728034

REPOSITORY DOE-OHRE

COLLECTION PLUTONIUM INJECTION

BOX NO. 1

FOLDER Center For Human Radiobiology (40-006) (Unknown / CH13)

0000616

REPOSITORY DOE-OHRE

COLLECTION PLUTONIUM INJECTION

BOX NO. 1

FOLDER Center For Human Radiobiology (40-006) (Unknown / CH13)

8000617

SEARCH/
CONTACT

0000618

70-006

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

0000619

Chi-3

Dec 13, 1972

Report of first search of Billings Hospital [illegible]

Cases Chi-I and Chi-II were identified as unit Nos. 354370 and 371183, respectively. Celloidin blocks were available from Chi-II and not specimens from Chi-I. Death certificates were not available [illegible].

Chi-III

Autopsy and biopsy reports were searched for [illegible] disease (as per classification of [illegible]) yielding the following unit #'s

385271	357210	357542
81913	371484	
77706	366351	
361161	348546	
335509	347623	
365177	210156	

None were suitable - females or inappropriate stay in Hospital.

8000620

Chicago patients

I

Inj. date Apr 26, 1945 male ~ 68 yr
Death Oct 3, 1945
Autopsy April 11, 1945
Surgery 2 days P.I. Apr. 25, 1945

Age Malignancy of mouth
Alcoholic Bronchitis Att. Phys.

II

female ~ 55
Inj. date 12-27-45
Death 1-13-46
Autopsy

Met. breast CA + lymphoblastoma
Geo. Dick att. phys.

III

Male
Injected 12/27/45
Expected expected for ~~at least~~ 160 days
EB Russell Thought he had Hodgkins disease

8000621

Chi - III

Name

Hospital No.

Date of birth

Date of injection

Age at injection - Dec. 27, 1945 ^{239}Pu (VI) citrate

Date of death

Age at death Time after injection -

Death certificate No.

0000622

CORRESPONDENCE

0000623

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.

40-006

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

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).

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.

40-006

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

NOV 21 1985

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

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. Balint

for David T. Goldman
Area Manager

Enclosure:
As Stated

cc: A. Zilberstein, ANL, w/enclosure
R. E. Rowland, Princeton, KY, w/enclosure 502-365-2979
[redacted]

DEC 04 1985

8000629

THE KNOXVILLE JOURNAL

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

40-006

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.

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 M Beck

Randell M. Beck, reporter
(615) 522-4141, Ext. 423

DEC 04 1985

000630

40-006

DOE F 1325.8
(7-79)

U.S. DEPARTMENT OF ENERGY

memorandum

DATE November 12, 1985

REPLY TO ATTN OF MA-232.1 – Joan Ogbazghi

SUBJECT Freedom of Information Request #11048505D

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

0000631

40-006

November 14, 1985

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

Re: 110463098
110485078
110485088
110485228

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) 576-0685; Gail M. Borkan, 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

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

DEC 04 1985

0000632

8000633

MEMO ROUTE SLIP
Form ERDA-93 (1-75) ERDAM 240

☐ See me about this. ☐ For reference. ☐ For action.
☐ Note and return. ☐ For signature. ☐ For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
Dr. Sidney Marks Division of Biomedical and Environmental Research E-201		MICROFILMED MAR 08 1978
TO (Name and unit)	INITIALS / DATE	REMARKS CHR RECORDS RECEIVED CHR JUN 27 1977
TO (Name and unit)	INITIALS / DATE	REMARKS RECORDS ROOM re: DIVISION OF BIOMEDICAL AND ENVIRONMENTAL RESEARCH, HEADQUARTERS - REQUEST TO LOCATE UNIDENTIFIED SUBJECT KNOWN AS CHICAGO-III (41-2-117)
FROM (Name and unit) Gordon F. Ihmle Assistant Director for Investigations Office of Internal Review		REMARKS Per our conversation enclosed is a copy of our report concerning "Chicago-III."
PHONE NO. 3492	DATE 2/23/76	

USE OTHER SIDE FOR ADDITIONAL REMARKS

643—16—83488-1 GPO

0000634

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

November 29, 1974

Jon D. Anderson, Director
Division of Inspection

MEMORANDUM REPORT

DIVISION OF BIOMEDICAL AND ENVIRONMENTAL RESEARCH, HEADQUARTERS - REQUEST TO LOCATE UNIDENTIFIED SUBJECT KNOWN AS CHICAGO-III (41-2-117)

This investigation was predicated upon the request of Dr. James L. Liverman, Assistant General Manager for Biomedical and Environmental Research and Safety Programs, and Director, Division of Biomedical and Environmental Research, Headquarters, that an attempt be made to locate an unidentified white male who was involved in a clinical testing program at the University of Chicago Hospitals and Clinics, 950 East 59th Street, Chicago, Illinois, in 1945, but who was subsequently lost to followup.

BACKGROUND INFORMATION

Review of a report entitled Medical Industrial Hazards Section, dated January 19, 1946, and identified as MUC-HC-1187, disclosed that it states in part as follows:

* * * * *

"Special Urines: Two humans were injected with 94.91 μg of plutonium on December 27, 1945. The composition of the injected solution and the volume injected is given in Table I. The urinary plutonium excretion for the male subject is given in Table II and for the female in Table III."

* * * * *

Examination of Table II and Table III, in the referenced report, disclosed that the former tabulated the daily plutonium urinary excretion data for a male known as MX-200, and the latter tabulated similar data for a female known as WX-300.

Examination of a publication entitled Plutonium in Man: A New Look at the Old Data, authored by Dr. Patricia W. Durbin, Radiobiologist, Biology and Medicine Division, Lawrence Berkeley Laboratory, formerly Lawrence Radiation

Laboratory, disclosed that, with respect to Chicago-III (CHI-III), it states in part as follows:

* * * * *

"Chi-3: White male, young adult, injected 12/27/45, ~ 0.085 μCi/kg ^{239}Pu(VI) citrate. Hodgkin's disease, no other information. Died ~ 170 days post injection, autopsy withheld. (Also designated as MX-200 in Ref. 48)."

* * * * *

Examination of Reference 48 disclosed that it states in part as follows:

* * * * *

"48. J. J. Nickson, E. R. Russell, and J. E. Rose: Medical Industrial Hazards Section and Biochemical Survey Section Reports, Metallurgical Laboratory (a) MUC-HG-1088 (May 1945), (b) MUC-HG-1187 (Jan. 1946), (c) MUC-HG-1194 (Feb. 1946), (d) MUC-HG-1203 (Mar.-Apr. 1946), (e) MUC-ERR-206 (May 1946), (f) MUC-ERR-211, (June 1946)."

* * * * *

The above report in Reference 48 (a) was not pursued because the date of the report, May 1945, preceded the known date of injection of the subject of the inquiry, December 27, 1945. A consolidation of the urinary excreta data on MX-200 (CHI-III), as shown in references (b) through (f) above, disclosed that 108 samples were taken from the unidentified subject over a period of 163 days post injection.

Mr. John C. Stuhlmann, Resident Investigator, Division of Inspection, stationed at the Chicago Operations Office, perused the records at the Center for Human Radiobiology, Argonne National Laboratory, and advised that no reports such as those in Reference 48 could be located beyond June 1946. He further advised that the only report which he could locate that related to the clinical testing program was identified as CH-3607-C, issued on October 2, 1946, the examination of which disclosed that it dealt with the distribution and excretion of plutonium in two human subjects designated as CHI-I and CHI-II, both of whose identities were already known.

RESULTS OF INVESTIGATION

At the outset of this investigation, Dr. George V. LeRoy, Director, University Health Services, and Professor of Medicine, University of Chicago Hospitals and Clinics, and Mr. Mark Olson, Director, Office of Medical

Legal Affairs, University of Chicago, were interviewed jointly. Dr. LeRoy requested that Mr. Olson be present at the interview because he (Olson) is always consulted on any matters concerning patient inquiries, to which the writer agreed.

Dr. LeRoy advised that prior to the writer's arrival, Mr. Olson's staff had done some preliminary searching of hospital records to try to isolate the subject of the inquiry; that the Registry of Neoplastic Diseases was scanned to identify young, male, adult, Hodgkin's disease patients; that this Registry was compiled during the mid-1950's by going back through autopsy and various other hospital records; that, in his opinion, the Registry is about 98 percent accurate; that while there was a possibility that the subject may not have been recorded in the Registry, it was the best available source since the subject's name was unknown.

Dr. LeRoy advised that the scanning process by Mr. Olson's staff resulted in nine potential subjects, with an average age of 26 years, which had been reduced to three, prior to the writer's arrival, the eliminations being made based upon admission or discharge dates, established dates of death, etc. He advised that the three patients who had not been eliminated at the time of interview had been "flagged" for further followup because the Registry data made reference to the administration of a "Substance X," and the fact that the clinical testing program at one time was shrouded in secrecy made the reference suspect.

Examination of the data accumulated by Mr. Olson's staff on the six patients eliminated from further consideration validated the basis for their elimination. Examination of the records of the three remaining patients considered as potentials disclosed that "Substance X" was in reality Nitrogen Mustard, which, Dr. LeRoy explained, was an experimental substance used at one time in Hodgkin's disease cases. He opined that two experimental substances would not have been administered simultaneously because of inconclusive results and potential legal implications. Based upon his opinion, these three patients were eliminated from further consideration, along with evidence on their medical records that they received continuing treatment, whereas the subject of the inquiry, according to Dr. Durbin, would not accept treatment because of religious scruples although he permitted excreta samples to be taken.

Dr. LeRoy advised that it was his understanding that Dr. Leon O. Jacobson, Division of Biological Sciences, University of Chicago, believed that CHI-III left the hospital against medical advice (AMA), which could be verified only on his medical record if his identity were known, as could the matter of his refusal to accept treatment because of religious scruples. Dr. Jacobson was out of the country at the time of the inquiry and thus not available for interview.

As stated hereinbefore, the review of the records by Mr. Olson's staff focused on Hodgkin's disease patients with an average age of 26 years, because the

best information available indicated that CHI-III was an adult male between "16-40 years of age." In order to test the validity of the review by Mr. Olson's staff, and to expand that review, the writer obtained a card file from Dr. Phillip W. Graff, Pathologist, Surgical and Pathology, Clinics and Hospitals, University of Chicago, who stated that, within the 98 percent accuracy estimated by Dr. LeRoy, the file represented all Hodgkin's disease patients who had been in the Clinics and Hospitals, and was directly correlated with the Registry of Neoplastic Diseases, previously mentioned. It was noted that, by count, this card file included 504 individual patient cards, which contained information in varying degrees, such as patient number, name, date of death, date of autopsy, if any, whether patient was still living, date of last visit, etc.

Prior to reviewing the card file, it was determined from the record that from January 28, 1945, to January 1, 1947, the patient numbers assigned for all medical purposes ranged from 349,998 to 398,000. As the cards were reviewed, female patients were eliminated, as were those whose cards showed other data such as age, recent examinations or evidence of continuing treatment. In addition, only those patients with numbers falling within the aforementioned range were recorded for further followup, excluding those already identified by Mr. Olson's staff and previously eliminated. Mr. Olson commented that one fallacy in using the patient number approach was that if the subject of the inquiry had been born at the hospital, he would carry a patient number well outside the range established, assuming that his name was recorded in the file in the first place. He stated, however, that this approach was the most logical one under the circumstances.

The review of this card record resulted in 14 possibilities which were listed by name and patient number, and with the assistance of Mrs. Lylian J. Kane, Administrative Assistant, Office of Medical Legal Affairs, University of Chicago, were traced into various hospital records and eliminated from further consideration for the following reasons:

Basis for Elimination	No.
Admission subsequent to known injection date	8
Age considerations (7 and 65 years)	2
Received Nitrogen Mustard treatment	2
Date of known death and autopsy	1
Not a patient at time of known injection	1
	14

Mrs. Kane advised that prior to assuming her present position, she worked in the hospital records unit for 17 years; that she is positive that daily census records would have been maintained during the period that the subject was an in-house patient; and that because of the age of these records, they would be difficult to locate assuming that they were still in existence. Efforts to locate these records while the writer was onsite in Chicago,

September 25-27, 1974, proved futile. Mrs. Kane agreed to continue the search and subsequently advised the writer on November 19, 1974, that her efforts failed to locate the records, and that she has concluded that because of their age and lack of storage space, they have been destroyed.

It will be recalled that Reference 48, previously quoted, contained the name of one E. R. Russell as a co-author of certain publications utilized by Dr. Durbin in her article pertaining to participants in the clinical testing program.

Mr. Edwin R. Russell, formerly an Assistant, Metallurgical Laboratory, University of Chicago, and a Group Leader and Associate Chemist, Argonne National Laboratory, presently a Staff Chemist, E. I. DuPont deNemours Company, Savannah River Laboratory, Aiken, South Carolina, was contacted telephonically. He stated that he was aware that there were three patients who were in the clinical testing program at the University of Chicago; that, after examining a personal notebook in his possession, he had recorded the last names of two patients known as CHI-I and CHI-II, already known to the writer; that he did not know the name of the third participant who was a young adult male who had Hodgkin's disease; that he did recall that no autopsy was permitted due to the patient's religious scruples; and that he could not recall the specific description or age of this patient, whether he had succumbed in the hospital, or whether he had left the hospital against medical advice. He added that he did find one entry in his notebook that referred to picking up samples from a Mr. Hempleman (phonetic) but he could not recall any other specifics and, consequently, could not say whether or not this name was pertinent.

Mrs. Kane was recontacted telephonically and requested to scan the hospital records for a patient by the name of Hempleman, Hempelmann, or any similar name. She subsequently advised that her search of the records disclosed no patient of such name, but that other records did identify a Dr. Louis Henry Hempelmann, Jr., who at one time had been associated with the Los Alamos Scientific Laboratory and more recently with the Department of Radiology at the University of Rochester School of Medicine and Dentistry.

Mr. Russell advised that the information which he had recorded in his personal notebook was quite limited because of the secrecy regarding the clinical testing program at the time it was conceived and executed. He stated, however, that he recalls that during the time the program was in progress, a number of "gray, numbered, research notebooks" were kept by various individuals, including himself; that these notebooks were all notarized by the then Director of the Library at the Argonne National Laboratory, a female; and that these notebooks would not have been destroyed and should be located in the archives at the Laboratory. He added that this data should contain detailed information regarding all subjects in the program, probably including their identification.

The writer telephonically contacted Mr. E. Newman Pettitt, Technical Publications and Classification, Library Services, Argonne National Laboratory, and

requested his assistance in locating the research notebooks referred to by Mr. Russell. Mr. Pettitt was familiar with the subject of the inquiry, stating that he had searched out other information during an earlier phase of the overall inquiry, but that he did not recall searching for or seeing any research notebooks.

After considerable searching, which was hampered by the fact that the storage facility had been moved and that sometimes research notebooks were logged under various names, Mr. Pettitt advised that he had been able to locate several notebooks, none of which made reference to specific names of individuals involved in the clinical testing program. He advised, however, that he is certain that there are others in existence and that he will continue to search for them and advise the writer in the event they are located so that they may be reviewed by a representative of the Division of Inspection.

In view of the foregoing, I recommend that no further action be taken regarding this matter until such time as additional information may be forthcoming as a result of Mr. Pettitt's continuing efforts. Should pertinent leads evolve from his efforts, I would recommend that the case be reopened.

Giles L. Lofton
Deputy Assistant Director
Division of Inspection

Period of Inquiry:
September 25-27, 1974

Distribution:

2 - Division of Biomedical and Environmental Research

MX-2000 (Chi-III)
copied from MUC-HG-1187
Jun 1946

MICROFILMED

Injected 12/27/45 94.9 μg

day	% (urine)
1	.857
2	.182
3	.063
4	.077
5	.026
6	.0256
7	.0234
8	.0227
9	.0082
10	.0097
11	.0097

8000642

SECRET

SECRET

DECLASSIFIED

Daily Plutonium Urinary Excretion
(continued) MX-200

Days after Injection	24-hour Volume	% of injected dose excreted
12	640*	.0253
13	640*	.00[illegible]
14	580*	.0080
15	590*	.0100
16	380*	.0005
17	10*	------
18	1590	.022
19	1485	.0030
20	870	.0016
21	1[illegible]	.0[illegible]
22	1500	.0[illegible]
23,24	5250	.0[illegible]
25	1500	.0[illegible]
26	1700	.0[illegible]
27	1950	.0[illegible]
28	1700	.0[illegible]
29	1800	.0[illegible]
30	1800	.0[illegible]
31	1[illegible]	.0[illegible]
32	2940	.0[illegible]
33	3300	.0[illegible]
34	1500	.0127
35	1800	.0[illegible]
36	1330	.0121
37	2500	.0[illegible]
38	1670	.0[illegible]
39	1050	.0072
40	1550	.0058
41	2000	.0[illegible]

* It was learned that incomplete collections were made on specimens 9 through 17, therefore, the [illegible] are low.

STATUS VERIFIED UNCLASSIFIED
Dennis C. Murphy ADC-1B
DATE 6/5/96

Tissue Analysis 205-HIH-3550 (Secret-Restricted)

A. Tissue Specimens Received

Human 31
Animal. 13
Total 44

from MUC-HG-1194
Feb 1946

Daily Plutonium Urinary Excretion
MX-200 (continued from MUC-ERR-185)

Days after injection	24-hour volume	% of injected dose excreted
42	1400 ml	.0095
43	330*	.0031
44	850*	.015
45	700*	.012
47	1080	.0064
48	980	.0063
49	450*	.0054
50	550*	.0071
51	1270	.007
57	600*	.0094
58	820*	.011
61	1200	.0083
62	1120	.0094
63	1850	.0071
64	1150	.0099
65	1580	.014
66	1570	.014
67	1000	.011
68	1670	.011
69	1640	.014
70	1150	.0096
72	1700	.0083
73	1420	.010
74	1700	.0083
75	1300	.0081
77	1200	.014
84	800*	.007
93	500*	.0093
94	270*	.006
95	700	.011
97	1150	.012

*Incomplete collection.

Because of the very small volumes of urine collected on some days, these values have been omitted from the table.

From MUC-HG-1203 april 1946

Special Urines (R. Lesko)

A. Received 54

B. Analysed 32

The daily urinary plutonium excretion of the subject MX-200 is being followed. The Table below is a continuation of the one from MUC-HG-1203

Table III

Daily Plutonium Urinary Excretion
(MX-200)

Days after Injection	24-hour Volume	% of injected dose excreted
98	810 ml*	.000
99	900	.0096
101	1150	.009
102	280	.006
103	1600	.019
104	730	.0026
105	1150	.0078
106	800	[illegible]
109	[illegible]	.0025
110	[illegible]*	[illegible]
111	680	.0005
112	780	.011
113	750	.0145
114	[illegible]	.0069
116	890	.0065
119	1600	.0115
121	1130	.0206
123	1100	.005
127	650*	[illegible]
129	[illegible]	[illegible]

* Incomplete collection

II. Stool Analysis [illegible]-3510

A. Specimens Received . . . . . [illegible]

B. Specimens Analysed . . . . . [illegible]

from MUC-ERR-206 May 20, 1946

II. Routine Urine Survey: 249-MLH-3501 (Jackson-Sellers-Moore)

A. Urine Specimens Received

Chicago	.59	
Other	5	
Backlog	.20	
Total		.84

B. Specimens Analysed

Chicago	.76	
Other	5	
Total		.81

C. Backlog 3

Special Urines: R. Beske

A. Received 34

B. Analysed 32

The data in Table 1 is a continuation of the urinary plutonium excretion results of Table III, MUC-ERR-136. As is seen the daily plutonium excretion has remained at nearly 0.01% at the end of 160 days.

Table I

Daily Plutonium Urinary Excretion
(MX-200)

Days After Injection	24-hour Volume	% of Injected Dose Excreted
130	540 ml*	0.0051
131	810*	0.011
133	550*	0.0075
135	600*	0.0077
137	710*	0.0094
139	880*	0.010
142	950*	0.0089
145	460*	0.006
149	1140*	0.010
152	490*	0.011
155	430*	0.0056
156	560*	0.011
158	520*	0.012
159	285*	0.0057
160	555*	0.012
161	490*	0.0075
163	520*	0.0086

* Uncertain about complete 24 collection--Results on the basis of volume received.

from MUC-ERR-211 June 1946

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	.472	.569	.440	.296	-	.217	.377	.160	.414	.101	.857	2.531*	.152	.460
2	.146	.294	.289	.236	.166	.216	.212	.232	.085	.330	.103	.182	.163	.167	.150
3	.114	.174	.112	.221	.077	.127	.137	.128	.069	.218	.083	.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	.059	.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	-	.023	-	.0056
18	.026	.020	.017	.037	.020	.015	.011	.029	.027	.021	.026	-	.026	-	.010
19	.025	.019	.016	.032	.018	.015	.010	.031	.029	.017	.029	.0022	.015	-	.006
20	.017	.021	.012	.025	.021	.013	.003	.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	.0123	.020	-	.0076
25	.013	.014	-	.011	-	-	.008	.023	.029	.016	.021	.0123	.148*	-	.011
26	-	.017	-	.011	-	-	.007	.022	.032	.016	.023	.0175	.024	-	.0022
27	-	.008	-	.008	-	-	.008	.023	.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	-	.0064
35	-	-	-	-	-	-	.006	-	.022	-	.026	.0127	.009	-	.0069
36	-	-	-	-	-	-	.006	.015	.022	-	.018	.0165	.015	-	.0079
37	-	-	-	-	-	-	.006	.011	-	-	.023*	.0111	.011	-	.0063
38	-	-	-	-	-	-	-	.016	-	-	.018	.0174	.009	-	.0085
39	-	-	-	-	-	-	-	.012	-	-	.021	.0112	.008	-	.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	-	-	.0062
52	-	-	-	-	-	-	-	-	-	-	.035	.0073	-	-	.0098
53	-	-	-	-	-	-	-	.013	-	-	.019	.0023	-	-	.0074
54	-	-	-	-	-	-	-	.013	-	-	.043	-	-	-	.0077
55	-	-	-	-	-	-	-	.015	-	-	.013*	.0073	.014	-	.0096
56	-	-	-	-	-	-	-	.013	-	-	.036	.003	-	-	.0064
57	-	-	-	-	-	-	-	.012	-	-	.018	.0075	-	-	.0050
58	-	-	-	-	-	-	-	.013	-	-	.036	.0094	-	-	.0058
59	-	-	-	-	-	-	-	.012	-	-	-	.011	-	-	.0096
60	-	-	-	-	-	-	-	.011	-	-	-	.0053	.022	-	.0067
61	-	-	-	-	-	-	-	.012	-	-	-	.0068	-	-	.0066
62	-	-	-	-	-	-	-	.010	-	-	-	.0092	-	-	.0058
63	-	-	-	-	-	-	-	.009	-	-	-	.0064	-	-	.0077
64	-	-	-	-	-	-	-	.012	-	-	-	.0071	-	-	.0042
65	-	-	-	-	-	-	-	.011	-	-	-	.0059	.024	-	.0042
66	-	-	-	-	-	-	-	-	-	-	-	.024	-	-	.0047
67	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0064
68	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0068
69	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0070
70	-	-	-	-	-	-	-	-	-	-	-	.012	-	-	.0100
71	-	-	-	-	-	-	-	-	-	-	-	.0056	-	-	.0072
72	-	-	-	-	-	-	-	-	-	-	-	.0059	.014	-	.0092
73	-	-	-	-	-	-	-	-	-	-	-	.0083	-	-	.0069

523
1610
1645

MUC's CH-3067 CH-3069

LA-1151

UCRL-20850 used data from the original report.

Don't use these values something got garbled.

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)

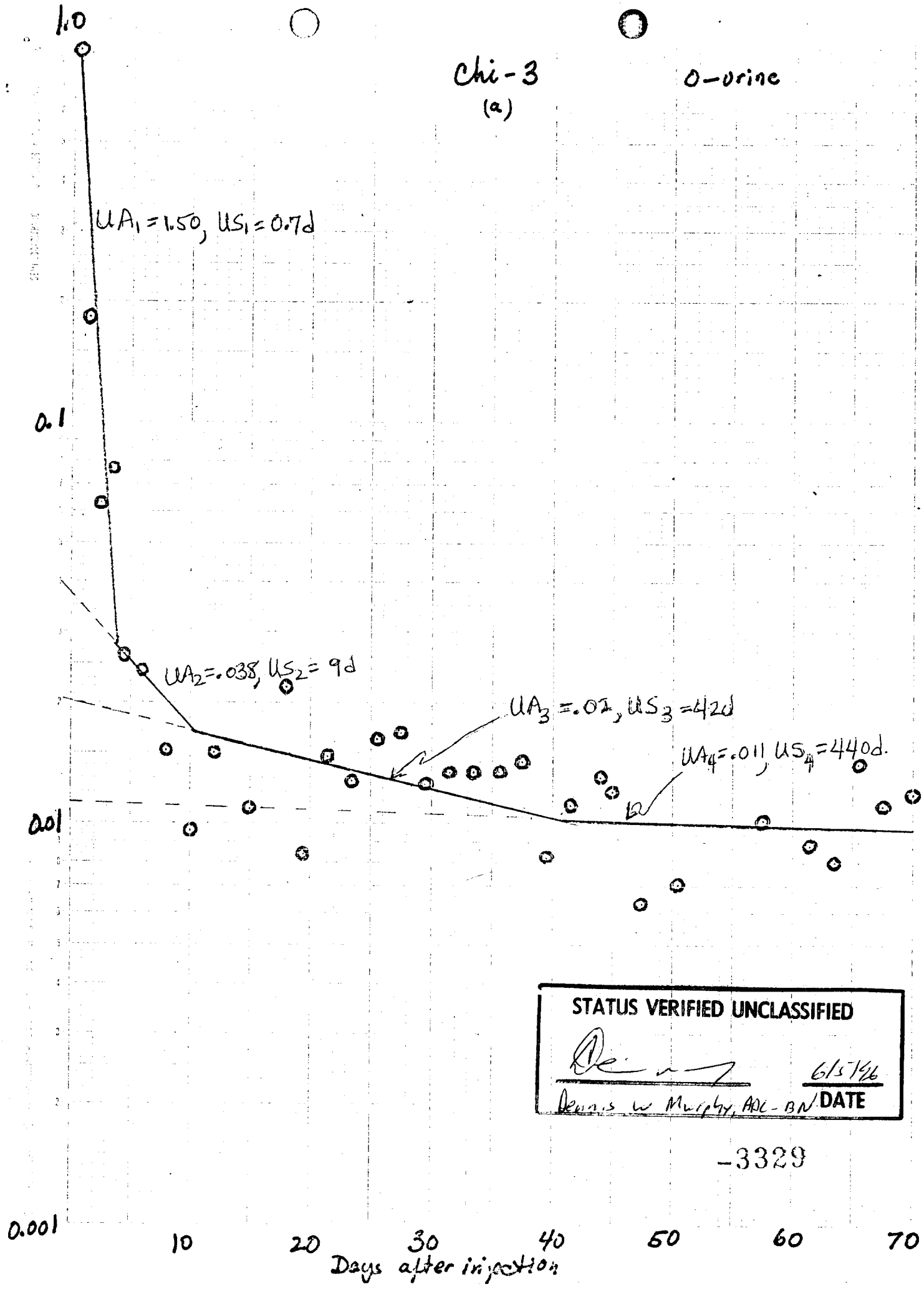
DAYS POST INJECTION	PER CENT OF INJECTED DOSE EXCRETED PER DAY														
	Hp-1	Hp-2	Hp-3	Hp-4	Hp-5	Hp-6	Hp-7	Hp-8	Hp-9	Hp-10	Hp-12	Chi.-I[2]	Chi.-II[2]	Chi.-III[2]	Cal.-I[3]
74	-	-	-	-	-	-	-	-	-	-	-	.010	-	-	.0079
75	-	-	-	-	-	-	-	-	-	-	-	.013	-	-	.0051
76	-	-	-	-	-	-	-	-	-	-	-	.0081	-	-	.0041
77	-	-	-	-	-	-	-	-	-	-	-	.0043	-	-	.0065
78	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0074
79	-	-	-	-	-	-	-	-	-	-	-	.0052	-	-	.0066
80	-	-	-	-	-	-	-	-	-	-	-	.0046	.024	-	.0048
81	-	-	-	-	-	-	-	-	-	-	-	.0042	-	-	.0055
82	-	-	-	-	-	-	-	-	-	-	-	.002	.018	-	.0080
83	-	-	-	-	-	-	-	-	-	-	-	.0041	-	-	.0068
84	-	-	-	-	-	-	-	-	-	-	-	.0029	-	-	.0022
85	-	-	-	-	-	-	-	-	-	-	-	.007	-	-	-
86	-	-	-	-	-	-	-	-	-	-	-	.0046	-	-	.0100
87	-	-	-	-	-	-	-	-	-	-	-	.0076	-	-	.0079
88	-	-	-	-	-	-	-	-	-	-	-	.0086	-	-	.0037
89	-	-	-	-	-	-	-	-	-	-	-	.0049	-	-	.0071
90	-	-	-	-	-	-	-	-	-	-	-	.0032	.017	-	.0077
91	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0088
92	-	-	-	-	-	-	-	-	-	-	-	.014	-	-	.0071
93	-	-	-	-	-	-	-	-	-	-	-	.006	-	-	.0060
94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0071
95	-	-	-	-	-	-	-	-	-	-	-	.0093	.017	-	.0052
96	-	-	-	-	-	-	-	-	-	-	-	.011	.015	-	.0042
97	-	-	-	-	-	-	-	-	-	-	-	.0083	-	-	.0057
98	-	-	-	-	-	-	-	-	-	-	-	.012	.013	-	.0053
99	-	-	-	-	-	-	-	-	-	-	-	.006	-	-	.0070
100	-	-	-	-	-	-	-	-	-	-	-	.0096	-	-	.0061
101	-	-	-	-	-	-	-	-	-	-	-	.005	-	-	.0052
102	-	-	-	-	-	-	-	-	-	-	-	.009	.008	-	.0040
103	-	-	-	-	-	-	-	-	-	-	-	.003	-	-	.0070
104	-	-	-	-	-	-	-	-	-	-	-	.0088	-	-	.0051
105	-	-	-	-	-	-	-	-	-	-	-	.019	-	-	.0058
106	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0046
107	-	-	-	-	-	-	-	-	-	-	-	.0098	-	-	.0060
108	-	-	-	-	-	-	-	-	-	-	-	.0033	.009	-	.0052
109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0044
110	-	-	-	-	-	-	-	-	-	-	-	.0056	-	-	.0015
111	-	-	-	-	-	-	-	-	-	-	-	.0085	-	-	.0042
112	-	-	-	-	-	-	-	-	-	-	-	.015	-	-	.0051
113	-	-	-	-	-	-	-	-	-	-	-	.0095	.007	-	.0056
114	-	-	-	-	-	-	-	-	-	-	-	.011	-	-	.0029
115	-	-	-	-	-	-	-	-	-	-	-	.0145	.009	-	.0053
116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0047
117	-	-	-	-	-	-	-	-	-	-	-	.0069	-	-	.0023
118	-	-	-	-	-	-	-	-	-	-	-	.0035	-	-	.0039
119	-	-	-	-	-	-	-	-	-	-	-	.0066	-	-	.0036
120	-	-	-	-	-	-	-	-	-	-	-	.0051	.007	-	.0025
121	-	-	-	-	-	-	-	-	-	-	-	.0041	-	-	.0047
122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.0039
123	-	-	-	-	-	-	-	-	-	-	-	.0115	-	-	.0014
124	-	-	-	-	-	-	-	-	-	-	-	.0086	-	-	.0039
125	-	-	-	-	-	-	-	-	-	-	-	.0106	.009	-	.0036
126	-	-	-	-	-	-	-	-	-	-	-	.0037	-	-	.0032
127	-	-	-	-	-	-	-	-	-	-	-	.008	.011	-	.0040
128	-	-	-	-	-	-	-	-	-	-	-	.0073	-	-	.0019
129	-	-	-	-	-	-	-	-	-	-	-	.0052	-	-	.0024
130	-	-	-	-	-	-	-	-	-	-	-	.0054	-	-	.0014
131	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0011
132	-	-	-	-	-	-	-	-	-	-	-	.0055	.008	-	.0038
133	-	-	-	-	-	-	-	-	-	-	-	.0038	-	-	.0037
134	-	-	-	-	-	-	-	-	-	-	-	.0091	-	-	.0027
135	-	-	-	-	-	-	-	-	-	-	-	.011	.007	-	.0029
136	-	-	-	-	-	-	-	-	-	-	-	.0056	-	-	.0026
137	-	-	-	-	-	-	-	-	-	-	-	.0075	-	-	.0032
138	-	-	-	-	-	-	-	-	-	-	-	.0073	.009	-	.0010

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

(1) All cases except Chi-1, 2, 3 and Cal-1 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-3307 and unpublished data.

(3) Hamilton, J. G., et al, Report No. CH-3589.



STATUS VERIFIED UNCLASSIFIED

Dennis W Murphy, ADC-BN 6/5/96 DATE

-3329

40-006 Mule

N-2200

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MAR 8 1977

MEDICAL INDUSTRIAL HAZARDS SECTION

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J.J. Nickson, Section Chief
J.E. Rose, Associate Section Chief

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REPORT FOR MONTH OF JANUARY 1946

1. R.S.S.
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6. H.J.C.
7. L.H.H.
8. J.G.H.
9. A.H.D.
10. S.L.W.
11. K.S.C.
12. S.T.C.
13. J.E.R.
14. E.R.R.
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[redacted]

[redacted]

January 19, 1946

To: Dr. R.S. Stone

From: Dr. J.J. Nickson

Subject: Monthly Summary for Section H-III

I. Routine Urine Survey for Plutonium Activity

A. Urine Specimens received

Chicago 80
Other 10

B. Backlog of specimens

Chicago 51
Other 28

C. Specimens analyzed

Chicago 69
Other 38

Of the Chicago specimens analyzed, 7.3 per cent showed a body content of plutonium greater than 0.1 μg, 32 per cent showed negative counts (maximum being less than 0.1 count per minute) and the remainder showed less than 0.1 μg retained in the body.

The laboratory which was designed to be dust-free in order to avoid outside contamination has not met the specifications. However, control urines have been run quite frequently and none have shown α counts in excess of 0.1 count per minute per 1000 ml sample.

Special Urines: Two humans were injected with 94.91 μg of plutonium on December 27, 1945. The composition of the injected solution and the volume injected is given in Table I. The urinary plutonium excretion for the male subject is given in Table II and for the female in Table III.

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40-006 Mule

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MEDICAL INDUSTRIAL HAZARDS SECTION

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J.J. Nickson, Section Chief
J.E. Rose, Associate Section Chief

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[redacted]

[redacted]

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January 19, 1946

To: Dr. R.S. Stone

From: Dr. J.J. Nickson

Subject: Monthly Summary for Section H-III

I. Routine Urine Survey for Plutonium Activity

A. Urine Specimens received

Chicago 80
Other 10

B. Backlog of specimens

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C. Specimens analyzed

Chicago 69
Other 38

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The laboratory which was designed to be dust-free in order to avoid outside contamination has not met the specifications. However, control urines have been run quite frequently and none have shown α counts in excess of 0.1 count per minute per 1000 ml sample.

Special Urines: Two humans were injected with 94.91 μg of plutonium on December 27, 1945. The composition of the injected solution and the volume injected is given in Table I. The urinary plutonium excretion for the male subject is given in Table II and for the female in Table III.

[redacted]

[redacted]

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[redacted]

[redacted]

SECRET

Table I

Composition of Solution

Plutonium concentration	21.57 μg/ml
Volume injected (each)	4.4 ml
pH	6.5
Sodium citrate	0.01 M
Isotonic Saline	

Table II

Daily Plutonium Urinary Excretion (Male)
MX-200

Days after injection	24 hour volume	Specific gravity	Percent of injected dose excreted
1	1130 ml	1.014	0.857
2	1425 ml	1.013	0.182
3	940 ml	1.012	0.063
4	1400 ml	1.012	0.077
5	1160 ml	1.012	0.026
6	1270 ml	1.014	0.0256
7	1290 ml	1.012	0.0234
8	940 ml	1.012	0.0227
9	550 ml	1.012	0.0082
10	535 ml	1.012	0.0097
11	650 ml	1.010	0.0097
12	640 ml	1.010	
13	640 ml	1.010	

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[redacted]

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Table III

Daily Plutonium Urinary Excretion (Female-WX-300)

Days after injection	24-hour volume	specific gravity	percent of injected dose excreted
1	1660 ml	1.012	0.152
2	1725 ml	1.010	0.167
3	1750 ml	1.012	0.067
4	1150 ml	1.012	0.033
5	2020 ml	1.010	0.042
6	1300 ml	1.010	0.042
7	1190 ml	1.010	0.0243
8	1500 ml	1.010	0.0254
9	1400 ml	1.010	0.019
10	1280 ml	1.010	0.030
11	1120 ml	1.010	0.019
12	940 ml	1.010	0.014
13	875 ml	1.010	
14	630 ml	1.010	
15	830 ml	1.010	

Plutonium Therapy: Studies are being completed on the effect of pH and citric acid concentration on the diffusibility of Pu(IV) through cellophane membranes using low pressure ultrafiltration techniques. A report summarizing the results obtained in preliminary studies of Pu therapy is being prepared.

Results of ultrafiltration to date show that a pH of about 2.5 immediately precedes a steep drop in the extent of Pu(IV) which is diffusible, thus indicating, it is presumed, the onset of definite colloidality. At a pH of 7.3 and in the presence of varying amounts of citric acid, it is found that:

(a) As little as 0.0001 M citric acid appreciably increases the diffusibility of Pu.

(b) A minimum in the diffusability of Pu occurs at .005 - .006 M citric acid. This phenomenon, if confirmable, may be

[redacted] N-240-096 Male

[redacted]

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5 pages and 0 figures.
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This document also had another number
MUC-HG-1194

MEDICAL INDUSTRIAL HAZARDS SECTION

J.J. Mickson, Section Chief
J.E. Rose, Associate Section Chief

REPORT FOR MONTH OF FEBRUARY 1946

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2. J.E.H.
3. K.Z.M.
4. M.J.C.
5. [illegible]H.E.
6. J.J.H.
7. A.H.D.
8. S.L.W.
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10. S.T.C.
11. J.E.R.
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8000657

[redacted]

February 21, 1949

CLASSIFICATION CANCELLED
DATE 1-27-56
For The Atomic Energy Commission
H. F. Canall
Chief, Declassification Branch

To: L. O. Jacobson, M.D.

From: Dr. J. J. Nickson

Subject: Monthly Summary for Section H-III

Routine Urine Survey 249-MLH-3501

A. Urine Specimens Received

Chicago	74	
Other	20	
From Backlog	79	
Total		173

B. Specimens Analysed

Chicago	133	
Other	20	
Total		153

C. Backlog

Chicago	20	
Other	0	
Total		20

Of the Chicago specimens analysed, less than 2% showed a body content above 0.1 ug. No specimen was above 0.4 ug.

Special Urines (R. Lesko)

Specimens received	31
Specimens analysed	29

Only one of the subjects mentioned in the previous report was available for study after the 10th day. The urinary plutonium excretion of the male subject (MX-200) was followed daily. The continuation of the excretion table is given below.

[redacted]

8000658

Daily Plutonium Urinary Excretion
(continued) MX-200

Days after Injection	24-hour Volume	% of injected dose excreted
12	640*	.0236
13	640*	.007
14	580*	.0059
15	590*	.0109
16	330*	.0005
17	10*	-----
18	1380	.022
19	1485	.0093
20	870	.0076
21	1625	.0145
22	1300	.0151
23,24	3250	.0256
25	2500	.0175
26	1700	.0181
27	1950	.0197
28	1700	.0136
29	1850	.0151
30	1680	.010
31	1340	.010
32	2540	.017
33	2290	.014
34	1500	.0127
35	1860	.0165
36	1560	.0111
37	2300	.0174
38	1670	.0112
39	1050	.0072
40	1550	.0092
41	2000	.0127

* It was learned that incomplete collections were made on specimens 9 through 17, therefore, these values are low.

Tissue Analysis 365-MLH-3530 (Monroe-Brown)

A. Tissue Specimens Received

Human 21
Animal. 16
Total 37

40-006 Mall

[redacted]

MUC-HG-1203
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Series A.

MEDICAL INDUSTRIAL HAZARDS SECTION

J. J. Nickson, Section Chief

J. E. Rose, Associate Section Chief

REPORT FOR MONTHS MARCH & APRIL, 1946

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2. J.E.W.
3. K.Z.M.
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5. L.H.H.
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7. A.H.D.
8. S.L.W.
9. K.S.C.
10. S.T.C.
11. J.E.R.
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14. G.F.
15. Chi. Tech. File
16. J.J.N. (2)
17. Clin Cen. File

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Name	DATE	NAME	DATE

[redacted]

8000660

[redacted]

April 22, 1946

TO: L. O. Jacobson, M.D.

FROM: Dr. J. J. Nickson

Subject: Monthly Summary for Section H-III

I. Routine Urine Survey 249-MLH-3501 (Jackson-Sellers-Monroe-Schuman)

A. Urine Specimens Received

Chicago	126	
Other	21	
Backlog	20	
Total		167

B. Specimens Analysed

Chicago	126	
Other	21	
Total		147

C. Backlog

Chicago	20	
Other	0	
Total		20

Of the Chicago specimens analysed, less than 2% showed a body content above 0.1 ug. No specimen was above 0.4 ug.

Special Urines (R. Lesko)

Specimens recived	31
Specimens analysed	29

The table of excretion results from MUC-ERR-185 is continued in this report.

Daily Plutonium Urinary Excretion
MX-200 (continued from MUC-ERR-185)

Days after injection	24-hour volume	% of injected dose excreted
42	1400 ml	.0095
43	330*	.0031
44	850*	.013
45	700*	.012
47	1080	.0064
48	980	.0063
49	450*	.0054
50	550*	.0071
51	1270	.007
57	600*	.0094
58	820*	.011
61	1200	.0083
62	1120	.0094
63	1830	.0071
64	1150	.0099
65	1580	.014
66	1570	.014
67	1000	.011
68	1870	.011
69	1640	.014
70	1150	.0096
72	1700	.0083
73	1420	.010
74	1700	.0083
75	1300	.0081
77	1200	.014
84	800*	.007
93	500*	.0093
94	270*	.006
95	700	.011
97	1130	.012

*Incomplete collection.

Because of the very small volumes of urine collected on some days, these values have been omitted from the table.

Special Urines (R. Lesko)

A. Received 34

B. Analysed 32

The daily urinary plutonium excretion of the subject MX-200 is being followed. The Table below is a continuation of the one from MUC-HG-1203

Table III

Daily Plutonium Urinary Excretion
(MX-200)

Days after Injection	24-hour Volume	% of injected dose excreted
98	310 ml*	.006
99	900	.0096
101	1150	.009
102	280	.006
103	1600	.019
104	730	.0086
105	1180	.0075
106	800	.0098
109	370*	.0085
110	300*	.015
111	650	.0095
112	560	.011
113	780	.0145
114	410*	.0069
116	840	.0066
119	1600	.0115
121	1110	.0106
123	1100	.008
127	650*	.0075
129	480*	.0088

* Incomplete collection

II. Stool Analysis (R. Lesko)

A. Specimens Received 34

B. Specimens Analysed 22

June 20, 1946

TO: Dr. J. J. Nickson--Director, Health Division

FROM: E. R. Russell

Subject: Monthly Summary for Biochemical Survey Section

Plutonium Injection Studies: Plutonium appearing in the feces of individuals working with or in areas contaminated with the element may indicate (1) that the material is deposited in the lungs and is being coughed up and swallowed, (2) that the material has entered the intestines by way of the mouth, (3) that the material is deposited in the body and is being eliminated by the intestines, or (4) that the fecal elimination is a combination of any or all of the preceding factors. The experimental evidence on the rates of elimination of plutonium by way of the kidneys and the intestines is such that one could very easily establish the existence of plutonium incorporated in the body. Urinary plutonium excretion is from 2-4 fold greater than fecal plutonium excretion.

In a preliminary survey on a few persons of the Metallurgical Laboratory, single fecal specimens were found to contain as much as 200αc/m. Some of those individuals were removed from contaminated areas for at least one week and a fecal analysis at the end of this period showed only a slight decrease. Even at the end of two weeks one individual having an initial count of $\sim$200 α c/m in a single specimen decreased to only 30 α c/m. That the plutonium was not incorporated in the body was shown by simultaneous analysis of the urine which indicated a body content of less than 0.1 microgram.

The question as to whether the plutonium detected in the feces was coming from the lungs or if there was a slow elimination of injected material in one which could not be answered since no experiments had been conducted along this line. The animal studies by R. Abrams on the inhalation of plutonium aerosols showed a lung retention of 50% after 20-30 days and 10-20% retention after 100 days. This would indicate fairly slow lung elimination. In order that one might gain some idea as to the rate of intestinal elimination, it was thought advisable to conduct experiments with humans whereby approximately 400 α c/m were injected and the elimination rate followed. Previous experiments with animals showed that less than 0.1% of injected plutonium is absorbed from the gut and therefore this amount of plutonium would not results in the absorption of above tolerance amounts. The details of the tests are given in the following section.

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Inf. Div

BIOCHEMICAL SURVEY SECTION

Edwin M. Russell

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2. J.E.W.
3. K.Z.M.
4. A.M.B.
5. L.H.H.
6. J.C.H.
7. A.H.D.
8. S.L.W.
9. K.S.C.
10. H.M.P.
11. J.E.R.
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13. R.E.Z.
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40006 Mule

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Eng-Div

DECLASSIFIED

MATERIAL SURVEY SECTION

L. R. [illegible]

CLASSIFICATION CANCELLED
BY AUTHORITY OF THE DECLASSIFICATION BRANCH USAEC
BY [illegible] 5-15-56
SIGNATURE OF THE PERSON MAKING THE CHANGE DATE

REPORT FOR THE MONTH, MAY, 1946

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1.	J.J.N	7.	A.H.D.	13.	R.E.Z.
2.	J.F.W	8.	S.L.W.	14.	G.F.
3.	K.Z.M.	9.	K.S.C.	15.	Chi.Tech.File
4.	N.J.C.	10.	S.T.C.	16.	E.R.R (2)
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6.	J.G.H.	12.	L.O.J.		

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[illegible]

8000666

May 20, 1946

TO: Dr. J. J. Nickson

FROM: E. R. Russell

Subject: Monthly Summary for Biochemical Survey Section

The analysis of the urine will give a fair indication of the plutonium incorporated in the body. However, material taken into the lungs is not readily absorbed and a portion of it is eliminated by way of the intestines. From animal experiments is is shown that from 10 to 20% of that reaching the lungs is retained after 90 days. This, then, imposes an additional hazar if individuals constantly work in areas in which the air is even slightly contaminated with plutonium. In order to place an additional safeguard on the individual worker, frequent stool an sputum analyses should be made along with the urines.

Two cases are reported in Tables I and II in which these individuals had worked in areas with above tolerance air counts of plutonium. In case 2 the individual remained at home for nearly two weeks and collected urine, sputum, and stool specimens As is shown, there is a decrease in the amount of plutonium eliminated with the stools. However, since no experiments have been performed to show the rate of elimination by humans, it is not possible to calculate accurately the amount of material retained. These two cases, the only ones studied, are apparently fair indications of what might be a serious problem.

Table I

(Case 1)

Date of Specimen	Urine (body cont.)	Stool (counts)	Sputum (counts)
2-13-46	<0.1 ug	---	---
3-4-46	<0.1 ug	---	---
3-8-46	<0.1 ug	---	---
4-3-46	<0.1 ug	---	---
4-17-46	---	---	2.1 c/m
4-20-46	<0.1 ug	---	1.6 c/m
[illegible]	<0.1 ug	250 c/m	2.8 c/m
[illegible]	---	244 c/m	---
[illegible]	---	42 c/m	---
[illegible]	---	---	2.03 c/m

II. Routine Urine Survey: 249-MXZ-3501 (Jackson-Sellers-Moss)

A. Urine Specimens Received

Chicago 50
Other 5
Backlog 20
Total 84

B. Specimens Analysed

Chicago 76
Other 5
Total 81

C. Backlog 3

Special Urines: R. Losko

A. Received 34
B. Analysed 32

The data in Table I is a continuation of the urinary plutonium excretion results of Table III, MUC-ERR-206. As is seen the daily plutonium excretion has remained at nearly 0.01% at the end of 160 days.

Table I

Daily Plutonium Urinary Excretion
(MX-200)

Days After Injection	24-hour Volume	% of Injected Dose Excreted
130	540 ml*	0.0091
131	810*	0.011
133	550*	0.0075
135	600*	0.0077
137	710*	0.0094
139	880*	0.010
142	950*	0.0089
145	460*	0.006
149	1140*	0.010
152	480*	0.011
155	450*	0.0056
156	500*	0.011
158	520*	0.012
159	285*	0.0057
160	535*	0.012
161	490*	0.0075
163	690*	0.0036

* Uncertain about complete 24 collection--Results on the basis of volume received.

0/20/12

4-22-46

[redacted]

CLASSIFICATION CHANGED
TO: NOT CLASSIFIED
5/15/56 7/D-1116
Authority of: USAEC
11-24-60 H. Brown

[redacted]

MUC-HG-1203
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MEDICAL INDUSTRIAL HAZARDS SECTION

J. J. Nickson, Section Chief

J. E. Rose, Associate Section Chief

REPORT FOR MONTHS MARCH & APRIL, 1946

1.	L.O.J.	7.	A.H.D.	13.	R.E.Z.
2.	J.E.W.	8.	S.L.W.	14.	G.F.
3.	K.Z.M.	9.	K.S.C. ✓	15.	Chi. Tech. File
4.	H.J.C.	10.	S.T.C.	16.	J.J.N. (2)
5.	L.H.H.	11.	J.E.R.	17.	Clin Cen. File
6.	J.G.H.	12.	E.R.R.		

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Name	DATE	NAME	DATE
K S Cole	MAY -2 1946		

8000669

[redacted]

[redacted]

[redacted]

April 22, 1946

TO: L. O. Jacobson, M.D.

FROM: Dr. J. J. Nickson

Subject: Monthly Summary for Section H-III

I. Routine Urine Survey 249-MLH-3501 (Jackson-Sellers-Monroe-Schuman)

A. Urine Specimens Received

Chicago	126	
Other	21	
Backlog	20	
Total		167

B. Specimens Analysed

Chicago	126	
Other	21	
Total		147

C. Backlog

Chicago	20	
Other	0	
Total		20

Of the Chicago specimens analysed, less than 2% showed a body content above 0.1 ug. No specimen was above 0.4 ug.

Special Urines (R. Lesko)

Specimens recived	31
Specimens analysed	29

The table of excretion results from MUC-ERR-185 is continued in this report.

[redacted]

[redacted]

SECRET

Daily Plutonium Urinary Excretion
MX-200 (continued from MUC-ERR-185)

Days after injection	24-hour volume	% of injected dose excreted
42	1400 ml	.0095
43	330*	.0031
44	850*	.013
45	700*	.012
47	1080	.0064
48	980	.0063
49	450*	.0054
50	550*	.0071
51	1270	.007
57	600*	.0094
58	820*	.011
61	1200	.0083
62	1120	.0094
63	1830	.0071
64	1150	.0099
65	1580	.014
66	1570	.014
67	1000	.011
68	1870	.011
69	1640	.014
70	1150	.0096
72	1700	.0083
73	1420	.010
74	1700	.0083
75	1300	.0081
77	1200	.014
84	800*	.007
93	500*	.0093
94	270*	.006
95	700	.011
97	1130	.012

*Incomplete collection.

Because of the very small volumes of urine collected on some days, these values have been omitted from the table.

[redacted]

H.6. Russell Rep. I

VOC #ERR-179

N-L

This document consists of 3 pages and 0 figures.
No. 1 of 3 copies, Series A

[redacted]

Table I

11 January 1946

To: Dr. J. J. Nickson

From: E. R. Russell

In Re: Abstract of Work for the Month Ending January 11, 1946

for Plutonium Activity

I. Routine Urine Survey - 249-MLH-3501

A. Urine Specimens Received

Chicago 80
Other 10

B. Backlog of Specimens

Chicago 51
Other 28

C. Specimens Analysed

Chicago 69
Other 38

CLASSIFICATION CANCELLED
DATE JAN 11 1967
For the Atomic Energy Commission
RAYMOND A. CARPENTER
for the
Chief, Declassification Branch

Of the Chicago specimens analysed, 7.3% showed a body content of plutonium greater than 0.1 ug, 32% showed negative counts (maximum being less than 0.1 count per minute) and the remainder showed less than 0.1 ug retained in the body.

The laboratory which was designed to be dust-free in order to avoid outside contamination has not met the specifications. However, control urines have been run quite frequently and none have shown counts in excess of 0.1 count per minute per 1000 ml sample.

Special Urines: Two humans were injected with 94.91 ug of plutonium on December 27, 1945. The composition of the injected solution and the volume injected is given in Table I. The urinary plutonium excretion for the male subject is given in Table II and for the female in Table III.

[redacted]

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Table I

Composition of Solution

Plutonium Concentration. . .	21.57 ug/ml
Volume injected (each) . . .	4.4 ml
pH	6.5
Sodium citrate	0.01 M
Isotonic Saline	

Table II

Chicago Case #3

RER 12/19/72

Daily Plutonium Urinary Excretion (Male)
MX-200

Days after Injection	24-hour Volume	Specific Gravity	% of injected dose excreted
1	1130 ml	1.014	0.857
2	1425	1.013	0.182
3	940	1.012	0.063
4	1400	1.012	0.077
5	1160	1.012	0.026
6	1270	1.014	0.0256
7	1290	1.012	0.0234
8	9940	1.012	0.0227
9	550	1.012	0.0082
10	535	1.012	0.0097
11	650	1.010	0.0097
12	640	1.010	
13	640	1.010	

[illegible] completed on the [illegible] and concentration on the diffusibility of [illegible] Pu [illegible] low [illegible] diffusible techniques. A report summarizing the results obtained in preliminary studies of Au therapy is being prepared. Results of ultrafiltration to date show that a pH of [illegible] immediately produced a sharp drop in the extent of [illegible] to colloids, that inhibition, it is presumed, the [illegible] of the Pu colloidality. At a pH of 7.3 and in the presence of [illegible] amounts of citric acid, it was found that:

[illegible] as little as 0.0[illegible] citric acid appreciably increased the diffusibility of Pu.

The maximum in the diffusibility of Pu occurs at .005 citric acid. This phenomenon, if confirmable, may be related to the neutralization of a positively charged Pu colloid by the negatively charged citrate ion. Migration experiments are planned to study the sign on the Pu colloids and complexes [illegible].

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Table III

Chicago Case #2
RER 12/19/72

Daily Plutonium Urinary Excretion
(Female-WX-300)

Days after Injection	24-hour volume	Specific gravity	% of Injected dose excreted
1	1660 ml	1.012	0.152
2	1725	1.010	0.167
3	1750	1.012	0.067
4	1150	1.012	0.0335
5	2020	1.010	0.042
6	1300	1.010	0.042
7	1190	1.010	0.0243
8	1500	1.010	0.0254
9	1400	1.010	0.019
10	1280	1.010	0.030
11	1120	1.010	0.019
12	940	1.010	0.014
13	875	1.010	
14	630	1.010	
15	830	1.010	

Plutonium Therapy: Studies are being completed on the effect of pH and citric acid concentration on the diffusibility of Pu(IV) through cellophane membranes using low pressure ultrafiltration techniques. A report summarizing the results obtained in preliminary studies of Pu therapy is being prepared.

Results of ultrafiltration to date show that a pH of about 2.5 immediately precedes a steep drop in the extent of Pu(IV) which is diffusible, thus indicating, it is presumed, the onset of definite colloidality. At a pH of 7.3 and in the presence of varying amounts of citric acid, it is found that:

(a) As little as 0.0001 M citric acid appreciably increases the diffusibility of Pu.

(b) A minimum in the diffusability of Pu occurs at .005-.006M citric acid. This phenomenon, if confirmable, may be related to the neutralization of a positively charged Pu colloid by the negatively charged citrate ion. Migration experiments are planned to study the sign on the Pu colloid and complex directly.

MUC #SAK-185 N-L

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No. 1 of 2 copies, Series A

February 11, 1946

Daily Plutonium Urinary Excretion

To: Dr. J. J. Nickson

From: E. R. Russell

In Re: Abstract of Work for the Month Ending Feb. 11, 1946

I. Routine Urine Survey 249-MLH-3501

A. Urine Specimens Received

Chicago	74	
Other	20	
From Backlog	79	
Total		173

B. Specimens Analysed

Chicago	133	
Other	20	
Total		153

C. Backlog

Chicago	20	
Other	0	
Total		20

CLASSIFICATION CANCELLED
DATE JAN 11 1967
For the Atomic Energy Commission
RAYMOND A. CARPENTER
for the Chief, Declassification Branch

Of the Chicago specimens analysed, less than 2% showed a body content above 0.1 ug. No specimen was above 0.4 ug.

Special Urines (R. Lesko)

Specimens received	31
Specimens analysed	29

Only one of the subjects mentioned in the previous report was available for study after the 15th day. The urinary plutonium excretion of the male subject (MX-200) was followed daily. The continuation of the excretion table is given below.

A. Tissue Specimens Received

Human	22
Animal	15
Total	37

B. Tissues analysed

Human	23
Animal	16
Total	37

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Daily Plutonium Urinary Excretion

(continued) MX-200

Chicago Case #3
RER 12/19/72

Days after Injection	24-hour Volume	% of injected dose excreted
12	640*	.0236
13	640*	.007
14	580*	.0059
15	590*	.0109
16	330*	.0005
17	10*	----
18	1380	.022
19	1485	.0093
20	870	.0076
21	1625	.0145
22	1300	.0151
23,24	3250	.0256
25	2500	.0175
26	1700	.0151
27	1950	.0197
28	1700	.0138
29	1850	.0151
30	1680	.010
31	1340	.010
32	2540	.017
33	2290	.014
34	1500	.0127
35	1860	.0165
36	1560	.0111
37	2300	.0174
38	1670	.0112
39	1050	.0072
40	1550	.0092
41	2000	.0127

*It was learned that incomplete collections were made on specimens 9 through 17. Therefore these values are low.

II. Tissue Analysis 365-MLH-3530 (Monroe-Brown)

A. Tissue Specimens Received

Human 21
Animal 16
Total 37

B. Tissues analysed

Human 21
Animal 16
Total 37

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III. Plutonium Therapy 365-MLH-3530 (Brown-Reed)

A. Specimens Received

Dog-- urine and feces 62
Rat-- urine and feces 14

B. Specimens analysed

Dog-- urine and feces 18
Rat-- urine and feces 14

C. Backlog

Dog-- urine and feces 44

5-20-46

DEV-A 30888

[redacted]

[redacted]

MUC-ERR-206
This document consists of
6 pages and 0 figures.
No. 9 of 18 copies.
Series A.

BIOCHEMICAL SURVEY SECTION

E. R. Russell

CLASSIFICATION CHANGED
TO: NOT CLASSIFIED
List 8 4-26-56
Authority of: USAEC
2-17-65 D. Cobb

REPORT FOR THE MONTH, MAY, 1946

1.	J.J.N	7.	A.H.D.	13.	R.E.Z.
2.	J.E.W	8.	S.L.W.	14.	G.F.
3.	K.Z.M.	9.	K.S.C. ✓	15.	Chi.Tech.File
4.	H.J.C.	10.	S.T.C.	16.	E.R.R (2)
5.	L.H.H.	11.	J.E.R.	17.	Clin.Cen.File
6.	J.G.H.	12.	L.O.J.		

Please sign and date below before reading this document.

NAME	DATE	NAME	DATE
K S C	MAY 21 1946		

[redacted]

[redacted]

[redacted]

8000678

[redacted]

May 20, 1946

TO: Dr. J. J. Nickson

FROM: E. R. Russell

Subject: Monthly Summary for Biochemical Survey Section

The analysis of the urine will give a fair indication of the plutonium incorporated in the body. However, material taken into the lungs is not readily absorbed and a portion of it is eliminated by way of the intestines. From animal experiments is is shown that from 10 to 20% of that reaching the lungs is retained after 90 days. This, then, imposes an additional hazard if individuals constantly work in areas in which the air is even slightly contaminated with plutonium. In order to place an additional safeguard on the individual worker, frequent stool and sputum analyses should be made along with the urines.

Two cases are reported in Tables I and II in which these individuals had worked in areas with above tolerance air counts of plutonium. In case 2 the individual remained at home for nearly two weeks and collected urine, sputum, and stool specimens. As is shown, there is a decrease in the amount of plutonium eliminated with the stools. However, since no experiments have been performed to show the rate of elimination by humans, it is not possible to calculate accurately the amount of material retained. These two cases, the only ones studied, are apparently fair indications of what might be a serious problem.

Table I

(Case 1)

Date of Specimen	Urine (body cont.)	Stool (counts)	Sputum (counts)
2-13-46	<0.1 ug	---	---
3-4-46	<0.1 ug	---	---
3-8-46	<0.1 ug	---	---
4-6-46	<0.1 ug	---	---
4-17-46	---	---	2.1 c/m
4-20-46	<0.1 ug	---	1.6 c/m
4-30-46	<0.1 ug	250 c/m	2.8 c/m
5-4-46	---	244 c/m	---
5-5-46	---	42 c/m	---
5-6-46	---	---	2.68 c/m

[redacted]

Table II

(Case 2)

Date of Specimen	Urine (body cont.)	Stool (counts)	Sputum (counts)
3-18-46	<0.1 ug	---	---
3-29-46	---	---	1.3 c/m
4-4-46	<0.1 ug	---	2.0 c/m
4-6-46	<0.1 ug	---	---
4-9-46	<0.1 ug	---	---
4-12-46	<0.1 ug	26.1 c/m	4.0 c/m
4-17-46	---	---	0.27 c/m
4-20-46	<0.1 ug	36.0 c/m	0.10 c/m
4-26-46	<0.1 ug	6.5 c/m	0.90 c/m
4-29-46	0	20.3 c/m	0.23 c/m
4-30-46	0	5.0 c/m	0.05 c/m
5-1-46	0	9.7 c/m	0.22 c/m
5-2-46	---	3.3 c/m	--- c/m
5-3-46	---	6.12 c/m	0.28 c/m
5-4-46	<0.1 ug	2.2 c/m	0.07 c/m

Other Activities

I. Routine Urine Survey 249-MLH-3501 (Jackson-Sellers-Monroe-Schuman)

A. Urine Specimens Received

Chicago 71
Other 10
Backlog 20
Total 101

B. Specimens Analysed

Chicago 71
Other 10
Total 81

C. Backlog

Chicago 20
Other 0
Total 20

[redacted]

Special Urines (R. Lesko)

A. Received 34

B. Analysed 32

The daily urinary plutonium excretion of the subject MX-200 is being followed. The Table below is a continuation of the one from MUC-HG-1203

Table III

Daily Plutonium Urinary Excretion
(MX-200)

Chicago Case #3
RER 12/19/72

Days after Injection	24-hour Volume	% of injected dose excreted
98	310 ml*	.006
99	900	.0096
101	1150	.009
102	280	.006
103	1600	.019
104	730	.0086
105	1180	.0075
106	800	.0098
109	370*	.0085
110	300*	.015
111	630	.0095
112	560	.011
113	780	.0145
114	410*	.0069
116	840	.0066
119	1600	.0115
121	1110	.0106
123	1100	.008
127	650*	.0075
129	480*	.0088

* Incomplete collection

II. Stool Analysis 249-MLM-3510

A. Specimens Received 24

B. Specimens Analysed 22

[redacted]

III. Sputum Analysis 249-MLH-3520

A. Specimens Received 24

B. Specimens Analysed 24

IV. Experimental Tissue Analysis 365-MLH-3530 (Reed-Brown)

A. Specimens Received 122

B. Specimens Analysed 79

Effect of Citrate on the Concentration of Plutonium in the Urine: Nearly a year ago an experiment was tried in which a dog, having been injected several months previous with a known quantity of plutonium, was injected daily with 5 cc of a 3% sodium citrate solution for 10 days. The plutonium excretion during this period was increased 2-3 fold. It was suggested by Drs. Nickson and Brues that since citrate is rapidly destroyed, the immediate excretion following the injection may have been several times higher. In order to test this hypothesis, two dogs containing plutonium were injected with 5 cc of a 3.5% sucrose solution containing 3.5% sodium citrate and 3% citric acid. The bladder of each animal was emptied immediately before the injection. Following the injection, the urine from each was collected (catheter) for 10 minutes in 5-minute intervals. In one case the concentration of plutonium in the urine increased 5 fold in the first period and 8.5 fold in the second. The second animal showed a 6.5 fold increase in the first period and 9.7 fold increase in the second. It is obvious that the collections should have been for a longer period, however the test does indicate that citrate solutions injected IV may be useful in removing plutonium from the body.

Plutonium Therapy Studies: Metal Displacement. (J.Schubert-D.Revinson-J.Tolmach)

On October 25, 1946, a 7 Kgm dog, PX-121, was given an IV injection of 0.423 mgms of plutonium. By January 3, 1946 the urinary plutonium excretion rate had become relatively constant with an average daily excretion of 0.0077% of the injected dose. The excretion varied from 0.011% as a maximum to 0.0045% as a minimum. Beginning January 3 various treatments were tried in an attempt to increase the plutonium excretion.

Briefly, the treatments up to date have consisted of: (a) lead administration followed by an acidosis producing diet, (b) subcutaneous injection of 10 mgms of BAL per kgm, and (c) the I.V. injections of increasing amounts of zirconium. Treatments (a) and (b) did not result in any significant rise in plutonium excretion while a definite rise was observed following each zirconium injection.

The first zirconium injection was given March 29, the second April 10, and the third April 23. In the first injection 2 cc of a 15% ammonium citrate solution containing 44 mgms of zirconium was given. The second injection was twice that of the first and the third was four times the first. Following the first injection, the average plutonium excretion up to April 10 was 1.5-2 times normal. Following the second injection the average excretion was 2 times normal and after the third injection the plutonium excretion was 2.5 times normal. During the three-day period immediately following the third injection, the daily plutonium excretion rose as high as 5 times normal. Inasmuch as the dog can safely tolerate at least ten times as much zirconium as was given, increased amounts may be used in future experiments. Comparative studies of the effect of the solution, 15% ammonium citrate, will be made.

In preparation for further plutonium therapy investigations, the chemical toxicity of zirconium on 200 gram female albino rats is being ascertained. As much as 50 mgms of zirconium (250 mgms/Kgm) was administered to one group of rats in a single dose by I.P. injection. Some of the animals have received as much as 200 mgms (1 gram/kgm) and after several weeks have shown no ill effects. It appears that zirconium given I.P. is rapidly absorbed.

The zirconium solution was prepared by adding an excess of sodium citrate solution to an aqueous solution of zirconyl chloride. The resulting solution contained 9.6% sodium citrate and 26 mgms zirconium per ml at a pH = 6.0. The solution is stable toward dilution, pH changes and addition of phosphate ion, that is, none of these factors resulted in a precipitation of zirconium salts. A method for the quantitative determination of zirconium in rat excreta and tissues is being developed.

[redacted]

6-20-46

MUC-ERR-211
This document consists of
4 pages and 6 figures.
No. 1 of 20 copies.
Series A.

Noted
Action
Recd JUN 2 0 1946 J.J.N.
Ans.
File N. D. Russell

monthly report

BIOCHEMICAL SURVEY SECTION

Edwin M. Russell

CLASSIFICATION CHANGED
TO: NOT CLASSIFIED
Lid-1116 5-15-56
Authority of: USAEC
2-17-65 D. Corbett

REPORT FOR THE MONTH, JUNE, 1946

1.	J.J.N.	7.	A.H.D.	13.	R.E.Z.
2.	J.E.W.	8.	S.L.W.	14.	G.P.
3.	K.Z.M.	9.	K.S.C.	15.	R.S.S.
4.	A.M.B.	10.	H.M.P.	16.	P.S.H.
5.	L.H.H.	11.	J.E.R.	17.	Chi.Tech.File
6.	J.G.H.	12.	L.O.J.	18.	E.R.R.(2)
				19.	Clin.Cen.File

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NAME	DATE	NAME	DATE

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This document [redacted] the National [redacted] within the meaning of the [redacted] Espionage [redacted] to an [redacted] prohibited by law. [redacted]

II. Routine Urine Survey: 249-MLH-3501 (Jackson-Sellers-Monroe)

A. Urine Specimens Received

Chicago 59
Other 5
Backlog 20
Total 84

B. Specimens Analysed

Chicago 76
Other 5
Total 81

C. Backlog 3

Special Urines: R. Lesko

A. Received 34
B. Analysed 32

The data in Table I is a continuation of the urinary plutonium excretion results of Table III, MUC-ERR-206. As is seen the daily plutonium excretion has remained at nearly 0.01% at the end of 160 days.

Table I

Chicago Case 3
RER 12/19/72

Daily Plutonium Urinary Excretion
(MX-200)

Days After Injection	24-hour Volume	% of Injected Dose Excreted
130	540 ml*	0.0091
131	810*	0.011
133	550*	0.0075
135	600*	0.0077
137	710*	0.0094
139	880*	0.010
142	950*	0.0089
145	460*	0.006
149	1140*	0.010
152	490*	0.011
155	430*	0.0056
156	560*	0.011
158	520*	0.012
159	285*	0.0037
160	335*	0.012
161	490*	0.0073
163	520*	0.0086

* Uncertain about complete 24 collection--Results on the basis of volume received.

file type = PDS

Page 1 of 1

Description Case #

plutonium [illegible] @M, 40-006, @A,T, 0001, M, 1908, E, 0000, F, 0000, D, 4506 T,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
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____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
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____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;
____ @M, ____, @A,T, ____, M, ____, E, ____, F, ____, D, ____,;

bstracted by cA Date 2/25/77 Coded by cA Date 2/25/77