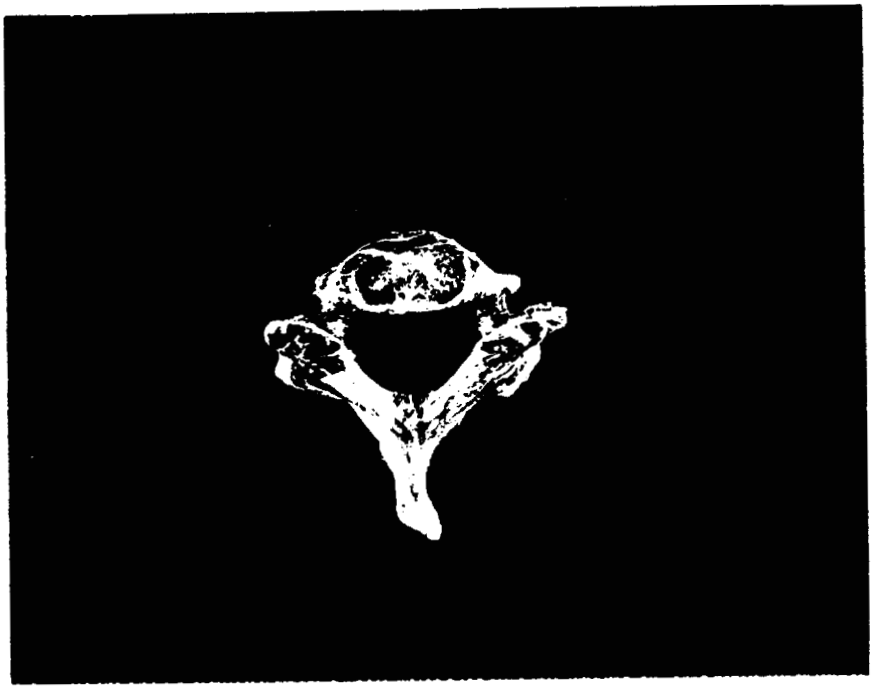

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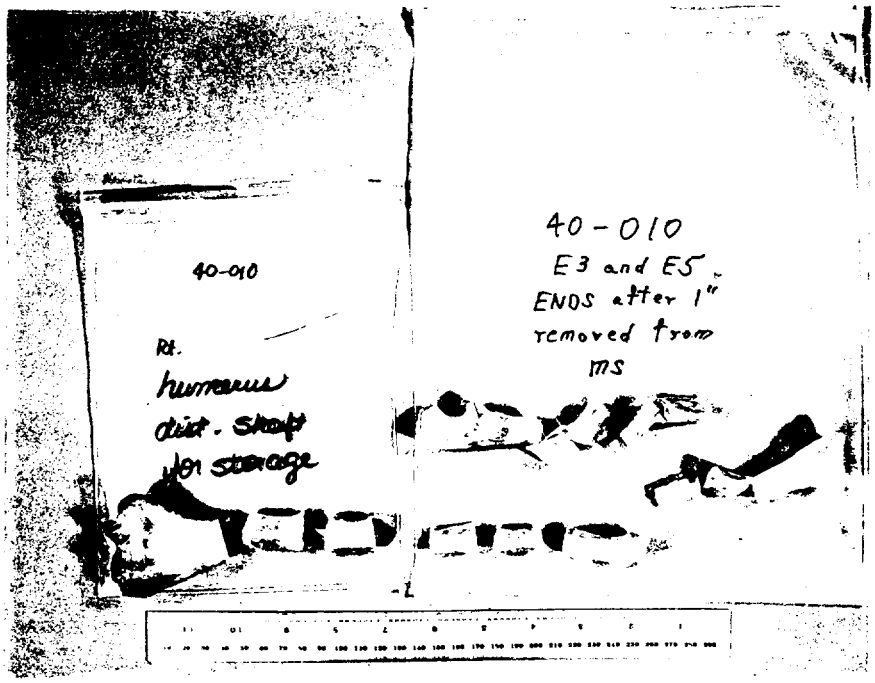
40-010
Rt.
humerus
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for storage
40-010
E3 and E5
ENDS after 1"
removed from
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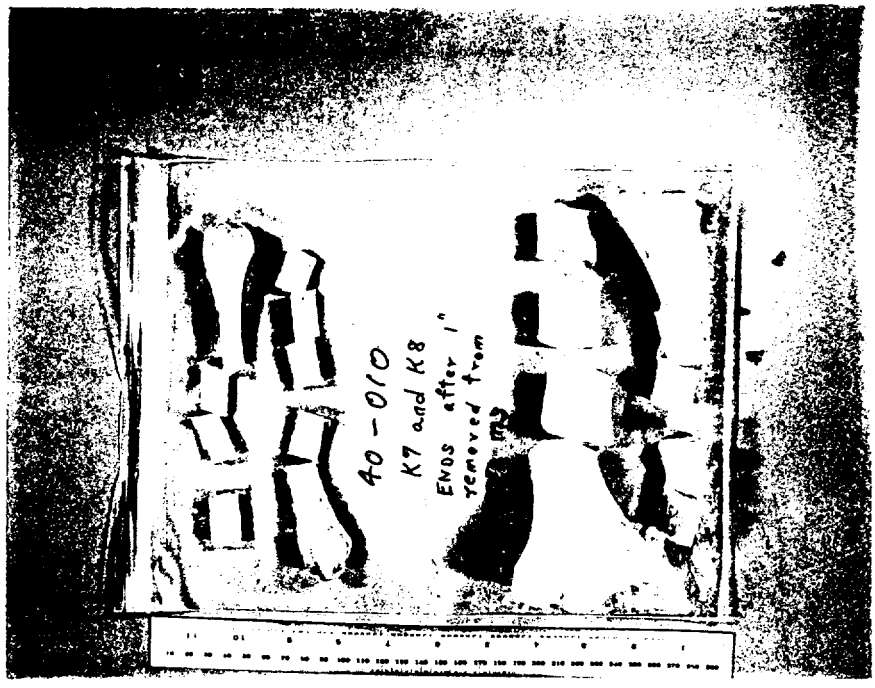
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FOR SAGITTAL Sections

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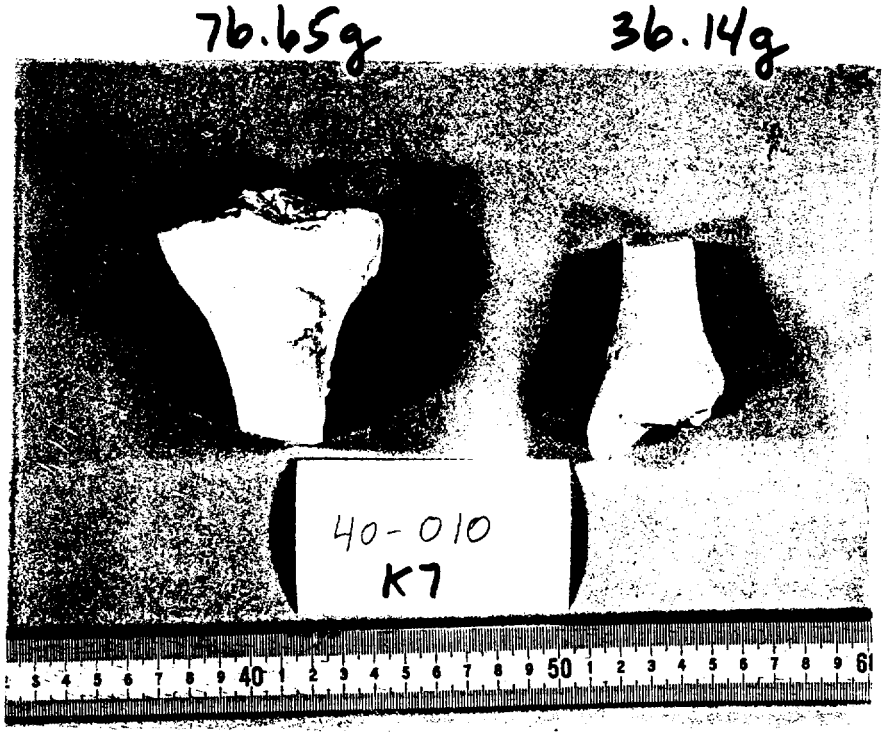
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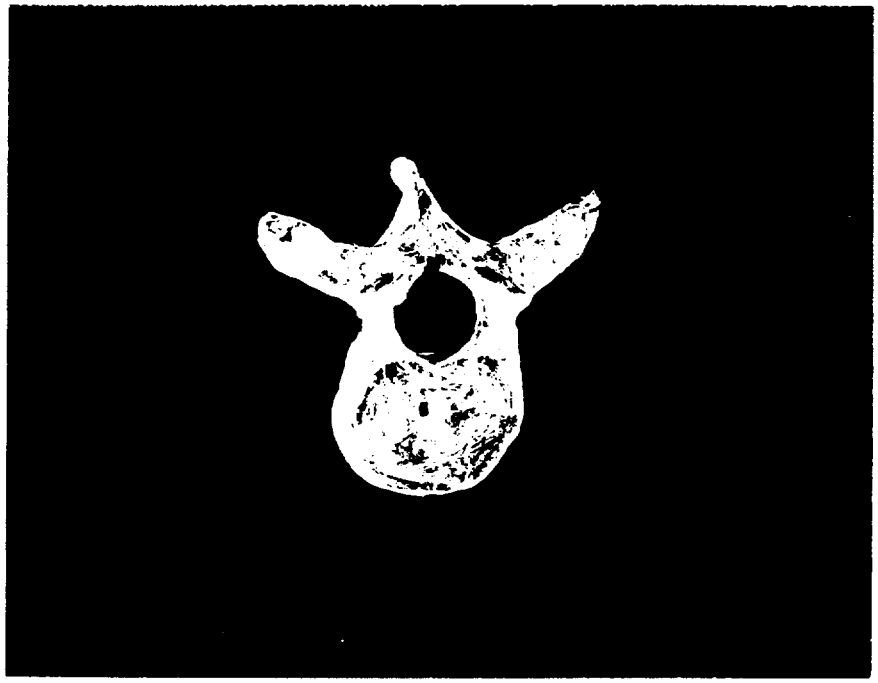
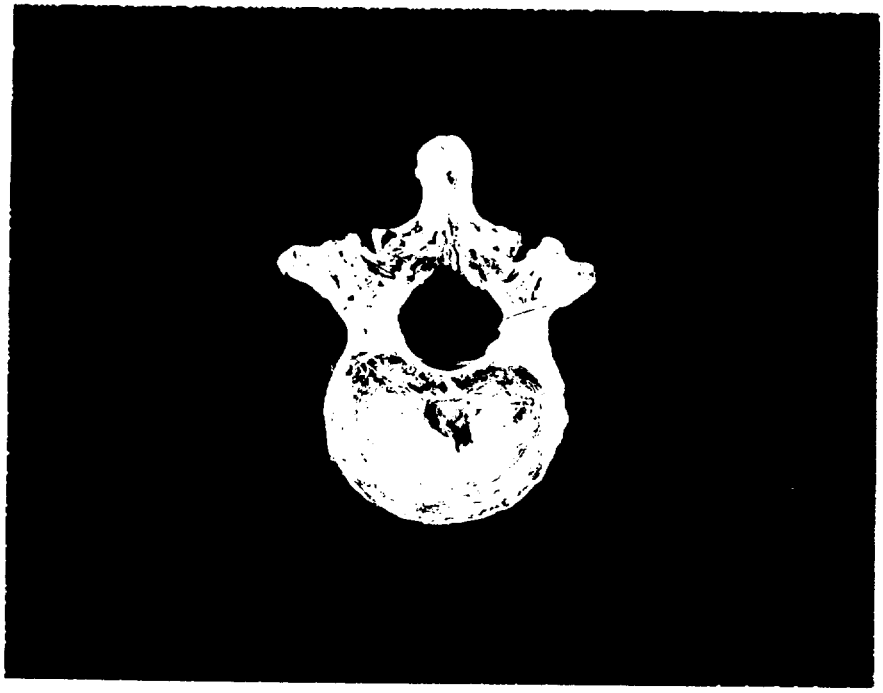
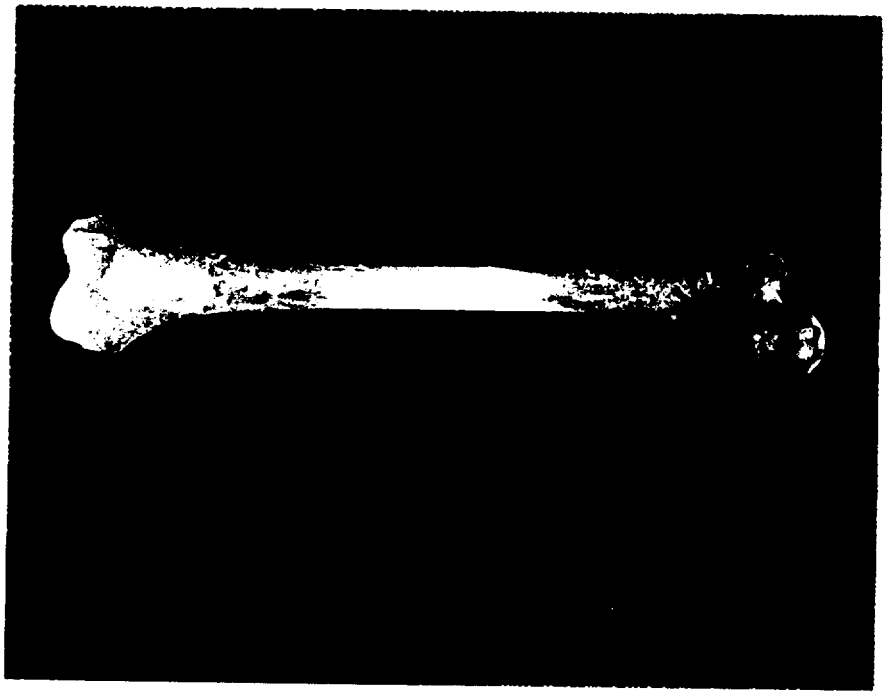
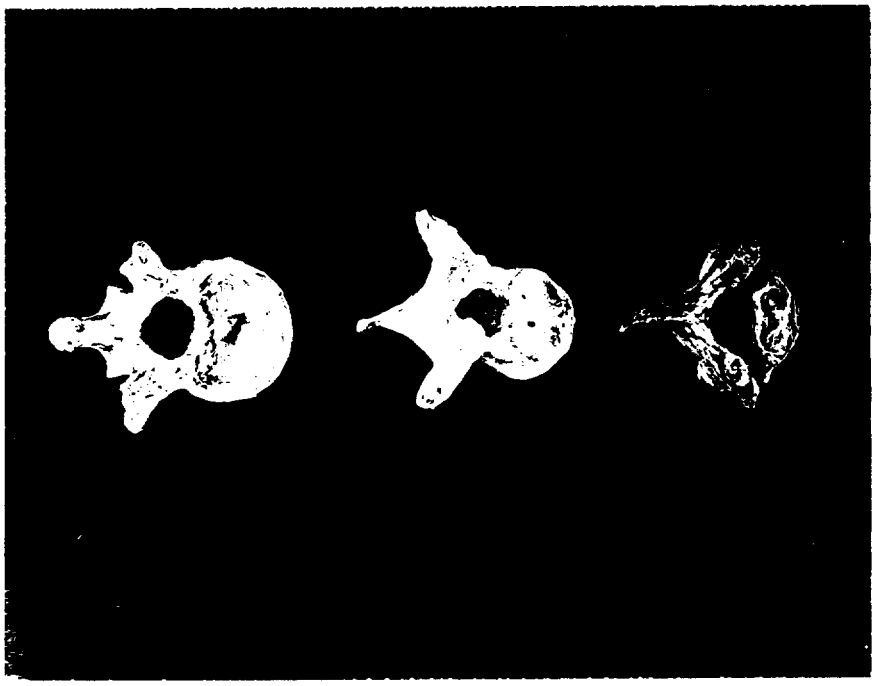
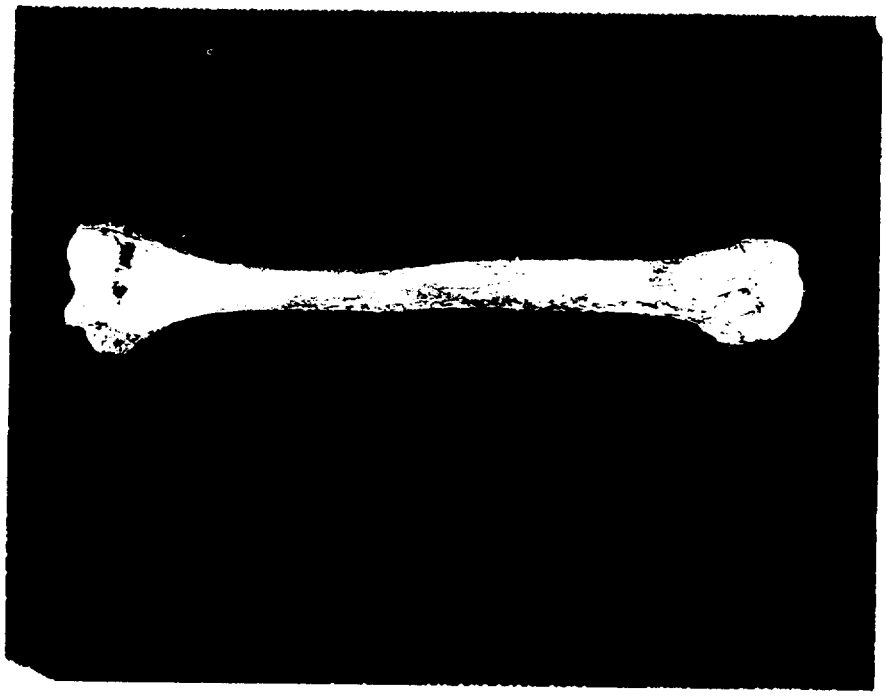
K7









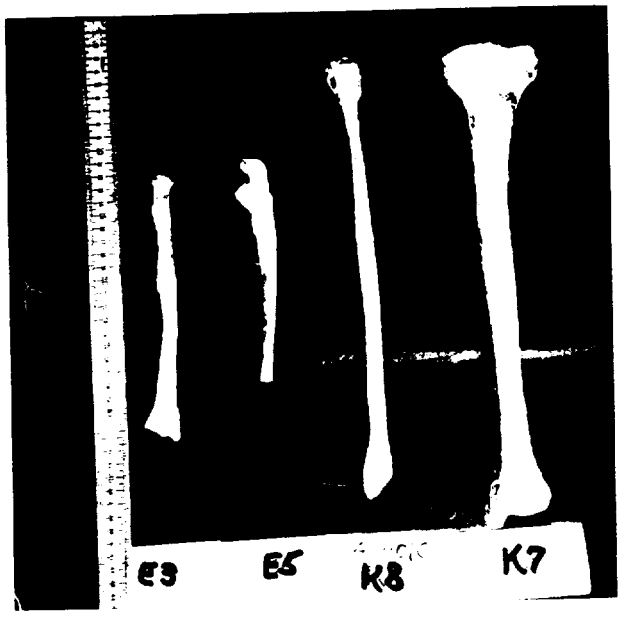


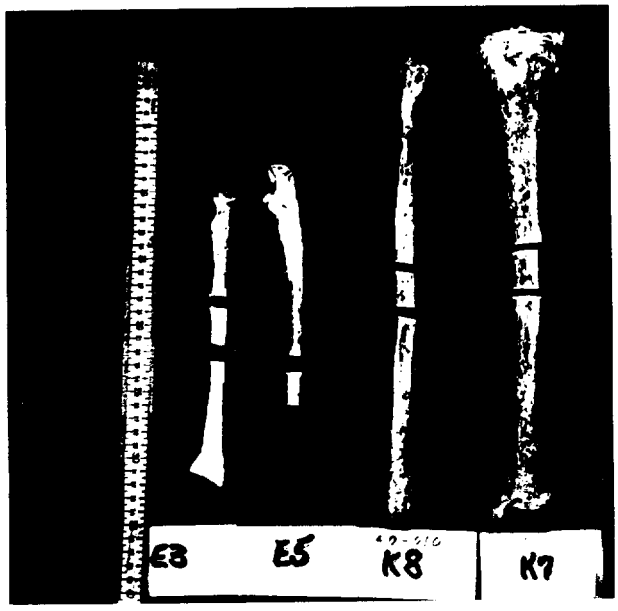
8001095

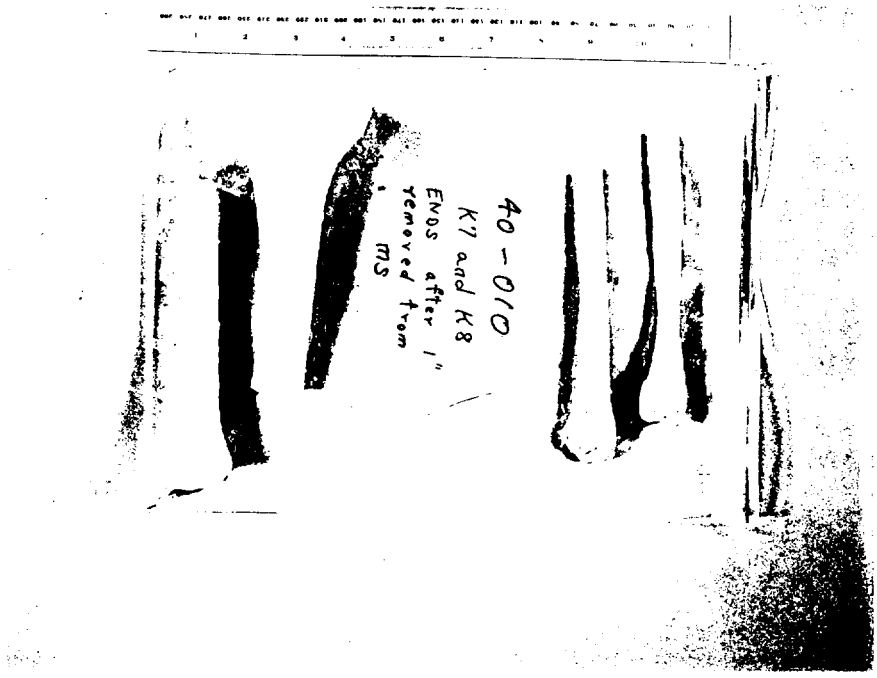
40-010

Gross Photos

Distribution of:
Femur, Humerus, Innominate, Vertebrae.


E3
E5
K8
K7

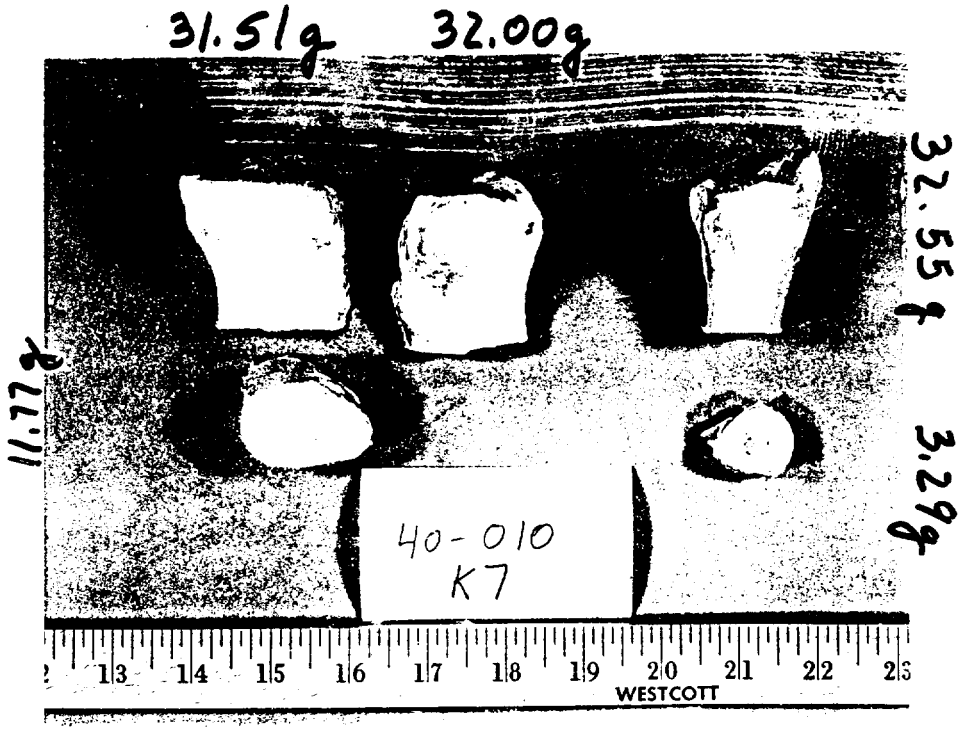

E3
E5
K8
K7

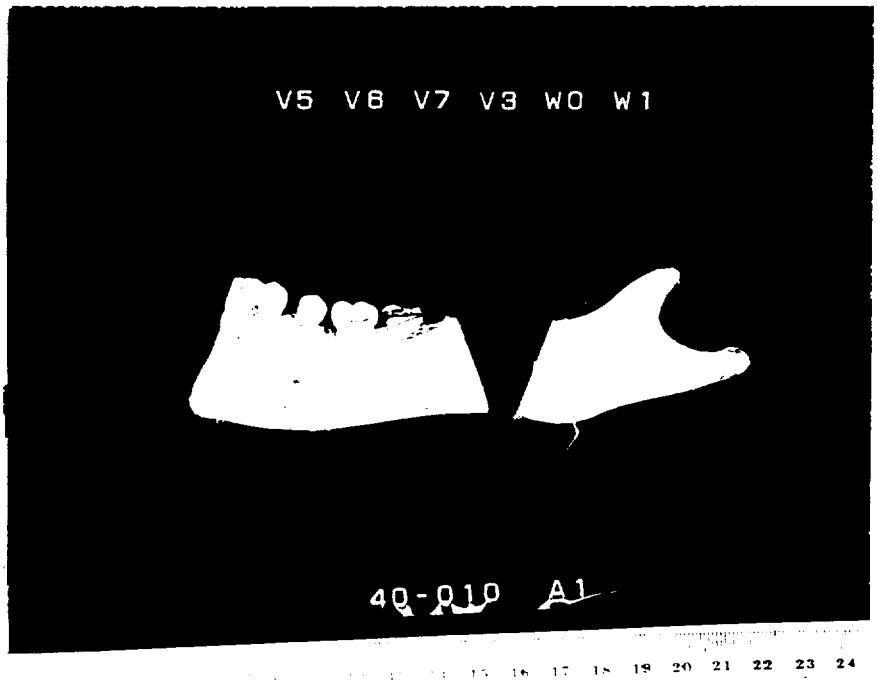

40-010
K7 and K8
ENDS after 1"
removed from
MS

FOR SAGITTAL SECTIONS

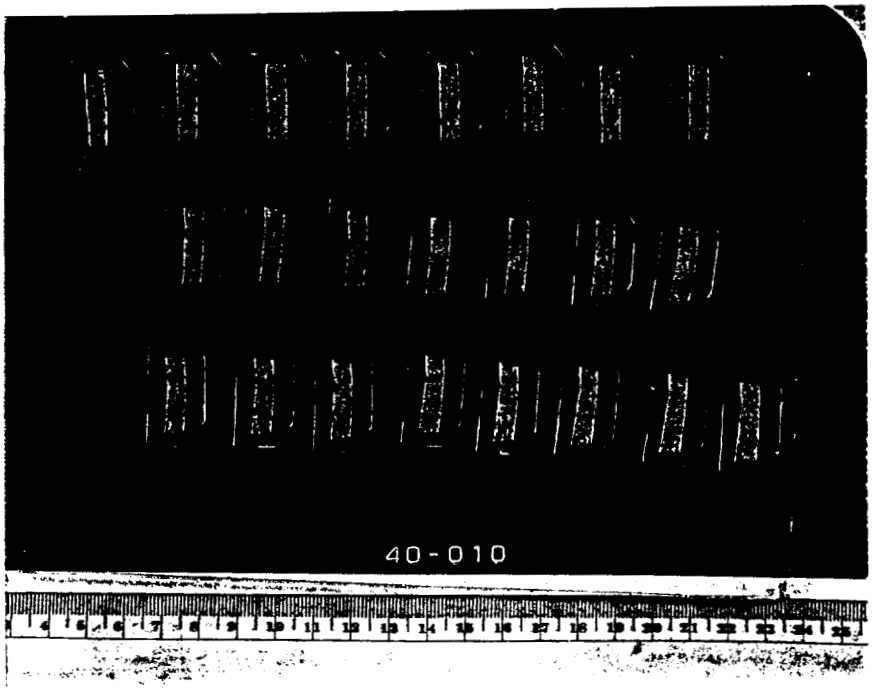
FOR SAGITTAL SECTIONS

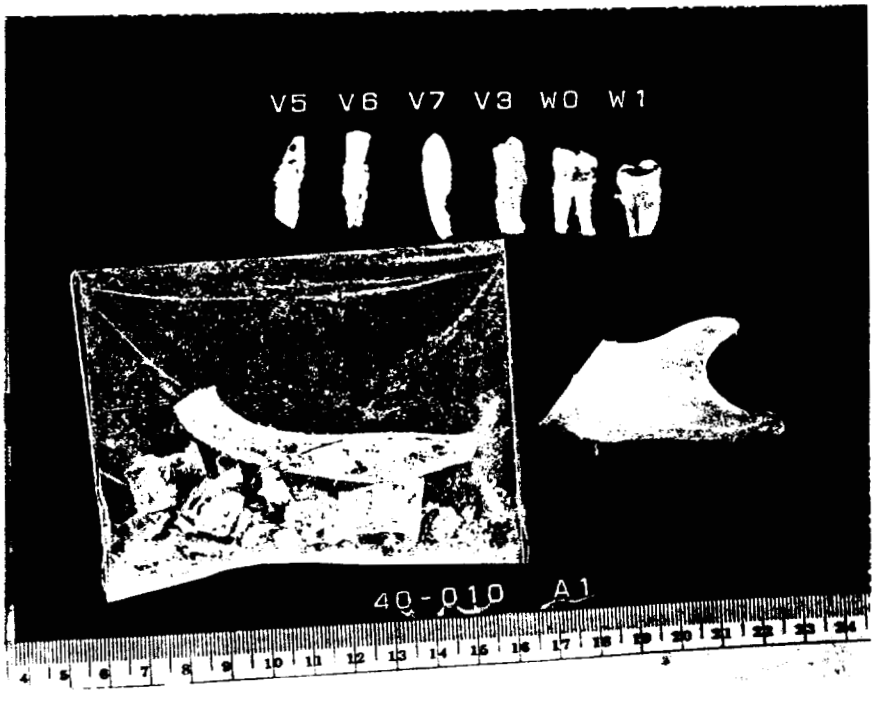
8001099


31.51g
32.00g
32.55g
11.77g
3.29g
40-010
K7
WESTCOTT


V5 V8 V7 V3 W0 W1
40-010 A1

8001100

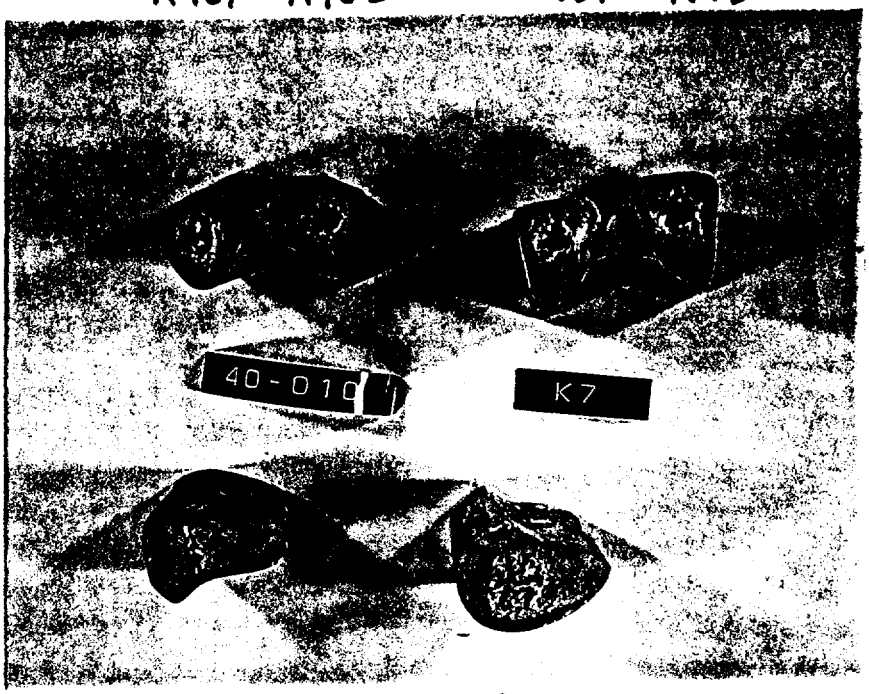

40-010


V5 V6 V7 V3 W0 W1
40-010 A1

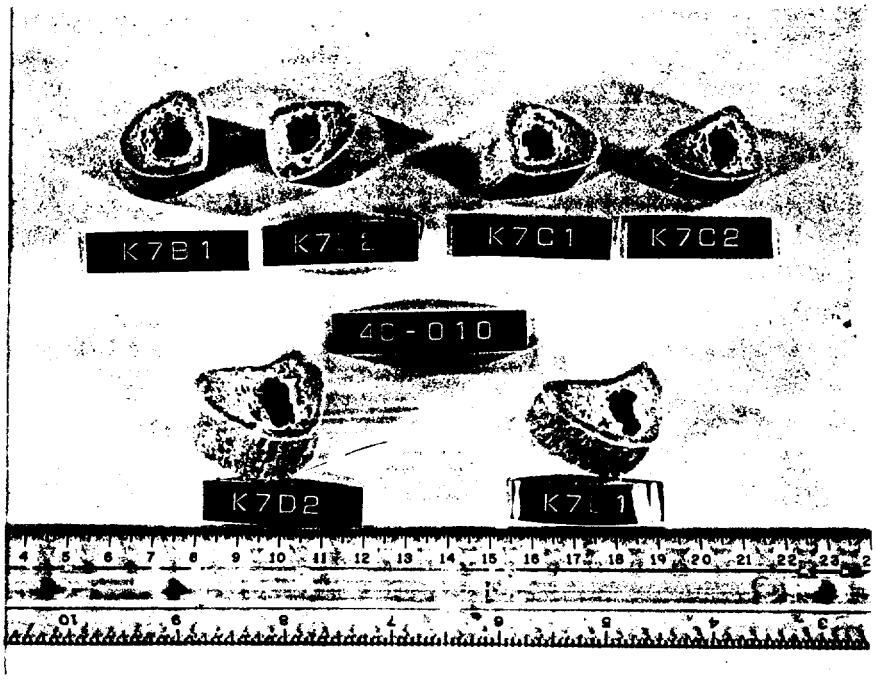
Sections cut for D. Toohey
AO

8001102

K7C1 K7C2 K7B1 K7B2



K7D1 K7D2



FOR SAGITTAL SECTIONS

FOR SAGITTAL SECTIONS

8001104

ARGONNE NATIONAL LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

October 3, 1973

TO: CHR Records Room

FROM: J. E. Farnham J.F.

SUBJECT: Exhumation of , 40-010

of the ,
Geneseo, New York made all the arrangements for the exhumation of Miss to take place on September 24, 1973.

Upon my arrival at the Funeral Chapel, I introduced myself to President. Mr. introduced me to two of his assistants, a Mr. and Mr. I inspected the documents pertaining to the disinterment, after which we all left for the Cemetery.

The grave had been opened by the cemetery personnel exposing a concrete vault. Two workmen from the concrete vault company entered the grave and broke open the vault with mallets and chisels. Approximately 2" of water was seen in the bottom of the vault. I requested a hole be chipped in the bottom of one end of the vault to let the water drain out, which they did. After the vault was opened, these two vault company workers hastily departed the area. We removed the casket, which was falling apart, placed it on a flat cart and took it to a workshed area. The casket showed signs of much deterioration mostly on the external sides and bottom.

Within the confines of the shed, we opened the casket and transferred the remains to a Ziegler case. The flesh on the exposed face and hands was considerably dehydrated, shriveled and a dark black in color. In handling the remains, however, the tissue felt softer than its dehydrated appearance would suggest. No mold was present on the remains. Superficial observation (will check further in our laboratory) suggests a complete post was done on this body. The cadaver was in good condition.

We sealed the Ziegler case with metal screws. The casket, which was falling apart, was returned to the grave site where the men from the vault company had broken apart the old vault, removed all the pieces, installed a new concrete vault in the grave and then departed. The casket pieces were placed in the new vault, the vault cover placed in position, but unsealed, and the grave was closed.

We placed the Ziegler case containing the remains of Miss in the station wagon and drove back to the Funeral Chapel. I went, from there, to a motel to clean up and stay the night. We delivered the remains

8001105

ANL-26 (11-68)

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

to United Air Freight Office in Rochester, New York for shipment to Chicago on Flight 899 leaving Rochester at 10:25 a.m. on September 25, 1973.

Upon my arrival back at the Laboratory at approximately 4:30 p.m. on September 25, 1973, I found that the remains had not been delivered to Argonne at this late hour. I then called Mr. who stated over the phone that the airlines had not contacted him as yet. I called the United Air Freight Office and requested that they trace the shipment. I also called Mr. in Geneseo and obtained the air bill number of the shipment (#0635-8973) and requested Mr. to call Rochester and start tracing the shipment from that direction. At 7:30 p.m. I received a call from United. They informed me that the shipment had been located. I then called Mr. and told him he could pick up the shipment at his convenience. I left for home.

A series of photographs were taken during this disinterment. As the photographs were initially taken on 35 mm color film, a description of the photographs will be made when processing of the film has been completed at a later date.

JEF/jt

cc: A. F. Stehney
M. M. Shanahan

PRIVACY ACT MATERIAL REMOVED

8001106

ARGONNE
NATIONAL
LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

October 23, 1973

TO: CHR Records Room

FROM: J. E. Farnham J. F.

SUBJECT: Exhumation photographs of case 40-010,

Photo #1 Headstone marker inscribed:

- 1947
A martyr to medical science

Photo #2 A small stone-faced building in which we placed the casket after removal from the grave.

Photo #3 The deteriorated, very fragile casket within the building in which the transfer of the remains to a Ziegler case was made.

Photo #4 A photo of the remains in the casket after removal of the cover. The remains were well preserved and moist except for the face and hands which were dehydrated and black in color. Heavy odor.

Photo #5 The remains just after being transferred from the casket to the metal Ziegler case.

Photo #6 A photo showing Mr. dusting the remains with a can of Hydrol embalming powder.

Photo #7 The remains were wrapped and covered with white sheets before the Ziegler case was sealed as is seen in this photograph.

Photo #8 This photo shows a new concrete vault installed in the grave site. Note the shallow grave, only 4 feet deep. The casket was broken in pieces and replaced within the new vault and the vault cover placed in position but not sealed.

JEF/jt
cc: A. F. Stehney
M. M. Shanahan

8001107

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

TO:

FROM: WPU 9/26 PM

UNIFORM AIRBILL NON-NEGOTIABLE

Subject to Cond[illegible] of Contract on Back of Shipper's Receipt of the Airbill.

AIRBILL NUMBER			DATE			TC	CHGS	FLIGHT/DATE	FLIGHT/DATE	DECLARED VALUE	CUBIC INCHES
CARRIER 016	ORIGIN RCC	0635 8973	DAY	MO.	YR.		PP			—	

ROUTING: Airline routing applies unless shipper inserts specific routing here.
UA 699/ 25th.

☒ PREPAID ☐ COLLECT

United Air Lines
P. O. Box 66100 Chicago, Illinois 60666

TO	VIA	TO	VIA	TO	VIA	TO	VIA
ORD	UA						

2/ CONSIGNEE'S ACCOUNT NUMBER

CONSIGNEE

NAME: FUNERAL HOME

STREET ADDRESS:

CITY: Lemont STATE: IL ZIP CODE:

CHARGES CODES:
PX - PREPAID CREDIT
PP - PREPAID CASH
CC - COLLECT
CG - COLLECT G.B.L.
CP - COLLECT CASH
CX - COLLECT CREDIT
MX - PART PREPAID PARTIAL COLLECT-CREDIT
MP - PART PREPAID, PARTIAL COLLECT-CASH
PG - PREPAID GBL AND/OR GTR

A - ASSEMBLY
B - CLEARANCE HANDLING
C - CONTAINER/KENNEL
D - DISTRIBUTION
E - INSURANCE
G - SIGNATURE SERVICE
H - SEPARATE/EARLY RELEASE
M - MISCELLANEOUS SERVICE CHARGE
P - PACKAGING
S - STORAGE
T - STATE SALES TAX
X - UNASSIGNED
RFC - REMITTANCE FOLLOWING COLLECTION

CARRIER USE ONLY	
RATE	CHARGES
2244	WEIGHT CHARGES A 43.76
	PICK UP B
	DELIVERY C

3/ DEL. ZONE — SPECIAL INSTRUCTIONS, INCLUDING CUSTOMER REFERENCE NUMBER AND BILLING INSTRUCTIONS: PH

EXCESS VALUE D

4/ SHIPPER'S ACCOUNT NUMBER: 999

SHIPPER

NAME: FUNERAL HOME

STREET ADDRESS:

CITY: , N.Y. STATE: ZIP CODE:

PCS/PKGS	LENGTH	WIDTH	DEPTH	CUBIC INCHES
		X	X	=

DIMENSIONAL WGT–LBS

ADVANCES E

OTHER F

SHIPPER'S C.O.D G

C.O.D. Shipment — if amount entered here by Shipper

C.O.D. FEE H

5/ PICK UP ZONE | ORIG. ADVANCE CHGS. | DESCRIPTION OF ORIGIN ADVANCE CHARGES | DEST. ADVANCE CHGS. | DESCRIPTION OF DESTINATION ADVANCE CHARGES: PAID | TAX I 2.19

6/ OTHER CHARGES | DESCRIPTION OF OTHER CHARGES | G.B.L. NUMBER/GTR NUMBER | TOTAL CHARGES T 45.95

NO. PCS.	WEIGHT	DESCRIPTION OF PIECES AND CONTENTS, PACKING, MARKS, NUMBER	CARRIER COMM'TY GROUP NO.	CARRIER COMM'TY GROUP NO.	CARRIER COMM'TY GROUP NO.
7/ 1	195	SAID TO BE HUMAN REMAINS OF	SCP		
—		(SHIPERS AIR TRAY)			
—					48100
—					

8/	WEIGHT CHARGES A	PICK UP B	DELIVERY C	EXCESS VALUE D	ADVANCES E	OTHER F	SHIPPER'S C.O.D. G	C.O.D. FEE H
	43.76							

TAX I	TOTAL CHARGES T	1ST RATE	2ND RATE	3RD RATE	ITEMS PREPAID	SHIPPER PAYS
2.19	45.95	2244				

EXECUTED AT/BY	DATE	TIME	ITEMS COLLECT	CONSIGNEE PAYS
RCFF WP	9/ 25/ 73			

RSON CONTACTED	BY	RECEIVED BY	DATE	TIME	CARRIER	ORIGIN	
ATE - TIME	PHONE	X			016		0635 8973

IN GOOD ORDER EXCEPT AS NOTED ON THE BACK HEREOF

AC 2147 REV. 4-73
C17) PRINTED IN U.S.A. 8001108

5. CONSIGNEE MEMO

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

PRESIDENT
LICENSED MANAGER

NEW YORK

TELEPHONE

Funeral Chapel, Inc.

ESTABLISHED 1886

AUG 3 1 1973

Dear Miss Shanahan

As per our telephone conversation, I am enclosing the tentative charges for exhumation + shipping the remains of miss to Chicago Ill. they may be a little different from my quotes on the phone as prices are going up on labor every day.

		increase foll. tel. conv.
grave opening for exhumation	$100	+15
grave opening for reinterment	100	+15
receiving vault	75	
transportation to Park via airport to vault	35	
transportation to Park via airport to return	35	
casket Vaught	210	+20
Vault Co. charge	100	
cash paid for shipping	30	
professional charges	50	
total	$ 735.	
Plus 2% sales tax charge for	-1	

Sincerely,

POOR QUALITY ORIGINAL

RECEIVED
CHR RECORDS
SEP 6 1973

8001109

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

40-

ARGONNE NATIONAL LABORATORY
U of C-AUA-USAEC

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

MICROFILMED

August 30, 1973

MEMO TO: File

F R O M: Mary Margaret Shanahan

SUBJECT: Exhumation of , 40-010

On or about August 24, 1973 I telephoned Mr. of the Funeral Chapel, Inc. in , New York to inquire how he was coming with his estimate of the charges to exhume . He apologized for the delay in replying to my letter of August 8, 1973 saying that he had just returned from vacation.

He read over the phone the following charges and agreed to send me a letter confirming them:

Cemetery charges:		CMSA pack	$ 30
1st opening . . .	$35	Vault company	
2nd opening . . .	35	charges (breaking	
Transportation to		open, replacing):	
Rochester + ret:		(190,100)	290
($35 each trip) .	70	Professional fee	50
Ziegler case . . .	75	TOTAL = $685 + air fare	

Mr. requested that the permission forms have the address of the signors added to them. He also inquired when the remains would be returned stating that no interments were permitted by the cemetery between December 1st and April 1st.

RECEIVED
CHR RECORDS
SEP 6 1973

s

xc: M.H.Chalfen
A.F.Stehney
J.E.Farnham

PRIVACY ACT MATERIAL REMOVED

8001110

SOUTHWEST FIELD STATION
5619 East Monterosa St., Phoenix, Arizona 85018 Tel. 602-949-5600

PRIVACY ACT MATERIAL REMOVED

Description (first - Examination)	Case #	@M,	@A,T,	M,	E,	F,	D,
healed fractures - L 9th rib		40-010	1962L	1280	0000	0000	4774Y
" L 10th "			1963L	1280			
osteoporosis - dorsal spine			1124	5021			
" - lumbar "			1125				
" - R femur			1171R				
" - R tibia			1173R				
" - R+L innominate bone			1197R				
dense deposits on surface of a number			0000	5600	5272	0000	4774Y
of bones and other such deposits							
in soft tissues close to bone surfaces -							
attributed to pluriopicism							
Cushing syndrome			9310	0000	0000	4693	4704C
adenoma - pituitary			9100	8140		0000	4704C
tumor - pituitary gland (basophile adenoma)			9100	8300			4704
pressure atrophy - bone - in back of sella turcica			1115	7100			
infantile ovaries			8700B	2325			
" uterus			8200	2324			
atrophy - thymus			9800	7100			
" - thyroid			9600	7100			

8001111

Abstracted by rA Date 9/2/77 Coded by rA Date 9/2/77

Filename = SNOP
file type = PDS

PRIVACY ACT MATERIAL REMOVED

Description	Case #	@M,	@A,T,	M,	E,	F,	D,
~~marked~~ adenosis	40-010						
chr glomerular nephritis c		7120B	4301	0000	0000	4704A	
contraction of kidneys		7100B	4841				
excessive obesity - trunk, head, neck (not extremities)		4100	7282				
bulging sterne - thorax		0251	7114				
- abdomen		0261	7114				
		4060	7282				
		4010	7282				
liver - 1cm over costal margin		5600	7200/				
cardiomegaly - esp Lvent		3200	7200				
dilation - ventricles		3240	3410				
infiltration - lungs bronchopneumonia		2800	4001				
hypertrophy - adrenals (master)		9300	7200				
atrophy - breasts		0401B	7100				
hirsutism		0000	7334				
Cushing's syndrome		9310	0000			4633	41471
hypertension		0001	0000			9042	41747
hypertensive retinitis		XX61	4000			9042	41747

8001112

Abstracted by cft Date 3/8/77 Coded by cft Date 3/8/77

PRIVACY ACT MATERIAL REMOVED

Description	Case #	@M,	@A,T,	M,	E,	F,	D,
hypertensive heart disease		40-010	3000	0000	0000	9135	4747L
epistaxis			2100	3850		0000	4747L
glaucoma - bil			XX00	0000		9051	4147L
pyelitis			7200	4000		0000	"
Elliot trethine (iridectomy) operation for visual symptoms			XX50	1557		0000	"
paroxysmal auricular fibrillation			3960 B	0000		7036	4847L
exploration - adrenal glands			9300	1510		0000	4447L
- pelvic organs			Y610	1510		"	"
hyperplasia - adrenal cortices			9310 B	7300		"	"
extreme weight gain			0001	0000		2913	4547L
backache			Y110	"		7536	"
headache			Y010	"		7536	"
epistaxes			2100	3850		0000	"
phlebotomies of polycythemia and			4800	1511		"	--47
hypertension have apparently dec. iron receptors			0600 0000	7715 0000	0000	" 1262.4#	--47L 4547L
mild urinary infection			7010	4000		0000	4647L
Cushing's syndrome			9310	0000		4633	4747R
pituitary basophilism (not cushing)							
adrenal cortical hyperfunction (not cushing)							

8001113

Abstracted by CA Date 9/2/77 Coded by CA Date 9/9/77

PRIVACY ACT MATERIAL REMOVED

Description		Case #											
nausea, hist of	@M,	40-010	, @A,T,	5000	, M,	0000	, E,	0000	, F,	7233	, D,	7047P	,
weakness, "	@M,		, @A,T,	0000	, M,		, E,		, F,	8481	, D,		,
vomiting, "	@M,		, @A,T,	5000	, M,		, E,		, F,	7222	, D,		,
weight gain, "	@M,		, @A,T,	0000	, M,		, E,		, F,	2913	, D,	4047P	,
headaches, "	@M,		, @A,T,	Y010	, M,		, E,		, F,	7536	, D,		,
backaches, "	@M,		, @A,T,	Y110	, M,		, E,		, F,	7536	, D,		,
polydypsia, " [illegible]	@M,		, @A,T,	0000	, M,		, E,		, F,	1241	, D,		,
polyuria, "	@M,		, @A,T,	7010	, M,		, E,		, F,	7314	, D,		,
occ. tarry stool, '	@M,		, @A,T,	6Y10	, M,	3850	, E,		, F,	0000	, D,		,
obesity - thorax + abdomen	@M,		, @A,T,	Y210	, M,	7232	, E,		, F,		, D,	4747R	,
striae -	@M,		, @A,T,	0261	, M,	7114	, E,		, F,		, D,		,
	@M,		, @A,T,	Y410	, M,	7282	, E,		, F,		, D,		,
sl. injection - throat	@M,		, @A,T,	6010	, M,	3810	, E,		, F,		, D,		,
hemorrhage - epiglottis	@M,		, @A,T,	2401	, M,	3850	, E,		, F,		, D,		,
BP 210/120	@M,		, @A,T,	0001	, M,	0000	, E,		, F,	9042	, D,		,
sl kyphosis	@M,		, @A,T,	1120	, M,	3368	, E,		, F,	0000	, D,		,
hirsutism	@M,		, @A,T,	0000	, M,	7394	, E,		, F,	0000	, D,		,
plethora	@M,		, @A,T,	0100	, M,	0000	, E,		, F,	9061	, D,		,
blurring - optic discs	@M,		, @A,T,	XX63B	, M,	0002	, E,		, F,	0000	, D,		,

8001114

Abstracted by ... Date ... Coded by ... Date ...

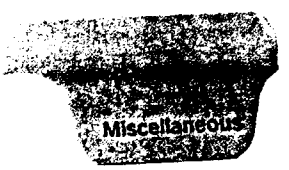
PRIVACY ACT MATERIAL REMOVED

Description	Case #	@M,	@A,T,	M,	E,	F,	D,
ecchymoses - lower extremities		40-010	0279B	3852	0000	0000	4747R
dyspnea			2000	0000		7101	4747L
plutonium injection			0001	1908		0600	3550T
severe fall - landing on head scraping knee, hand			4010	1000	9230	0000	3678P

Abstracted by [illegible] Date 9/8/77 Coded by [illegible] Date 9/8/77

8001115

9111008



ARGONNE NATIONAL LABORATORY — CENTER FOR HUMAN RADIOBIOLOGY

PRIVACY ACT MATERIAL REMOVED

PROPOSAL FOR EXHUMATION	Proposed by AFS (AEC)	Date 4/1/73

PROSPECTIVE CASE DATA

Name	Case No.	Date of birth
HP-4	40--010	

Date of death	Place of death	Autopsy?	Remains
5/2/47	Wyoming County Community Hosp. Warsaw, N.Y.	X Yes __ No	X Normal __ Cremains

RADIOACTIVITY DATA

EXPOSURE:	Company, Hospital, M.D., etc.: (18) Strong Memorial Hosp.		Type: Pu inj.
INTAKE:	Radionuclide, Amount (if known): 239 Pu (IV) citrate 0.3 μCi	Dates From: Nov. 27, 1945	To:
RESIDUAL:	Nuclide / Amt. / Date / Lab	Nuclide / Amt. / Date / Lab	

REASONS FOR POST-MORTEM STUDIES

__ Unknown body burden X Priority group __ Known intake __ Medical

__ Calibration comparison __ Ra-228/Ra-226 X Distribution __ Other

EXPLANATION Pu^{40}

PROPOSED ANALYSES: alpha auto, distribution - 7 to 10 ref., micro and x-rays for pathology. Radiochem. 730924

REVIEW AND AUTHORIZATION

Number of known relatives	Estimated number of consents needed: 2	Court action anticipated: __ Yes X No
Cemetery	Address: GENESEO, NY.	Cooperative? X Yes __ No __ Never used
Funeral Home: FUNERAL CHAPEL, INC.	Address: GENESEO, NY.	X Yes __ No __ Never used
Prognosis of suitable remains: X Good __ Fair __ Poor	Reason: In vault - 26 years. Obtained # 826	By J.E.S. Date 4-3-75

Comments:

RECOMMENDATION: __ Yes __ No __ Cannot say _____ Scientific Reviewer _____ Date

Comments: Authorized for exhumation in A.F. Stehney memo to M.M. Shanahan 3/24/73

Assignment of responsibility for permits

APPROVAL? __ Yes __ No __ Defer _____ Director of CHR _____ Date

PRIVACY ACT MATERIAL REMOVED

0001117

NJ.
CO-006
-027
Barricelli

01-006

Grandin Med

RECEIVED

FEB 11 '76

CHR RECORDS

8001118

PRIVACY ACT MATERIAL REMOVED

"Disinterment" Reinterred

Form VS No. 62. 11-65-10M

TRANSIT PERMIT

NEW YORK
STATE DEPARTMENT OF HEALTH
ALBANY

☛ **A Transit Permit and Transit Label issued by the Local Registrar of Vital Statistics must accompany each dead body transported by a common carrier. — San. Code Sec. 13.1(a).**

CERTIFICATE OF FUNERAL DIRECTOR OR UNDERTAKER

I Hereby Certify that the accompanying dead body of. .....

Veteran* ..... (If veteran, give name of War) who died in the Village (City, Village or Town) of Warsaw,

County of Wyoming, State of New York, on April 29 1947, Sex F, Single* Married Widowed Divorced

Color or race White, Age 20 years ..... months ..... days, Birthplace ..... and Cause of Death Cushing's Syndrome has been prepared for transportation strictly in accordance with San. Code Sec. 13.1, Par. 24 as printed with this blank. Certificate was signed by ....., M.D., Address ..... Date of shipment 9-25 19 73, Route of shipment Rochester NY United Airlines; Point of shipment Rochester NY; Point of destination Chicago Ill.

Name and Address of Consignee United Air Lines .....

(Signature of Funeral Director/Undertaker) ..... Reg. No. 02422

Dated 9-21 19 73 Address Geneseo NY.

* Cross out words not applying.

PERMIT OF LOCAL REGISTRAR

DIST. No. 2522 **Registered No.** .....

Date of issuance September 21 19 73

A satisfactory Certificate of Death for above decedent having been filed and recorded in my office. PERMISSION IS HEREBY GRANTED FOR THE REMOVAL AND SHIPMENT OF THE BODY.

(Signature of Local Registrar) Betty K. Smith

Local Registrar of the Village (City, Village, Town) of Geneseo, County of Livingston, State of New York.

☛ **Only the Local Registrar (Deputy or Subregistrar) may issue a Burial, Removal or Transit Permit**

☛ **Detach here and give part above to escort or attach to waybill if shipped by express.**

☛ **Always write legibly, with durable black ink.**

PRIVACY ACT MATERIAL REMOVED

8001119

ENDORSEMENT OF SEXTON OR PERSON IN CHARGE OF PREMISES ON WHICH INTERMENTS OR CREMATIONS ARE MADE

Date of ..... (Interment or Cremation) was ..... 19.....

..... (Name of Cemetery, Crematorium, etc.)

Section ..... Lot No. ..... Grave No. .....

Signature ..... (Person in Charge) (Address)

Persons in charge must return this Permit to Registrar of his District within SEVEN (7) DAYS from above date. If no person is in charge, THE FUNERAL DIRECTOR OR UNDERTAKER MUST SIGN ABOVE STATEMENT, write across the face of the Permit the words "No person in charge" and FILE PERMIT WITHIN THREE (3) DAYS with Registrar of District in which cemetery is located.

SEXTONS, FUNERAL DIRECTORS and UNDERTAKERS violating the law relative to the return of permits are liable to a penalty of NOT LESS THAN FIVE DOLLARS NOR MORE THAN FIFTY DOLLARS FOR THE FIRST OFFENSE. The law will be enforced. Local Registrars are required, under penalty, to report violations thereof.

8001120

PRIVACY ACT MATERIAL REMOVED

"Disinterment"

Form VS No. 62.

Attach part below to outer box or case Re-Interment

3-65-10M (483-48)

TRANSIT LABEL

NEW YORK
STATE DEPARTMENT OF HEALTH
ALBANY

☞ **A Transit Permit and Transit Label issued by the Local Registrar of Vital Statistics must accompany each dead body transported by a common carrier. — San. Code Sec. 13.1(a).**

PERMIT OF LOCAL REGISTRAR

DIST. No. 2522 Registered No. .....

Date of issuance September 21 19 73

A satisfactory Certificate of Death having been filed and recorded in my office for .....
....., who died in the Village (City, Village or Town) of Warsaw,
County of Livingston, State of New York on April 29 19 47, and the body having been prepared strictly in accordance with San. Code Sec. 13.1, Par. 2A, as certified by
Funeral Chapel Inc. Geneseo (Name and Address of Shipping Funeral Director/Undertaker) Shipping Funeral Director/Undertaker, PERMISSION IS HEREBY GRANTED FOR THE REMOVAL AND SHIPMENT OF THE BODY OF SAID DECEDENT; Name of escort or consignee United Air Lines; Point of shipment Rochester, N.Y.;
Point of destination Chicago, Ill.

(Signature of Local Registrar) Betty K. Smith

Local Registrar of the Village (City, Village or Town) of Geneseo, County of Livingston, State of New York.

ROUTING

The Railroad or other Transportation Agent must enter hereon a description of the tickets held by the passenger in charge of the corpse, the exact route, and VIA WHAT JUNCTIONAL POINT it reads.

SPECIAL INSTRUCTIONS—A burial case containing a corpse must not be received for transportation unless the person in charge presents a Transit Permit issued by the Local Registrar of Vital Statistics, and a Funeral Director's or an Undertaker's Certificate stating that the body has been prepared for shipment in accordance with the Laws of the State, nor should it be received even then if any fluids or offensive odors are escaping from the case.

Date 9-24 19 73

From Geneseo N.Y. State of New York to Argonne State of Ill.
No. of Escort's Ticket ..... Form No. of Escort's Ticket .....
No. of Corpse Ticket ..... Form No. of Corpse Ticket .....
Via Rochester N.Y. To Chicago Ill.
Via ..... To .....
Via ..... To .....
Name of Passenger in charge ..... Place of Residence .....
Signed ..... Shipping Agent

Always write legibly, with durable black ink.

PRIVACY ACT MATERIAL REMOVED

8001121

PART 13

TRANSPORTATION OF DEAD BODIES

(Statutory authority: Public Health Law, § 225)

Section 13.1 Transportation of dead bodies by common carriers. The transportation of dead human bodies by common carriers shall be conducted in such manner as not to be a menace to health and shall conform to the following requirements:

(a) **[Transit permit and label required.]** A transit permit and transit label issued by the local registrar of vital statistics must accompany each dead body transported by a common carrier.

(1) The transit permit shall state the date of issuance, the name, sex, race and age of the deceased, and the cause and date of death. The transit permit shall also state the date and route of shipment, the point of shipment and destination, the method of preparation of the body, and shall bear the signature of the undertaker, and the signature and official title of the officer issuing the permit.

(2) The transit label shall state the date of issuance, the name of the deceased, the place and date of death, the name of the escort or consignee, the point of shipment and destination, and shall bear the signature and official title of the officer who issued the transit permit. The transit label shall be attached to the outer box or case.

(b) **Transportation of bodies dead of other than enumerated diseases.** The transportation by common carriers of bodies dead of any diseases other than those mentioned in subdivision (c) below shall be permitted only under the following conditions:

(1) The body shall be encased in a sealed metal transfer shipping case or in a coffin or casket. The coffin or casket shall be encased in a strong outer box made of good sound lumber, not less than seven eighths of an inch thick, except that, when shipment is made by air, the coffin or casket may be encased in a sturdy plywood outer box designed specifically for the purpose. All box joints shall be securely put together and the box tightly closed. Either the coffin or casket, or the outer box or case, shall be watertight. Every outer wooden box holding any dead body offered for transportation by common carrier shall bear at least four handles and when over five feet six inches in length shall bear six handles.

(2) When the destination cannot be reached within 60 hours after death, all body orifices shall be closed with absorbent cotton and the body placed at once in a coffin or casket which shall be immediately closed and the coffin or casket shall be prepared as indicated in paragraph (1) of this subdivision.

(c) The transportation by common carrier of bodies dead of smallpox, plague, Asiatic cholera, typhus fever, diphtheria (membranous croup, diphtheritic sore throat), scarlet fever (scarlet rash, scarlatina), shall be permitted only under the following conditions:

(1) All body orifices shall be closed with absorbent cotton, the body shall be enveloped in a sheet saturated with an effective disinfecting fluid and shall be placed at once in a coffin which shall be immediately and permanently closed. The coffin or casket shall be prepared as indicated in paragraph (1) of subdivision (b) of this section.

(d) **[Restrictions on disinterment.]** (1) No dead bodies shall be disinterred for transportation by common carrier, or for removal to another cemetery in the same registration district, or in another district, but not requiring shipment by common carrier, without the previous consent of authorities having jurisdiction at the place of disinterment.

(2) The undertaker shall make a request to disinter the body on a form provided for the purpose. This form shall provide for a statement of principal facts concerning the decedent, whether body is to be transported by common carrier or otherwise and final disposition of same. Upon receipt of such request the local registrar shall issue a transit permit and transit label as required by subdivision (a) and the provisions of paragraph (1) of subdivision (b) shall apply.

(e) **[Exceptions.]** Notwithstanding any other provisions of this section, dead human bodies, prepared for shipment by the War Department of the United States in accordance with the repatriation program, may be accepted by common carriers for shipment to places designated by that department. Under the authority of a basic health permit issued by the War Department the registrar of vital statistics of the district to which such a dead human body has been transported shall issue a permit for the burial, removal or other disposition of the dead body. The permit shall be made out as completely as possible on the basis of the information available.

FUUR QUALITY ORIGINAL

PRIVACY ACT MATERIAL REMOVED

New York State Department of Health
DIVISION OF VITAL STATISTICS

CERTIFICATE OF DEATH

Dist. No. 6027 — To be inserted by registrar

Registered No. 26659

1 PLACE OF DEATH: STATE OF NEW YORK
County Wyoming
Town
Village Warsaw N.Y.
City Ward
Name of Hospital or Institution Wyoming County Community Hospital
(If a hospital or institution give its NAME instead of street and number)
Length of stay: In hospital or institution 22 days; In town, village or city 22 days

2 USUAL RESIDENCE OF DECEASED (If an institution, give place of residence prior to admission)
State New York
County Genesee
Town Genesee
Village or City Batavia
No.
Is residence within limits of city of 5,000 or more? If so, ward?
2a Citizen of foreign country? If so, which?
If yes, name country

3 Full Name (First)

4 (a) Social Security No. None
4 (b) If Veteran, Name War —

5 Sex: Female
6 COLOR OR RACE: White
7 Single, Married, Widowed, or Divorced (Write the word): Single

8 IF MARRIED, WIDOWED OR DIVORCED, Name of Husband (or) Wife — Age if alive — years

9 DATE OF BIRTH (month, day, year)

10 AGE: Years 20 | Months 2 | Days 20 | If LESS than 1 day — hrs. or — min.

11 Usual occupation —

12 Industry or business —

13 BIRTHPLACE (City or Town) (State or Country): Rochester New York

FATHER
14 NAME
15 BIRTHPLACE (City or Town) (State or Country): Providence Rhode Island

MOTHER
16 MAIDEN NAME
17 BIRTHPLACE (City or Town) (State or Country): Ashton Rhode Island

18 THE ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE
Informant's own signature
Address Pendleton N.Y.

19 PLACE OF BURIAL, CREMATION OR REMOVAL — DATE OF BURIAL: Mar 2 1927

20 UNDERTAKER OR PERSON IN CHARGE (Signature)
ADDRESS Silversco N.Y.
UNDERTAKER'S License No. 848

21 Date received 4/3 1927
Signature of Registrar or Subregistrar

MEDICAL CERTIFICATION

22 DATE OF DEATH (Month, Day and Year) April 2 1927

23 I HEREBY CERTIFY, That I attended deceased from April 7 1926 to April 2 1927
I last saw her alive on April 1 1927
To the best of my knowledge, death occurred on the date stated above, at 8 P.M.
Immediate cause of death
Cushing Syndrome
Due to Adenoma Pituitary
Due to
Other conditions (Include pregnancy within 3 months of death)
Major findings of operation Rad. Sub. Sec.
Of autopsy
What laboratory test was made? X Ray Basal

24 If death was due to external causes, fill in the following:
(a) Accident, suicide, or homicide (specify)
(b) Date of occurrence
(c) Where did injury occur? (City or town) (County)
(d) Did injury occur in or about home, on farm, in industry, in public place? (Specify type of place) While at work?
(e) Means of injury

25 Signature Clifford Lattimore M.D.
Address Warsaw N.Y. Date 4/30/27

Burial or Transit Permit issued by Grace Mackenzie Sub-registrar Date of issue 4/5/27

POOR QUALITY ORIGINAL

8001123

PRIVACY ACT MATERIAL REMOVED

This is to certify that the within copy of certificate of death has been compared by me with the original thereof on file in the Bureau of Vital Records, New York State Department of Health, Albany, N. Y. and that it is a correct photocopy of the original record and of the whole thereof.

Joseph H. Sterzinger, Director
Bureau of Vital Records

N. B. Do not accept this copy unless the raised seal of the New York State Department of Health is affixed thereon.

Albany, New York

FEB 1 1973

8001124

PRIVACY ACT MATERIAL REMOVED

CENTER FOR HUMAN RADIOBIOLOGY
Argonne National Laboratory

Authorization to Any Physician, Dentist
Clinic or Hospital

I, Mrs hereby request that you give the authorized representative of the Center for Human Radiobiology, or its scientific successors, the information desired regarding the past medical history of A copy of this authorization shall be as valid as the original.

Date March 7 - 1976 Signature Mrs.

PRIVACY ACT MATERIAL REMOVED

8001125

PRIVACY ACT MATERIAL REMOVED

CENTER FOR HUMAN RADIOBIOLOGY
Argonne National Laboratory

Authorization to Any Physician, Dentist

Clinic or Hospital

I, _____, hereby request that you give the authorized representative of the Center for Human Radiobiology, or its scientific successors, the information desired regarding the past medical history of A copy of this authorization shall be as valid as the original.

Date 3-7-76 Signature _____ _____

PRIVACY ACT MATERIAL REMOVED

8001126

PRIVACY ACT MATERIAL REMOVED

40

To Whom It May Concern:

MAY 10 1973

I, _____ (name) of Rockaway, N.J. (city and state), being the next-of-kin of _____ (name), do hereby authorize the disinterment and examination of the remains of my late Sister (relationship), _____ (name) under the direction of the Center for Human Radiobiology, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, or its scientific successors, such disinterment and examination to be for the purposes of advancing medical and scientific research and education. I authorize the transportation of said remains to the Center for Human Radiobiology for the purpose of carrying out such examination and to retain such bone specimens as the scientific personnel may deem fit. The grave site will be restored to its original condition. All the above procedures will be accomplished at no cost to me.

Executed as a sealed instrument on May 5 (date), 1973.

_____ _____ _____ _____

Witness Signature

PRIVACY ACT MATERIAL REMOVED

RECEIVED
CHR RECORDS
MAY 22 1973

8001127

PRIVACY ACT MATERIAL REMOVED

To Whom It May Concern:

MAY 10 1973

I, _____ (name) of Rochester, N.Y. (city and state),
being the next-of-kin of _____ (name), do
hereby authorize the disinterment and examination of the remains
of my late Sister (relationship), _____ (name) under
the direction of the Center for Human Radiobiology, Argonne National
Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, or
its scientific successors, such disinterment and examination to be
for the purposes of advancing medical and scientific research and
education. I authorize the transportation of said remains to the
Center for Human Radiobiology for the purpose of carrying out such
examination and to retain such bone specimens as the scientific
personnel may deem fit. The grave site will be restored to its
original condition. All the above procedures will be accomplished
at no cost to me.

Executed as a sealed instrument on May 5 (date), 1973.

_____ _____ _____ _____ _____ _____

Witness Signature

Rochester, New York
Tel:

8001128

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

40 –

To Whom It May Concern:

I, _____ (name) of Tucson, Arizona (city and state)

being the next-of-kin of _____ (name) _____, do hereby authorize the disinterment and examination of the remains of my late sister (relationship), _____ (name) _____ under the direction of the Center for Human Radiobiology, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, or its scientific successors, such disinterment and examination to be for the purposes of advancing medical and scientific research and education. I authorize the transportation of said remains to the Center for Human Radiobiology for the purpose of carrying out such examination and to retain such bone specimens as the scientific personnel may deem fit. The grave site will be restored to its original condition. All the above procedures will be accomplished at no cost to me.

Executed as a sealed instrument on July 5 (date), 1973

_____ Witness

_____ Signature

Tucson, Arizona
Tel:

8001129

PRIVACY ACT MATERIAL REMOVED

SEP

8001130

ARGONNE NATIONAL LABORATORY
U of C-AUA-USERDA

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

PRIVACY ACT MATERIAL REMOVED

March 15, 1976

Ms. Geraldine D. Smith
Medical Records
Wyoming County Community Hospital
Warsaw, New York 14569

Dear Ms. Smith:

The attached authorizations are from the two next-of-kin of , of whom we corresponded (cf. my request of 17 February and your reply of 27 February). Mr. , brother, lives at and Mrs. , Tucson, Arizona. These persons have previously given releases for other information on their sister.

I trust this is adequate. A copy of your note is attached.

Faithfully,

Austin M. Brues, M.D.
Medical Director

AMB:jmt
Attachment

bcc: CHR-RR✓
G. J. Hamilton

PRIVACY ACT MATERIAL REMOVED

8001131

CENTER FOR HUMAN RADIOBIOLOGY
9700 S. Cass Avenue, Argonne, Illinois 60439 Tel. 312-739-7711 Ext. 4625

Wyoming County Community Hospital
Warsaw, New York 14569
TELEPHONE 786-2233
AREA CODE 716

PRIVACY ACT MATERIAL REMOVED

February 27, 1976

A. M. Brues, M. D.
Medical Director
Center for Human Radiobiology
9700 South Cass Avenue
Argonne, Illinois 60439

Dear Sir:

In answer to your request of February 17, 1976, I am sorry, I am unable to send you a copy of the autopsy report on who expired here April 29, 1947.

It is a policy of our hospital that no information may be submitted unless accompanied by an authorization, in this case, from the family.

Sincerely,

Geraldine D. Smith

Geraldine D. Smith, ART
Medical Records

RECEIVED
JUL 22 '76
CHR RECORDS

PRIVACY ACT MATERIAL REMOVED

8001132

PRIVACY ACT MATERIAL REMOVED

MICROFILMED
MAR 03 1976
CHR RECORDS

ARGONNE NATIONAL LABORATORY
U of C-AUA-USERDA

CENTER FOR HUMAN RADIOBIOLOGY

Argonne National Laboratory • Massachusetts Institute of Technology • New Jersey Field Station • Southwest Field Station

February 17, 1976

Wyoming County Community Hospital
400 North Main Street
Warsaw, New York 14569

Attention: Records Room

Gentlemen:

We are writing to request a copy of the medical record on , who died at your hospital on April 29, 1947. It is our understanding that an autopsy was performed.

This information will aid the Center for Human Radiobiology in its long-range study of persons exposed to internally deposited radioactive materials. Our work is supported by the Division of Biomedical and Environmental Research of the United States Energy Research and Development Administration. All medical records will be used for scientific purposes only, and the identities of the patients will be held in strictest confidence.

Thank you for your cooperation.

Sincerely yours,

Austin M. Brues, M.D.
Medical Director

AMB:jmt

CENTER FOR HUMAN RADIOBIOLOGY
9700 S. Cass Avenue, Argonne, Illinois 60439 Tel. 312-739-7711 Ext. 4625

8001133

RER-45 (4-75)

PRIVACY ACT MATERIAL REMOVED

COPY

40 · 010

May 8, 1947

PRIVACY ACT MATERIAL REMOVED

Re:
Unit No. 180331

SNOP CODED

Medical Director
Wyoming County Community Hospital
Warsaw, New York

Dear sir:

At the request of J. H. Trimmer, M.D., resident, medical service, we are giving you a summary of our findings in the case of who was admitted to this hospital March 13, 1947 and discharged March 29, 1947 unimproved.

Her final diagnosis was Cushing's syndrome; hypertension; hypertensive retinitis; hypertensive heart disease; and epistaxis. - She was discharged on Digitoxin .0001 mg. a day, low salt and calorie diet, limited activity. It was felt she was unable to work.

The patient was first seen in this hospital July 21, 1941, and discharged November 22, 1942 at which time the diagnosis of Cushing's syndrome was made. Because of the classical nature of her symptoms and newer methods of treatment, she was placed on the metabolism ward for study. She received enormous amount of Testosterone Propionate as well as other androgens. In addition to Cushing's syndrome she developed bilateral glaucoma and pyelitis during her stay. An Elliot trethine operation was done to relieve her visual symptoms.

She was readmitted August 1943,and discharged September 4, 1943 because of paroxysmal auricular fibrillation which responded to digitalization. She returned May 17, 1944 and was discharged July 7, 1944. An exploration of her right and left adrenal glands and pelvic organs was carried out. These glands were grossly not enlarged and sections showed hyperplasia of both adrenal cortices.

was admitted April 24, 1945, and discharged August 15, 1945. She had had an extreme gain in weight and was put on a rice and rasin diet to which she responded rather well by losing approximately 17 kilograms. Her next admission was October 29, 1945, and she was discharged December 20, 1945. At that time she complained of backache, headache and nosebleeds. Her blood pressure had increased considerably in four years and her iron reserves had apparently been depleted as a result of the numerous phlebotomies for the polycythemia and hypertension. Treatment was symptomatic with added iron and Testosterone Propionate. It was also noted that she had a mild urinary infection. She was again admitted February 11, 1946 and discharged February 17, 1946. She received Penicillin therapy for her urinary infection with only minimal improvement.

Very truly yours,

D. C. MAC LEAN, M.D.

RECEIVED
MAR 22'76
CHR RECORDS

Director
Strong Memorial Hospital
260 Crittenden Boulevard
Rochester 7, New York

8001134

PRIVACY ACT MATERIAL REMOVED

WYOMING COUNTY COMMUNITY HOSPITAL Case No. 26269

PRIVACY ACT MATERIAL REMOVED

PERSONAL HISTORY

Room No.

Date: April 7, 1947

Dr. Klostermyer/Burgeson

Ref. Dr. Bone

NAME ADDRESS

Final Diagnosis

Cushing's syndrome
(pituitary basophilism)
(adrenal cortical hyperfunction)

SNOP (90TD)

MAR [illegible] 1977

ADMITTED: April 7, 1947 DISCHARGED: April 29, 1947 EXPIRED

AGE 20 SEX F S.M.W.D. S Race W OCCUPATION

Chief Complaint: Weakness, nausea and vomiting.

Present Illness:

The patient states that she was apparently normal in weight and development until the age of 13, at which time she started to notice sudden severe increase in weight with the appearance of "marked" over the abdomen and peculiar disposition of an excessive amount of fat in the abdomen around the pelvic girdle. She states that her menses started at the age of 13, and that during that year, there were six scanty periods. Since then, she has not menstruated. Conditions persisted along with the weakness, easy fatiguability and back pains. The last few years, she has noted severe headaches and her eyesight has diminished, requiring a bilateral iridectomy for, apparently, glaucoma. She states that she never had any pain in her eyes; her eyes blurred and around lights there appeared halos. In the last few months, she has noticed black and blue spots over the body. She denies that the adipose tissue over the body was ever painful. There is polydypsia, and polyuria which is present now. She states that she has had occasional tarry stool, one today and a few times previously. At the onset of her illness, she noticed that her hair becoming more coarse, development of hair on the face appeared. She has been studied repeatedly at Strong Memorial Hospital, at which time bilateral surgical exploration of the renal areas was performed and results have not been obtained to date. She states that she has never had any treatment with x-rays.

RECEIVED
MAR 22'76
CHR RECORDS

Approved and Signed by: _____

R.R.-35

8001135

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

Wyoming County Community Hospital

26269

PHYSICAL EXAMINATION

Provisional Diagnosis

General Condition:

Patient is an extremely obese girl with coarse hair, flushed and plethoric appearance to the face. Distribution of fatty tissue is confined to the thorax and abdomen, and pelvic area. There is a large hottentot apron effect of the adipose tissue. Over the thorax and abdomen, there are numerous large brownish-red stria.

Head: Suggestion of frontal prominence.
Face is covered with a marked growth of hair.
Eyes - mucous membranes are of normal color: sclera clear: bilateral iridectomies are present; grossly, the vascular fields on the right seem to be contracted in both upper quadrants; on the left, superior temporal field is contracted; eye grounds appear essentially normal on the right except there is some blurring of the disc in the lesser field; left side reveals a very indistinct optic disc with apparent degenerative changes in the tissue surroudning it; there are numerous small dark pigmented areas in the periphery of the retina; this is interpreted as well advanced optic and retinal atrophy.
Ears, nose - negative.
Throat - slight injection; tongue is of normal size; does not seem dehydrated; it is moist; the epiglottis is easily seen and there is a small area of hemorrhage on the anterior surface.

Neck: Essentially negative.

Chest: Lack of breast tissue; there is an ecchymotic spot in the left upper anterior chest wall; it is not tender; the adipose tissue around the mammary region is slightly tender to palpation.

Heart & Lungs: Seem to be negative; there seems to be an accentuation in the heart tones to the left of the sternum at the base of the heart. Blood pressure 210/120.

Examined by: _____

8001136

PRIVACY ACT MATERIAL REMOVED

R.R.-34

PRIVACY ACT MATERIAL REMOVED

Wyoming County Community Hospital

2626(

PHYSICAL EXAMINATION

Provisional Diagnosis

General Condition: continued

Abdomen: Aside from the extreme adiposity and ecchymotic area to the left below the umbilicus, shows no abnormalities; no organs can be palpated; there is a male distribution of several hair, femoral pulsations are palpated. Upon sitting up in bed, there is a slight kyphosis noted to the spine, although there is no tenderness over the vertebra. Above the creasts of the ilia, there are bilateral, very indistinct scars of the previous operation She complains of tenderness upon pressure over the sacral regions.

Extremities: Reflexes are present. Skin of the extremities is generally mottled grey, partially cyanotic mottling; there are numerous ecchymotic and pigmented areas over both extremities, pigmented areas generally being confined to site or old injury.

Pelvic & Rectal: Not performed.

Examined by: _____

8001137

R.R.-34

PRIVACY ACT MATERIAL REMOVED

COPY 4 -010

PRIVACY ACT MATERIAL REMOVED

June 16, 1947

RECEIVED
MAR 22 '76
CHR RECORDS

Dr. Harold A. Friedman
Strong Memorial Hospital
360 Crittenden Boulevard
Rochester 7, New York

Dear Dr. Friedman:

We are in receipt of your recent request for further information concerning

was admitted to the hospital on April 7, 1947 at which time her primary complaints were persistent vomiting of several days duration and weakness. With the exception of these symptoms there had been no significant change in her symptomatology since she was last seen at the Strong Memorial Hospital.

Physical examination revealed an extremely obese girl with coarse hair and flushed, phlethoric appearance. There was some blurring of the right optic disc and considerable blurring of the margins of the left optic disc. The epiglottis was easily seen and a small area of hemorrhage was seen on the anterior surface. The chest was essentially negative. The heart was enlarged to the left and the blood pressure was 210/120. The abodmen appeared negative other than extreme adiposity. Considerable kyphosis of the dorsal spine was noted. There were numerous ecchymotic areas over both lower extremities.

Admission urinalysis was as follows: Reaction acid, specific gravity 1.010, albumin 4+, white blood cells 2+ and red blood cells 4+. Admission blood count was as follows: Hemoglobin 75%, RBC 3,640,000, and WBC 18,050 with 11 stabs, 78 segmented, and 11 lymphocytes. Sedimentation rate was 37. NPN was 59. A blood glucose 100. Blood chlorides 450, serum calcium was 8.5 and blood phosphorus 4.0 mg%.

On only symptomatic treatment, the vomiting ceased almost immediately.

After several days in the hospital, however, the patient edeveloped marked listlessness and weakness. There was frequent urination of small amounts and considerable dyspnea developed. There symptoms persisted until the patient expired on April 29, 1947.

On April 16th, a glucose tolerance test was made, the results of which were as follows: Fasting specimen 95 mg%., ½ hour after glucose 145 mg%., 1 hour after glucose 165 mg%., 2 hours after glucose 170 mg%., 3 hours after glucose 150 mg%.

- over -

8001138

PRIVACY ACT MATERIAL REMOVED

C O P Y

Repeated urinalysis showed persistent large quantities of blood and albumin. By April 18th the NPN had increased to 117 mg% and on April 23rd the NPN was 168 and creatinine 6.3.

In view of these findings it was decided that the patient's ultimate death was due to renal failure and uremia.

During the time the patient was in the hospital, a chest x-ray was made which showed moderate cardiac hypertrophy, transverse apical diameter being 16 cm. with an intrathoracic of 27.5 cm. Radiographs of the skull showed expansion of the sellatursica. AP diameter was 14 cm. and sella appeared deeper than average. Posterior clinoid showed moderate erosion.

I trust this information will meet the requirements. If there is any additional data I can supply, I will be glad to do so on request.

Very truly, yours,

P. A. BURGESON, M.D.

8001139

POOR QUALITY ORIGINAL

47 - 010

LABORATORY COMMISSION
S. Le Ble ... M.D.
... Gurney, M.D.
... W. ...
... Whitney
LeRoy F. Clark
George W. Peck
Harold E. Harrower

THE GENESEE LABORATORY
75 Main Street
BATAVIA, NEW YORK

PRIVACY ACT MATERIAL REMOVED

DIRECTOR
J. Thannhauser, M.D.

SNOP CODED

Lab. No. 3837
Pa-30-47
4-29-47

MAR 1977

Patient:

Wyoming County Community Hospital

Physician: L. L. Klostermyer, M.D.

RECEIVED
MAR 22 '76
CHR RECORDS

AUTOPSY

The body is that of a young, white woman, of about 18 to 20 years of age. Rigor mortis is present on jaws and extremities, and livores are seen on the demending parts of the body. These features are particularly striking on external examination. The body is enormously obese, but there is a marked disproportion in the distribution of the obesity, the trunk being very obese in contrast to upper and lower extremities which have about the ordinary appearance. The breasts show no female characteristics, the chest appearing like that of an obese male individual. The external genitalia and pubes are of female appearance. Many broad striae are seen on the trunk, over the abdomen as well as on the lateral aspects of the chest. They run in various directions in contra-distinction to striae seen after pregnancy. They are also much broader having widths of 1 to 2 cm. They are welt-like bulging, raised for about 2 to 3 mm., the skin is obviously very thin in these areas as if ready to rupture. In some areas, particularly on the lateral sides of chest and abdomen they are bluish discolored. The neck is short and thick. The entire face is round appearing to be over-stuffed.

The body is opened by the usual incisions. This reveals enormously increased layers of subcutaneous adipose tissue which is a markedly lighter yellow in color than usually. The width of the panniculus adiposus over the chest is about 3 to 3.5 cm., and 7 to 8 over the abdominal cavity. The skin (epidermis and cutis) appears thin everywhere, not only in the areas of the striae. Upon opening of the abdominal cavity, the serosa shows no particular pathological changes. It is smooth and glistening. The abdominal cavity contains no free fluid or foreign matter. No adhesions are seen either. The uterus and adnexa are very small, definitely infantile. The ovaries are not larger than 2:0.4:0.3 cm. and present a definitely infantile appearance. The Fallopian tubes are string-like about 2 mm. in diameter. The liver protrudes for about 1 cm. over the costal margin. The spleen does not reach the costal margin. The diaphragm stands at the level of the fifth rib on the right side, and at that of the sixth interspace on the left. Upon opening of the

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PRIVACY ACT MATERIAL REMOVED

POOR QUALITY ORIGINAL

[illegible] slight, the lungs scarcely retract. The anterior mediastinum is occupied by adipose tissue that has replaced the thymus gland. Both pleural cavities are free and present a smooth and glistening serosa, but both lungs appear peculiarly rather evenly livid and they have almost flesh-like consistency. The pericardium is large. The inner surface is smooth and glistening. It contains about 50 cc. of clear amber fluid. The heart is definitely enlarged, particularly in the segment of the left ventricle. Both ventricles appear to be dilated. The epicardial surface is smooth and glistening. The conus arteriosus pulmonalis contains clotted blood and chicken fat. On examination of the heart, no changes were found on any of the valves. The beginning segment of the aorta is free of mesaortitis syphilitica and arteriosclerotic changes. The coronaries are of adequate size showing no stenosing changes. The musculature of the left ventricle is definitely increased in volume, and incisions parallel to the endocardium, showd no evidence of necrosis or scars. The weight of the heart is 420 grams, the increase in weight being due to increase in the musculature of the left ventricle. Both lungs present the same appearance both weighing 480 grams each. On incision, they appear to be somewhat infiltrated, the infiltration being rather evenly spread. The cut surface fails to show the fine granulation usually presented by a pneumonia with fibrinous exudate. It appears to be rather smooth with many lobules of about 0.5 square cm., slightly bulging over the surface, leaving in between them very small, grey stripes of about less than 0.5 mm. diameter. This network of stripes appears to be the interstitial tissue. The spleen is small weighing 90 grams. The capsule is wrinkled. The consistency is moderately firm. On incision, a grey-red surface is seen. The colon and small intestine up to the duodenum are removed together. On opening, no particular pathological changes are seen, in particular, no swelling or ulcerations of the mucosa of the descending colon, the latter appearing to be pale and showing the ordinary picture. The bile duct system shows no particular pathological changes. The papilla of Vater permits bile to escape on pressure on the common duct and the gallbladder. The latter has a length of about 9 cm. and contains dark green bile. The wall appears to be somewhat thickened, eventually due to subserosal adipose tissue. The liver is comparatively small, weighing 1280 grams. It has a peculiar deep yellow-brown color. The pancreas is of adequate size. On examination of cross incisions, no dilatation of the duct nor any other pathological changes are seen. No particular changes are seen on the mucosa and the wall of the duodenum and stomach. Following removal of the intestines the area of the kidney and adrenal almost form an even plane with the anterior surface of the vertebral column evenly covered by masses of fat which is somewhat lighter colored than ordinarily seen in this age group. The adrenals are so much covered by adipose tissue that they do not protrude at all. They are carefully dissected free and then lengthwise incised. This reveals a definite hypertrophy which extends evenly throughout the organ, cortex and medulla participating. The color of the adrenals is light sulfur-

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POOR QUALITY ORIGINAL

yellow in the cortical area. No circumscribed tumor or tumor-like structures are seen. Both adrenals with surrounding adipose tissue are, in toto placed in formalin for fixation. The kidneys are surrounded by enormous fat capsules and a fibrous capsule which is easily removed. Their size is definitely reduced. Each weighs 90 grams. The surface presents a peculiarly mottled appearance, light red-brown foci alternate with more grey-brown areas each having diameters of from 2 to 4 mm. On incisions, the cut surface presents a similar appearance. The cortex is not more than about 4 to 5 mm. in width. The fine architecture ordinarily seen appears to be blurred. The renal pelvis and the ureter show a pale mucosa and are free of any marked pathological changes on either side. The urinary bladder shows no particular changes. The ovaries and uterus show the atrophic changes described above. They are removed together. The uterus is opened lengthwise. It presents a mucosa of a scarcely recognizable width. The organs are placed, for fixation, in formalin. The thyroid gland is dissected free. This also reveals a considerable panniculus adiposus on the neck. The thyroid is found to be markedly reduced in size. It is carefully dissected free and removed together with two parathyroid glands. The latter measuring 4:3:1 to 2 mm. in size. The thyroid is placed in formalin. Its weight is found to be 10.5 grams.

The skull is opened in the usual way for examination of the brain. This also reveals an unusual content of adipose tissue in the scalp which has a width of about 1 cm. No other changes are seen on the scalp or at the bony surface of the skull. The cap of the skull is removed by handsaw. This reveals no unusual hardness or softness of the bony structure of the skull. The width of the skull shows no particular changes, either. Its cancellous bone and internal and external table present the usual architecture. The dura is moderately tense. The sinus longitudinalis shows no particular changes, containing some clotted blood. The inside of the dura is smooth and glistening. The spinal fluid appears of the usual volume. The surface of the brain shows no particular swelling of the gyri nor any marked atrophy. No particular changes are seen on the meninges over the hemispheres nor at the base. The optic nerves show no marked gross changes. The infundibulum is of the usual size. No changes are seen on the basal arteries. The brain weighs 1060 grams. On inspection of the base of the skull, it is apparent that the back of the sella turcica is somewhat bulging-out under the dura so as if the bone had been destroyed. This proves to be true. The back of the sella can easily be cut away with a pair of scissors. The posterior portion of the pituitary gland has been protruding toward and pressing on the back of the sella. The pituitary gland is removed and a sagittal incision is made. This reveals a grey, soft, tumor-like mass in the posterior portion having a diameter of about 6 to 7 mm. and showing some degree of malacia. It is placed in formalin and weighs exactly 1 gram. The brain is dissected freshly. No particular pathological changes are seen either in size and content of the ventricles, nor in the brain substance proper. The

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POOR QUALITY ORIGINAL

adrenal gland appears of the usual adequate size. The entire brain is placed in formalin after preliminary dissection. The sinuses at the base of the brain fail to show any particular pathological changes. A rib is removed and, on incision shows that some of the usually red appearing marrow has been replaced by yellow adipose tissue.

ANATOMICAL DIAGNOSIS

1. Solid, partially softened tumor of the pituitary gland.
2. Pressure atrophy of the bone in the back of the sella turcica.
3. Infantile ovaries, infantile uterus, atrophy of thymus and thyroid glands.
4. Marked hypertrophy of both adrenals.
5. Bilateral chronic glomerular nephritis with contraction of the kidneys.
6. Excessive obesity involving the trunk, neck and head, sparing the extremities.
7. Multiple bulging striae over thorax and abdomen.
8. Atrophy of the breasts, hirsutism.

MICROSCOPICAL EXAMINATION

PANCREAS: The glandular tissue is interspersed by small lobules of adipose tissue. The Langerhan's islets are quite numerous and rather large. Quite many of the arterioles show hyalinization of their walls, and a moderate intimal thickening is seen in larger arteries.

GALLBLADDER: Sections through the wall of the gallbladder show no particular changes on the mucosa, but there is moderate thickening of the subserosal layers by augmented fibrous scar tissue and a moderate amount of round cell infiltrations, mainly mononuclears. The small arteries also show definite thickening of the wall by hyalinization.

SPLEEN: The lymphatic tissue in the Malpighian bodies is reduced in size, the arterioles show definite thickening of their wall by hyalinization. The pulp is not particularly cellular, rather fibrotic. A moderate fleck-wise thickening is present of the capsule of the spleen by hyalinized fibrous scar tissue which has developed beneath the serosal epithelium.

UTERUS: Sections through the uterus show a thin atrophic mucosa with comparatively few glands in a resting phase and a dense cellular stroma. Here and there, a few glands are cystic and protrude a bit over the inner surface.

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POOR QUALITY ORIGINAL

THYROID: The thyroid consists of lobules of alveoli with a thin, almost endothelium-like epithelial lining, the lumina being filled by well and evenly staining colloid. Here and there, lobules of adipose tissue have grown into the gland along the septa.

KIDNEY: Sections through the kidney show a picture that has a great similarity to a subacute to chronic glomerular nephritis. Many glomeruli are more or less completely destroyed; there are innumerable small scars in which the entire nephron has been destroyed. In between those miliary scars there is a dilatation of convoluted tubules which are lined by an epithelium that is almost flat, like capillary endothelium. These tubules frequently contain homogeneous casts. The picture they present resembles somewhat that of an emphysematous lung. All transitional stages from apparently normal and over-sized glomeruli to complete hyalinization are observed. Most frequently some of the capillary loops cling together so that the tuft is divided in 2 to 4 coarse partitions. The glomeruli are cellular and most of their capillary lumens are obstructed by hyalinization. Such hyalinization is not infrequently seen at the vasa afferentia, also. Here and there, half-moon like semi-circular and eventually partly hyalinized epithelial proliferations are also seen within the glomeruli. Here and there, a calcified cast is present. This picture, as a whole, resembles that of a common subacute to subchronic glomerular nephritis. However, the arteries and particularly the smaller branches present an additional feature. The wall of the middle-sized arteries and arterioles is definitely thickened, not so much due to intimal proliferations though this is not completely lacking, but particularly due to a marked hypertrophy of the musculature.

LUNG: Sections through the lung show a bronchopneumonic process with purulent exudate. Very small foci throughout the lungs are connected by areas of edema and by areas which are partly inflated. The small end bronchi are in the same way affected. The inflammatory process appears to be rather fresh, the exudate contains eventually many leucocytes but little fibrin.

LIVER: Small zones in the periphery of the lobules contain large fat droplets in hepatic cells, the nucleus assuming a semi-circular shape. In the intermediate and central parts of the lobules, no particular pathological changes are seen, on the whole.

HEART: Sections through the heart musculature show no particular changes.

PITUITARY GLAND: Sections show a comparatively large basophile adenoma which is quite cellular and vascular and is well distinguishable from the preserved structure of the pituitary gland. The tumor has not invaded the pituitary gland proper but has pushed the gland aside, particularly forward. The pituitary gland proper contains eosinophile,

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POOR QUALITY ORIGINAL

as well as, basophile cell structures. It even appears as if the eosinophile cells are somewhat more numerous than ordinarily seen. The basophile cell cords within the pituitary gland proper, are well distinguishable from the cell cord of the adenoma even when these cords are bordering on one another. The tumor cells are much larger, about twice the size of the ordinary cell cords and the cell layers within the adenomatous cords are much more numerous than those within the gland proper. The protoplasm of the adenomatous cells is also much larger than that of the basophile cells of the gland. At the borderline between glandular part of the pituitary gland and the nervous part, a few small cysts are present containing homogeneous colloid-like material.

PARATHYROID: Sections show no other changes but the presence of small lobules of adipose tissue within the gland which otherwise is composed of the usual cell cords which, here and there, form lumen-like spaces containing some homogeneous matter that is well staining with eosin.

RIB: Sections through the bony part of the rib show a definite atrophy of the bony trabeculae of the cancellous bone as well as of the compacta, particularly the latter has become very thin. The atrophy is rather diffuse, uniform and there are no signs of regeneration or apposition. Only rarely is there seen evidence of lacunar absorption. The bone marrow is moderately cellular with areas which are almost completely replaced by adipose tissue. No signs of proliferation were seen at the borderline between cartilage and bone.

CHIASMA: Sections through the chiasma show no inflammatory changes but a moderate increase in small glial cells such as might be compatible with a slowly progressing atrophy. In the surrounding of an arterial branch within the optic nerve, a moderate round cell infiltration of the adventitia is seen consisting of mononuclear cells of the size of lymphocytes.

CHOROID PLEXUS: Sections through the choroid plexus show moderate thickening of the villi by slight increase in the fibrous tissue of the stroma and some edema. Here and there, in a circumscribed area, the stroma has become completely hyalinized forming structures which resemble what would be considered the first stages of corpora amylacea.

PINEAL GLAND: Sections through the pineal gland show no particular pathological changes except for irregularly distributed but definite areas of hyalinization and scarring. In some areas foci of calcification are also seen.

FOURTH VENTRICLE: Sections through the floor of the fourth ventricle show small tiny papillomatous protrusions of the floor of the fourth ventricle which consist of tiny nodules glial fibres with comperatively few cells. They are surmounted by a single row of the ordinary ependymal cells. No inflammatory changes are seen.

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POOR QUALITY ORIGINAL

4-26-47

VETERANS

This is a case that had clinically presented the signs of Cushing's syndrome. Anatomically, a basophilic adenoma of the pituitary gland was found that had caused atrophy of the bed of the sella turcica. The adrenals, on both sides, presented a marked hypertrophy of all portions, particularly the cortex, without a tumor being present. The ovaries were completely under-developed. The thymus and thyroid gland were atrophic. An excessive obesity had developed with multiple bulging welt-like striae over thorax and abdomen. The cause of death was a subacute to chronic glomerular nephritis that had caused already marked scarring, but was still in a state of progression. Multiple foci of bronchopneumonia had developed throughout the lungs.

J. Tannenberg, M.D.
Director

8001146

DETAILED RESULTS: 40-010 010 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 010

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1234

TYPE :ST SAMPLE DESCRIPTION: DIAPHRAM -

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		010
2.	METHOD		CRI
3.	DATE REQUESTED		731002
4.	DATE ANALYZED		770913
5.	SAMPLE SIZE	KGW	4.754E-02
6.	ALIQUOT (FRACTION)		0.250
7.	SAMPLE SIZE MEASURED	KGW	4.385E-03
8.	242 PU SPIKE	DPM	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250
10.	242 PU SAMPLE COUNTS	CTS	17192
11.	239 PU SAMPLE COUNTS	CTS	1675
12.	239 PU IN SAMPLE	PCI	2.098
13.	STD. ERROR(CCUNTS+SYS)	PCI	5.481E-02
14.	CONCENTRATION 239PU	PCI/KGW	478.455
15.	STD. ERROR(CNT+SYS)	PCI/KGW	12.500
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	478.455	PCI/KGW
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGW
3.	STD. ERROR(INTERNAL)	12.500	PCI/KGW
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0261	

6. PU (MEAN) IN ALIQ #1 : 2.098 + 0.055 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 478.869 ± 12.511 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

JUL 3'78

8001147

CHR RECORDS

DETAILED RESULTS: 40-010 020 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 020

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1235

TYPE :ST SAMPLE DESCRIPTION: MUSCLE FROM THIGH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		020
2.	METHOD		CRI
3.	DATE REQUESTED		731002
4.	DATE ANALYZED		780202
5.	SAMPLE SIZE	KGW	0.182
6.	ALIQUOT (FRACTION)		0.025
7.	SAMPLE SIZE MEASURED	KGW	4.552E-03
8.	242 PU SPIKE	DPM	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.090
10.	242 PU SAMPLE COUNTS	CTS	39348
11.	239 PU SAMPLE COUNTS	CTS	1520
12.	239 PU IN SAMPLE	PCI	0.972
13.	STD. ERROR(COUNTS+SYS)	PCI	2.545E-02
14.	CONCENTRATION 239PU	PCI/KGW	213.457
15.	STD. ERROR(CNT+SYS)	PCI/KGW	5.590
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	213.457	PCI/KGW
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGW
3.	STD. ERROR(INTERNAL)	5.590	PCI/KGW
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0262	

6. PU (MEAN) IN ALIQ #1 : 0.972 + 0.025 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 213.644 ± 5.595 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

JUL 3 '78

CHR RECORDS

CHR FORM 10/14/77(HFL)

8001148

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 040 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 040

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1237

TYPE :ST SAMPLE DESCRIPTION: NERVES SEVERAL

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		040B	040A
2. METHOD		CRI	CRI
3. DATE REQUESTED		731002	731002
4. DATE ANALYZED		770830	770901
5. SAMPLE SIZE	KGW	1.287E-02	1.287E-02
6. ALIQUOT (FRACTION)		0.250	0.250
7. SAMPLE SIZE MEASURED	KGW	3.218E-03	3.218E-03
8. 242 PU SPIKE	DPM	47.800	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250	0.250
10. 242 PU SAMPLE COUNTS	CTS	68759	108808
11. 239 PU SAMPLE COUNTS	CTS	1156	1888
12. 239 PU IN SAMPLE	PCI	0.362	0.374
13. STD. ERROR(COUNTS+SYS)	PCI	1.090E-02	8.891E-03
14. CONCENTRATION 239PU	PCI/KGW	112.520	116.130
15. STD. ERROR(CNT+SYS)	PCI/KGW	3.389	2.763
16. REFERENCES-CHR DOCS.		R103CC	R103CC

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	114.688	PCI/KGW
2. STD.ERROR(EXTERNAL)	1.768	PCI/KGW
3. STD. ERROR(INTERNAL)	2.142	PCI/KGW
4. VARIANCE RATIO,F	0.681	
5. FRACTIONAL STD. ERROR	0.0187	

6. PU (MEAN) IN ALIQ #1 : 0.369_+ 0.007 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATICN OR RATE: 114.787 ± 2.143 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
JUL 3 '78
CHR RECORDS

CHR FORM 10/14/77(HFL)

8001149

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 050 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 050

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1238

TYPE :ST SAMPLE DESCRIPTION: EYES BOTH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		050B
2.	METHOD		CRI
3.	DATE REQUESTED		731002
4.	DATE ANALYZED		780202
5.	SAMPLE SIZE	KGW	1.260E-02
6.	ALIQUOT (FRACTION)		0.200
7.	SAMPLE SIZE MEASURED	KGW	2.520E-03
8.	242 PU SPIKE	DPM	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.090
10.	242 PU SAMPLE COUNTS	CTS	41103
11.	239 PU SAMPLE COUNTS	CTS	5153
12.	239 PU IN SAMPLE	PCI	3.154
13.	STD. ERROR(COUNTS+SYS)	PCI	4.688E-02
14.	CONCENTRATION 239PU	PCI/KGW	1251.487
15.	STD. ERROR(CNT+SYS)	PCI/KGW	18.604
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	1251.487	PCI/KGW
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGW
3.	STD. ERROR(INTERNAL)	18.604	PCI/KGW
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0149	

6. PU (MEAN) IN ALIQ #1 : 3.154_+ 0.047 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1252.583 ± 18.620 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 EPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
JUL 3 '78
CHR RECORDS

CHR FORM 10/14/77(HFL)

8001150

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 060 PU239 (NEW) 780613

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 060

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1239

TYPE :ST SAMPLE DESCRIPTION: NAILS -

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		060C	060D
2. METHOD		CRI	CRI
3. DATE REQUESTED		731002	731002
4. DATE ANALYZED		780124	780503
5. SAMPLE SIZE	KGW	2.700E-03	2.700E-03
6. ALIQUOT (FRACTION)		0.100	0.100
7. SAMPLE SIZE MEASURED	KGW	2.700E-04	2.700E-04
8. 242 PU SPIKE	DPM	55.840	42.740
9. STD. ERROR OF ITEM 8	DPM	0.090	0.380
10. 242 PU SAMPLE COUNTS	CTS	154143	76127
11. 239 PU SAMPLE COUNTS	CTS	254	130
12. 239 PU IN SAMPLE	PCI	4.145E-02	3.288E-02
13. STD. ERROR(COUNTS+SYS)	PCI	2.604E-03	2.901E-03
14. CONCENTRATION 239PU	PCI/KGW	153.528	121.778
15. STD. ERROR(CNT+SYS)	PCI/KGW	9.644	10.744
16. REFERENCES-CHR DOCS.		R105CC	R105CC

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	139.361	PCI/KGW
2. STD.ERROR(EXTERNAL)	15.782	PCI/KGW
3. STD. ERROR(INTERNAL)	7.177	PCI/KGW
4. VARIANCE RATIO,F	4.836	
5. FRACTIONAL STD. ERROR	0.1132	

6. PU (MEAN) IN ALIQ #1 : 3.763E-02 + 4.261E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.395E+02 ± 1.580E+01 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
JUL 3'78
CHR RECORDS

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001151

ETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 070 PU239 (NEW) 780613

239PU (PLUTONIUM)
****

AME: *CASE NO.: 40-010 *SAMPLE NO.: 070

VENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1240

YPE :ST SAMPLE DESCRIPTION: MISCELLAN TRACHEA + LARYNX

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		070
2. METHOD		CRI
3. DATE REQUESTED		731002
4. DATE ANALYZED		771011
5. SAMPLE SIZE	KGW	4.853E-02
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	KGW	9.706E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
0. 242 PU SAMPLE COUNTS	CTS	40857
1. 239 PU SAMPLE COUNTS	CTS	17148
2. 239 PU IN SAMPLE	PCI	9.038
3. STD. ERROR(COUNTS+SYS)	PCI	9.485E-02
4. CONCENTRATION 239PU	PCI/KGW	931.170
5. STD. ERROR(CNT+SYS)	PCI/KGW	9.773
6. REFERENCES-CHR DOCS.		R103CC

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	931.170	PCI/KGW
2. STD.ERROR(EXTERNAL)	0.000	PCI/KGW
3. STD. ERROR(INTERNAL)	9.773	PCI/KGW
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0105	

6. PU (MEAN) IN ALIQ #1 : 9.038_+ 0.095 PCI

****
RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 931.978 ± 9.781 PCI/KGW

NALYZED BY: CGC CHECKED: 6/15/78 RDD REVIEWED BY/DATE: 6/15/78 RPL

CMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
JUL 3 '78

HR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001152

ETAILED RESULTS: 40-010 080 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

AME: *CASE NO.: 40-010 *SAMPLE NO.: 080

VENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1241

YPE :ST SAMPLE DESCRIPTION: SKIN SKIN FROM THIGH

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUE-NUMBER		080
2. METHOD		CRI
3. DATE REQUESTED		731002
4. DATE ANALYZED		771006
5. SAMPLE SIZE	KGW	3.106E-02
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	KGW	6.212E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
0. 242 PU SAMPLE COUNTS	CTS	47914
1. 239 PU SAMPLE COUNTS	CTS	6029
2. 239 PU IN SAMPLE	PCI	2.710
3. STD. ERROR(COUNTS+SYS)	PCI	3.965E-02
4. CONCENTRATION 239PU	PCI/KGW	436.188
5. STD. ERROR(CNT+SYS)	PCI/KGW	6.382
. REFERENCES-CHR DOCS.		R103CC

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		436.188	PCI/KGW
2. STD.ERROR(EXTERNAL)		0.000	PCI/KGW
3. STD. ERROR(INTERNAL)		6.382	PCI/KGW
4. VARIANCE RATIO,F		0.000	
5. FRACTIONAL STD. ERROR		0.0146	
6. PU (MEAN) IN ALIQ #1 :	2.710 +	0.040	PCI

****
RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 436.566 ± 6.388 PCI/KGW

NALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

OMMENTS AND FEFERENCES:

O (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

HR FORM 10/14/77(HFL)

8001153

PRIVACY ACT MATERIAL REMOVED

JUL 3 '78

CHR RECORDS

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 090 PU239 (NEW) 780613

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 090

EVENT: DEATH *DATE OF EVENT: 470429 *LAB NO.: 1242

TYPE :ST SAMPLE DESCRIPTION: MISCELLAN COSTAL CARTILAGE

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		090
2. METHOD		CRI
3. DATE REQUESTED		731002
4. DATE ANALYZED		771006
5. SAMPLE SIZE	KGW	3.296E-02
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	KGW	6.592E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	55599
11. 239 PU SAMPLE COUNTS	CTS	4722
12. 239 PU IN SAMPLE	PCI	1.829
13. STD. ERROR(CCUNTS+SYS)	PCI	2.933E-02
14. CONCENTRATION 239PU	PCI/KGW	277.437
15. STD. ERROR(CNT+SYS)	PCI/KGW	4.449
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		277.437	PCI/KGW
2. STD.ERROR(EXTERNAL)		0.000	PCI/KGW
3. STD. ERROR(INTERNAL)		4.449	PCI/KGW
4. VARIANCE RATIO,F		0.000	
5. FRACTIONAL STD. ERROR		0.0160	
6. PU (MEAN) IN ALIQ #1 :	1.829 +	0.029	PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 277.677 ± 4.452 PCI/KGW

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 EPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77 (HFL)

JUL 3'78

8001154

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 100 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 100

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1821

TYPE :BO SAMPLE DESCRIPTION: BONE XIPHOID-HALF MANUBRIUM + STERN

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		100
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770706
5. SAMPLE SIZE	GMA	0.107
6. ALIQUOT (FRACTION)		0.120
7. SAMPLE SIZE MEASURED	GMA	1.288E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	6094
11. 239 PU SAMPLE COUNTS	CTS	2957
12. 239 PU IN SAMPLE	PCI	11.046
13. STD. ERROR(COUNTS+SYS)	PCI	0.250
14. CONCENTRATION 239PU	PCI/GMA	857.851
15. STD. ERROR(CNT+SYS)	PCI/GMA	19.441
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	857.851	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	19.441	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0227	

6. PU (MEAN) IN ALIQ #1 : 11.046 + 0.250 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 858.588 ± 19.458 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001155

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 110 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 110

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1834

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF CER VERT BODIES C1-C5

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		110
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770727
5.	SAMPLE SIZE	GMA	0.103
6.	ALIQUOT (FRACTION)		0.080
7.	SAMPLE SIZE MEASURED	GMA	8.256E-03
8.	242 PU SPIKE	DPM	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.410
10.	242 PU SAMPLE COUNTS	CTS	5584
11.	239 PU SAMPLE COUNTS	CTS	1316
12.	239 PU IN SAMPLE	PCI	5.246
13.	STD. ERROR(COUNTS+SYS)	PCI	0.167
14.	CONCENTRATION 239PU	PCI/GMA	635.404
15.	STD. ERROR(CNT+SYS)	PCI/GMA	20.172
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	635.404	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	20.172	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0317	

6. PU (MEAN) IN ALIQ #1 : 5.246 + 0.167 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 635.951 ± 20.189 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001156

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 120 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 120

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1835

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF CER VERT PROC C1-C6

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		120
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770727
5.	SAMPLE SIZE	GMA	0.101
6.	ALIQUOT (FRACTION)		0.080
7.	SAMPLE SIZE MEASURED	GMA	8.080E-03
8.	242 PU SPIKE	DPM	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.410
10.	242 PU SAMPLE COUNTS	CTS	12074
11.	239 PU SAMPLE COUNTS	CTS	1307
12.	239 PU IN SAMPLE	PCI	2.410
13.	STD. ERROR(COUNTS+SYS)	PCI	7.296E-02
14.	CONCENTRATION 239PU	PCI/GMA	298.210
15.	STD. ERROR(CNT+SYS)	PCI/GMA	9.029
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	298.210	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	9.029	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0303	

6. PU (MEAN) IN ALIQ #1 : 2.410 + 0.073 PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 298.467 ± 9.037 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001157

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 130 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 130

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1836

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF TH VERT BOD C1-6 C8-12

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		130
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770727
5.	SAMPLE SIZE	GMA	0.103
6.	ALIQUOT (FRACTION)		0.080
7.	SAMPLE SIZE MEASURED	GMA	8.208E-03
8.	242 PU SPIKE	DPM	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.410
10.	242 PU SAMPLE COUNTS	CTS	64962
11.	239 PU SAMPLE COUNTS	CTS	18690
12.	239 PU IN SAMPLE	PCI	6.404
13.	STD. ERROR(COUNTS+SYS)	PCI	7.516E-02
14.	CONCENTRATION 239PU	PCI/GMA	780.229
15.	STD. ERROR(CNT+SYS)	PCI/GMA	9.157
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	780.229	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	9.157	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0117	

6. PU (MEAN) IN ALIQ #1 : 6.404 + 0.075 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 780.900 ± 9.165 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001158

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 140 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 140

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1837

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF TH VERT PRO C1-6 C8-12

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		140
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770722
5. SAMPLE SIZE	GMA	0.102
6. ALIQUOT (FRACTION)		0.040
7. SAMPLE SIZE MEASURED	GMA	4.072E-03
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	14892
11. 239 PU SAMPLE COUNTS	CTS	1186
12. 239 PU IN SAMPLE	PCI	1.813
13. STD. ERROR(COUNTS+SYS)	PCI	5.504E-02
14. CONCENTRATION 239PU	PCI/GMA	445.213
15. STD. ERROR(CNT+SYS)	PCI/GMA	13.516
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	445.213	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	13.516	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0304		
6. PU (MEAN) IN ALIQ #1 :	1.813_+	0.055	PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 445.596 ± 13.528 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001159

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 150 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 150

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1838

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF LU VERT BODIES 2-5

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		150
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770722
5. SAMPLE SIZE	GMA	0.101
6. ALIQUOT (FRACTION)		0.040
7. SAMPLE SIZE MEASURED	GMA	4.052E-03
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	36668
11. 239 PU SAMPLE COUNTS	CTS	4626
12. 239 PU IN SAMPLE	PCI	2.872
13. STD. ERROR(COUNTS+SYS)	PCI	4.584E-02
14. CONCENTRATION 239PU	PCI/GMA	708.751
15. STD. ERROR(CNT+SYS)	PCI/GMA	11.313
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	708.751	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	11.313	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0160		
6. PU (MEAN) IN ALIQ #1 :	2.872_+	0.046	PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 709.361 ± 11.322 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001160

DETAILED RESULTS: 40-010 160 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 160

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1839

TYPE :BO SAMPLE DESCRIPTION: BONE L HALF LU VERT PRO 2-5

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		160
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770722
5.	SAMPLE SIZE	GMA	0.104
6.	ALIQUOT (FRACTION)		0.040
7.	SAMPLE SIZE MEASURED	GMA	4.152E-03
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	19324
11.	239 PU SAMPLE COUNTS	CTS	1184
12.	239 PU IN SAMPLE	PCI	1.395
13.	STD. ERROR(COUNTS+SYS)	PCI	4.202E-02
14.	CONCENTRATION 239PU	PCI/GMA	335.924
15.	STD. ERROR(CNT+SYS)	PCI/GMA	10.121
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	335.924	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	10.121	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTICNAL STD. ERROR	0.0301	

6. PU (MEAN) IN ALIQ #1 : 1.395_+ 0.042 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 336.213 ± 10.129 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001161

DETAILED RESULTS: 40-010 170 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 170

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1870

TYPE :BO SAMPLE DESCRIPTION: TARSALSLT LEFT TARSALS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		170
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770623
5. SAMPLE SIZE	GMA	0.250
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.250
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	12055
11. 239 PU SAMPLE COUNTS	CTS	6246
12. 239 PU IN SAMPLE	PCI	11.794
13. STD. ERROR(COUNTS+SYS)	PCI	0.188
14. CONCENTRATION 239PU	PCI/GMA	47.121
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.752
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	47.121	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.752	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0159		
6. PU (MEAN) IN ALIQ #1 :	11.794 ±	0.188	PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 47.162 ± 0.752 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001162

DETAILED RESULTS: 40-010 300 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 300

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3233

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 10-12 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		300
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780214
5.	SAMPLE SIZE	KGD	5.737E-04
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	5.737E-04
8.	242 PU SPIKE	DPM	55.620
9.	STD. ERROR OF ITEM 8	DPM	0.280
10.	242 PU SAMPLE COUNTS	CTS	110208
11.	239 PU SAMPLE COUNTS	CTS	284
12.	239 PU IN SAMPLE	PCI	6.457E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	3.850E-03
14.	CONCENTRATION 239PU	PCI/KGD	112.550
15.	STD. ERROR(CNT+SYS)	PCI/KGD	6.711
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	112.550	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	6.711	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0596	

6. PU (MEAN) IN ALIQ #1 : 6.457E-02 + 3.850E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.126E+02 ± 6.717E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RDD 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:ED___

CHR FORM 10/14/77 (HFL)

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001163

DETAILED RESULTS: 40-010 290 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 290

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3232

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 8-10 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		290
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780309
5.	SAMPLE SIZE	KGD	5.859E-04
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	5.859E-04
8.	242 PU SPIKE	DPM	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.090
10.	242 PU SAMPLE COUNTS	CTS	32278
11.	239 PU SAMPLE COUNTS	CTS	108
12.	239 PU IN SAMPLE	PCI	8.417E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	8.114E-03
14.	CONCENTRATION 239PU	PCI/KGD	143.659
15.	STD. ERROR(CNT+SYS)	PCI/KGD	13.849
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	143.659	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	13.849	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0964	

6. PU (MEAN) IN ALIQ #1 : 8.417E-02 + 8.114E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.438E+02 ± 1.386E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 1 1978

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001164

ETAILED RESULTS: 40-01[illegible] 250 PU239 (NEW) 781004

239PU (PLUTONIUM)
****

PRIVACY ACT MATERIAL REMOVED

AME: *CASE NO.: 40-010 *SAMPLE NO.: 250

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3228

YPE :ST SAMPLE DESCRIPTION: HAIR HAIR 1-3 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		250
2. METHOD		CRI
3. DATE REQUESTED		780320
4. DATE ANALYZED		780501
5. SAMPLE SIZE	KGD	6.700E-04
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	6.700E-04
8. 242 PU SPIKE	DPM	42.740
9. STD. ERROR OF ITEM 8	DPM	0.380
10. 242 PU SAMPLE COUNTS	CTS	54859
11. 239 PU SAMPLE COUNTS	CTS	325
12. 239 PU IN SAMPLE	PCI	0.114
13. STD. ERROR(COUNTS+SYS)	PCI	6.427E-03
14. CONCENTRATION 239PU	PCI/KGD	170.251
15. STD. ERROR(CNT+SYS)	PCI/KGD	9.592
16. REFERENCES-CHR DOCS.		R105CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	170.251	PCI/KGD	
2. STD. ERROR(EXTERNAL)	0.000	PCI/KGD	
3. STD. ERROR(INTERNAL)	9.592	PCI/KGD	
4. VARIANCE RATIO, F	0.000		
5. FRACTIONAL STD. ERROR	0.0563		

6. PU (MEAN) IN ALIQ #1 : 0.114 + 0.006 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 170.401 ± 9.600 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:
This sample is suspect. Plutonium in the scalp material (see 40-010.230) could have diffused into or externally contaminated these samples of hair.

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL)

OCT 17 '78

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001165

DETAILED RESULTS: 40-01 270 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 270

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3230

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 4-6 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		270
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780314
5.	SAMPLE SIZE	KGD	8.219E-04
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	8.219E-04
8.	242 PU SPIKE	DPM	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.090
10.	242 PU SAMPLE COUNTS	CTS	98198
11.	239 PU SAMPLE COUNTS	CTS	253
12.	239 PU IN SAMPLE	PCI	6.481E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	4.081E-03
14.	CONCENTRATION 239PU	PCI/KGD	78.857
15.	STD. ERROR(CNT+SYS)	PCI/KGD	4.966
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	78.857	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	4.966	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0630	

6. PU (MEAN) IN ALIQ #1 : 6.481E-02 + 4.081E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 7.893E+01 ± 4.970E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RDD 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 1

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED CHR RECORDS

8001166

DETAILED RESULTS: 40-01. 260 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

ME: *CASE NO.: 40-010 *SAMPLE NO.: 260

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3229

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 2-4 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		260
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780314
5. SAMPLE SIZE	KGD	9.082E-04
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	9.082E-04
8. 242 PU SPIKE	DPM	55.840
9. STD. ERROR OF ITEM 8	DPM	0.090
10. 242 PU SAMPLE COUNTS	CTS	97286
11. 239 PU SAMPLE COUNTS	CTS	336
12. 239 PU IN SAMPLE	PCI	8.688E-02
13. STD. ERROR(COUNTS+SYS)	PCI	4.750E-03
14. CONCENTRATION 239PU	PCI/KGD	95.664
15. STD. ERROR(CNT+SYS)	PCI/KGD	5.230
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	95.664	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	5.230	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0547	

6. PU (MEAN) IN ALIQ #1 : 8.688E-02 + 4.750E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 9.575E+01 ± 5.235E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RPO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:
This sample is suspect. Plutonium in the scalp material (see 40-010.230) could have diffuse into or externally contaminated these samples of hair.

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) PRIVACY ACT MATERIAL REMOVED

8001167

CHR RECORDS

DETAILED RESULTS: 40-01 280 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 280

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3231

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 6-8 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		280
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780228
5.	SAMPLE SIZE	KGD	7.390E-04
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	7.390E-04
8.	242 PU SPIKE	DPM	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.090
10.	242 PU SAMPLE COUNTS	CTS	71156
11.	239 PU SAMPLE COUNTS	CTS	167
12.	239 PU IN SAMPLE	PCI	5.904E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	4.575E-03
14.	CONCENTRATION 239PU	PCI/KGD	79.891
15.	STD. ERROR(CNT+SYS)	PCI/KGD	6.191
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	79.891	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	6.191	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0775	

6. PU (MEAN) IN ALIQ #1 : 5.904E-02 + 4.575E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 7.996E+01 ± 6.196E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 17 '78

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001168

DETAILED RESULTS: 40-010 180 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 180

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1871

TYPE :BO SAMPLE DESCRIPTION: METTARLT LEFT METATARSALS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		180
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770623
5. SAMPLE SIZE	GMA	0.254
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.254
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
0. 242 PU SAMPLE COUNTS	CTS	7136
1. 239 PU SAMPLE COUNTS	CTS	4288
2. 239 PU IN SAMPLE	PCI	13.679
3. STD. ERROR(COUNTS+SYS)	PCI	0.268
4. CONCENTRATION 239PU	PCI/GMA	53.895
5. STD. ERROR(CNT+SYS)	PCI/GMA	1.057
6. REFERENCES-CHR DOCS.		RC96RO

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	53.895	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.057	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0196		

5. PU (MEAN) IN ALIQ #1 : 13.679_+ 0.268 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS PROGRAM

****
RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 53.942 ± 1.058 PCI/GMA

ALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

MMENTS AND REFERENCES:

O (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

R FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001169

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 190 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 190

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1872

TYPE :BO SAMPLE DESCRIPTION: PHLT DIGITS OF LEFT FOOT

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		190
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770623
5.	SAMPLE SIZE	GMA	0.251
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.251
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	6920
11.	239 PU SAMPLE COUNTS	CTS	3354
12.	239 PU IN SAMPLE	PCI	11.033
13.	STD. ERROR(COUNTS+SYS)	PCI	0.235
14.	CONCENTRATION 239PU	PCI/GMA	43.939
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.936
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	43.939	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.936	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0213	

6. PU (MEAN) IN ALIQ #1 : 11.033 + 0.235 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 43.977 ± 0.937 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001170

DETAILED RESULTS: 40-010 210 PU239 (NEW) 771122

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 210

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1888

TYPE :BO SAMPLE DESCRIPTION: METCARLT LEFT METACARPALS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		210
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770629
5. SAMPLE SIZE	GMA	0.108
6. ALIQUOT (FRACTION)		0.160
7. SAMPLE SIZE MEASURED	GMA	1.728E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	13892
11. 239 PU SAMPLE COUNTS	CTS	309
12. 239 PU IN SAMPLE	PCI	0.506
13. STD. ERROR(COUNTS+SYS)	PCI	2.917E-02
14. CONCENTRATION 239PU	PCI/GMA	29.302
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.688
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	29.302	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.688	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0576		

6. PU (MEAN) IN ALIQ #1 : 0.506 + 0.029 PCI

RECEIVED CHR

NOV 29 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 29.327 ± 1.690 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001171

DETAILED RESULTS: 40-010 220 PU239 (NEW) 771122

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 220

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1889

TYPE :BO SAMPLE DESCRIPTION: PHLT DIGITS OF LEFT HAND

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		220
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770701
5.	SAMPLE SIZE	GMA	0.106
6.	ALIQUOT (FRACTION)		0.160
7.	SAMPLE SIZE MEASURED	GMA	1.704E-02
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	18330
11.	239 PU SAMPLE COUNTS	CTS	481
12.	239 PU IN SAMPLE	PCI	0.597
13.	STD. ERROR(COUNTS+SYS)	PCI	2.766E-02
14.	CONCENTRATION 239PU	PCI/GMA	35.056
15.	STD. ERROR(CNT+SYS)	PCI/GMA	1.624
6.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	35.056	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	1.624	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0463	

6. PU (MEAN) IN ALIQ #1 : 0.597 + 0.028 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 35.086 ± 1.625 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001172

ETAILED RESULTS: 40-01 230 PU239 (NEW) 781004

)9PU (PLUTONIUM)
****

PRIVACY ACT MATERIAL REMOVED

ME: *CASE NO.: 40-010 *SAMPLE NO.: 230

/ENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3226

YPE :ST SAMPLE DESCRIPTION: SCALP SCALP TAKEN FROM #1236

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		230A	230B
2. METHOD		CRI	CRI
3. DATE REQUESTED		780320	780320
4. DATE ANALYZED		780428	780509
5. SAMPLE SIZE	KGD	5.252E-03	5.252E-03
6. ALIQUOT (FRACTION)		0.250	0.250
7. SAMPLE SIZE MEASURED	KGD	1.313E-03	1.313E-03
8. 242 PU SPIKE	DPM	55.840	42.740
9. STD. ERROR OF ITEM 8	DPM	0.090	0.380
10. 242 PU SAMPLE COUNTS	CTS	10321	21677
11. 239 PU SAMPLE COUNTS	CTS	3130	8235
12. 239 PU IN SAMPLE	PCI	7.629	7.315
13. STD. ERROR(CCUNTS+SYS)	PCI	0.156	0.115
14. CONCENTRATION 239PU	PCI/KGD	5810.285	5570.945
15. STD. ERROR(CNT+SYS)	PCI/KGD	118.930	87.486
16. REFERENCES-CHR DOCS.		R105CC	R105CC

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

. PU CONCENTRATION OR RATE(WTD. MEAN)	5654.980	PCI/KGD
2. STD.ERROR(EXTERNAL)	114.242	PCI/KGD
3. STD. ERROR(INTERNAL)	70.472	PCI/KGD
4. VARIANCE RATIO,F	2.628	
5. FRACTIONAL STD. ERROR	0.0202	

. PU (MEAN) IN ALIQ #1 : 7.425_+ 0.150 PCI

****
RESULTS: AT TIME OF EVENT *
****

U CONCENTRATION OR RATE: 5659.969 ± 114.343 PCI/KGD

ALYZED BY: CGC CHECKED: RDO 10/5/78 REVIEWED BY/DATE: RPL 10/5/78

MMENTS AND REFERENCES: This sample is suspect. The plutonium value is a factor of
n times higher than for comparable soft tissue samples. Embalming fluids probably
olubilized plutonium in cranial bones.
O (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

R FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001173

DETAILED RESULTS: 40-01[illegible] 240 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 240

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3227

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 0-2 CM ABOVE SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		240
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780316
5. SAMPLE SIZE	KGD	1.350E-03
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	1.350E-03
8. 242 PU SPIKE	DPM	55.840
9. STD. ERROR OF ITEM 8	DPM	0.090
10. 242 PU SAMPLE COUNTS	CTS	30266
11. 239 PU SAMPLE COUNTS	CTS	735
12. 239 PU IN SAMPLE	PCI	0.611
13. STD. ERROR(COUNTS+SYS)	PCI	2.283E-02
14. CONCENTRATION 239PU	PCI/KGD	452.521
15. STD. ERROR(CNT+SYS)	PCI/KGD	16.909
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		452.521	PCI/KGD
2. STD.ERROR(EXTERNAL)		0.000	PCI/KGD
3. STD. ERROR(INTERNAL)		16.909	PCI/KGD
4. VARIANCE RATIO,F		0.000	
5. FRACTIONAL STD. ERROR		0.0374	
6. PU (MEAN) IN ALIQ #1 :	0.611 +	0.023	PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 452.918 ± 16.924 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10/14/78 REVIEWED BY/DATE: RPL 10/14/78

COMMENTS AND REFERENCES:
This sample is suspect. Plutonium in the scalp material (see 40-010.230) could have diffused into or externally contaminated these samples of hair.

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77 (HFL)

OCT 17 '78

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001174

DETAILED RESULTS: 40-010 350 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 350

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3238

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 20-22 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		350
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780105
5. SAMPLE SIZE	KGD	2.161E-04
6. ALIQUCT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	2.161E-04
8. 242 PU SPIKE	DPM	55.620
9. STD. ERROR OF ITEM 8	DPM	0.280
10. 242 PU SAMPLE COUNTS	CTS	123452
11. 239 PU SAMPLE CCUNTS	CTS	231
12. 239 PU IN SAMPLE	PCI	4.689E-02
13. STD. ERROR(COUNTS+SYS)	PCI	3.097E-03
14. CONCENTRATION 239PU	PCI/KGD	216.962
15. STD. ERROR(CNT+SYS)	PCI/KGD	14.330
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	216.962	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	14.330	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0660	

6. PU (MEAN) IN ALIQ #1 : 4.689E-02 + 3.097E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 2.172E+02 ± 1.434E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL) OCT 17 '78

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

8001175

DETAILED RESULTS: 40-010 330 PU239 (NEW) 781004

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 330

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3236

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 16-18 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		330
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780221
5. SAMPLE SIZE	KGD	3.509E-04
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	3.509E-04
8. 242 PU SPIKE	DPM	55.620
9. STD. ERROR OF ITEM 8	DPM	0.280
10. 242 PU SAMPLE COUNTS	CTS	109098
11. 239 PU SAMPLE COUNTS	CTS	270
12. 239 PU IN SAMPLE	PCI	6.201E-02
13. STD. ERROR(COUNTS+SYS)	PCI	3.791E-03
14. CONCENTRATION 239PU	PCI/KGD	176.721
15. STD. ERROR(CNT+SYS)	PCI/KGD	10.805
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	176.721	PCI/KGD
2. STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3. STD. ERROR(INTERNAL)	10.805	PCI/KGD
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0611	

6. PU (MEAN) IN ALIQ #1 : 6.201E-02 + 3.791E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.769E+02 ± 1.081E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 17 '78

CHR FORM 10/14/77(HFL)

CHR RECORDS

PRIVACY ACT MATERIAL REMOVED

8001176

DETAILED RESULTS: 40-010 320 PU239 (NEW) 781004

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 320

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3235

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 14-16 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		320
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780221
5. SAMPLE SIZE	KGD	5.456E-04
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	5.456E-04
8. 242 PU SPIKE	DPM	55.620
9. STD. ERROR OF ITEM 8	DPM	0.280
10. 242 PU SAMPLE COUNTS	CTS	123023
11. 239 PU SAMPLE COUNTS	CTS	396
12. 239 PU IN SAMPLE	PCI	8.066E-02
13. STD. ERROR(COUNTS+SYS)	PCI	4.080E-03
14. CONCENTRATION 239PU	PCI/KGD	147.829
15. STD. ERROR(CNT+SYS)	PCI/KGD	7.478
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	147.829	PCI/KGD
2. STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3. STD. ERROR(INTERNAL)	7.478	PCI/KGD
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0506	

6. PU (MEAN) IN ALIQ #1 : 8.066E-02 + 4.080E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.480E+02 ± 7.484E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RDD 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:VSD

CHR FORM 10/14/77(HFL)

8001177

CHR RECORDS

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 310 PU239 (NEW) 781004

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 310

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3234

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 12-14 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		310
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780309
5. SAMPLE SIZE	KGD	4.847E-04
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	4.847E-04
8. 242 PU SPIKE	DPM	55.620
9. STD. ERROR OF ITEM 8	DPM	0.280
10. 242 PU SAMPLE COUNTS	CTS	77217
11. 239 PU SAMPLE COUNTS	CTS	213
12. 239 PU IN SAMPLE	PCI	6.912E-02
13. STD. ERROR(COUNTS+SYS)	PCI	4.755E-03
14. CONCENTRATION 239PU	PCI/KGD	142.600
15. STD. ERROR(CNT+SYS)	PCI/KGD	9.811
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	142.600	PCI/KGD
2. STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3. STD. ERROR(INTERNAL)	9.811	PCI/KGD
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0688	

6. PU (MEAN) IN ALIQ #1 : 6.912E-02 + 4.755E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.427E+02 ± 9.819E+00 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001178

CHR RECORDS

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 340 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 340

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3237

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 18-20 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		340
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780221
5.	SAMPLE SIZE	KGD	2.645E-04
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	2.645E-04
8.	242 PU SPIKE	DPM	55.620
9.	STD. ERROR OF ITEM 8	DPM	0.280
10.	242 PU SAMPLE COUNTS	CTS	103322
11.	239 PU SAMPLE COUNTS	CTS	181
12.	239 PU IN SAMPLE	PCI	4.389E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	3.273E-03
14.	CONCENTRATION 239PU	PCI/KGD	165.953
15.	STD. ERROR(CNT+SYS)	PCI/KGD	12.374
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	165.953	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	12.374	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0746	

6. PU (MEAN) IN ALIQ #1 : 4.389E-02 + 3.273E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.661E+02 ± 1.239E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:VED

CHR FORM 10/14/77(HFL)

OCT 17 '78

8001179

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

DETAILED RESULTS: 40-010 360 PU239 (NEW) 781004

239PU (PLUTONIUM)
****

PRIVACY ACT MATERIAL REMOVED

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 360

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3239

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 22-24 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		360
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780314
5.	SAMPLE SIZE	KGD	8.570E-05
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	8.570E-05
8.	242 PU SPIKE	DPM	55.620
9.	STD. ERROR OF ITEM 8	DPM	0.280
10.	242 PU SAMPLE COUNTS	CTS	99091
11.	239 PU SAMPLE COUNTS	CTS	111
12.	239 PU IN SAMPLE	PCI	2.807E-02
13.	STD. ERROR(COUNTS+SYS)	PCI	2.669E-03
14.	CONCENTRATION 239PU	PCI/KGD	327.516
15.	STD. ERROR(CNT+SYS)	PCI/KGD	31.148
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	327.516	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	31.148	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0951	

6. PU (MEAN) IN ALIQ #1 : 2.807E-02 + 2.669E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 3.278E+02 ± 3.117E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 17 '78
CHR RECORDS

CHR FORM 10/14/77(HFL)

8001180

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 370 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 370

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3240

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 24-26 CM FROM SCALP

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		370
2.	METHOD		CRI
3.	DATE REQUESTED		770801
4.	DATE ANALYZED		780110
5.	SAMPLE SIZE	KGD	2.440E-05
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	KGD	2.440E-05
8.	242 PU SPIKE	DPM	55.620
9.	STD. ERROR OF ITEM 8	DPM	0.280
10.	242 PU SAMPLE COUNTS	CTS	287890
11.	239 PU SAMPLE COUNTS	CTS	99
12.	239 PU IN SAMPLE	PCI	8.617E-03
13.	STD. ERROR(COUNTS+SYS)	PCI	8.672E-04
14.	CONCENTRATION 239PU	PCI/KGD	353.138
15.	STD. ERROR(CNT+SYS)	PCI/KGD	35.542
16.	REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	353.138	PCI/KGD
2.	STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3.	STD. ERROR(INTERNAL)	35.542	PCI/KGD
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.1006	

6. PU (MEAN) IN ALIQ #1 : 8.617E-03 + 8.672E-04 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 3.534E+02 ± 3.557E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: RPL 10-4-78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED
OCT 17 '78

CHR FORM 10/14/77(HFL)

8001181

PRIVACY ACT MATERIAL REMOVED CHR RECORDS

DETAILED RESULTS: 40-0[illegible] 380 PU239 (NEW) 781004

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: 380

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3241

TYPE :ST SAMPLE DESCRIPTION: HAIR HAIR 26-28 CM FROM SCALP

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		380
2. METHOD		CRI
3. DATE REQUESTED		770801
4. DATE ANALYZED		780110
5. SAMPLE SIZE	KGD	1.920E-05
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	KGD	1.920E-05
8. 242 PU SPIKE	DPM	55.620
9. STD. ERROR OF ITEM 8	DPM	0.280
10. 242 PU SAMPLE COUNTS	CTS	251486
11. 239 PU SAMPLE COUNTS	CTS	112
12. 239 PU IN SAMPLE	PCI	1.116E-02
13. STD. ERROR(COUNTS+SYS)	PCI	1.056E-03
14. CONCENTRATION 239PU	PCI/KGD	581.204
15. STD. ERROR(CNT+SYS)	PCI/KGD	55.009
16. REFERENCES-CHR DOCS.		R103CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	581.204	PCI/KGD
2. STD.ERROR(EXTERNAL)	0.000	PCI/KGD
3. STD. ERROR(INTERNAL)	55.009	PCI/KGD
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0946	

6. PU (MEAN) IN ALIQ #1 : 1.116E-02 + 1.056E-03 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 5.817E+02 ± 5.506E+01 PCI/KGD

ANALYZED BY: CGC CHECKED: RDO 10-4-78 REVIEWED BY/DATE: EPL 10-4-78

COMMENTS AND REFERENCES:

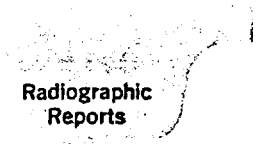
TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001182

PRIVACY ACT MATERIAL REMOVED

E811008



PRIVACY ACT MATERIAL REMOVED

Radiological and Environmental Research Division

Argonne National Laboratory

SNSP SORTED

MAR 1 1977

CENTER FOR HUMAN RADIOBIOLOGY

Radiologist's Report

CHR # 40-010 Date read: November 15, 1974

Patient's Name _____

Post-exhumation Radiographs.

Chest and ribs: There are healed fractures of the left 9th and 10th ribs. All the ribs on both sides show many discrete rounded very dense deposits, 1 to 3 mm. They all appear to be on bone surfaces. The sternum likewise shows very many discrete very dense deposits up to 1 mm. Some of them are on bone surfaces and some in soft tissues near the bone.

Cervical spine: (C1 to C6) No abnormality.

Dorsal spine: (T1 to T6, T8 to T12) There is osteoporosis. A few small very dense deposits on surfaces of some of the bodies.

Lumbar spine: (L2 to L5). Osteoporosis is present. A few very small dense deposits on surfaces of bodies.

Sacrum: Many very dense deposits 3 to 6 mm in upper portions.

Right humerus: No abnormality within the bone, one small dense deposit on surface, humeral head.

Right and left radius and ulna: No abnormalities.

Right and left hand and wrist: A few small very dense deposits in the distal portions of right middle and ring fingers only.

Right femur: Slight osteoporosis.

Left femur: A single dense deposit 3 mm on surface, supracondylar area.

Right tibia and fibula: Osteoporosis in tibia.

Left tibia and fibula: A few 3 - 4 mm dense deposits in upper portions of these bones.

Right and left scapula and clavicle: No abnormalities.

Right foot and ankle: A few very dense deposits 2 to 3 mm in the distal parts of the right toes.

Left foot and ankle: No evidence of abnormality.

Right Innominate bone: Many round very dense deposits 2 to 4 mm in the ischium and ilium. Osteoporosis.

Left innominate: Osteoporosis present, single very dense deposit 6 mm.

Skull vault: No evidence of abnormality.

Skull base: The dorsum sellae is absent (previously removed in handling).

8001184

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

The sinuses and mastoids are normal.

Impression: Osteoporosis is present. There is no evidence of bone changes resembling those which may be seen in persons exposed to radium. An entirely different abnormality is present, namely, that there are very many very small very dense deposits on the surfaces of a number of the bones, and other such deposits in the soft tissues very close to the bone surfaces. This abnormality is attributed to the plutonium which has been administered during the subject's life. The radiographic pattern is unique.

I. E. Kirsh, M. D.

hmb

PRIVACY ACT MATERIAL REMOVED

Outside
Medical

8001186

ARGONNE
NATIONAL
LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

June 16, 1976

TO: CHR File

FROM: Gail Knasko GK

MICROFILMED

SUBJECT: ABSTRACT OF AUTOPSY REPORT
40-010

The Genesee Laboratory
Batavia, N. Y.

Date of Death: 4-29-47

Anatomical Diagnosis:
1. Softened tumor of the pituitary gland
2. Atrophy of bone back of sella turcica
3. Infantile ovaries and uterus, atrophy of thymus and thyroid gla
4. Hypertrophy of both adrenals
5. Bilateral chronic glomerular nephritis
6. Obesity of trunk, neck and head
7. Bulging striae over thorax and abdomen
8. Atrophy of breasts, hirsutism

Cause of death: Subacute to chronic glomerular nephritis
Multiple foci of bronchopneumonia

PRIVACY ACT MATERIAL REMOVED

8001187

40-010

Wyoming County Community Hospital

PRIVACY ACT MATERIAL REMOVED

Warsaw, New York 14569

TELEPHONE 786-2233
AREA CODE 716

March 19, 1976

Austin M. Brues, M. D.
Medical Director
Center for Human Radiobiology
9700 S. Cass Avenue
Argonne, Illinois 60439

Dear Sir:

Enclosed are copies of part of the Medical Record on

.

This chart is on film and we do not have the necessary equipment to reproduce copies from the film. I hope, therefore, this information will be adequate.

Sincerely,

Geraldine D. Smith, ART
Medical Records

RECEIVED
MAR 22 '76
CHR RECORDS

PRIVACY ACT MATERIAL REMOVED

8001188

DETAILED RESULTS: 40-010 E19 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E19

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1882

TYPE :BO SAMPLE DESCRIPTION: HUMLTDEND L HUMERUS DISTAL END

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		E19A	E19B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770627	770629
5. SAMPLE SIZE	GMA	0.102	0.105
6. ALIQUOT (FRACTION)		1.000	0.400
7. SAMPLE SIZE MEASURED	GMA	0.102	0.042
8. 242 PU SPIKE	DPM	50.530	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170	0.170
10. 242 PU SAMPLE COUNTS	CTS	17433	6362
11. 239 PU SAMPLE COUNTS	CTS	3968	619
12. 239 PU IN SAMPLE	PCI	5.181	2.215
13. STD. ERROR(COUNTS+SYS)	PCI	9.279E-02	9.355E-02
14. CONCENTRATION 239PU	PCI/GMA	50.947	52.936
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.912	2.236
16. REFERENCES-CHR DOCS.		RC96RO	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	51.231	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.696	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.845	PCI/GMA	
4. VARIANCE RATIO,F	0.678		
5. FRACTIONAL STD. ERROR	0.0165		

6. PU (MEAN) IN ALIQ #1 : 5.210_+ 0.086 PCI

RECEIVED CHR

NOV 2 8 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 51.275 ± 0.845 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001189

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E21 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E21

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1883

TYPE :BO SAMPLE DESCRIPTION: RADRTENDS PROXIMAL AND DISTAL ENDS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E21
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770629
5. SAMPLE SIZE	GMA	0.105
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	GMA	2.104E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	17026
11. 239 PU SAMPLE COUNTS	CTS	970
12. 239 PU IN SAMPLE	PCI	1.297
13. STD. ERROR(COUNTS+SYS)	PCI	4.303E-02
14. CONCENTRATION 239PU	PCI/GMA	61.639
15. STD. ERROR(CNT+SYS)	PCI/GMA	2.045
16. REFEPENCES-CHR DOCS.		RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	61.639	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	2.045	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0332		

6. PU (MEAN) IN ALIQ #1 : 1.297_+ 0.043 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 61.692 ± 2.047 PCI/GMA

ANALYZED BY: RO CHECKED: _____ REVIEWED BY/DATE: _____

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001190

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E22 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E22

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1884

TYPE :BO SAMPLE DESCRIPTION: RADRTSH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E22
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770629
5.	SAMPLE SIZE	GMA	0.250
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.250
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	13773
11.	239 PU SAMPLE COUNTS	CTS	2973
12.	239 PU IN SAMPLE	PCI	4.914
13.	STD. ERROR(COUNTS+SYS)	PCI	0.101
14.	CONCENTRATION 239PU	PCI/GMA	19.655
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.403
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	19.655	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.403	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0205	

6. PU (MEAN) IN ALIQ #1 : 4.914 + 0.101 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 19.672 ± 0.403 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-27-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001191

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E41 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E41

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1885

TYPE :BO SAMPLE DESCRIPTION: ULNRTENDS PROXIMAL AND DISTAL ENDS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E41
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770628
5. SAMPLE SIZE	GMA	0.254
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	GMA	5.072E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
0. 242 PU SAMPLE COUNTS	CTS	11768
1. 239 PU SAMPLE COUNTS	CTS	951
2. 239 PU IN SAMPLE	PCI	1.840
3. STD. ERROR(COUNTS+SYS)	PCI	6.232E-02
4. CONCENTRATION 239PU	PCI/GMA	36.270
5. STD. ERROR(CNT+SYS)	PCI/GMA	1.229
6. REFERENCES-CHR DOCS.		RC96RO

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	36.270	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.229	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0339		

6. PU (MEAN) IN ALIQ #1 : 1.840 + 0.062 PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 36.301 ± 1.230 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPC 11-28-77

COMMENTS AND REFERENCES:

BO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001192

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E42 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E42

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1886

TYPE :BO SAMPLE DESCRIPTION: ULNRTSH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E42
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770629
5.	SAMPLE SIZE	GMA	0.204
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.204
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	14359
11.	239 PU SAMPLE COUNTS	CTS	2419
12.	239 PU IN SAMPLE	PCI	3.835
13.	STD. ERROR(COUNTS+SYS)	PCI	8.527E-02
14.	CONCENTRATION 239PU	PCI/GMA	18.789
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.418
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	18.789	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.418	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0222	

6. PU (MEAN) IN ALIQ #1 : 3.835 + 0.085 PCI

RECEIVED CHR

NOV 29 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 18.806 ± 0.418 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001193

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E62 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E62

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1366

TYPE :BO SAMPLE DESCRIPTION: INNOMRTMIDCR RIGHT MID CREST

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E62
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770815
5. SAMPLE SIZE	GMA	1.053
6. ALIQUOT (FRACTION)		0.010
7. SAMPLE SIZE MEASURED	GMA	1.053E-02
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	4708
11. 239 PU SAMPLE COUNTS	CTS	1322
12. 239 PU IN SAMPLE	PCI	6.047
13. STD. ERROR(COUNTS+SYS)	PCI	0.191
14. CONCENTRATION 239PU	PCI/GMA	574.016
15. STD. ERROR(CNT+SYS)	PCI/GMA	18.117
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	574.016	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	18.117	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0316	

6. PU (MEAN) IN ALIQ #1 : 6.047 + 0.191 PCI

RECEIVED CHR

NOV 29 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 574.511 ± 18.133 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001195

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E63 PU239 (NEW) 771114

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E63

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1367

TYPE :BO SAMPLE DESCRIPTION: INNOMRTPOCR RIGHT POSTERIOR CREST

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E63
2. METHOD		AID
3. DATE REQUESTED		750601
4. DATE ANALYZED		750730
5. SAMPLE SIZE	GMA	0.281
6. ALIQUOT (FRACTION)		0.027
7. SAMPLE SIZE MEASURED	GMA	7.475E-03
8. 242 PU SPIKE	DPM	69.100
9. STD. ERROR OF ITEM 8	DPM	1.200
10. 242 PU SAMPLE COUNTS	CTS	15213
11. 239 PU SAMPLE COUNTS	CTS	2004
12. 239 PU IN SAMPLE	PCI	4.101
13. STD. ERROR(COUNTS+SYS)	PCI	0.121
14. CONCENTRATION 239PU	PCI/GMA	548.615
15. STD. ERROR(CNT+SYS)	PCI/GMA	16.148
16. REFERENCES-CHR DOCS.		RC51FI

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	548.615	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	16.148	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0294	

6. PU (MEAN) IN ALIQ #1 : 4.101 + 0.121 PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 549.056 ± 16.160 PCI/GMA

ANALYZED BY: FI CHECKED: RDO REVIEWED BY/DATE: RPL 11/14/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001196

DETAILED RESULTS: 40-010 E64 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E64

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1368

TYPE :BO SAMPLE DESCRIPTION: INNOMRTSUPRA SUPERIOR RAMUS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E64
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770815
5. SAMPLE SIZE	GMA	0.740
6. ALIQUOT (FRACTION)		0.010
7. SAMPLE SIZE MEASURED	GMA	7.399E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	10332
11. 239 PU SAMPLE COUNTS	CTS	1467
12. 239 PU IN SAMPLE	PCI	3.058
13. STD. ERROR(COUNTS+SYS)	PCI	8.679E-02
14. CONCENTRATION 239PU	PCI/GMA	413.233
15. STD. ERROR(CNT+SYS)	PCI/GMA	11.730
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	413.233	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	11.730	PCI/GMA	
4. VARIANCE RATIO, F	0.000		
5. FRACTIONAL STD. ERROR	0.0284		
6. PU (MEAN) IN ALIQ #1 : 3.058 +	0.087	PCI	

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 413.589 ± 11.740 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001197

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E65 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E65

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1369

TYPE :BO SAMPLE DESCRIPTION: INNOMRTANRA ANT. RAMUS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E65
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770815
5. SAMPLE SIZE	GMA	0.180
6. ALIQUOT (FRACTION)		0.040
7. SAMPLE SIZE MEASURED	GMA	7.184E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	10997
11. 239 PU SAMPLE COUNTS	CTS	2048
12. 239 PU IN SAMPLE	PCI	4.010
13. STD. ERROR(COUNTS+SYS)	PCI	9.877E-02
14. CONCENTRATION 239PU	PCI/GMA	558.229
15. STD. ERROR(CNT+SYS)	PCI/GMA	13.748
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	558.229	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	13.748	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0246		
6. PU (MEAN) IN ALIQ #1 : 4.010_+	0.099	PCI	

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 558.710 ± 13.760 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001198

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E66 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E66

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1370

TYPE :BO SAMPLE DESCRIPTION: INNOMRTPORA POST. RAMUS

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E66
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770815
5.	SAMPLE SIZE	GMA	0.125
6.	ALIQUOT (FRACTION)		0.040
7.	SAMPLE SIZE MEASURED	GMA	4.984E-03
8.	242 PU SPIKE	DPM	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250
10.	242 PU SAMPLE COUNTS	CTS	15675
11.	239 PU SAMPLE COUNTS	CTS	2083
12.	239 PU IN SAMPLE	PCI	2.862
13.	STD. ERROR(COUNTS+SYS)	PCI	6.839E-02
14.	CONCENTRATION 239PU	PCI/GMA	574.151
15.	STD. ERROR(CNT+SYS)	PCI/GMA	13.722
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	574.151	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	13.722	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0239	

6. PU (MEAN) IN ALIQ #1 : 2.862 ± 0.068 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 574.646 ± 13.734 PCI/GMA

ANALYZED BY: RO CHECKED: RDD/ 11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001199

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E71 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

AME: *CASE NO.: 40-010 *SAMPLE NO.: E71

VENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1841

YPE :BO SAMPLE DESCRIPTION: INNOMANCR ANTERIOR ILIAC CREST

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E71
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770721
5. SAMPLE SIZE	GMA	0.109
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.752E-03
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
0. 242 PU SAMPLE COUNTS	CTS	18057
1. 239 PU SAMPLE COUNTS	CTS	5593
2. 239 PU IN SAMPLE	PCI	7.051
. STD. ERROR(COUNTS+SYS)	PCI	0.110
4. CONCENTRATION 239PU	PCI/GMA	805.631
5. STD. ERROR(CNT+SYS)	PCI/GMA	12.623
6. REFERENCES-CHR DOCS.		RC96RO

****
RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	805.631	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	12.623	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0157		
. PU (MEAN) IN ALIQ #1 : 7.051 +	0.110	PCI	

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
RESULTS: AT TIME OF EVENT *
****

U CONCENTRATION OR RATE: 806.324 ± 12.634 PCI/GMA

ALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

MMENTS AND REFERENCES:

O (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

R FORM 10/14/77(HFL)

8001200 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E72 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E72

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1842

TYPE :BO SAMPLE DESCRIPTION: INNOMPOCR POSTERIOR ILIAC CREST

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E72
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770722
5. SAMPLE SIZE	GMA	0.105
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.400E-03
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	60090
11. 239 PU SAMPLE COUNTS	CTS	19648
12. 239 PU IN SAMPLE	PCI	7.443
13. STD. ERROR(COUNTS+SYS)	PCI	6.610E-02
14. CONCENTRATION 239PU	PCI/GMA	886.097
15. STD. ERROR(CNT+SYS)	PCI/GMA	7.869
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	886.097	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	7.869	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0089		
6. PU (MEAN) IN ALIQ #1 :	7.443 ±	0.066	PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 886.860 ± 7.875 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001201

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E73 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E73

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1843

TYPE :BO SAMPLE DESCRIPTION: INNOMISCH ISCHIUM

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E73
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770722
5.	SAMPLE SIZE	GMA	0.103
6.	ALIQUOT (FRACTION)		0.080
7.	SAMPLE SIZE MEASURED	GMA	8.240E-03
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	42908
11.	239 PU SAMPLE COUNTS	CTS	9181
12.	239 PU IN SAMPLE	PCI	4.871
13.	STD. ERROR(COUNTS+SYS)	PCI	5.836E-02
14.	CONCENTRATION 239PU	PCI/GMA	591.111
15.	STD. ERROR(CNT+SYS)	PCI/GMA	7.082
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	591.111	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	7.082	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0120	

6. PU (MEAN) IN ALIQ #1 : 4.871_+ 0.058 PCI

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****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 591.620 ± 7.088 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) PRIVACY ACT MATERIAL REMOVED

8001202

DETAILED RESULTS: 40-010 E74 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E74

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1844

TYPE :BO SAMPLE DESCRIPTION: INNOMPUB PUBIS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E74
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770725
5. SAMPLE SIZE	GMA	0.108
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.680E-03
8. 242 PU SPIKE	DPM	49.410
9. STD. ERROR OF ITEM 8	DPM	0.410
10. 242 PU SAMPLE COUNTS	CTS	17673
11. 239 PU SAMPLE COUNTS	CTS	4605
12. 239 PU IN SAMPLE	PCI	5.800
13. STD. ERROR(COUNTS+SYS)	PCI	0.107
14. CONCENTRATION 239PU	PCI/GMA	668.204
15. STD. ERROR(CNT+SYS)	PCI/GMA	12.368
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	668.204	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	12.368	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0185	

6. PU (MEAN) IN ALIQ #1 : 5.800 + 0.107 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 668.780 ± 12.379 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001203

DETAILED RESULTS: 40-010 E75 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E75

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1845

TYPE :BO SAMPLE DESCRIPTION: INNOMILSI ILIUM SACRO-ILIAC AREA

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E75
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770726
5. SAMPLE SIZE	GMA	0.102
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.176E-03
8. 242 PU SPIKE	DPM	49.410
9. STD. ERROR OF ITEM 8	DPM	0.410
10. 242 PU SAMPLE COUNTS	CTS	23773
11. 239 PU SAMPLE COUNTS	CTS	4926
12. 239 PU IN SAMPLE	PCI	4.612
13. STD. ERROR(COUNTS+SYS)	PCI	8.172E-02
14. CONCENTRATION 239PU	PCI/GMA	564.130
15. STD. ERROR(CNT+SYS)	PCI/GMA	9.995
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	564.130	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	9.995	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0177		

6. PU (MEAN) IN ALIQ #1 : 4.612_+ 0.082 PCI

RE[illegible]

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 564.615 ± 10.004 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77 (HFL)

PRIVACY ACT MATERIAL REMOVED

8001204

DETAILED RESULTS: 40-010 E76 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E76

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1846

TYPE :BO SAMPLE DESCRIPTION: INNOMILBO ILIUM BODY

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E76
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770726
5. SAMPLE SIZE	GMA	0.106
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.440E-03
8. 242 PU SPIKE	DPM	49.410
9. STD. ERROR OF ITEM 8	DPM	0.410
10. 242 PU SAMPLE COUNTS	CTS	22274
11. 239 PU SAMPLE COUNTS	CTS	3452
12. 239 PU IN SAMPLE	PCI	3.450
13. STD. ERROR(COUNTS+SYS)	PCI	6.929E-02
14. CONCENTRATION 239PU	PCI/GMA	408.732
15. STD. ERROR(CNT+SYS)	PCI/GMA	8.210
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	408.732	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	8.210	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0201		
6. PU (MEAN) IN ALIQ #1 :	3.450 ±	0.069	PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 409.084 ± 8.217 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001205

DETAILED RESULTS: 40-010 E91 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1869

TYPE :BO SAMPLE DESCRIPTION: PATLT LEFT PATELLA

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E91
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770630
5. SAMPLE SIZE	GMA	0.104
6. ALIQUOT (FRACTION)		0.160
7. SAMPLE SIZE MEASURED	GMA	1.664E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	14655
11. 239 PU SAMPLE COUNTS	CTS	534
12. 239 PU IN SAMPLE	PCI	0.829
13. STD. ERROR(COUNTS+SYS)	PCI	3.665E-02
14. CONCENTRATION 239PU	PCI/GMA	49.848
15. STD. ERROR(CNT+SYS)	PCI/GMA	2.202
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	49.848	PCI/GMA
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	2.202	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0442	

6. PU (MEAN) IN ALIQ #1 : 0.829 + 0.037 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 49.891 ± 2.204 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001206

DETAILED RESULTS: 40-010 K41 PU239 (NEW) 771114

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K41

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1358

TYPE :BO SAMPLE DESCRIPTION: FEMRTHD POST. 1/2 HEAD AND NECK

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K41A	K41B
2.	METHOD		AID	AID
3.	DATE REQUESTED		750601	750601
4.	DATE ANALYZED		750724	770817
5.	SAMPLE SIZE	GMA	1.297	1.298
6.	ALIQUOT (FRACTION)		0.035	0.050
7.	SAMPLE SIZE MEASURED	GMA	4.539E-02	6.490E-02
8.	242 PU SPIKE	DPM	69.100	47.800
9.	STD. ERROR OF ITEM 8	DPM	1.200	0.250
10.	242 PU SAMPLE COUNTS	CTS	9347	14832
11.	239 PU SAMPLE COUNTS	CTS	1869	5693
12.	239 PU IN SAMPLE	PCI	6.225	8.265
13.	STD. ERROR(COUNTS+SYS)	PCI	0.191	0.136
14.	CONCENTRATION 239PU	PCI/GMA	137.120	127.356
15.	STD. ERROR(CNT+SYS)	PCI/GMA	4.212	2.094
16.	REFERENCES-CHR DOCS.		RC51FI	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	129.292	PCI/GMA
2.	STD. ERROR (EXTERNAL)	3.893	PCI/GMA
3.	STD. ERROR(INTERNAL)	1.875	PCI/GMA
4.	VARIANCE RATIO, F	4.308	
5.	FRACTIONAL STD. ERROR	0.0301	

6. PU (MEAN) IN ALIQ #1 : 5.869 + 0.177 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 129.395 ± 3.896 PCI/GMA

ANALYZED BY: FI CHECKED: RDO REVIEWED BY/DATE: RPL 11/14/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

001207

DETAILED RESULTS: 40-010 K42 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K42

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1359

TYPE :BO SAMPLE DESCRIPTION: FEMRTTROC ANT. 1/2 TROCH

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		K42
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770726
5. SAMPLE SIZE	GMA	0.200
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.200
8. 242 PU SPIKE	DPM	49.410
9. STD. ERROR OF ITEM 8	DPM	0.410
10. 242 PU SAMPLE COUNTS	CTS	13390
11. 239 PU SAMPLE COUNTS	CTS	10628
12. 239 PU IN SAMPLE	PCI	17.668
13. STD. ERROR(COUNTS+SYS)	PCI	0.272
14. CONCENTRATION 239PU	PCI/GMA	88.383
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.362
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	88.383	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.362	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0154		

6. PU (MEAN) IN ALIQ #1 : 17.668 ± 0.272 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 88.459 ± 1.364 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11/10/77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001208

DETAILED RESULTS: 40-010 K43 PU239 (NEW) 771109

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K43

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1360

TYPE :BO SAMPLE DESCRIPTION: FEMRTPROXSH PROX. SHAFT

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K43
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770727
5.	SAMPLE SIZE	GMA	0.204
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.204
8.	242 PU SPIKE	DPM	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.410
10.	242 PU SAMPLE COUNTS	CTS	60523
11.	239 PU SAMPLE COUNTS	CTS	11476
12.	239 PU IN SAMPLE	PCI	4.221
13.	STD. ERROR(COUNTS+SYS)	PCI	5.544E-02
14.	CONCENTRATION 239PU	PCI/GMA	20.649
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.271
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	20.649	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.271	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0131	

6. PU (MEAN) IN ALIQ #1 : 4.221_+ 0.055 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 20.667 ± 0.271 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) PRIVACY ACT MATERIAL REMOVED

8001209

DETAILED RESULTS: 40-010 K44 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K44

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1361

TYPE :BO SAMPLE DESCRIPTION: FEMRTMS --

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K44
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770727
5.	SAMPLE SIZE	GMA	0.204
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.204
8.	242 PU SPIKE	DPM	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.410
10.	242 PU SAMPLE COUNTS	CTS	54121
11.	239 PU SAMPLE COUNTS	CTS	9490
12.	239 PU IN SAMPLE	PCI	3.903
13.	STD. ERROR(COUNTS+SYS)	PCI	5.418E-02
14.	CONCENTRATION 239PU	PCI/GMA	19.161
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.266
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	19.161	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.266	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0139	

6. PU (MEAN) IN ALIQ #1 : 3.903 ± 0.054 PCI

RECEIVED CHR

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 19.177 ± 0.266 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001210

DETAILED RESULTS: 40-010 K45 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K45

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1362

TYPE :BO SAMPLE DESCRIPTION: FEMRTDISTSH --

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K45B	K45A
2.	METHOD		AID	AID
3.	DATE REQUESTED		750801	750801
4.	DATE ANALYZED		770817	770817
5.	SAMPLE SIZE	GMA	0.201	0.207
6.	ALIQUOT (FRACTION)		1.000	1.000
7.	SAMPLE SIZE MEASURED	GMA	0.201	0.207
8.	242 PU SPIKE	DPM	47.800	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250	0.250
10.	242 PU SAMPLE COUNTS	CTS	40423	68371
11.	239 PU SAMPLE COUNTS	CTS	7538	12480
12.	239 PU IN SAMPLE	PCI	4.016	3.931
13.	STD. ERROR(COUNTS+SYS)	PCI	5.458E-02	4.343E-02
14.	CONCENTRATION 239PU	PCI/GMA	20.008	18.970
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.272	0.210
16.	REFERENCES-CHR DOCS.		RC99RO	RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	19.357	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.502	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.166	PCI/GMA
4.	VARIANCE RATIO,F	9.132	
5.	FRACTIONAL STD. ERROR	0.0259	

6. PU (MEAN) IN ALIQ #1 : 3.885 + 0.101 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 19.374 ± 0.502 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001211

DETAILED RESULTS: 40-010 K46 PU239 (NEW) 771109

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED

****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K46

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1363

TYPE :BO SAMPLE DESCRIPTION: FEMRTDIST

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K46
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770817
5.	SAMPLE SIZE	GMA	0.204
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.204
8.	242 PU SPIKE	DPM	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250
10.	242 PU SAMPLE COUNTS	CTS	59500
11.	239 PU SAMPLE COUNTS	CTS	14970
12.	239 PU IN SAMPLE	PCI	5.418
13.	STD. ERROR(COUNTS+SYS)	PCI	5.707E-02
14.	CONCENTRATION 239PU	PCI/GMA	26.506
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.279
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	26.506	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.279	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0105	

6. PU (MEAN) IN ALIQ #1 : 5.418 + 0.057 PCI

RECEIVED CHR

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 26.529 ± 0.279 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001212

DETAILED RESULTS: 40-010 K47 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K47

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1364

TYPE :BO SAMPLE DESCRIPTION: FEMRTCOND MEDIAL CONDYLE

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K47
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770816
5.	SAMPLE SIZE	GMA	11.754
6.	ALIQUOT (FRACTION)		0.010
7.	SAMPLE SIZE MEASURED	GMA	0.118
8.	242 PU SPIKE	DPM	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250
10.	242 PU SAMPLE COUNTS	CTS	11426
11.	239 PU SAMPLE COUNTS	CTS	2609
12.	239 PU IN SAMPLE	PCI	4.917
13.	STD. ERROR(COUNTS+SYS)	PCI	0.110
14.	CONCENTRATION 239PU	PCI/GMA	41.834
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.934
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	41.834	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.934	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0223	

6. PU (MEAN) IN ALIQ #1 : 4.917 + 0.110 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 41.870 ± 0.935 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001213

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K50 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K50

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1847

TYPE :BO SAMPLE DESCRIPTION: FEMLTHD

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K50A
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770706
5.	SAMPLE SIZE	GMA	0.107
6.	ALIQUOT (FRACTION)		0.200
7.	SAMPLE SIZE MEASURED	GMA	2.146E-02
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	6330
11.	239 PU SAMPLE COUNTS	CTS	2121
12.	239 PU IN SAMPLE	PCI	7.627
13.	STD. ERROR(COUNTS+SYS)	PCI	0.193
14.	CONCENTRATION 239PU	PCI/GMA	355.427
15.	STD. ERROR(CNT+SYS)	PCI/GMA	8.997
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	355.427	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	8.997	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0253	

6. PU (MEAN) IN ALIQ #1 : 7.627_+ 0.193 PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 355.733 ± 9.005 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001214

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-01 K51 PU239 (NEW) 780608

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K51

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1848

TYPE :BO SAMPLE DESCRIPTION: FEMLTTROC

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K51
2.	METHOD		CRI
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770706
5.	SAMPLE SIZE	GMA	0.202
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.202
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	7050
11.	239 PU SAMPLE COUNTS	CTS	9285
12.	239 PU IN SAMPLE	PCI	29.980
13.	STD. ERROR(COUNTS+SYS)	PCI	0.484
14.	CONCENTRATION 239PU	PCI/GMA	148.491
15.	STD. ERROR(CNT+SYS)	PCI/GMA	2.398
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	148.491	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	2.398	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0162	

6. PU (MEAN) IN ALIQ #1 : 29.980 ± 0.484 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 148.619 ± 2.400 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 6/9/78 REVIEWED BY/DATE: RPL 6/9/78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

RECEIVED

JUL 3'78

CHR RECORDS

8001215

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K56 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K56

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1853

TYPE :BO SAMPLE DESCRIPTION: FEMLTDMT1

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K56
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770707
5.	SAMPLE SIZE	GMA	0.202
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.202
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	16178
11.	239 PU SAMPLE COUNTS	CTS	4812
12.	239 PU IN SAMPLE	PCI	6.771
13.	STD. ERROR(COUNTS+SYS)	PCI	0.113
14.	CONCENTRATION 239PU	PCI/GMA	33.469
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.561
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	33.469	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.561	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0168	

6. PU (MEAN) IN ALIQ #1 : 6.771 + 0.113 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 33.498 ± 0.561 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001216 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K57 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K57

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1854

TYPE :BO SAMPLE DESCRIPTION: FEMLTDMT2

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		K57A
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770707
5. SAMPLE SIZE	GMA	0.205
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.205
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	5633
11. 239 PU SAMPLE COUNTS	CTS	1418
12. 239 PU IN SAMPLE	PCI	5.730
13. STD. ERROR(COUNTS+SYS)	PCI	0.171
14. CONCENTRATION 239PU	PCI/GMA	27.939
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.835
. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	27.939	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	0.835	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0299	

6. PU (MEAN) IN ALIQ #1 : 5.730 + 0.171 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 27.963 ± 0.836 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

(BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77 (HFL) PRIVACY ACT MATERIAL REMOVED

8001217

DETAILED RESULTS: 40-010 K58 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K58

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1855

TYPE :BO SAMPLE DESCRIPTION: FEMLTDMT3

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K58
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770707
5.	SAMPLE SIZE	GMA	0.203
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.203
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	5615
11.	239 PU SAMPLE COUNTS	CTS	1911
12.	239 PU IN SAMPLE	PCI	7.747
13.	STD. ERROR(COUNTS+SYS)	PCI	0.207
14.	CONCENTRATION 239PU	PCI/GMA	38.127
15.	STD. ERROR(CNT+SYS)	PCI/GMA	1.018
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	38.127	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	1.018	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0267	

6. PU (MEAN) IN ALIQ #1 : 7.747 + 0.207 PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 38.160 ± 1.019 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

BO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001218

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 K59 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K59

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1856

TYPE :BO SAMPLE DESCRIPTION: FEMLTCOND

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K59
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770707
5.	SAMPLE SIZE	GMA	0.106
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.106
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	14869
11.	239 PU SAMPLE COUNTS	CTS	2896
12.	239 PU IN SAMPLE	PCI	4.434
13.	STD. ERROR(COUNTS+SYS)	PCI	9.128E-02
14.	CONCENTRATION 239PU	PCI/GMA	41.670
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.858
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	41.670	PCI/GMA	
2.	STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3.	STD. ERROR(INTERNAL)	0.858	PCI/GMA	
4.	VARIANCE RATIO,F	0.000		
5.	FRACTIONAL STD. ERROR	0.0206		
6.	PU (MEAN) IN ALIQ #1 :	4.434 +	0.091	PCI

RECEIVED
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 41.705 ± 0.859 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) PRIVACY ACT MATERIAL REMOVED

8001219

DETAILED RESULTS: 40-010 K60 PU239 (NEW) 771122

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K60

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1857

TYPE :BO SAMPLE DESCRIPTION: TJBRTPCON PROXIMAL CONDYLES

ITEM	UNIT	ANALYSIS NUMBER 1	2	3	4
1. SAMPLE SUB-NUMBER		K60A	K60B	K60C	K60D
2. METHOD		AID	AID	AID	AID
3. DATE REQUESTED		750801	750801	750801	75080
4. DATE ANALYZED		750908	760809	770622	77062
5. SAMPLE SIZE	GMA	6.990E-02	1.170E-01	1.109E-01	1.083E-0
6. ALIQUOT (FRACTION)		1.000	1.000	1.000	1.00
7. SAMPLE SIZE MEASURED	GMA	6.990E-02	1.170E-01	1.109E-01	1.083E-0
8. 242 PU SPIKE	DPM	69.100	57.580	50.530	101.06
9. STD. ERROR OF ITEM 8	DPM	1.200	0.490	0.170	0.34
10. 242 PU SAMPLE COUNTS	CTS	17433	6034	14413	2547
11. 239 PU SAMPLE COUNTS	CTS	2285	1565	3996	350
12. 239 PU IN SAMPLE	PCI	4.080	6.728	6.311	6.25
13. STD. ERROR(COUNTS+SYS)	PCI	0.115	0.199	0.115	0.11
14. CONCENTRATION 239PU	PCI/GMA	58.373	57.503	56.909	57.78
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.647	1.703	1.035	1.05
16. REFERENCES-CHR DOCS.		RC51FI	RC99RO	RC97RO	RC97R

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	57.511	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.299	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.628	PCI/GMA	
4. VARIANCE RATIO, F	0.226		
5. FRACTIONAL STD. ERROR	0.0109		

6. PU (MEAN) IN ALIQ #1 : 4.020 ± 0.044 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 57.557 ± 0.628 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001220

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 1 PU239 (NEW) 780608

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K61

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1858

TYPE :BO SAMPLE DESCRIPTION: TIBRTSCON SUBCODYLAR 1

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		K61A	K61B
2. METHOD		CRI	CRI
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		750901	770707
5. SAMPLE SIZE	GMA	7.870E-02	1.082E-01
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	7.870E-02	1.082E-01
8. 242 PU SPIKE	DPM	69.100	50.530
9. STD. ERROR OF ITEM 8	DPM	1.200	0.170
10. 242 PU SAMPLE COUNTS	CTS	25871	6616
11. 239 PU SAMPLE COUNTS	CTS	2153	1082
12. 239 PU IN SAMPLE	PCI	2.591	3.723
13. STD. ERROR(COUNTS+SYS)	PCI	7.349E-02	1.227E-01
14. CONCENTRATION 239PU	PCI/GMA	32.918	34.407
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.934	1.134
16. REFERENCES-CHR DOCS.		RC51FI	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	33.519	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.731	PCI/GMA
3. STD. ERROR(INTERNAL)	0.721	PCI/GMA
4. VARIANCE RATIO,F	1.028	
5. FRACTIONAL STD. ERROR	0.0218	

6. PU (MEAN) IN ALIQ #1 : 2.638 + 0.058 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 33.546 ± 0.731 PCI/GMA

ANALYZED BY: FI CHECKED: RDO 6/9/78 REVIEWED BY/DATE: RPL 6/9/78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL)

8001221

PRIVACY ACT MATERIAL REMOVED

JUL 3 '78

CHR RECORDS

DETAILED RESULTS: 40-010 K62 PU239 (NEW) 771122

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K62

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1859

TYPE :BO SAMPLE DESCRIPTION: TIBRTSCON SUBCONDYLAR 2

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K62A	K62B
2.	METHOD		AID	AID
3.	DATE REQUESTED		750801	750801
4.	DATE ANALYZED		750910	770707
5.	SAMPLE SIZE	GMA	0.128	0.206
6.	ALIQUOT (FRACTION)		1.000	1.000
7.	SAMPLE SIZE MEASURED	GMA	0.128	0.206
8.	242 PU SPIKE	DPM	69.100	50.530
9.	STD. ERROR OF ITEM 8	DPM	1.200	0.170
10.	242 PU SAMPLE COUNTS	CTS	26169	14310
11.	239 PU SAMPLE COUNTS	CTS	2239	2625
12.	239 PU IN SAMPLE	PCI	2.663	4.176
13.	STD. ERROR(COUNTS+SYS)	PCI	7.469E-02	8.977E-02
14.	CONCENTRATION 239PU	PCI/GMA	20.857	20.280
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.585	0.436
16.	REFERENCES-CHR DOCS.		RC51FI	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	20.486	PCI/GMA
2.	STD. ERROR (EXTERNAL)	0.276	PCI/GMA
3.	STD. ERROR (INTERNAL)	0.350	PCI/GMA
4.	VARIANCE RATIO, F	0.624	
5.	FRACTIONAL STD. ERROR	0.0171	

6. PU (MEAN) IN ALIQ #1 : 2.616 + 0.045 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 20.503 ± 0.350 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001222

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-01\ 63 PU239 (NEW) 780608

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K63

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1860

TYPE :BO SAMPLE DESCRIPTION: TIBRTPMT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		K63A	K63B
2. METHOD		CRI	CRI
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		750911	760809
5. SAMPLE SIZE	GMA	0.244	0.258
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.244	0.258
8. 242 PU SPIKE	DPM	69.100	57.580
9. STD. ERROR OF ITEM 8	DPM	1.200	0.490
10. 242 PU SAMPLE COUNTS	CTS	31685	18543
11. 239 PU SAMPLE COUNTS	CTS	3547	2798
12. 239 PU IN SAMPLE	PCI	3.485	3.914
13. STD. ERROR(COUNTS+SYS)	PCI	8.643E-02	8.609E-02
14. CONCENTRATION 239PU	PCI/GMA	14.311	15.153
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.355	0.333
16. REFERENCES-CHR DOCS.		RC51FI	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	14.759	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.420	PCI/GMA
3. STD. ERROR(INTERNAL)	0.243	PCI/GMA
4. VARIANCE RATIO,F	2.991	
5. FRACTIONAL STD. ERROR	0.0285	

6. PU (MEAN) IN ALIQ #1 : 3.594_+ 0.102 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 14.771 ± 0.421 PCI/GMA

ANALYZED BY: FI CHECKED: RDO 6/9/78 REVIEWED BY/DATE: RDL 6/13/78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

JUL 3'78

8001223

CHR RECORDS

DETAILED RESULTS: 40-010 K64 PU239 (NEW) 771122

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K64

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1861

TYPE :BO SAMPLE DESCRIPTION: TIBRTMS1

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K64A	K64B
2.	METHOD		AID	AID
3.	DATE REQUESTED		750801	750801
4.	DATE ANALYZED		750912	770707
5.	SAMPLE SIZE	GMA	0.308	0.203
6.	ALIQUOT (FRACTION)		1.000	1.000
7.	SAMPLE SIZE MEASURED	GMA	0.308	0.203
8.	242 PU SPIKE	DPM	69.100	50.530
9.	STD. ERROR OF ITEM 8	DPM	1.200	0.170
10.	242 PU SAMPLE COUNTS	CTS	9304	14326
11.	239 PU SAMPLE COUNTS	CTS	1390	1805
12.	239 PU IN SAMPLE	PCI	4.651	2.868
13.	STD. ERROR(COUNTS+SYS)	PCI	0.156	0.072
14.	CONCENTRATION 239PU	PCI/GMA	15.095	14.143
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.507	0.356
16.	REFERENCES-CHR DOCS.		RC51FI	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	14.457	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.448	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.292	PCI/GMA
4.	VARIANCE RATIO,F	2.360	
5.	FRACTIONAL STD. ERROR	0.0310	
6.	PU (MEAN) IN ALIQ #1 :	4.454 + 0.138	PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 14.469 ± 0.448 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RDL 11-28-77

COMMENTS AND REFERENCES:

PO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001224 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K65 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K65

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1862

TYPE :BO SAMPLE DESCRIPTION: TIBRTMS2

ITEM	UNIT	ANALYSIS NUMBER 1	2	3	4
1. SAMPLE SUB-NUMBER		K65A	K65B	K65C	K65D
2. METHOD		AID	AID	AID	AID
3. DATE REQUESTED		750801	750801	750801	75080
4. DATE ANALYZED		750915	760810	770711	77072
5. SAMPLE SIZE	GMA	0.297	0.303	0.203	0.20
6. ALIQUOT (FRACTION)		1.000	1.000	1.000	1.00
7. SAMPLE SIZE MEASURED	GMA	0.298	0.303	0.203	0.20
8. 242 PU SPIKE	DPM	69.100	57.580	50.530	50.53
9. STD. ERROR OF ITEM 8	DPM	1.200	0.490	0.170	0.17
10. 242 PU SAMPLE COUNTS	CTS	10442	9075	20964	1837
11. 239 PU SAMPLE COUNTS	CTS	1220	1403	2247	196
12. 239 PU IN SAMPLE	PCI	3.637	4.010	2.440	2.43
13. STD. ERROR(COUNTS+SYS)	PCI	0.127	0.120	0.055	0.05
14. CONCENTRATION 239PU	PCI/GMA	12.225	13.218	12.031	12.01
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.426	0.396	0.270	0.28
5. REFERENCES-CHR DOCS.		RC51FI	RC99RO	RC97RO	RC99R

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	12.254	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.255	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.163	PCI/GMA	
4. VARIANCE RATIO,F	2.446		
5. FRACTIONAL STD. ERROR	0.0208		

6. PU (MEAN) IN ALIQ #1 : 3.646_+ 0.076 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 12.264 ± 0.255 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001225

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 56 PU239 (NEW) 780608

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K66

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1863

TYPE :BO SAMPLE DESCRIPTION: TIBRTDMT1

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		K66A	K66B
2. METHOD		CRI	CRI
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		750901	770711
5. SAMPLE SIZE	GMA	0.244	0.202
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.244	0.202
8. 242 PU SPIKE	DPM	69.100	50.530
9. STD. ERROR OF ITEM 8	DPM	1.200	0.170
10. 242 PU SAMPLE COUNTS	CTS	20325	10583
11. 239 PU SAMPLE COUNTS	CTS	1924	1092
12. 239 PU IN SAMPLE	PCI	2.947	2.349
13. STD. ERROR(COUNTS+SYS)	PCI	8.694E-02	7.507E-02
14. CONCENTRATION 239PU	PCI/GMA	12.077	11.628
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.356	0.372
16. REFERENCES-CHR DOCS.		RC51FI	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	11.862	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.224	PCI/GMA
3. STD. ERROR(INTERNAL)	0.257	PCI/GMA
4. VARIANCE RATIO,F	0.760	
5. FRACTIONAL STD. ERROR	0.0217	

6. PU (MEAN) IN ALIQ #1 : 2.894 + 0.063 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 11.871 ± 0.257 PCI/GMA

ANALYZED BY: FI CHECKED: RDO 6/9/78 REVIEWED BY/DATE: RPL 6/19/78

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77 (HFL)

8001226

PRIVACY ACT MATERIAL REMOVED

JUL 3 '78

CHR RECORDS

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K67 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K67

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1864

TYPE :BO SAMPLE DESCRIPTION: TIBRTDMT2

ITEM	UNIT	ANALYSIS NUMBER 1	2	3
1. SAMPLE SUB-NUMBER		K67A	K67B	K67C
2. METHOD		AID	AID	AID
3. DATE REQUESTED		750801	750801	750801
4. DATE ANALYZED		750916	750918	770712
5. SAMPLE SIZE	GMA	0.110	0.105	0.204
6. ALIQUOT (FRACTION)		1.000	1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.110	0.105	0.204
8. 242 PU SPIKE	DPM	69.100	69.100	50.530
9. STD. ERROR OF ITEM 8	DPM	1.200	1.200	0.170
10. 242 PU SAMPLE COUNTS	CTS	32359	17295	16701
11. 239 PU SAMPLE COUNTS	CTS	2031	967	2455
12. 239 PU IN SAMPLE	PCI	1.954	1.741	3.346
13. STD. ERROR(COUNTS+SYS)	PCI	5.611E-02	6.497E-02	7.320E-02
14. CONCENTRATION 239PU	PCI/GMA	17.794	16.529	16.419
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.511	0.617	0.359
16. REFERENCES-CHR DOCS.		RC51FI	RC51FI	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	16.810	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.424	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.265	PCI/GMA	
4. VARIANCE RATIO,F	2.551		
5. FRACTIONAL STD. ERROR	0.0252		

6. PU (MEAN) IN ALIQ #1 : 1.846_+ 0.047 PCI

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****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 16.824 ± 0.424 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)
8001227 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K68 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K68

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1865

TYPE :BO SAMPLE DESCRIPTION: TIBRTDMT3

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		K68A	K68B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		750917	770712
5. SAMPLE SIZE	GMA	8.590E-02	2.015E-01
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	8.590E-02	2.015E-01
8. 242 PU SPIKE	DPM	69.100	50.530
9. STD. ERROR OF ITEM 8	DPM	1.200	0.170
10. 242 PU SAMPLE COUNTS	CTS	28226	10844
11. 239 PU SAMPLE COUNTS	CTS	1594	1853
12. 239 PU IN SAMPLE	PCI	1.758	3.890
13. STD. ERROR(COUNTS+SYS)	PCI	5.459E-02	9.865E-02
14. CONCENTRATION 239PU	PCI/GMA	20.465	19.304
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.636	0.490
16. REFERENCES-CHR DOCS.		RC51FI	RC97RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	19.737	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.561	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.388	PCI/GMA	
4. VARIANCE RATIO,F	2.094		
5. FRACTIONAL STD. ERROR	0.0284		

6. PU (MEAN) IN ALIQ #1 : 1.695 + 0.048 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 19.753 ± 0.562 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001228

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K69 PU239 (NEW) 771122

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K69

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1866

TYPE :BO SAMPLE DESCRIPTION: TIBRTDCON DISTAL CONDYLE

ITEM	UNIT	ANALYSIS NUMBER 1	2	3	4
1. SAMPLE SUB-NUMBER		K69A	K69B	K59D	K69C
2. METHOD		AID	AID	AID	AID
3. DATE REQUESTED		750801	750801	750801	75080
4. DATE ANALYZED		750918	760810	770630	77070
5. SAMPLE SIZE	GMA	6.880E-02	1.579E-01	1.046E-01	1.055E-0
6. ALIQUOT (FRACTION)		1.000	1.000	1.000	1.00
7. SAMPLE SIZE MEASURED	GMA	6.880E-02	1.579E-01	1.046E-01	1.055E-0
8. 242 PU SPIKE	DPM	69.100	57.580	50.530	50.53
9. STD. ERROR OF ITEM 8	DPM	1.200	0.490	0.170	0.17
10. 242 PU SAMPLE COUNTS	CTS	11161	15933	16611	1880
11. 239 PU SAMPLE COUNTS	CTS	848	3290	2496	277
12. 239 PU IN SAMPLE	PCI	2.365	5.356	3.421	3.36
13. STD. ERROR(COUNTS+SYS)	PCI	9.373E-02	1.122E-01	7.433E-02	6.925E-0
14. CONCENTRATION 239PU	PCI/GMA	34.378	33.922	32.701	31.84
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.362	0.711	0.711	0.65
16. REFERENCES-CHR DOCS.		RC51FI	RC99RO	RC97RO	RC97R

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	32.896	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.537	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.383	PCI/GMA	
4. VARIANCE RATIO,F	1.970		
5. FRACTIONAL STD. ERROR	0.0163		

6. PU (MEAN) IN ALIQ #1 : 2.263 + 0.037 PCI

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RECORDS ROOM

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* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 32.923 ± 0.538 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RDL 11-28-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) 8001229 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K71 PU239 (NEW) 780613

239PU (PLUTONIUM)
****

NAME *CASE NO.: 40-010 *SAMPLE NO.: K71

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3003

TYPE :BO SAMPLE DESCRIPTION: TIBLTPROXEND

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K71A	K71B
2.	METHOD		CRI	CRI
3.	DATE REQUESTED		771125	771125
4.	DATE ANALYZED		771220	780214
5.	SAMPLE SIZE	GMA	0.106	0.102
6.	ALIQUOT (FRACTION)		1.000	1.000
7.	SAMPLE SIZE MEASURED	GMA	0.106	0.102
8.	242 PU SPIKE	DPM	55.620	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.280	0.090
10.	242 PU SAMPLE COUNTS	CTS	20518	43198
11.	239 PU SAMPLE COUNTS	CTS	4374	8526
12.	239 PU IN SAMPLE	PCI	5.342	4.965
13.	STD. ERROR(COUNTS+SYS)	PCI	9.293E-02	5.938E-02
14.	CONCENTRATION 239PU	PCI/GMA	50.250	48.487
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.874	0.580
16.	REFERENCES-CHR DOCS.		RC99RO	R105CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	49.025	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.812	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.483	PCI/GMA
4.	VARIANCE RATIO,F	2.825	
5.	FRACTIONAL STD. ERROR	0.0166	

6. PU (MEAN) IN ALIQ #1 : 5.211 + 0.086 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 49.068 ± 0.813 PCI/GMA

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

RECEIVED

CHR FORM 10/14/77(HFL) 8001230 PRIVACY ACT MATERIAL REMOVED JUL 3 '78

CHR RECORDS

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K72 PU239 (NEW) 780613

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K72

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3004

TYPE :BO SAMPLE DESCRIPTION: TIBLTPMT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		K72A	K72B
2. METHOD		CRI	CRI
3. DATE REQUESTED		771125	771125
4. DATE ANALYZED		771228	780214
5. SAMPLE SIZE	GMA	0.201	0.206
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.201	0.206
8. 242 PU SPIKE	DPM	55.620	55.840
9. STD. ERROR OF ITEM 8	DPM	0.280	0.090
10. 242 PU SAMPLE COUNTS	CTS	36809	19078
11. 239 PU SAMPLE COUNTS	CTS	9559	4736
12. 239 PU IN SAMPLE	PCI	6.507	6.245
13. STD. ERROR(COUNTS+SYS)	PCI	8.157E-02	1.019E-01
14. CONCENTRATION 239PU	PCI/GMA	32.422	30.270
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.406	0.494
16. REFERENCES-CHR DOCS.		RC99RO	R105CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		31.553	PCI/GMA
2. STD.ERROR(EXTERNAL)		1.056	PCI/GMA
3. STD. ERROR(INTERNAL)		0.314	PCI/GMA
4. VARIANCE RATIO,F		11.314	
5. FRACTIONAL STD. ERROR		0.0335	
6. PU (MEAN) IN ALIQ #1 :	6.333 +	0.212	PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 31.581 ± 1.056 PCI/GMA

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

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CHR FORM 10/14/77(HFL) 8001231 PRIVACY ACT MATERIAL REMOVED JUL 3'78

CHR RECORDS

DETAILED RESULTS: 40-010 K73 PU239 (NEW) 780613

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K73

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3005

TYPE :BO SAMPLE DESCRIPTION: TIBLTDMT

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		K73A	K73B
2.	METHOD		CRI	CRI
3.	DATE REQUESTED		771125	771125
4.	DATE ANALYZED		771228	780216
5.	SAMPLE SIZE	GMA	0.155	0.150
6.	ALIQUOT (FRACTION)		1.000	1.000
7.	SAMPLE SIZE MEASURED	GMA	0.155	0.150
8.	242 PU SPIKE	DPM	55.620	55.840
9.	STD. ERROR OF ITEM 8	DPM	0.280	0.090
10.	242 PU SAMPLE COUNTS	CTS	30407	180258
11.	239 PU SAMPLE COUNTS	CTS	3383	18769
12.	239 PU IN SAMPLE	PCI	2.788	2.619
13.	STD. ERROR(COUNTS+SYS)	PCI	5.244E-02	2.053E-02
14.	CONCENTRATION 239PU	PCI/GMA	17.985	17.427
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.338	0.137
16.	REFERENCES-CHR DOCS.		RC99RO	R105CC

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	17.505	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.194	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.127	PCI/GMA
4.	VARIANCE RATIO,F	2.342	
5.	FRACTIONAL STD. ERROR	0.0111	

6. PU (MEAN) IN ALIQ #1 : 2.713_+ 0.030 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 17.521 ± 0.194 PCI/GMA

ANALYZED BY: CGC CHECKED: 6/15/78 RDO REVIEWED BY/DATE: 6/15/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

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JUL 3'78

CHR FORM 10/14/77(HFL)

8001232

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

DETAILED RESULTS: 40-010 K91 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1867

TYPE :BO SAMPLE DESCRIPTION: FIBLTENDS PROIMAL AND DISTAL ENDS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		K91
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770701
5. SAMPLE SIZE	GMA	0.105
6. ALIQUOT (FRACTION)		0.200
7. SAMPLE SIZE MEASURED	GMA	2.104E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	15243
11. 239 PU SAMPLE COUNTS	CTS	697
12. 239 PU IN SAMPLE	PCI	1.041
13. STD. ERROR(COUNTS+SYS)	PCI	4.047E-02
14. CONCENTRATION 239PU	PCI/GMA	49.472
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.923
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	49.472	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.923	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0389		
6. PU (MEAN) IN ALIQ #1 : 1.041 +	0.040	PCI	

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 49.515 ± 1.925 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001233

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 K92 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: K92

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1868

TYPE :BO SAMPLE DESCRIPTION: FIBLTSH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		K92
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770701
5.	SAMPLE SIZE	GMA	0.198
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.198
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	6069
11.	239 PU SAMPLE COUNTS	CTS	1040
12.	239 PU IN SAMPLE	PCI	3.901
13.	STD. ERROR(COUNTS+SYS)	PCI	0.132
14.	CONCENTRATION 239PU	PCI/GMA	19.662
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.663
16.	REFERENCES-CHR DOCS.		RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	19.662	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.663	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0337	

6. PU (MEAN) IN ALIQ #1 : 3.901 + 0.132 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 19.678 ± 0.664 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001234

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 Q81 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: Q81

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1375

TYPE :BO SAMPLE DESCRIPTION: VERT7TH --

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		Q81
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770816
5.	SAMPLE SIZE	GMA	0.453
6.	ALIQUOT (FRACTION)		0.010
7.	SAMPLE SIZE MEASURED	GMA	4.532E-03
8.	242 PU SPIKE	DPM	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.250
10.	242 PU SAMPLE COUNTS	CTS	9771
11.	239 PU SAMPLE COUNTS	CTS	1720
12.	239 PU IN SAMPLE	PCI	3.791
13.	STD. ERROR(COUNTS+SYS)	PCI	0.101
14.	CONCENTRATION 239PU	PCI/GMA	836.415
15.	STD. ERROR(CNT+SYS)	PCI/GMA	22.304
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	836.415	PCI/GMA
2.	STD. ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	22.304	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0267	

6. PU (MEAN) IN ALIQ #1 : 3.791 + 0.101 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 837.137 ± 22.323 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001235

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 R41 PU239 (NEW) 771114

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: R41

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1376

TYPE :BO SAMPLE DESCRIPTION: VERTILUM --

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		R41
2. METHOD		AID
3. DATE REQUESTED		750601
4. DATE ANALYZED		750723
5. SAMPLE SIZE	GMA	0.212
6. ALIQUOT (FRACTION)		0.019
7. SAMPLE SIZE MEASURED	GMA	3.979E-03
8. 242 PU SPIKE	DPM	34.600
9. STD. ERROR OF ITEM 8	DPM	0.600
10. 242 PU SAMPLE COUNTS	CTS	8464
11. 239 PU SAMPLE COUNTS	CTS	1772
12. 239 PU IN SAMPLE	PCI	3.263
13. STD. ERROR(COUNTS+SYS)	PCI	0.102
14. CONCENTRATION 239PU	PCI/GMA	820.185
15. STD. ERROR(CNT+SYS)	PCI/GMA	25.718
16. REFERENCES-CHR DOCS.		RC51FI

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	820.185	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	25.718	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0314	

6. PU (MEAN) IN ALIQ #1 : 3.263_+ 0.102 PCI

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NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 820.844 ± 25.738 PCI/GMA

ANALYZED BY: FI CHECKED: RDO REVIEWED BY/DATE: RPL 11/14/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001236

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 R91 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: R91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1840

TYPE :BO SAMPLE DESCRIPTION: SACRUM

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		R91
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770721
5. SAMPLE SIZE	GMA	0.108
6. ALIQUOT (FRACTION)		0.040
7. SAMPLE SIZE MEASURED	GMA	4.308E-03
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	18139
11. 239 PU SAMPLE COUNTS	CTS	1928
12. 239 PU IN SAMPLE	PCI	2.420
13. STD. ERROR(COUNTS+SYS)	PCI	5.853E-02
14. CONCENTRATION 239PU	PCI/GMA	561.645
15. STD. ERROR(CNT+SYS)	PCI/GMA	13.586
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	561.645	PCI/GMA
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	13.586	PCI/GMA
4. VARIANCE RATIO, F	0.000	
5. FRACTIONAL STD. ERROR	0.0242	

6. PU (MEAN) IN ALIQ #1 : 2.420_+ 0.059 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 562.128 ± 13.597 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-21-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001237

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 V71 PU239 (NEW) 780612

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: V71

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 2671

TYPE :BO SAMPLE DESCRIPTION: TOOTH LEFT LOWER CANINE

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		V71A	V71B
2.	METHOD		CRI	CRI
3.	DATE REQUESTED		770617	770617
4.	DATE ANALYZED		770712	770726
5.	SAMPLE SIZE	GMA	0.652	0.652
6.	ALIQUOT (FRACTION)		0.200	0.600
7.	SAMPLE SIZE MEASURED	GMA	0.130	0.391
8.	242 PU SPIKE	DPM	50.530	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170	0.170
10.	242 PU SAMPLE COUNTS	CTS	20030	61458
11.	239 PU SAMPLE COUNTS	CTS	116	868
12.	239 PU IN SAMPLE	PCI	0.132	0.322
13.	STD. ERROR(COUNTS+SYS)	PCI	1.228E-02	1.104E-02
14.	CONCENTRATION 239PU	PCI/GMA	1.011	0.822
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.094	0.028
16.	REFERENCES-CHR DOCS.		RC97RO	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	0.838	PCI/GMA
2.	STD. ERROR(EXTERNAL)	0.052	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.027	PCI/GMA
4.	VARIANCE RATIO,F	3.699	
5.	FRACTIONAL STD. ERROR	0.0621	

6. PU (MEAN) IN ALIQ #1 : 0.109 + 0.007 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 0.838 ± 0.052 PCI/GMA

ANALYZED BY: JRS CHECKED: 6/12/78 RDO REVIEWED BY/DATE: 6/12/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

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CHR FORM 10/14/77(HFL)

8001238 PRIVACY ACT MATERIAL REMOVED JUL 3'78

CHR RECORDS

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 V91 PU239 (NEW) 780612

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: V91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 2672

TYPE :BO SAMPLE DESCRIPTION: TOOTH LEFT 2ND LOWER PREMOLAR

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		V91B
2.	METHOD		CRI
3.	DATE REQUESTED		770617
4.	DATE ANALYZED		770728
5.	SAMPLE SIZE	GMA	0.103
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.103
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	142921
11.	239 PU SAMPLE COUNTS	CTS	994
12.	239 PU IN SAMPLE	PCI	0.158
13.	STD. ERROR(COUNTS+SYS)	PCI	5.067E-03
14.	CONCENTRATION 239PU	PCI/GMA	1.537
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.049
16.	REFERENCES-CHR DOCS.		RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	1.537	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.049	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0320	

6. PU (MEAN) IN ALIQ #1 : 0.158_+ 0.005 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 1.538 ± 0.049 PCI/GMA

ANALYZED BY: JRS CHECKED: 6/12/78 RDD REVIEWED BY/DATE: 6/12/78 RPL

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHR FILE:_____

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JUL 3 '78

CHR FORM 10/14/77(HFL) 8001239 PRIVACY ACT MATERIAL REMOVED CHR RECORDS

DETAILED RESULTS: 40-010 A01 PU239 (NEW) 771109

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A01

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1812

TYPE :BO SAMPLE DESCRIPTION: SKULLCALV CALVARIUM

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		A01C	A01A
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770622	770622
5. SAMPLE SIZE	GMA	0.253	0.269
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.253	0.269
8. 242 PU SPIKE	DPM	50.530	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170	0.170
10. 242 PU SAMPLE COUNTS	CTS	15211	14602
11. 239 PU SAMPLE COUNTS	CTS	27837	29256
12. 239 PU IN SAMPLE	PCI	41.659	45.609
13. STD. ERROR(COUNTS+SYS)	PCI	0.443	0.487
14. CONCENTRATION 239PU	PCI/GMA	164.400	169.297
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.747	1.807
16. REFERENCES-CHR DOCS.		RC97RO	RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	166.766	PCI/GMA	
2. STD. ERROR(EXTERNAL)	2.447	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.256	PCI/GMA	
4. VARIANCE RATIO,F	3.794		
5. FRACTIONAL STD. ERROR	0.0147		

6. PU (MEAN) IN ALIQ #1 : 42.258_+ 0.620 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 166.909 ± 2.449 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001240

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 A02 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A02

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1813

TYPE :BO SAMPLE DESCRIPTION: SKULLTESQ TEMPORAL SQUAMOUS AREA

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		A02A	A02B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770622	770623
5. SAMPLE SIZE	GMA	0.252	0.254
6. ALIQUOT (FRACTION)		1.000	1.000
7. SAMPLE SIZE MEASURED	GMA	0.252	0.254
8. 242 PU SPIKE	DPM	50.530	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170	0.170
10. 242 PU SAMPLE COUNTS	CTS	5740	6235
11. 239 PU SAMPLE COUNTS	CTS	10361	10570
12. 239 PU IN SAMPLE	PCI	41.090	38.591
13. STD. ERROR(COUNTS+SYS)	PCI	0.690	0.630
14. CONCENTRATION 239PU	PCI/GMA	162.925	151.752
15. STD. ERROR(CNT+SYS)	PCI/GMA	2.736	2.476
16. REFERENCES-CHR DOCS.		RC95RO	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	156.783	PCI/GMA	
2. STD. ERROR(EXTERNAL)	5.559	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.836	PCI/GMA	
4. VARIANCE RATIO,F	9.165		
5. FRACTIONAL STD. ERROR	0.0355		
6. PU (MEAN) IN ALIQ #1 :	39.541 ±	1.402	PCI

RECEIVED CHR
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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 156.918 ± 5.563 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-11-77 REVIEWED BY/DATE: RPL/11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001241

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 A03 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A03

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1814

TYPE :BO SAMPLE DESCRIPTION: SKULLPARO PARIETAL OCCIPITAL AREA

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		A03A	A03B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770622	770712
5. SAMPLE SIZE	GMA	0.254	0.101
6. ALIQUOT (FRACTION)		1.000	0.120
7. SAMPLE SIZE MEASURED	GMA	0.254	0.012
8. 242 PU SPIKE	DPM	50.530	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170	0.170
10. 242 PU SAMPLE COUNTS	CTS	5141	9672
11. 239 PU SAMPLE COUNTS	CTS	11203	1073
12. 239 PU IN SAMPLE	PCI	49.606	2.525
13. STD. ERROR(COUNTS+SYS)	PCI	0.852	0.082
14. CONCENTRATION 239PU	PCI/GMA	195.528	207.953
15. STD. ERROR(CNT+SYS)	PCI/GMA	3.359	6.728
16. REFERENCES-CHR DOCS.		RC95RO	RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	198.007	PCI/GMA	
2. STD.ERROR(EXTERNAL)	4.965	PCI/GMA	
3. STD. ERROR(INTERNAL)	3.005	PCI/GMA	
4. VARIANCE RATIO,F	2.730		
5. FRACTIONAL STD. ERROR	0.0251		

6. PU (MEAN) IN ALIQ #1 : 50.234_+ 1.260 PCI

RECEIVED CHR
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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 198.177 ± 4.970 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001242

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 A11 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A11

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1818

TYPE :BO SAMPLE DESCRIPTION: MANLT LEFT HALF MANDIBLE MINUS TEETH

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		A11
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770705
5.	SAMPLE SIZE	GMA	0.104
6.	ALIQUOT (FRACTION)		0.120
7.	SAMPLE SIZE MEASURED	GMA	1.243E-02
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	60847
11.	239 PU SAMPLE COUNTS	CTS	2496
12.	239 PU IN SAMPLE	PCI	0.934
13.	STD. ERROR(COUNTS+SYS)	PCI	1.933E-02
14.	CONCENTRATION 239PU	PCI/GMA	75.112
15.	STD. ERROR(CNT+SYS)	PCI/GMA	1.555
16.	REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	75.112	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	1.555	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0207	

6. PU (MEAN) IN ALIQ #1 : 0.934 + 0.019 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 75.176 ± 1.556 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001243

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-0.. A31 PU239 (NEW) 771110

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A31

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1819

TYPE :BO SAMPLE DESCRIPTION: CLAVLT LEFT CLAVICLE

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		A31
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770705
5. SAMPLE SIZE	GMA	0.104
6. ALIQUOT (FRACTION)		0.120
7. SAMPLE SIZE MEASURED	GMA	1.244E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	27156
11. 239 PU SAMPLE COUNTS	CTS	2595
12. 239 PU IN SAMPLE	PCI	2.175
13. STD. ERROR(COUNTS+SYS)	PCI	4.529E-02
14. CONCENTRATION 239PU	PCI/GMA	174.806
15. STD. ERROR(CNT+SYS)	PCI/GMA	3.640
16. REFERENCES-CHR DOCS.		RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	174.806	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	3.640	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0208		

6. PU (MEAN) IN ALIQ #1 : 2.175_+ 0.045 PCI RECEIVED CHR

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 174.956 ± 3.643 PCI/GMA

ANALYZED BY: RO CHECKED: RDO REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001244

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 A51 PU239 (NEW) 771109

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A51

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1820

TYPE :BO SAMPLE DESCRIPTION: SCAPLT LEFT SCAPULA

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		A51
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770623
5. SAMPLE SIZE	GMA	0.252
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.252
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	3884
11. 239 PU SAMPLE COUNTS	CTS	13388
12. 239 PU IN SAMPLE	PCI	78.466
13. STD. ERROR(COUNTS+SYS)	PCI	1.454
14. CONCENTRATION 239PU	PCI/GMA	311.248
15. STD. ERROR(CNT+SYS)	PCI/GMA	5.768
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	311.248	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	5.768	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0185		

6. PU (MEAN) IN ALIQ #1 : 78.466 + 1.454 PCI

RECEIVED CHR

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RECORDS ROOM

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* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 311.515 ± 5.773 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001245

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 A91 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: A91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1827

TYPE :BO SAMPLE DESCRIPTION: RIB6LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		A91A	A91B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770712	770803
5. SAMPLE SIZE	GMA	0.103	0.103
6. ALIQUOT (FRACTION)		0.040	0.080
7. SAMPLE SIZE MEASURED	GMA	4.116E-03	8.232E-03
8. 242 PU SPIKE	DPM	50.530	47.800
9. STD. ERROR OF ITEM 8	DPM	0.170	0.250
10. 242 PU SAMPLE COUNTS	CTS	80414	14951
11. 239 PU SAMPLE COUNTS	CTS	4612	1700
12. 239 PU IN SAMPLE	PCI	1.306	2.449
13. STD. ERROR(COUNTS+SYS)	PCI	2.025E-02	6.397E-02
14. CONCENTRATION 239PU	PCI/GMA	317.195	297.438
15. STD. ERROR(CNT+SYS)	PCI/GMA	4.920	7.770
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	311.541	PCI/GMA
2. STD. ERROR(EXTERNAL)	8.930	PCI/GMA
3. STD. ERROR(INTERNAL)	4.157	PCI/GMA
4. VARIANCE RATIO,F	4.615	
5. FRACTIONAL STD. ERROR	0.0287	

6. PU (MEAN) IN ALIQ #1 : 1.282 + 0.037 PCI

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****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 311.809 ± 8.937 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/17/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001246

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 B11 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: B11

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1822

TYPE :BO SAMPLE DESCRIPTION: RIB1LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		B11A	B11B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770711	770726
5. SAMPLE SIZE	GMA	0.104	0.104
6. ALIQUOT (FRACTION)		0.020	0.020
7. SAMPLE SIZE MEASURED	GMA	2.074E-03	2.074E-03
8. 242 PU SPIKE	DPM	50.530	49.410
9. STD. ERROR OF ITEM 8	DPM	0.170	0.410
10. 242 PU SAMPLE COUNTS	CTS	7089	41022
11. 239 PU SAMPLE COUNTS	CTS	214	1391
12. 239 PU IN SAMPLE	PCI	0.687	0.755
13. STD. ERROR(COUNTS+SYS)	PCI	4.773E-02	2.151E-02
14. CONCENTRATION 239PU	PCI/GMA	331.332	363.924
15. STD. ERROR(CNT+SYS)	PCI/GMA	23.016	10.371
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	358.423	PCI/GMA	
2. STD.ERROR(EXTERNAL)	12.207	PCI/GMA	
3. STD. ERROR(INTERNAL)	9.455	PCI/GMA	
4. VARIANCE RATIO,F	1.667		
5. FRACTIONAL STD. ERROR	0.0341		

6. PU (MEAN) IN ALIQ #1 : 0.743_+ 0.025 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 358.731 ± 12.218 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11-11-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001247

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 B31 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: B31

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1823

TYPE :BO SAMPLE DESCRIPTION: RIB2LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		B31A	B31B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770712	770725
5. SAMPLE SIZE	GMA	0.101	0.102
6. ALIQUOT (FRACTION)		0.040	0.040
7. SAMPLE SIZE MEASURED	GMA	4.060E-03	4.084E-03
8. 242 PU SPIKE	DPM	50.530	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170	0.170
10. 242 PU SAMPLE COUNTS	CTS	21346	23038
11. 239 PU SAMPLE COUNTS	CTS	1288	1395
12. 239 PU IN SAMPLE	PCI	1.374	1.378
13. STD. ERROR(COUNTS+SYS)	PCI	3.968E-02	3.829E-02
14. CONCENTRATION 239PU	PCI/GMA	338.312	337.511
15. STD. ERROR(CNT+SYS)	PCI/GMA	9.773	9.375
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		337.895	PCI/GMA
2. STD.ERROR(EXTERNAL)		0.400	PCI/GMA
3. STD. ERROR(INTERNAL)		6.766	PCI/GMA
4. VARIANCE RATIO,F		0.003	
5. FRACTIONAL STD. ERROR		0.0200	
6. PU (MEAN) IN ALIQ #1 :	1.372 ±	0.027	PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 338.185 ± 6.771 PCI/GMA

ANALYZED BY: RO CHECKED: RDO 11/11/77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001248

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 B51 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: B51

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1824

TYPE :BO SAMPLE DESCRIPTION: RIB3LT

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		B51A	B51B
2.	METHOD		AID	AID
3.	DATE REQUESTED		750801	750801
4.	DATE ANALYZED		770714	770727
5.	SAMPLE SIZE	GMA	0.101	0.101
6.	ALIQUOT (FRACTION)		0.040	0.080
7.	SAMPLE SIZE MEASURED	GMA	4.048E-03	8.096E-03
8.	242 PU SPIKE	DPM	50.530	49.410
9.	STD. ERROR OF ITEM 8	DPM	0.170	0.410
10.	242 PU SAMPLE COUNTS	CTS	69628	10241
11.	239 PU SAMPLE COUNTS	CTS	4091	1258
12.	239 PU IN SAMPLE	PCI	1.337	2.734
13.	STD. ERROR(COUNTS+SYS)	PCI	2.198E-02	8.478E-02
14.	CONCENTRATION 239PU	PCI/GMA	330.406	337.736
15.	STD. ERROR(CNT+SYS)	PCI/GMA	5.430	10.472
[illegible].	REFERENCES-CHR DOCS.		RC95RO	RC99RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	331.959	PCI/GMA
2.	STD.ERROR(EXTERNAL)	2.995	PCI/GMA
3.	STD. ERROR(INTERNAL)	4.821	PCI/GMA
4.	VARIANCE RATIO,F	0.386	
5.	FRACTIONAL STD. ERROR	0.0145	

6. PU (MEAN) IN ALIQ #1 : 1.344_+ 0.020 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 332.245 ± 4.825 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/17/77

COMMENTS AND REFERENCES:

[illegible]D (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001249

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 B71 PU239 (NEW) 771107

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: B71

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1825

TYPE :BO SAMPLE DESCRIPTION: RIB4LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		B71A	B71B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770714	770803
5. SAMPLE SIZE	GMA	0.103	0.103
6. ALIQUOT (FRACTION)		0.040	0.080
7. SAMPLE SIZE MEASURED	GMA	4.112E-03	8.224E-03
8. 242 PU SPIKE	DPM	50.530	47.800
9. STD. ERROR OF ITEM 8	DPM	0.170	0.250
10. 242 PU SAMPLE COUNTS	CTS	46470	38627
11. 239 PU SAMPLE COUNTS	CTS	2447	4131
12. 239 PU IN SAMPLE	PCI	1.199	2.303
13. STD. ERROR(COUNTS+SYS)	PCI	2.519E-02	3.958E-02
14. CONCENTRATION 239PU	PCI/GMA	291.509	280.030
15. STD. ERROR(CNT+SYS)	PCI/GMA	6.125	4.812
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	284.411	PCI/GMA	
2. STD.ERROR(EXTERNAL)	5.577	PCI/GMA	
3. STD. ERROR(INTERNAL)	3.784	PCI/GMA	
4. VARIANCE RATIO,F	2.172		
5. FRACTIONAL STD. ERROR	0.0196		
6. PU (MEAN) IN ALIQ #1 :	1.169 +	0.023	PCI

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****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 284.655 ± 5.582 PCI/GMA

ANALYZED BY: RO CHECKED: 11/7/77, RDO REVIEWED BY/DATE: 11/8/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001250

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 B91 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: B91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1826

TYPE :BO SAMPLE DESCRIPTION: RIB5LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		B91A	B91B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770712	770803
5. SAMPLE SIZE	GMA	0.107	0.107
6. ALIQUOT (FRACTION)		0.040	0.080
7. SAMPLE SIZE MEASURED	GMA	4.276E-03	8.552E-03
8. 242 PU SPIKE	DPM	50.530	49.410
9. STD. ERROR OF ITEM 8	DPM	0.170	0.410
10. 242 PU SAMPLE COUNTS	CTS	19108	38806
11. 239 PU SAMPLE COUNTS	CTS	1340	4974
12. 239 PU IN SAMPLE	PCI	1.596	2.853
13. STD. ERROR(COUNTS+SYS)	PCI	4.543E-02	4.906E-02
14. CONCENTRATION 239PU	PCI/GMA	373.332	333.617
15. STD. ERROR(CNT+SYS)	PCI/GMA	10.625	5.737
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	342.582	PCI/GMA	
2. STD. ERROR(EXTERNAL)	16.603	PCI/GMA	
3. STD. ERROR(INTERNAL)	5.048	PCI/GMA	
4. VARIANCE RATIO,F	10.819		
5. FRACTIONAL STD. ERROR	0.0485		

6. PU (MEAN) IN ALIQ #1 : 1.465 + 0.071 PCI

RECEIVED CHR

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 342.876 ± 16.617 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/17/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001251

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 C71 PU239 (NEW) 771109

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: C71

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1374

TYPE :BO SAMPLE DESCRIPTION: VERT7CERV --

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		C71
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770816
5. SAMPLE SIZE	GMA	0.215
6. ALIQUOT (FRACTION)		0.010
7. SAMPLE SIZE MEASURED	GMA	2.150E-03
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	15045
11. 239 PU SAMPLE COUNTS	CTS	1296
12. 239 PU IN SAMPLE	PCI	1.855
13. STD. ERROR(COUNTS+SYS)	PCI	5.457E-02
14. CONCENTRATION 239PU	PCI/GMA	862.773
15. STD. ERROR(CNT+SYS)	PCI/GMA	25.381
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	862.773	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	25.381	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0294		

6. PU (MEAN) IN ALIQ #1 : 1.855_+ 0.055 PCI

RECEIVED CHR

NOV 2 9 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 863.518 ± 25.403 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001252

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 C91 PU239 (NEW) 771122

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: C91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1828

TYPE :BO SAMPLE DESCRIPTION: RIB7LT

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		C91
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		750930
5. SAMPLE SIZE	GMA	7.230E-02
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	7.230E-02
8. 242 PU SPIKE	DPM	69.100
9. STD. ERROR OF ITEM 8	DPM	1.200
10. 242 PU SAMPLE COUNTS	CTS	22033
11. 239 PU SAMPLE COUNTS	CTS	16425
12. 239 PU IN SAMPLE	PCI	23.206
13. STD. ERROR(COUNTS+SYS)	PCI	0.469
14. CONCENTRATION 239PU	PCI/GMA	320.971
15. STD. ERROR(CNT+SYS)	PCI/GMA	6.482
. REFERENCES-CHR DOCS.		RC51FI

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	320.971	PCI/GMA	
2. STD. ERROR (EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	6.482	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0202		

6. PU (MEAN) IN ALIQ #1 : 23.206_+ 0.469 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 321.230 ± 6.487 PCI/GMA

ANALYZED BY: FI CHECKED: RO REVIEWED BY/DATE: RPL 11-28-77

COMMENTS AND REFERENCES:

PO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001253

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 D11 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: D11

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1829

TYPE :BO SAMPLE DESCRIPTION: RIB8LT

	ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1.	SAMPLE SUB-NUMBER		D11A	D11B
2.	METHOD		AID	AID
3.	DATE REQUESTED		750801	750801
4.	DATE ANALYZED		770712	770803
5.	SAMPLE SIZE	GMA	0.105	0.105
6.	ALIQUOT (FRACTION)		0.040	0.080
7.	SAMPLE SIZE MEASURED	GMA	4.212E-03	8.424E-03
8.	242 PU SPIKE	DPM	50.530	47.800
9.	STD. ERROR OF ITEM 8	DPM	0.170	0.250
10.	242 PU SAMPLE COUNTS	CTS	14109	12717
11.	239 PU SAMPLE COUNTS	CTS	1025	1776
12.	239 PU IN SAMPLE	PCI	1.654	3.007
13.	STD. ERROR(COUNTS+SYS)	PCI	5.379E-02	7.779E-02
14.	CONCENTRATION 239PU	PCI/GMA	392.630	356.995
15.	STD. ERROR(CNT+SYS)	PCI/GMA	12.770	9.234
16.	REFERENCES-CHR DOCS.		RC95RO	RC99RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	369.230	PCI/GMA
2.	STD. ERROR(EXTERNAL)	16.920	PCI/GMA
3.	STD. ERROR(INTERNAL)	7.483	PCI/GMA
4.	VARIANCE RATIO,F	5.113	
5.	FRACTIONAL STD. ERROR	0.0458	

6. PU (MEAN) IN ALIQ #1 : 1.555_+ 0.071 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 369.548 ± 16.935 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/18/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHE FORM 10/14/77(HFL)

8001254

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 D31 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: D31

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1830

TYPE :BO SAMPLE DESCRIPTION: RIB9LT

ITEM	UNIT	ANALYSIS NUMBER 1	ANALYSIS NUMBER 2
1. SAMPLE SUB-NUMBER		D31A	D31B
2. METHOD		AID	AID
3. DATE REQUESTED		750801	750801
4. DATE ANALYZED		770712	770804
5. SAMPLE SIZE	GMA	0.103	0.103
6. ALIQUOT (FRACTION)		0.040	0.080
7. SAMPLE SIZE MEASURED	GMA	4.100E-03	8.200E-03
8. 242 PU SPIKE	DPM	50.530	47.800
9. STD. ERROR OF ITEM 8	DPM	0.170	0.250
10. 242 PU SAMPLE COUNTS	CTS	20372	15972
11. 239 PU SAMPLE COUNTS	CTS	1446	2367
12. 239 PU IN SAMPLE	PCI	1.616	3.191
13. STD. ERROR(COUNTS+SYS)	PCI	4.431E-02	7.224E-02
14. CONCENTRATION 239PU	PCI/GMA	394.089	389.177
15. STD. ERROR(CNT+SYS)	PCI/GMA	10.807	8.810
16. REFERENCES-CHR DOCS.		RC95RO	RC99RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	391.138	PCI/GMA	
2. STD.ERROR(EXTERNAL)	2.406	PCI/GMA	
3. STD. ERROR(INTERNAL)	6.828	PCI/GMA	
4. VARIANCE RATIO,F	0.124		
5. FRACTIONAL STD. ERROR	0.0175		

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RECORDS ROOM

6. PU (MEAN) IN ALIQ #1 : 1.604_+ 0.028 PCI

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* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 391.475 ± 6.834 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/18/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001255

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 D51 PU239 (NEW) 771117

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: D51

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1831

TYPE :BO SAMPLE DESCRIPTION: RIB10LT

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		D51
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770714
5.	SAMPLE SIZE	GMA	0.106
6.	ALIQUOT (FRACTION)		0.040
7.	SAMPLE SIZE MEASURED	GMA	4.232E-03
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	13972
11.	239 PU SAMPLE COUNTS	CTS	1003
12.	239 PU IN SAMPLE	PCI	1.634
13.	STD. ERROR(COUNTS+SYS)	PCI	5.370E-02
14.	CONCENTRATION 239PU	PCI/GMA	386.136
15.	STD. ERROR(CNT+SYS)	PCI/GMA	12.689
16.	REFERENCES-CHR DOCS.		RC95RO

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* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	386.136	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	12.689	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0329	

6. PU (MEAN) IN ALIQ #1 : 1.634 + 0.054 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 386.469 ± 12.700 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11/18/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

8001256

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 D71 PU239 (REV)* 780926

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: D71

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1832

TYPE :BO SAMPLE DESCRIPTION: RIB11LT

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		D71B
2. METHOD		CRI
3. DATE REQUESTED		750801
4. DATE ANALYZED		780808
5. SAMPLE SIZE	GMA	0.101
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.088E-03
8. 242 PU SPIKE	DPM	42.740
9. STD. ERROR OF ITEM 8	DPM	0.380
10. 242 PU SAMPLE COUNTS	CTS	52954
11. 239 PU SAMPLE COUNTS	CTS	7588
12. 239 PU IN SAMPLE	PCI	2.759
13. STD. ERROR(COUNTS+SYS)	PCI	4.182E-02
14. CONCENTRATION 239PU	PCI/GMA	341.127
15. STD. ERROR(CNT+SYS)	PCI/GMA	5.170
6. REFERENCES-CHR DOCS.		R112R0

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		341.127	PCI/GMA
2. STD. ERROR(EXTERNAL)		0.000	PCI/GMA
3. STD. ERROR(INTERNAL)		5.170	PCI/GMA
4. VARIANCE RATIO,F		0.000	
5. FRACTIONAL STD. ERROR		0.0152	
6. PU (MEAN) IN ALIQ #1 :	2.759 +	0.042	PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 341.431 ± 5.175 PCI/GMA

ANALYZED BY: CGC CHECKED: RDO 9/27/78 REVIEWED BY/DATE: RPL 9/28/78

COMMENTS AND REFERENCES:
Previous result reported in error probably due to mistake in aliquot size.

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

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CHR FORM 10/14/77(HFL) 8001257

PRIVACY ACT MATERIAL REMOVED

CHR RECORDS

DETAILED RESULTS: 40-010 _91 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: D91

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1833

TYPE :BO SAMPLE DESCRIPTION: RIB12LT

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		D91
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770726
5. SAMPLE SIZE	GMA	0.101
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	8.048E-03
8. 242 PU SPIKE	DPM	49.410
9. STD. ERROR OF ITEM 8	DPM	0.410
10. 242 PU SAMPLE COUNTS	CTS	10306
11. 239 PU SAMPLE COUNTS	CTS	1338
12. 239 PU IN SAMPLE	PCI	2.890
13. STD. ERROR(COUNTS+SYS)	PCI	8.733E-02
14. CONCENTRATION 239PU	PCI/GMA	359.077
15. STD. ERROR(CNT+SYS)	PCI/GMA	10.851
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	359.077	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	10.851	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0302		
6. PU (MEAN) IN ALIQ #1 :	2.890_+	0.087	PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 359.386 ± 10.861 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001258

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 EODC PU239 (NEW) 811118

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: EODC

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3400

TYPE :BO SAMPLE DESCRIPTION: HUMRTDIST CORT PORTION OF EOD1

ITEM	UNIT	ANALYSIS NUMBER 1	2	3
1. SAMPLE SUB-NUMBER		EODCA	EODCC	EODCB
2. METHOD		CRI	CRI	CRI
3. DATE REQUESTED		781207	781207	781207
4. DATE ANALYZED		790223	790417	790417
5. SAMPLE SIZE	GMA	2.651	2.651	2.651
6. ALIQUOT (FRACTION)		0.076	0.091	0.091
7. SAMPLE SIZE MEASURED	GMA	0.202	0.241	0.241
8. 242 PU SPIKE	DPM	37.400	37.400	37.400
9. STD. ERROR OF ITEM 8	DPM	0.130	0.130	0.130
10. 242 PU SAMPLE COUNTS	CTS	47239	28569	28477
11. 239 PU SAMPLE COUNTS	CTS	5268	3902	3770
12. 239 PU IN SAMPLE	PCI	1.879	2.301	2.231
13. STD. ERROR(COUNTS+SYS)	PCI	2.806E-02	4.008E-02	3.943E-02
14. CONCENTRATION 239PU	PCI/GMA	9.302	9.552	9.259
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.139	0.166	0.164
16. REFERENCES-CHR DOCS.		R112RO	R116RO	R116RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	9.361	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.087	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.089	PCI/GMA	
4. VARIANCE RATIO,F	0.945		
5. FRACTIONAL STD. ERROR	0.0095		

6. PU (MEAN) IN ALIQ #1 : 1.891 ± 0.018 PCI

RECEIVED MAR 31 1982 RECORDS MGMT

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 9.370 ± 0.089 PCI/GMA

ANALYZED BY: SMM CHECKED: DS 11/18/81 REVIEWED BY/DATE: RDO 11/19/81

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001259

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E0DT PU239 (NEW) 810803

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E0DT

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3398

TYPE :BO SAMPLE DESCRIPTION: HUMRTDIST TRAB PORTION OF E0D1

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E0DTA
2.	METHOD		CRI
3.	DATE REQUESTED		781207
4.	DATE ANALYZED		790226
5.	SAMPLE SIZE	GMA	0.131
6.	ALIQUOT (FRACTION)		0.400
7.	SAMPLE SIZE MEASURED	GMA	5.227E-02
8.	242 PU SPIKE	DPM	37.400
9.	STD. ERROR OF ITEM 8	DPM	0.130
10.	242 PU SAMPLE COUNTS	CTS	30954
11.	239 PU SAMPLE COUNTS	CTS	4911
12.	239 PU IN SAMPLE	PCI	2.673
13.	STD. ERROR(COUNTS+SYS)	PCI	4.210E-02
14.	CONCENTRATION 239PU	PCI/GMA	51.143
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.805
16.	REFERENCES-CHR DOCS.		R112RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	51.143	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.805	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0157	

6. PU (MEAN) IN ALIQ #1 : 2.673 + 0.042 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 51.189 ± 0.806 PCI/GMA

ANALYZED BY: SMM CHECKED: DS 8/4/81 REVIEWED BY/DATE: RDO 11/13/81

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) 8001260

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E0DI PU239 (NEW) 810803

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E0DI

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 3399

TYPE :BO SAMPLE DESCRIPTION: HUMRTDIST MIX OF TRAB CORT OF E0D1

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E0D1A
2.	METHOD		CRI
3.	DATE REQUESTED		781207
4.	DATE ANALYZED		790226
5.	SAMPLE SIZE	GMA	0.418
6.	ALIQUOT (FRACTION)		0.400
7.	SAMPLE SIZE MEASURED	GMA	0.167
8.	242 PU SPIKE	DPM	37.400
9.	STD. ERROR OF ITEM 8	DPM	0.130
10.	242 PU SAMPLE COUNTS	CTS	24574
11.	239 PU SAMPLE COUNTS	CTS	5646
12.	239 PU IN SAMPLE	PCI	3.871
13.	STD. ERROR(COUNTS+SYS)	PCI	5.869E-02
14.	CONCENTRATION 239PU	PCI/GMA	23.140
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.351
16.	REFERENCES-CHR DOCS.		F112RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	23.140	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.351	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0152	

6. PU (MEAN) IN ALIQ #1 : 3.871 ± 0.059 PCI

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 23.161 ± 0.351 PCI/GMA

ANALYZED BY: SMM CHECKED: 5/4/81 REVIEWED BY/DATE: RDO 11/13/81

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL) 8001261 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E01 PU239 (NEW) 771114

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E01

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1371

TYPE :BO SAMPLE DESCRIPTION: HUMRTPROX --

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E01
2. METHOD		AID
3. DATE REQUESTED		750601
4. DATE ANALYZED		750724
5. SAMPLE SIZE	GMA	1.893
6. ALIQUOT (FRACTION)		0.023
7. SAMPLE SIZE MEASURED	GMA	4.302E-02
8. 242 PU SPIKE	DPM	69.100
9. STD. ERROR OF ITEM 8	DPM	1.200
10. 242 PU SAMPLE COUNTS	CTS	6104
11. 239 PU SAMPLE COUNTS	CTS	1283
12. 239 PU IN SAMPLE	PCI	6.543
13. STD. ERROR(COUNTS+SYS)	PCI	0.231
14. CONCENTRATION 239PU	PCI/GMA	152.099
15. STD. ERROR(CNT+SYS)	PCI/GMA	5.366
16. REFERENCES-CHR DOCS.		RC51FI

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	152.099	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	5.366	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0353		
6. PU (MEAN) IN ALIQ #1 :	6.543 ±	0.231	PCI

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****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 152.221 ± 5.371 PCI/GMA

ANALYZED BY: FI CHECKED: RDO REVIEWED BY/DATE: RPL 11/14/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E02 PU239 (NEW) 771114

239PU (PLUTONIUM) PRIVACY ACT MATERIAL REMOVED
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E02

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1372

TYPE :BO SAMPLE DESCRIPTION: HUMRTMS PROX. OF TRUE MS

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E02
2.	METHOD		AID
3.	DATE REQUESTED		750601
4.	DATE ANALYZED		750728
5.	SAMPLE SIZE	GMA	1.405
6.	ALIQUOT (FRACTION)		0.175
7.	SAMPLE SIZE MEASURED	GMA	0.246
8.	242 PU SPIKE	DPM	69.100
9.	STD. ERROR OF ITEM 8	DPM	1.200
10.	242 PU SAMPLE COUNTS	CTS	25530
11.	239 PU SAMPLE COUNTS	CTS	4983
12.	239 PU IN SAMPLE	PCI	6.076
13.	STD. ERROR(COUNTS+SYS)	PCI	0.141
14.	CONCENTRATION 239PU	PCI/GMA	24.711
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.575
16.	REFERENCES-CHR DOCS.		RC51FI

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	24.711	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.575	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0233	

6. PU (MEAN) IN ALIQ #1 : 6.076 ± 0.141 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 24.731 ± 0.575 PCI/GMA

ANALYZED BY: FI CHECKED: RDO REVIEWED BY/DATE: RPL 11/14/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001263 PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E03 PU239 (NEW) 771109

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E03

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1373

TYPE :BO SAMPLE DESCRIPTION: HUMRTMS DIST. OF TRUE MS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E03
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770816
5. SAMPLE SIZE	GMA	2.720
6. ALIQUOT (FRACTION)		0.080
7. SAMPLE SIZE MEASURED	GMA	0.218
8. 242 PU SPIKE	DPM	47.800
9. STD. ERROR OF ITEM 8	DPM	0.250
10. 242 PU SAMPLE COUNTS	CTS	5832
11. 239 PU SAMPLE COUNTS	CTS	1069
12. 239 PU IN SAMPLE	PCI	3.947
13. STD. ERROR(COUNTS+SYS)	PCI	0.133
14. CONCENTRATION 239PU	PCI/GMA	18.137
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.611
16. REFERENCES-CHR DOCS.		RC95RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	18.137	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.611	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0337		

6. PU (MEAN) IN ALIQ #1 : 3.947 + 0.133 PCI

RECEIVED CHR
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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 18.152 ± 0.611 PCI/GMA

ANALYZED BY: RO CHECKED: RDO/11-10-77 REVIEWED BY/DATE: RPL 11/11/77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001264

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E10 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E10

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1873

TYPE :BO SAMPLE DESCRIPTION: HUMLTHD

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E10
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770623
5. SAMPLE SIZE	GMA	0.248
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.248
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	6657
11. 239 PU SAMPLE COUNTS	CTS	9476
12. 239 PU IN SAMPLE	PCI	32.403
13. STD. ERROR(COUNTS+SYS)	PCI	0.530
14. CONCENTRATION 239PU	PCI/GMA	130.817
15. STD. ERROR(CNT+SYS)	PCI/GMA	2.138
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)		130.817	PCI/GMA
2. STD.ERROR(EXTERNAL)		0.000	PCI/GMA
3. STD. ERROR(INTERNAL)		2.138	PCI/GMA
4. VARIANCE RATIO,F		0.000	
5. FRACTIONAL STD. ERROR		0.0163	
6. PU (MEAN) IN ALIQ #1 :	32.403 ±	0.530	PCI

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NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 130.929 ± 2.140 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001265

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E11 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E11

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1874

TYPE :BO SAMPLE DESCRIPTION: HUMLTPREP L HUMERUS PROXIMAL EPIPHYSIS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E11B
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770712
5. SAMPLE SIZE	GMA	0.105
6. ALIQUOT (FRACTION)		0.400
7. SAMPLE SIZE MEASURED	GMA	4.196E-02
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	6091
11. 239 PU SAMPLE COUNTS	CTS	1073
12. 239 PU IN SAMPLE	PCI	4.010
13. STD. ERROR(COUNTS+SYS)	PCI	0.133
14. CONCENTRATION 239PU	PCI/GMA	95.570
15. STD. ERROR(CNT+SYS)	PCI/GMA	3.180
16. REFERENCES-CHR DOCS.		RC97RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	95.570	PCI/GMA
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3. STD. ERROR(INTERNAL)	3.180	PCI/GMA
4. VARIANCE RATIO,F	0.000	
5. FRACTIONAL STD. ERROR	0.0333	

6. PU (MEAN) IN ALIQ #1 : 4.010 + 0.133 PCI

RECEIVED CHR

NOV 29 1977

RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 95.652 ± 3.183 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001266

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E12 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E12

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1875

TYPE :BO SAMPLE DESCRIPTION: HUMLTSNK1 L HUMERUS SURGICAL NECK1

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E12
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770623
5. SAMPLE SIZE	GMA	0.258
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.258
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	6755
11. 239 PU SAMPLE COUNTS	CTS	4087
12. 239 PU IN SAMPLE	PCI	13.773
13. STD. ERROR(COUNTS+SYS)	PCI	0.277
14. CONCENTRATION 239PU	PCI/GMA	53.342
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.072
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	53.342	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.072	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0201		

6. PU (MEAN) IN ALIQ #1 : 13.773 + 0.277 PCI

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RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 53.387 ± 1.073 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001267

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E13 PU239 (NEW) 771117

PRIVACY ACT MATERIAL REMOVED

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E13

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1876

TYPE :BO SAMPLE DESCRIPTION: HUMLTSNK2 L HUMERUS SURGICAL NECK 2

	ITEM	UNIT	ANALYSIS NUMBER 1
1.	SAMPLE SUB-NUMBER		E13
2.	METHOD		AID
3.	DATE REQUESTED		750801
4.	DATE ANALYZED		770628
5.	SAMPLE SIZE	GMA	0.236
6.	ALIQUOT (FRACTION)		1.000
7.	SAMPLE SIZE MEASURED	GMA	0.236
8.	242 PU SPIKE	DPM	50.530
9.	STD. ERROR OF ITEM 8	DPM	0.170
10.	242 PU SAMPLE COUNTS	CTS	6395
11.	239 PU SAMPLE COUNTS	CTS	2249
12.	239 PU IN SAMPLE	PCI	8.006
13.	STD. ERROR(COUNTS+SYS)	PCI	0.198
14.	CONCENTRATION 239PU	PCI/GMA	33.908
15.	STD. ERROR(CNT+SYS)	PCI/GMA	0.839
16.	REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1.	PU CONCENTRATION OR RATE(WTD. MEAN)	33.908	PCI/GMA
2.	STD.ERROR(EXTERNAL)	0.000	PCI/GMA
3.	STD. ERROR(INTERNAL)	0.839	PCI/GMA
4.	VARIANCE RATIO,F	0.000	
5.	FRACTIONAL STD. ERROR	0.0247	

6. PU (MEAN) IN ALIQ #1 : 8.006 ± 0.198 PCI

RECEIVED CHR
NOV 2 9 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 33.937 ± 0.840 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001268

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: PRIVACY ACT MATERIAL REMOVED 40-010 E14 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E14

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1877

TYPE :BO SAMPLE DESCRIPTION: HUMLTMS1

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E14
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770627
5. SAMPLE SIZE	GMA	0.252
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.252
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	17555
11. 239 PU SAMPLE COUNTS	CTS	6332
12. 239 PU IN SAMPLE	PCI	8.211
13. STD. ERROR(COUNTS+SYS)	PCI	0.123
14. CONCENTRATION 239PU	PCI/GMA	32.569
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.490
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	32.569	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.490	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0150		
6. PU (MEAN) IN ALIQ #1 :	8.211 ±	0.123	PCI

RECEIVED CHR
NOV 23 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 32.597 ± 0.490 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

PRIVACY ACT MATERIAL REMOVED

DETAILED RESULTS: 40-010 E15 PU239 (NEW) 771117

PRIVACY ACT EXEMPTION

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E15

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1878

TYPE :BO SAMPLE DESCRIPTION: HUMLTMS2

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E15
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770628
5. SAMPLE SIZE	GMA	0.253
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.253
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	6855
11. 239 PU SAMPLE COUNTS	CTS	1993
12. 239 PU IN SAMPLE	PCI	6.618
13. STD. ERROR(COUNTS+SYS)	PCI	0.170
14. CONCENTRATION 239PU	PCI/GMA	26.201
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.673
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	26.201	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.673	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0257		
6. PU (MEAN) IN ALIQ #1 :	6.618 ±	0.170	PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 26.223 ± 0.673 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

8001270

PRIVACY ACT EXEMPTION

DETAILED RESULTS: 40-010 E16 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E16

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1879

TYPE :BO SAMPLE DESCRIPTION: HUMLTDMT1

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E16
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770627
5. SAMPLE SIZE	GMA	0.256
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.256
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	17518
11. 239 PU SAMPLE COUNTS	CTS	4530
12. 239 PU IN SAMPLE	PCI	5.887
13. STD. ERROR(COUNTS+SYS)	PCI	0.100
14. CONCENTRATION 239PU	PCI/GMA	23.039
15. STD. ERROR(CNT+SYS)	PCI/GMA	0.392
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	23.039	PCI/GMA	
2. STD.ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	0.392	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0170		
6. PU (MEAN) IN ALIQ #1 : 5.887 +	0.100	PCI	

RECEIVED CHR
NOV 3 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 23.059 ± 0.392 PCI/GMA

ANALYZED BY: RO CHECKED: Ro REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

FREEDOM OF INFORMATION ACT/PRIVACY ACT SYSTEM MATERIAL RECORDS

DETAILED RESULTS: 40-010 E18 PU239 (NEW) 771117

239PU (PLUTONIUM)
****

NAME: *CASE NO.: 40-010 *SAMPLE NO.: E18

EVENT: DEATH/E *DATE OF EVENT: 470429 *LAB NO.: 1881

TYPE :BO SAMPLE DESCRIPTION: HUMLTDEP L HUMERUS DISTAL EPIPHYSIS

ITEM	UNIT	ANALYSIS NUMBER 1
1. SAMPLE SUB-NUMBER		E18
2. METHOD		AID
3. DATE REQUESTED		750801
4. DATE ANALYZED		770628
5. SAMPLE SIZE	GMA	0.101
6. ALIQUOT (FRACTION)		1.000
7. SAMPLE SIZE MEASURED	GMA	0.101
8. 242 PU SPIKE	DPM	50.530
9. STD. ERROR OF ITEM 8	DPM	0.170
10. 242 PU SAMPLE COUNTS	CTS	4907
11. 239 PU SAMPLE COUNTS	CTS	521
12. 239 PU IN SAMPLE	PCI	2.417
13. STD. ERROR(COUNTS+SYS)	PCI	0.112
14. CONCENTRATION 239PU	PCI/GMA	23.836
15. STD. ERROR(CNT+SYS)	PCI/GMA	1.101
16. REFERENCES-CHR DOCS.		RC96RO

****
* RESULTS: AT TIME OF FIRST MEASUREMENT *
****

1. PU CONCENTRATION OR RATE(WTD. MEAN)	23.836	PCI/GMA	
2. STD. ERROR(EXTERNAL)	0.000	PCI/GMA	
3. STD. ERROR(INTERNAL)	1.101	PCI/GMA	
4. VARIANCE RATIO,F	0.000		
5. FRACTIONAL STD. ERROR	0.0462		
6. PU (MEAN) IN ALIQ #1 :	2.417 +	0.112	PCI

RECEIVED CHR
NOV 29 1977
RECORDS ROOM

****
* RESULTS: AT TIME OF EVENT *
****

PU CONCENTRATION OR RATE: 23.856 ± 1.102 PCI/GMA

ANALYZED BY: RO CHECKED: RO REVIEWED BY/DATE: RPL 11-18-77

COMMENTS AND REFERENCES:

TO (BY/DATE): CHR FILE:_____SR FORM:_____SA CARD:_____CHEM FILE:_____

CHR FORM 10/14/77(HFL)

40-010

ARGONNE NATIONAL LABORATORY

INTRA-LABORATORY MEMO

MICROFILMED

JUL 2 1981

June 24, 1981

TO: J. Rundo

FROM: R. P. Larsen

CHR RECORDS

SUBJECT: Comparison of the plutonium distribution in the skeletal remains of 40-015 with that in 40-010

In the 1978-79 Annual Report a comparison was made of the distribution of plutonium in the skeletal remains of 40-010 with that in 40-015. To make this comparison nine bone samples from each skeleton were analyzed: 5 sections of individual bones, 3 whole bones, and one group of bones. The concentrations in the sample from each skeleton were then divided by the concentration in a particular sample from that skeleton, the femur midshaft. The agreement of the values for these concentration ratios suggested that the distribution of plutonium in 40-010 was not atypical. The possibility of this was based on the knowledge that a symptom of Cushing's syndrome, the illness to which 40-010 succumbed, is osteoporosis.

Since July 1979 a number of other bone samples from these two cases have been analyzed. The concentration ratios for these samples are given in the following table, along with the values presented in the 1978-79 report. The conclusion drawn in that report, to wit, that there is no significant difference in the distribution of plutonium in the bones of the two skeletons, appears to be correct. Over a wide concentration range, the difference in the concentration ratios for any bone is less than a factor of 2.

A plot of the values for 40-010 against those for 40-015 indicated that there was a linear correlation between the concentrations in the two skeletons if the values for the femur were not considered. Since there was other evidence that plutonium deposition in the femur in 40-010 was atypical in comparison with that in the rest of the skeleton (the concentrations in the femur heads differed by a factor of about 3 and in the femur trochanters by a factor of about 2), the concentrations in each set were renormalized to the concentration in the respective tibia midshaft and these values were plotted. This plot is shown below.

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JUN 30 1981

RECORDS ROOM

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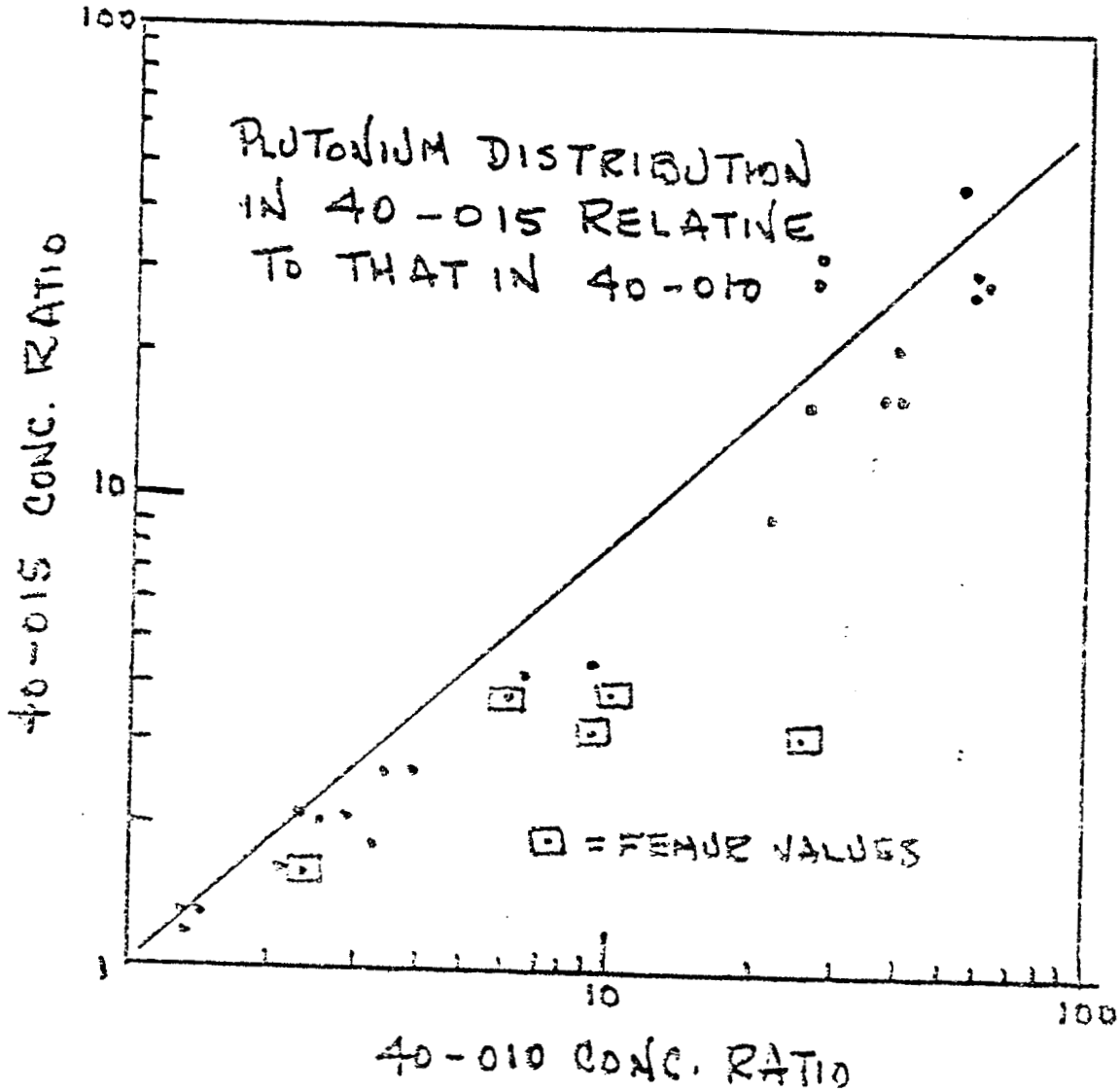

It appears that there is a good correlation between the distributions in the two cases when the concentration ratio is less than about 20, i.e., when most of the plutonium is in cortical bone. Beyond this, when there is a progressively higher percentage of the plutonium in trabecular bone, there is more scatter in the data. The only explanation I can offer is that as a result of the osteoporosis in 40-010, there were larger losses of calcium and/or plutonium from the trabeculae of certain bones than there were from others. Considering the facts that (1) they were

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both in very poor health, (2) one was a female and the other a male, (3) and she was about 20 years old and he about 60, it seems surprising that the distributions are so similar. In fact the concentration in a particular bone of 40-015 can be estimated with a relative error of about 25% from the concentration in the same bone of 40-010 using the following equation:

$$R_{15} = 0.6R_{10} + 0.4$$

where R_{15} is the concentration ratio in 40-015

and R_{10} is that in 40-010.

During the coming month or two, a few other bone samples from 40-015 will be analyzed. With the exception of the skull, the remainder are being returned to J. Farnham for reinterment.

RPL/md
Enclosure

cc: R. A. Schlenker
J. E. Farnham
R. D. Oldham
CHR Records Room

8001275

Bone	Relative Concentration Bone/Femur Midshaft[a]		
(1979)	Case 40-010	Case 40-015	40-010/40-015
Humerus shaft	0.97 (2.2)	1.11 (1.6)	0.87
Femur head	10.6, 3.86 (25,8.9)[b]	2.11 (3.1)	5.0, 1.8
Rib-2 (B-5)	10.1 (23)	10.2 (15.0)[c]	0.99
Rib-8 (D-1)	11.0 (25)	8.95 (13.5)[c]	1.2
Sternum	25.7 (57)	18.0 (27)	1.4
Vertebrae, cervical, body	25.8 (57)	19.3 (29)	1.3
Vertebrae, thoracic, body	23.3 (52)	29.8 (45)	0.78
Tarsals	1.41 (3.2)	1.23 (1.8)	1.1
(1981)			
Scapula	9.31 (21)	5.86 (8.9)	1.6
Manubrium & sternum	25.7 (59)	18.6 (28)	1.4
Rib-1 (B-1)	10.7 (25)	10.0 (15)	1.1
Rib-9 (D-3)	11.7 (27)	21.2 (3.1)	0.55
Rib-10 (D-5)	11.5 (26)	17.3 (27)	1.1
Thoracic vertebrae, processes	16.0 (37)	10.5 (16)	1.5
Iliac crest of innominate	17.2 (39)	10.6 (16)	1.6
Sacrum	16.8 (39)	13.1 (20)	1.2
Femur, trochanter	4.44, 2.63 (10,6.1)[b]	2.49 (38)	1.8, 1.1
Femur, condyles	1.25 (2.8)	1.41 (2.1)	0.88
Tibia, proximal condyles	1.72 (3.9)	1.76 (2.6)	0.98
Tibia, shaft	0.43 (1.0)	0.65 (1.0)	0.66
Tibia, distal condyles	0.98 (2.3)	1.41 (2.1)	0.69
Fibula, ends	1.48 (3.4)	1.73 (2.6)	0.86
Fibula, shaft	0.59 (1.4)	0.91 (13)	0.65
Humerus, head	3.91 (9.0)	2.92 (4.3)	1.3
Humerus, proximal epiphysis	2.85 (6.4)	2.82 (4.2)	1.0
Ulna, ends	1.09 (2.5)	1.45 (2.1)	0.75
Ulna, shaft	0.57 (1.3)	0.79 (1.2)	0.76
Radius, shaft	0.59 (1.3)	0.85 (1.3)	0.69

[a] Numbers in parentheses are relative to tibia midshart

[b] Left and right femur, respectively

[c] These values are known to be a factor of 1.5 to 2.0 low, as they are for a section of rib

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June 1974

Pathology Report

PRIVACY ACT MATERIAL REMOVED

Case 4C-010

Case History

Name :
Born : Sex : Female
Died : April 29, 1947 — Cushings Syndrome, no autopsy indicated on the death certificate.
Disinterred on September 24, 1973 after 26 years of burial in a sealed, concrete vault.

Radiation Exposure: As a terminal patient, 18 years of age she was injected with 4.9 mcg ^{239}Pu (IV) citrate on November 27, 1945.

Description of Exhumed Remains

The body was that of a young, adult, white female that had been well embalmed and showed no signs of decay during interment. External examination of the skin showed it to be considerably dehydrated, shriveled and discolored. Also seen was the usual Y and scalp incisions associated with a previous, complete autopsy. The mouth still contained about 21 teeth.

Internal examination revealed all organs and the brain to have been removed at the autopsy prior to burial. The flesh beneath the skin was still moist but homogenized. No evidence of severe decay was present.

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PRIVACY ACT MATERIAL REMOVED

CASE	LOG IN REC	SPCT IN	RECD	EVD	PRES SEN	SOR REF	LOCA	LOG#	DESCRIPTION	CHEC OPEN	UNIT	UNIT OCON	SPC	O.NO	PRIS	LOG OUT REC
									RU	1.1120E+02	GM	1.4400E+01	GM	BE	RAS	780102 5
									RU	7.4200E+01	GM	3.7000E+01	GM	BE	RAS	780629 6
									RU	3.6000E+01	GM	2.4100E+01	GM	BE	RAS	770520 8
									RU	1.2200E+01	GM	2.3370E+01	GM	BE	RBH	780412 9
									RU E0D2	8.6400E+00	GM	4.8400E+00	GM	BE	RPL	781207 22
40-004	5	BE	Y	750610	4	$	CHR	$	SK9	2139 SPINE PARTIAL	3.4480E+01	GM				
										SP	2.6900E+01	GM	7.5800E+00	GM	BE	RAS	780102 3
										SP	1.1730E+01				BE	RBH	770812 4
40-004	6	BE	Y	750610	4	$	CHR	$	SK9	2140 PELVIC B PARTIAL	3.7960E+01	GM				
40-004	7	BE	Y	750610	4	$	CHR	$	SK9	2141 RIB FRAGMENTS	7.5800E+00	GM				
										RI	0.0000E+00	GM	7.5900E+00	GM	BE	RBH	770812 2
40-004	8	BE	Y	750610	4	$	CHR	$	SK9	2142 SKULL B	6.0593E+02	GM				
										SK	3.0300E+02	GM	1.7037E+02	GM	BE	RBH	770812 1
40-004	9	BE	Y	750610	4	$	CHR	$	SK9	2143 SKELETON PARTIAL	2.6700E+00	KG				
40-010	1	BE	N	730924	2	$	CHR	$	WI2	2144 SKULL A0 A1 COMPLETE	3.0300E+02	GM*				
										SK R SINUSES	2.0200E+02	GM(	1.0200E+02	GM(	BE	M-A	750612 1
										SK L A0 A1	7.5800E+01	GM	1.2720E+02	GM	BE	RPL	750711 2
										SK L SINUSES	2.6800E+01	GM	4.8000E+01	GM	BE	RAS	770520 3
40-010	2	BE	N	730924	2	$	CHR	$	WI2	2145 SPINE COMPLETE	3.4000E+02	GM*				
										SP C7A1	3.4430E+02	GM	1.2100E+00	GM	BE	M-A	740304 4
										SP C7B1	3.4520E+02	GM	1.0000E+00	GM	BE	RPL	740304 5
										SP C0A1	3.4270E+02	GM	2.5700E+00	GM	BE	M-A	740304 6
										SP C0B1	3.4100E+02	GM	1.6000E+00	GM	BE	RPL	740304 7
										SP R6A1	3.3720E+02	GM	3.2800E+00	GM	BE	M-A	740304 8
										SP R6B1	3.3450E+02	GM	3.3200E+00	GM	BE	RPL	740304 9
										SP L HALF	1.6400E+02	GM	1.7050E+02	GM	BE	RPL	750711 10
40-010	3	BE	N	730924	2	$	CHR	$	WI2	2146 RIBS B 16 MISC.	2.1100E+02	GM*				
										RI B8 PROX.	2.0950E+02	GM	9.4000E-01	GM	BE	RAS	730328 11
										RI B8 DISTAL	2.0860E+02	GM	1.1000E+00	GM	BE	JR	750228 12
										RI C8 DISTAL	2.0650E+02	GM	2.3000E+00	GM	BE	M-A	731113 13
										RI L 12	4.6000E+01	GM	1.6020E+02	GM	BE	RPL	750711 14
40-010	4	BE	N	730924	2	$	CHR	$	--	2147 PELVIC B	2.4000E+02	GM*				
										PE E6A1-5	2.2830E+02	GM	1.1290E+01	GM	BE	M-A	740304 15
										PE E6A2-6	2.1570E+02	GM	1.4510E+01	GM	BE	RPL	740304 16
										PE E6C1	2.1070E+02	GM	2.7500E+00	GM	BE	M-A	740304 17
										PE E6C2	2.0770E+02	GM	3.2000E+00	GM	BE	RPL	740304 18

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CASE	LOG IN REC	SPCIN	RECD	EVD	PRES	SPN	SOR REF	LOCA	LOCN	DESCRIPTION	QREC QTEN	UNIT	QCON	UNIT	SPCO	LMO	DTS	LOG OUT REC
										FE E6C3-5	2.0400E+02	GM	1.4500E+00	GM	BE	RPL	740304	19
										FE E6C4-6	2.0490E+02	GM	1.3500E+00	GM	BE	M-A	740304	20
										FE L ALL	0.0000E+00	GM	2.0490E+02	GM	BE	RPL	750711	21
40-010	5	BE	N	730924		2	$	CHR	$	HI2	2148	HUMERUS B		1.5600E+02	GM(				
												HU E0A0-C0	1.4150E+02	GM	1.4060E+01	GM	BE	M-A	740304	22
												HU E0A0-C0	1.2097E+02	GM	2.0560E+01	GM	BE	RPL	740304	23
												HU L MOST	4.2370E+01	GM	7.2600E+01	GM	BE	RPL	750711	24
												HU E1N3 PCS.	3.4300E+01	GM	8.0700E+00	GM	BE	RAS	770320	25
												HU E0N3 PCS.	2.9000E+01	GM	5.2500E+00	GM	BE	RAS	770320	26
												HU E0D1	2.3030E+01	GM	6.0200E+00	GM	BE	RPL	781207	39
40-010	6	BE	N	730924		2	$	CHR	$	HI2	2149	FEMUR B		5.0600E+02	GM*				
												FE K4A0-E0	3.8720E+02	GM	1.1940E+02	GM	BE	M-A	740304	27
												FE K4A0-E0	2.6820E+02	GM	1.0590E+02	GM	BE	RPL	740304	28
												FE L MOST	3.3900E+01	GM	2.4830E+02	GM	BE	RPL	750711	29
												FE K5N3 PCS.	0.0000E+00	GM	3.3900E+01	GM	BE	RAS	770320	30
40-010	7	BE	N	730924		2	$	CHR	$	HI2	2150	TIBIA B		3.4400E+02	GM*				
												TI K7N3 PC.	3.3100E+02	GM	1.2700E+01	GM	BE	RAS	750206	31
												TI R ALL	1.8300E+02	GM	1.4200E+02	GM	BE	RPL	750711	32
												TI K7N3 PCS.	1.1200E+02	GM	7.6000E+01	GM	BE	RAS	770320	33
												TI K7A0-E0	0.0000E+00	GM	1.1200E+02	GM	BE	RPL	771130	34
40-010	8	BE	N	730924		2	$	CHR	$	HI2	2151	BONE OTHER MISC.		6.7700E+02	GM(				
												BO E5D0-E0	6.7170E+02	GM	5.5600E+00	GM	BE	M-A	731113	35
												BO N3 PCS.	6.6350E+02	GM	8.1600E+00	GM	BE	RAS	750206	36
												BO MISC.	2.4570E+02	GM	4.1790E+02	GM	BE	RPL	750711	37
												BO N3 PCS.	1.6140E+02	GM	8.4300E+01	GM	BE	RAS	770320	38
40-015	1	BE	N	780519		4	$	CHR	$	J001	2152	SKELETON COMPLETE	.		--					
50-108	1	JA	N	741205		$	00173	RS	--	--	2153	SINUS AIR L FRONTAL	2.4000E+00	ML						
50-108	2	JA	N	741205		$	00174	RS	--	--	2154	SINUS AIR L MASTOID	1.0000E+01	ML						
50-108	3	JA	N	741205		$	00175	RS	--	--	2155	SINUS AIR L MAX.	1.0000E+01	ML						
50-108	4	DA	N	741205		2	00172	RS	--	RFH	2156	BONE OTHER SAMPLES	.		--					
50-143	1	NS	N	780303		$	00450	MIT	72-3293	NSL	2157	PATH SLIDES	8.0000E+00	EA						
												PATH SLIDES	0.0000E+00	EA	8.0000E+00	EA	NS	NSL	780303	1

8001279

BONE AND DOSIMETRY GROUP
SAMPLE DISTRIBUTION

Case No. 40-010 Date: 781207

Sample Type (SPCI): Autopsy ___, EXH X, Cremains ___, Surgical ___, Willed ___

Sample(s):

	Code No.	Description	Weight	Wet or Dry
1.	EOD1 To RPL	Hu_n^{Rn} shaft$_n$ distal$_n$ pc.	6.02	Wet (from freeze
2.				
3.				
4.				
5.				
6.				
7.				
8.				

8001280

ARGONNE NATIONAL LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

May 20, 1977

Memo To: R. A. Schlenker
R. P. Larsen

From: J. E. Farnham

Subject: Bone specimens from Case #40-010

The bone specimens requested by Dr. Schlenker were delivered to the Bone and Dosimetry Group by Robert Oldham. The following is a listing of the specimens returned:

vertebrae, left halves	left humerus, distal shaft & epiphysis
left innominate	left scapula
skull, left half	right radius, shaft
mandible, left half	right ulna
left patella	left fibula
sacrum, left half	left ribs
sternum group, left half	left femur

See W. Vonseggen's memo dated 11 July, 1975.

Upon inspection Dr. Schlenker chose segments from the following diaphyseal bone for his sagittal cut section needs:

Four pieces of left femur	K5C, 15.6g
Three pieces of left femur	K5G, 18.2g (two pieces being returned)
Two pieces of left humerus	E1H, 8.07g
Five pieces of right radius	E2B, 7.5g (five pieces being returned)
Five pieces of right ulna	E4B, 8.75g (six pieces being returned)

These bone segments were photographed and weighed. The remaining specimens received from Robert Oldham were returned along with a photograph of the specimens we returned.

Several diaphyseal bone segments were also obtained from the bones in the Bone and Dosimetry Group's collection.

PRIVACY ACT MATERIAL REMOVED

8001281

ANL-26 (11-68)

Two pieces of right humerus, 11.27g
Two pieces of left radius, 4.38g
Six pieces of left ulna, 14.37g
Seven pieces of left tibia, 76.8g
Seven pieces of right fibula, 19.2g

The available bones were photographed before and after cutting the segments.

JEF:dmm

xc: CHR - Records Room

8001282

ARGONNE
NATIONAL
LABORATORY

PRIVACY ACT MATERIAL REMOVED

INTRA-LABORATORY MEMO

September 16, 1976

TO: R. P. Larsen

FROM: J. E. Farnham

SUBJECT: CHR case # 40-010

The following listed bone specimens have been returned to the Bone and Dosimetry Groups' facilities for selection of suitable endosteal surface areas for alpha quantitation:

1) A3, 3 pieces (both ends) and 1 1/2" segment of shaft
2) K9 B, 11 pieces of diaphysis
3) E2 A, 5 pieces of ends
4) K5 D, 4 pieces of pmt
5) K5 E, 4 pieces of ms
6) K5 F, 3 pieces of ms

Dr. Schlenker will select several small areas (1 cm^2) of smooth, flat endosteal surfaces to use in his studies. The endosteal surfaces will be cut from the cortical bone segments. All remaining materials will be returned to you. A statement listing the specimens we are keeping for study, and listing the weight of each sample will be sent to you at a later date.

JEF:clg

cc: R. A. Schlenker
J. Rundo
CHR Records Room

8001283

PRIVACY ACT MATERIAL REMOVED

ANL-26 (11-68)

ARGONNE
NATIONAL
LABORATORY

PRIVACY ACT MATERIAL REMOVED.

11-C/C

INTRA-LABORATORY MEMO

11 July 1975

To: R. Larsen
J. Rundo
R. Schlenker
J. Farnham
A. Stehney
CHR Records Room
Bone Group Case File

From: W. VonSeggen

Subject: Distribution of Skeletal Specimen of 40-010 to Radiochemical Group by Bone and Dosimetry Group

The following skeletal specimen have been given to Dr. Robert Larsen for radiochemical analysis. These specimen represent approximately 50% of the skeleton of 40-010. All specimen have been reduced to smaller size (1 inch or less) to facilitate chemical dissolution.

Attach.
WVS:jg
cc: RER-RF

8001284

PRIVACY ACT MATERIAL REMOVED

Skeletal Specimen of 40-010 for Radiochemical Analysis

AO - Skull (left half)

A. calvarium
B. temporal squamous area
C. parietal-occipital area
D. frontal sinus area
E. maxillary sinus area
F. mastoid area

A1 - mandible (left half) with 7 teeth

A3 - left clavicle

A5 - left scapula

A6 - manubrium (left half)

A7 - body of sternum (left half)

A8 - xiphoid (entire)

LEFT RIBS (entire)

1.	B1	5.	B9	9.	D3
2.	B3	6.	A9	10.	D5
3.	B5	7.	C9	11.	D7
4.	B7	8.	D1	12.	D9

Cervical Vertebral Bodies (left half) C1—6; bagged together
Cervical Vertebral Processes (left half) C1—6; bagged together

Thoracic Vertebral Bodies (left half) 1—6, 8—12; bagged together
Thoracic Vertebral Processes (left half) 1—6, 8—12; bagged together

Lumbar Vertebral Bodies (left half) 2—5; bagged together
Lumbar Vertebral Processes (left half) 2—5; bagged together

R9 Sacrum

E7 Left Innominate (entire)

A. anterior iliac crest
B. posterior iliac crest
C. ischium
D. pubis
E. ilium, sacro iliac area
F. ilium, body

8001285

K5 Left Femur (entire)

A. head
B. trochanter
C. proximal shaft #1
D. proximal shaft #2
E. midshaft #1
F. midshaft #2
G. distal shaft #1
H. distal shaft #2
I. distal shaft #3
J. condyles

K6 Right Tibia (entire)

A. proximal condyles
B. subcondylar #1
C. subcondylar #2
D. proximal shaft
E. midshaft #1
F. midshaft #2
G. distal shaft #1
H. distal shaft #2
I. distal shaft #3
J. distal condyle

K9 Left Fibula (entire)

A. proximal and distal ends
B. shaft

E9 Left Patella (entire)

Left Foot (entire)

A. Tarsals
B. Metatarsals
C. Digits

E1 Left Humerus

A. head
B. proximal epiphysis
C. surgical neck #1
D. surgical neck #2

E1 Left Humerus (entire) (cont'd)

E. midshaft #1
F. midshaft #2
G. distal shaft #1
H. distal shaft #2
I. distal epiphysis
J. distal end

E2 Right Radius (entire)

A. proximal and distal ends
B. shaft

E4 Right Ulna (entire)

A. proximal and distal ends
B. shaft

Left Hand (entire)

A. carpals
B. metacarpals
C. digits

8001287

8001288

40-010

MICROFILMED

MAR 11 1980

CHR RECORDS

RADIOCHEMISTRY

SAMPLE ANALYSIS FOR THIS CASE IS IN PROGRESS

8001289

40-010	A01	BO	PU239	1.66909E+02	2.44914E+00	771109	GMA ✓
	A02	BO	PU239	1.56918E+02	5.56349E+00	771109	GMA ✓
	A03	BO	PU239	1.98177E+02	4.96975E+00	771109	GMA ✓
	A11	BO	PU239	7.51765E+01	1.55598E+00	771109	GMA ✓
	A31	BO	PU239	1.74956E+02	3.64270E+00	771110	GMA ✓
	A51	BO	PU239	3.11515E+02	5.77337E+00	771109	GMA ✓
	A91	BO	PU239	3.11809E+02	8.93742E+00	771117	GMA ✓
	B11	BO	PU239	3.58731E+02	1.22180E+01	771109	GMA ✓
	B31	BO	PU239	3.38185E+02	6.77145E+00	771109	GMA ✓
	B51	BO	PU239	3.32245E+02	4.82487E+00	771117	GMA ✓
	B51D	BO	AM241	6.53000E+00	3.30000E-01	780901	GMA —
	B71	BO	PU239	2.84655E+02	5.58159E+00	771107	GMA ✓
	B91	BO	PU239	3.42876E+02	1.66173E+01	771117	GMA ✓
	C71	BO	PU239	8.63518E+02	2.54030E+01	771109	GMA ✓
	C91	BO	PU239	3.21230E+02	6.48735E+00	771122	GMA ✓
	D11	BO	PU239	3.69548E+02	1.69348E+01	771117	GMA ✓
	D31	BO	PU239	3.91475E+02	6.83423E+00	771117	GMA ✓
	D51	BO	PU239	3.86469E+02	1.27001E+01	771117	GMA ✓
	D71	BO	PU239	3.41431E+02	5.17492E+00	780926	GMA ✓

Detailed report not available 10/15/84 GA/HPL

CHK RECORDS

8001290

						GAS	
D91	BO	PU239	3.59386E+02	1.08608E+01	771117	GMA	✓
E0DC	BO	PU239	9.36963E+00	8.94263E-02	811118	GMA	✓
E0DI	BO	PU239	2.31606E+01	3.51165E-01	810803	GMA	✓
E0DT	BO	PU239	5.11890E+01	8.06146E-01	810803	GMA	✓
E01	BO	PU239	1.52221E+02	5.37070E+00	771114	GMA	✓
E02	BO	PU239	2.47313E+01	5.75467E-01	771114	GMA	✓
E03	BO	PU239	1.81524E+01	6.11355E-01	771109	GMA	✓
E10	BO	PU239	1.30929E+02	2.13966E+00	771117	GMA	✓
E11	BO	PU239	9.56518E+01	3.18315E+00	771117	GMA	✓
E12	BO	PU239	5.33874E+01	1.07312E+00	771117	GMA	✓
E13	BO	PU239	3.39367E+01	8.39775E-01	771117	GMA	✓
E14	BO	PU239	3.25974E+01	4.90275E-01	771117	GMA	✓
E14B	BO	AM241	6.02000E-01	4.40000E-02	780901	GMA	—
E15	BO	PU239	2.62230E+01	6.73147E-01	771117	GMA	✓
E16	BO	PU239	2.30589E+01	3.92105E-01	771117	GMA	✓
E18	BO	PU239	2.38561E+01	1.10217E+00	771117	GMA	✓
E19	BO	PU239	5.12752E+01	8.45468E-01	771117	GMA	✓
E21	BO	PU239	6.16922E+01	2.04701E+00	771122	GMA	✓
E22	BO	PU239	1.96717E+01	4.03287E-01	771122	GMA	✓
E41	BO	PU239	3.63007E+01	1.22985E+00	771122	GMA	✓

— no detailed report available 10/1/84 GA/HFL

8001291

ARGONNE
NATIONAL
LABORATORY

40 - 010

INTRA-LABORATORY MEMO

November 15, 1978

TO: Jean Plondke

FROM: Robert Oldham Robert Oldham

SUBJECT: Ca Results on Samples from Cases 40-004 and 40-010

Please remove Ca results that have been reported for the following samples from CHEM FILE:

40-004	E1C2
40-004	K4A6
40-004	010
40-010	B51
40-010	E14
40-010	E72
40-010	K50
40-010	110

Please also remove Ca Detailed Result sheets from records for the above samples and prepare new Summary Reports once the Ca results have been deleted.

cc: RDO

RDO/ns

8001292

IL-26 (11-68)

ARGONNE
NATIONAL
LABORATORY

INTRA-LABORATORY MEMO

July 12, 1978

TO: Jean Plondke

FROM: Robert Oldham

SUBJECT: Sample 40-010.200 (Lab. No. 1887)

Please remove results from CHEM FILE that have been reported for sample 40-010.200 (Lab. No. 1887). The sample that was analyzed did not consist entirely of carpals of the left hand as the sample description indicates. The ratio of ash weight (9.989 grams) to wet weight (11.4 grams) for this sample is 0.88 when one would expect it to be approximately 0.25. The indicated wet weight is, according to J. Farnham, a reasonable weight for the carpals of one hand. This and the fact that the dry weight (28.78 grams) exceeds the wet weight indicates that bone other than left hand carpals must have been added to the sample between the time that the wet weight was measured by the Bone and Dosimetry Group and the sample was dried and ashed by Frank Ilcewicz (RC51 FI). Therefore, the results reported for this sample are suspect and should be deleted.

8001293

40-010

ARGONNE NATIONAL LABORATORY

INTRA-LABORATORY MEMO

October 4, 1978

TO: Records

FROM: Robert Oldham R. Oldham

SUBJECT: Sample Analyses Without Detailed Result Forms

The following analyses on the samples indicated do not have Detailed Result Forms. Results were entered directly into CHEM FILE from notebooks containing the calculations using the CHEM coding Form, CHR-ANL-12/19/73.

NUCLIDE ANALYZED	SAMPLE ID	LAB NO
AM241	40-004.010	2980
"	40-004.E1C2	2986
"	40-009.19	946
"	40-009.20	947
"	40-009.22 to 40-009.27	949 to 954
"	40-010.B51	1824
"	40-010.E14	1877
"	40-012.08	1147
"	40-012.10	1149
"	40-012.11	1150
"	40-012.13	1152
PU239	40-009.01 to 40-009.28	930 to 955
"	40-012.07 to 40-012.23	1146 to 1162
PU238	40-001.BY1	3006
"	40-003.04	1130
"	40-003.11	1137
"	40-003.12	1138

cc: J. Plondke
R. Oldham

RO/ns

8001294

Special
Medical

8001295