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UNITED STATES TRANSURANIUM REGISTRY

ANNUAL REPORT
OCTOBER 1, 1977 TO OCTOBER 1, 1978

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TO DOE DIVISION OF
HEALTH AND ENVIRONMENTAL RESEARCH

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HANFORD ENVIRONMENTAL
HEALTH FOUNDATION

HEHF 28

UNITED STATES TRANSURANIUM REGISTRY
ANNUAL REPORT OCTOBER 1, 1977 TO OCTOBER 1, 1978
TO DOE OFFICE OF HEALTH AND
ENVIRONMENTAL RESEARCH

by

B. D. Breitenstein, Jr., M.D., Carlos E. Newton, Jr., and
W. D. Norwood, M.D.

HANFORD ENVIRONMENTAL HEALTH FOUNDATION
Richland, Washington 99352

JANUARY 1979

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U. S. TRANSURANIUM REGISTRY

ANNUAL REPORT

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SUMMARY

The U. S. Transuranium Registry (USTR) serves as a center for the acquisition and recording of information of the transuranic elements in man and their effects on man. To date 1[illegible],045 U. S. transuranium workers have been tabulated, authority for 1,048 autopsies obtained, and 93 autopsies granted.

Department of Energy contractor and National Regulatory Commission licensee activities at participating sites are discussed. A significant increase in participation from the Savannah River plant has been received during the past year.

The low level transuranic measurement laboratory analyzing tissue specimens for the USTR (except Rocky Flats specimens) was transferred from Battelle Pacific Northwest Laboratory to Los Alamos Scientific Laboratory.

Dr. Charles W. Mays was appointed chairman of the USTR Advisory Committee upon the resignation of Dr. James H. Stemer.

To improve the quality of autopsy tissue for analysis prosectors were appointed at the Hanford, Rocky Flats, and Los Alamos sites.

USTR educational and informational activities were extensive and varied.

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INTRODUCTION

This report covers activities of the U. S. Transuranium Registry (USTR) for the period October 1, 1977 to October 1, 1978.

PURPOSE AND SCOPE OF REGISTRY

The primary purpose of the Registry is to serve as a center for the acquisition and recording of the latest and most precise information on the metabolism of the transuranic elements in man and their effects on man. This is being done with the cooperation of participating Department of Energy and Nuclear Regulatory Commission contractor and licensee personnel operating nuclear facilities by:

- Initiating and supporting programs to identify, interview, secure medical, health physics and autopsy releases, and obtaining tissue samples at autopsy.
- Establishing contact as indicated with terminated employees to obtain participation in the Registry program.
- Overseeing processing of autopsy tissues by analytical laboratories.
- Compiling and analyzing medical and health physics data on autopsy cases for application or reconciliation with *in vivo* models.
- Establishing a base to provide input to epidemiology mortality studies.

REGISTRY MANAGEMENT

Bryce D. Breitenstein, Jr., M.D. is Director of the Registry, spending part-time in this activity. C. E. Newton continues part-time as Associate Director and W. D. Norwood, M.D. continues his affiliation with the Registry as a consultant, working on a limited basis. Gerald Dagle, Ph.D., Battelle, Pacific Northwest Laboratory, James McInroy, Ph.D., Los Alamos Scientific Laboratory, and Robert Bistline, Ph.D., Rocky Flats have agreed to serve as Prosectors for the USTR autopsy cases.

The Los Alamos Scientific Laboratory (LASL) is directing a U. S. plutonium worker health study which is affiliated with the Registry, with George Voelz, M.D. and Louis Hempelmann, M.D. serving as principal investigators. A separate advisory committee assists them in the study design and interpretation of findings.

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U. S. TRANSURANIUM REGISTRY STATISTICAL DATA

Tables I and II indicate the number of transuranium workers identified, health physics and medical releases obtained, autopsy permissions secured, autopsies completed and autopsy reports completed through September 1978.

It will be noted that 539 additional transuranium workers were identified among the contractors, with most of these coming from Savannah River. One transuranium worker was identified among the licensees. Oak Ridge has identified only 14 workers as having an estimated deposition of a few percent, but has still not identified a larger number of workers who would be classified as transuranium workers in accordance with the Registry definition. The total number of transuranium workers identified to date is 15,045.

To date, 5,888 health physics and medical releases have been obtained. Most of these are from Hanford, Rocky Flats, and Savannah River.

There have been 1,048 authorities for autopsy signed, 28 this calendar year, principally from Rocky Flats and Savannah River. Exxon Nuclear secured 8 of the 13 authorities for autopsy secured to date from the licensee group.

Five autopsies were secured during the reporting year, 3 by Rocky Flats and 2 by Savannah River. Reports have been completed on 75 of the 93 autopsies performed as part of the Registry program of which 14 were received from a foreign source.

CONTRACTOR ACTIVITIES

Hanford

Authority for autopsy has been obtained on 534 Hanford transuranic workers. There were no deaths reported among these registrants since the last annual report. Seventeen of the twenty-five previous autopsies have been completed, with completion of the eight in process anticipated soon.

Gail English, M.D. of Hanford Environmental Health Foundation Occupational Medicine Staff has been compiling health, morbidity, and mortality experience on all Hanford workers with an identified plutonium deposition for surveillance purposes. Data was previously published in 1976 on this group of workers.*

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*W. D. Norwood et al.
Health of Hanford Plutonium (Pu) Worker
The Health Effects of Plutonium and Radium,
J. W. Press, Salt Lake City, Utah 1976

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U. S. TRANSURANIUM REGISTRY

1977

TABLE I

Contractors	Transuranium Workers Identified			Health Physics and Medical Releases			Authority for Autopsy			Autopsies Obtained			Autopsy Reports Complete		
	Mo. Sep.	CY to Date	Total to Date	Mo. Sep.	CY to Date	Total to Date	Mo. Sep.	CY to Date	Total to Date	Mo. Sep.	CY to Date	Total to Date	Mo. Sep.	CY to Date	Total to Date
Hanford	0	113	7,079	0	89	2,244	1	8	535	0	2	24	0	1	11
Rocky Flats	4	141	2,129	4	136	1,960	0	20	209	0	6	42	0	0	30
Los Alamos	0	1	3,025	0	[illegible]	258	0	[illegible]	126	0	0	4	0	0	2
Savannah River	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80	0	0	0	0	0	0
Mound	0	1	334	0	[illegible]	0	0	[illegible]	10	0	0	1	0	0	1
Oak Ridge	0	0	14	0	0	0	0	0	0	0	0	1	0	0	1
Subtotal	14	361	14,264	23	392	4,638	21	120	972	0	8	72	0	1	45
Licensees															
Richland Energy Lab	0	0	13	0	0	9	0	0	2	0	0	1	0	0	0
Exxon Nuclear	0	2	47	0	3	35	0	0	8	0	0	0	0	0	0
Babcock & Wilcox	0	0	61	0	0	61	0	0	2	0	0	0	0	0	0
Nuclear Fuel Services, Inc.	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0
Total	14	363	14,386	23	395	4,744	21	120	985	0	8	73	0	1	45

TABLE II

U. S. TRANSURANIUM REGISTRY

1978

Contractors	Transuranium Workers Identified			Health Physics and Medical Releases			Authority for Autopsy			Autopsies Obtained			Autopsy Reports Complete		
	Month Sep.	Cal. Year to Date	Total to Date	Month Sep.	Cal. Year to Date	Total to Date	Month Sep.	Cal. Year to Date	Total to Date	Month Sep.	Cal. Year to Date	Total to Date	Month Sep.	Cal Year to Date	Total to Date
Hanford	0	57	7,153	0	45	2,301	-10	-3	534	0	0	25	0	0	17
Rocky Flats	16	108	2,274	16	105	2,091	-1	11	226	0	3	45	0	0	40
Los Alamos	0	1	3,026	0	1	259	-2	1	125	0	0	4	0	0	2
Savannah River	0	373	2,107	0	968	1,120	1	19	140	0	2	2	0	0	0
Mound	0	0	334	0	0	9	0	-1	9	0	0	1	0	0	1
Oak Ridge	0	0	14	0	0	0	0	0	0	0	0	1	0	0	1
Subtotal	16	539	14,908	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Licenses															
Richland Energy Lab	0	0	15	0	0	9	0	0	2	0	0	1	0	0	0
Exxon Nuclear	0	0	47	0	1	36	0	0	8	0	0	0	0	0	0
Babcock & Wilcox	0	0	61	0	0	61	0	0	2	0	0	0	0	0	0
Nuclear Fuel Services, Inc.	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0
Lawrence Livermore Labs	0	1	1	0	1	1	0	1	1	0	0	0	0	0	0
U.S. Total	16	540	15,031	16	1,021	5,888	-14	28	1,048	0	5	79	0	0	61
Foreign	0	0	14	0	0	0	0	0	0	0	0	14	0	0	14
Combined Total	16	540	15,045	16	1,021	5,888	-14	28	1,048	0	5	93	0	0	75

Rocky Flats

Rocky Flats increased their authorities for autopsy by 11 over the past year, the total being 226. Autopsies were obtained during 1978 bringing their total to 45, which is the largest number among the participating sites

A new anatomical donation consent form for autopsy and removal of parts and tissue for post-mortem use was developed and provided at the request of the Rocky Flats Plant.

Los Alamos

Dr. Breitenstein visited the Los Alamos site during 1978 to encourage greater participation in the USTR. Los Alamos participation has been relatively stable over the past year.

Savannah River

The greatest gains during this report period for the USTR in health physics and medical releases (868) and authority for autopsy (19) have occurred at the Savannah River Plant. Two autopsies have been obtained to this time, but the laboratory analyses of these tissue samples have not yet been completed.

Dr. George A. Poda, Medical Superintendent at Savannah River, has been instrumental in the success of the USTR program at this plant.

Mound Laboratory

Mr. Carlos Newton visited Mound Laboratory to encourage participation in the USTR. It appears that interest in participation is good, and that an active program may be starting soon. It would be most valuable if Mound Laboratory would become a USTR participant because it is the principal site handling Pu-238.

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Oak Ridge

In 1977, it was agreed with Union Carbide management that T. A. Lincoln, M.D. would contact for USTR participation currently employed and terminated Oak Ridge National Laboratory transuranic workers with estimated body depositions of any transuranic elements equal to or exceeding 25% of the permissible systemic limit. Dr. Lincoln was promoted to Union Carbide Corporate Medical Director, and transferred to New York City before he could implement this plan. He has designated A. S. Garrett, M.D. at Oak Ridge to pursue the USTR participation

Idaho Falls

Telephone contacts and written correspondence with Dr. John H. Spikard, Medical Director at Idaho Falls occurred during the past year. There is interest in USTR participation at this site.

Argonne National Laboratory and Battelle Memorial Institute

Participation has been encouraged at these sites, but has not yet started.

LICENSEE

Active participation by licensees is encouraged, but was not actively sought during the past year.

WHOLE BODY AUTOPSY CONSENTS

The USTR has had six registrants agree to whole body autopsy. In general, this category is reserved for registrants with depositions greater than 25% of a maximum permissible body burden for occupationally exposed personnel*.

Planning for whole body autopsies has been undertaken and agreements for assistance from the University of Washington Pathology Department have been made.

*Maximum permissible body burden for ^{239}Pu is 40 uCi and for ^{241}Am is 50 uCi.

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EDUCATION AND INFORMATION ACTIVITIES

Annual Letter

The annual letter to autopsy registrants (Appendix I) was mailed to 1,046 current and former transuranium workers who had authorized autopsy at the time of the mailing.

Communications - U. S. Government

The Annual Report for October 1, 1976 to October 1, 1977 was sent to U. S. Department of Energy and to the USTR mailing list.

Dr. Kenneth Inn, U. S. National Bureau of Standards, advised the USTR that the Bureau intends to establish standards for determining radioactive materials in tissue. He asked which isotopes and organs would be of interest to the USTR. He was advised that the Registry was interested in all of the transuranics but particularly interested in ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Am, Cm and Cf. The organs of interest are lung, hilar lymph nodes, liver, spleen, pancreas, kidney, thyroid, testis, ovary, and both trabecular and cortical bone. Organ samples could be provided if needed from LASL and Rocky Flats with USTR cooperation. A copy of the most recent annual USTR report was sent to Dr. Inn.

Scientific Meetings Attended and Plant Visits

Dr. Breitenstein attended a meeting of the Advisory Committee for the Health Study of Workers in the Nuclear Industry at Los Alamos Scientific Laboratory (LASL) on May 24-25, 1978. This study is affiliated with the USTR, and will include mortality and morbidity data on plutonium workers and their appropriate control personnel at Hanford, LASL, Mound Laboratory, Oak Ridge, Rocky Flats, and Savannah River.

Dr. Breitenstein attended the DOE physicians and contractor physicians meeting held in conjunction with the DOE Health Protection Meeting in Las Vegas, Nevada in November 1977.

Dr. Breitenstein visited the Savannah River plant and met with Dr. George Poda, Medical Superintendent, and members of the plant health physics group. The USTR program at Savannah River was discussed generally, and establishment of a trained prosector at the Savannah River Plant was planned.

Tissue Analysis for Transuranics

Starting in fiscal year 1978, the responsibility for analyzing USTR tissue specimens obtained in the Hanford area for transuranium element content was

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transferred from Battelle, Pacific Northwest Laboratory to Los Alamos Scientific Laboratory under the direction of Dr. James McInroy. All of the remaining unanalyzed tissue specimens at Battelle were transferred to the LASL's low level radionuclide detection facility. All acid aliquot samples of previously analyzed specimens were also transferred.

There are currently two laboratories analyzing the USTR tissue specimens; the low level radionuclide detection laboratories at LASL and Rocky Flats.

A meeting was held in February 1978 at the Rocky Flats Plant to determine the comparability of autopsy tissue analysis for transuranics between LASL and Rocky Flats. Except for bone there appeared to be no special problems, particularly since interlaboratory calibrations are to continue on a regular basis. For bone it was agreed to use ashed dried weight to avoid the considerable variations noted from methods using other weights such as wet weights. Those participating in the meeting were Dr. J. F. McInroy, LASL; Dr. R. W. Bistline and Dale Bokowski, Rocky Flats; and Carlos Newton, USTR.

As noted the USTR has adopted the Dosimetry Committee recommendation to use ashed bone weights. This will do much to reduce variations caused by different degrees of debridement and weight loss noted from dehydration of frozen samples; many of which remain frozen for several years before processing. It was possible to go back and get ashed weights for the Hanford cases and the skeleton depositions are being recalculated using these new data. Rocky Flats does not have ashed weight data on past cases, but does have aliquots of each sample from which the calcium content is being determined. From this it is hoped to get reasonable estimates of the ashed weight. The USTR cases from these two installations will be converted to skeleton depositions based on ashed weight calculations. It is not possible to estimate ashed weights for past autopsy data received from other sources.

The USTR Dosimetry Committee is now working on making recommendations to the Advisory Committee on the fraction of total skeleton burden of plutonium represented by various bones. In particular, the USTR needs factors for rib, sternum, vertebrae, and additionally for new cases the patella.

The health physics estimates of systemic body burdens of plutonium are being compared to the autopsy estimates. The comparisons are being made in two categories. One category involves health physics estimates which are for definite positive amounts and the other category for negative and other values below which (although positive) the reporting contractor has not placed a definite value; i.e. less than values. These indefinite values are generally less than a few percent of the maximum permissible body burden of 40 nCi; e.g. less than 1-2 nCi. A few of the health physics estimates published as Appendix 3 to the Annual Report

1976-1977 showed extremely low estimates which the reporting contractors provided through their computer programs. These low values are being replaced by the appropriate less than value.

The comparisons being made must be considered preliminary and certainly subject to revision as the data bank is enlarged from additional autopsy cases. The most serious defect is the inability to secure entire organs as skeleton, lungs, and pulmonary lymph nodes. Although the Registry has several whole body donation authorizations, there will undoubtedly continue to be uncertainty for some time in extrapolating the content of various individual bones to that of the entire skeleton. The lungs and associated nodes are no longer the problem they were when the Registry was first established. At that time it was practically impossible to get next of kin's permission to take whole organs, especially the heart and lungs. As the popularity and notoriety of organ transplants increased, opposition to taking whole organs at autopsy decreased. Now in most every case whole or nearly whole organs (except for skeleton) are obtained including at least one lung, associated lymph nodes, liver, spleen, kidneys, and larger bone samples.

Much of the early data presented in the literature on the estimated whole body content of plutonium including those made on depositions from fall-out include results obtained from small samples of various organs. The extrapolations have assumed the sample represented a homogeneous deposition while in fact they must have been from quite heterogeneous depositions. Such would especially be the case for a small lung, lymph node, or bone sample. Small samples of the rib or vertebral wedges probably do not represent the average concentration for the trabecular type of bone they represent.

The preliminary comparisons do not correct for errors introduced by using wet weight and using trabecular bone content as representative of the entire skeleton. These two are probably offsetting to some extent as the wet weight tends to underestimate the concentration and trabecular bone to overestimate the skeleton content. It is hoped that improvements in accuracy will be possible as a result of the Dosimetry Committee studies and recommendations.

The health physics estimates are for systemic burdens and do not include the insoluble material deposited in the chest. Therefore the amount calculated for the chest in the autopsy cases has been kept separate from systemic burdens so the health physics and autopsy systemic values can be compared with some degree of confidence once the bone or skeleton data is revised. Currently there are not enough health physics chest count data for a reliable comparison to the autopsy estimates, however the sensitivity and number of chest counts have increased. New autopsy cases are expected to include most of the chest

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content so reasonably valid comparisons with health physics data should be possible.

HISTOGRAMS

(Figures 1 through 6)

Histograms have been prepared to show the range of organ content for the autopsies processed thus far. In those cases where the organ was not sampled or the organ concentration was less than detection level estimated values were not used in the histogram of that organ. However, when extrapolating organ values to obtain the histograms of the systemic and whole body burdens generally an estimate, based upon data from other organs, was made and included. The burdens are for kidneys, liver, skeleton, systemic, chest, and whole body found in Appendix III.

Visitors

Dr. Emilio Iranzo, Junta de Energia Nuclear Madrid, Spain, visited the USTR.

Dr. George A. Outen, Chairman of the Energy Committee of the National Council of Churches, met with USTR representatives to discuss Registry activities.

News Media Requests for Information

Robert Monroe of Penthouse Magazine, New York, inquired about the USTR activities, and was provided a copy of the most recent USTR annual report.

Robert Ruby of Daily Camera, Boulder, Colorado, was provided copies of "Health of Hanford Plutonium (Pu) Workers", and the last USTR annual report.

Fred Gillies of the Denver Post called about the most recent USTR annual report, and published an article in the Denver Post about the USTR program.

Bill Dortity of the Boston Globe telephoned requesting information about possible radiation exposure of workers at the Portsmouth, N. H. Naval Shipyard. He was informed that the USTR had no information about employees of that facility.

A phone call was received from Warren Hinkle of The San Francisco Chronicle regarding a USTR autopsy in the San Francisco area. General information about the USTR was provided.

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Other Communications

Dr. Breitenstein discussed the USTR background, purpose and scope at a meeting of the Environmental Health Sciences Department of Hanford Environmental Health Foundation.

Roger Wallstedt, Administrative Officer at Lawrence Livermore Laboratory, requested a Privacy Act compliance form for use in conjunction with their USTR participation. Such a form was developed and provided.

In response to a request, information and copies of USTR forms were supplied to John H. Spikard, M.D., Medical Director at the DOE Idaho Operations Office.

A Freedom of Information Act request from John Abbotts, Public Interest Research group, on USTR autopsy data was provided through the Richland Operations Office of the U. S. Department of Energy.

ADVISORY COMMITTEE

Members -

C. W. Mays, Chairman
Robley D. Evans, Vice Chairman
C. C. Lushbaugh
H. M. Parker
John Poston
James Sterner
Donovan J. Thompson
George L. Voelz

In April 1978 Dr. C. W. Mays assumed the chairmanship of the USTR Advisory Committee upon the resignation of Dr. James Sterner, who has been chairman since October 1968. Dr. Sterner agreed to remain a member of the Advisory Committee.

Appendix II is a copy of a letter sent to the USTR Advisory Committee on October 20, 1977. The purpose of the letter was to respond to recommendations made at the last Advisory Committee meeting.

The Dosimetry Subcommittee met in Richland, Washington, on January 11-12, 1978. The members of this subcommittee are Dr. John Poston (Chairman), Georgia Institute of Technology, and Dr. C. W. Mays, University of Utah. Also present at the meeting were Dr. J. F. McInroy of LASL, Kenneth Heid of Battelle, Pacific Northwest Laboratory, and the Director and Associate Director of the USTR. The purpose of the meeting was to discuss acquisition, interpretation, and utilization of USTR autopsy data. Dr. Patricia W. Durbin, University of California, Lawrence Berkeley Laboratory, accepted an invitation to serve on the subcommittee, and will participate in future meetings.

Dr. J. F. McInroy, K. R. Heid, and C. F. Newton met on March 2, 1978, with Dr. Patricia W. Durbin at Lawrence Berkeley Laboratory. The discussions at this

meeting were concerned with the uptake, distribution, and retention, principally of plutonium in the bone of primates, and man. Comparative autopsy data on man and primates are being analyzed to provide urgently needed material to support or suggest revisions in the *in vivo* models currently in use to describe the uptake and retention of plutonium in humans.

Another meeting of the Dosimetry Subcommittee is planned for late December or early 1979.

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UNITED STATES TRANSURANIUM REGISTRY

May 8, 1978

Dear Participant;

ANNUAL LETTER TO AUTOPSY REGISTRANTS

Increasing public concern about all radioactive substances has accented the importance of research leading to more complete understanding of the ability of the human body to contend with any possible long-range effects of exposure. Each year the U. S. Transuranium Registry program receives more recognition and support as part of this vital research. Since our last annual letter, we have had an interesting and productive year, with continued progress in established programs, some additional activity and minor organizational changes.

With the full participation of four major Department of Energy contractor sites and partial cooperation of several other contractors and licensees, 1,037 authorities for autopsy have now been signed. Data has been received, analyzed, and recorded on 87 autopsies, including 14 from outside the U.S. A subcommittee was formed to evaluate the laboratory analysis program and recommend refinements to make better use of the information. A data processing program has been developed and will soon be in operation.

Without the cooperation of you, the registrants, our program would be impossible, and it is extremely important that we keep in touch. We are enclosing a card for your convenience in notifying us of any change of address. We are also including a new Donor Card to replace your old one if it has been damaged or lost. Please sign it and carry it at all times.

Our research program is of international interest. Thank you for being a part of it.

Sincerely,

Bryce Breitenstein

Bryce D. Breitenstein, Jr., M.D.
Director

Enclosures

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P.O. BOX 100 RICHLAND, WASHINGTON 99352

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Operated for the United States Department of Energy by the Hanford Environmental Health Foundation

Appendix II

UNITED STATES TRANSURANIUM REGISTRY

Date: October 20, 1977

To: U. S. Transuranium Registry Advisory Committee

From: Bryce D. Breitenstein, Jr., M.D., Director
Carlos E. Newton, Jr., Associate Director

Subject: PROGRESS REPORT REGARDING RECOMMENDATIONS OF U. S. TRANSURANIUM REGISTRY ADVISORY COMMITTEE AT THE MEETING JUNE 15-16, 1977 (Copy of Recommendations Enclosed)

1. Drs. Walter W. Weyzen, George L. Voelz and Bryce D. Breitenstein met at Oak Ridge, Tennessee on July 13, 1977 to discuss the relationships and responsibilities of the USTR and the Los Alamos epidemiology study of plutonium workers. A decision was made to leave this issue unresolved until the overall Department of Energy Occupational Worker Epidemiology Program is better defined.

2. The Battelle Northwest low-level, transuranic, tissue analytic laboratory has not been funded for analyses of human tissues for FY 1978. Arrangements will be made to have USTR autopsy tissue specimens analyzed at another laboratory but the details are yet to be worked out.

3. Letters have been sent to all pathologists concerned to obtain histopathologic slides on past autopsy cases. We now have seven sets of slides, and will hope to receive more in the future.

4. Review of all USTR forms has been postponed pending better definition of the USTR mission. The "Authority for Autopsy" form is receiving legal review with special attention to Privacy Act requirements.

5. Duplication and storage of USTR records at separate facilities is in the planning stage.

6. No action has been taken regarding identification of separated transuranic employees pending the resolution of Item 1 above.

7. The USTR intends to fully implement the recommendation regarding securing adequate bone and bone marrow specimens at autopsy. Procedures for separating bone marrow from bone have been started at Battelle Northwest. With the loss of funding of the Battelle project, the manner of accomplishing this objective will be reconsidered.

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Operated for the U. S. Atomic Energy Commission by the Harvard Environmental Health Foundation

8. No action has been taken yet regarding the mandate of the ad hoc subcommittee consisting of Drs. Poston (Chairman) and Mays to interpret and extrapolate data obtained from laboratory analyses of autopsy samples to the whole body and to subsequently correlate that data with appropriate health physics in vivo data.

9. No action has been taken regarding the establishment of a transuranic accident and analysis center, again pending resolution of Item 1 above. A letter from Dr. Stott supporting this concept is attached.

10. No action is to be taken by the USTR regarding the establishment of a uranium registry as per the Advisory Committee's recommendations.

11. Discussion was held with Dr. Walter W. Weyzen on July 13, 1977 regarding contact with the Nuclear Regulatory Commission. Dr. Weyzen indicated he would make this contact through his office. No additional information is available regarding the Nuclear Energy Liability Property Insurance Association at this time.

12. Continued efforts to increase the scientific use of USTR autopsy materials are going forward. The USTR Director visited Argonne National Laboratory on September 30, 1977 to increase interaction.

13. A USTR Advisory Committee meeting is tentatively planned for February 1979.

Other Items of Interest

A. The USTR Director met with Union Carbide officials at the Oak Ridge National Laboratory on July 14, 1977. Subsequently, Union Carbide has agreed to increase its USTR participation.

B. The Savannah River Plant, largely due to the efforts of Dr. George Poda, has added 97 registrants and 72 autopsy authorizations during the past year.

C. USTR visits to Battelle Memorial Institute in Columbus, Ohio, the Mound Laboratory in Miamisburg, Ohio and the Argonne National Laboratory in Argonne, Illinois occurred in September 1977. The purpose of the visits was to encourage USTR participation.

D. Death certificates are being obtained in all current autopsy cases and, insofar as possible, in all past cases to substantiate the cause of death.

E. A meeting to discuss the procurement and preparation of autopsy samples was held in Richland September 21, 1977. The agenda, minutes and revised autopsy worksheet are included as Attachment 3.

Attachments: 1) Recommendations
2) Letter from A.N.B. Stott
3) Agenda, minutes and worksheet

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UNITED STATES TRANSURANIUM REGISTRY

Date: July 11, 1977

To: U. S. Transuranium Registry Distribution

From: Bryce D. Breitenstein, Jr., M.D., Director Bryce Breitenstein

Subject: RECOMMENDATIONS OF THE U. S. TRANSURANIUM REGISTRY ADVISORY COMMITTEE - MEETING JUNE 15-16, 1977

The following recommendations of the U. S. Transuranium Registry Advisory Committee, which are endorsed by the Registry, are forwarded for your information and guidance.

1. The Committee noted that the basic charter of the Transuranium Registry included the responsibility for epidemiological studies and that Los Alamos also has a charter to conduct epidemiological studies in relation to the transuranic workers. Accordingly, it was recommended that both organizations define the scope of their programs, specify the kinds of collected information required and specifically note what collaboration between the two programs should and will develop. The Committee recommended that Drs. Voelz and Breitenstein pursue the resolution of these matters and report to the Committee their findings so this matter may be considered in more detail.

2. The Committee recommended that the use of a single laboratory to analyze the Transuranium Registry autopsy samples be avoided and that a minimum of two laboratories be used. Two main considerations were the technical aspects involving laboratory intercalibrations and the avoidance of socio-political opponents criticizing single laboratory bias. It was emphasized that assuring low-level detection ability of transuranic elements at the designated laboratories was essential. Battelle Northwest and LASL were considered the best choices at this time.

3. The Committee recommended that histopathological slides be systematically collected for all future cases, and that a concerted effort be made to obtain histopathological slides on past autopsy cases. These slides are to be reviewed by at least two independent pathologists when received by the Registry and kept on file.

4. It was recommended that all USTR forms be reviewed, revised if needed, and submitted to ERDA for approval. In particular, the Committee noted that the current "Authorization for Release of Medical and Radiation Exposure Information" was quite wide in scope and may need to be more specific. Included in these concerns of the Committee were the effects of the Privacy Act on the solicitation of such information, as well as the need for a critical legal review of the "Authority for Autopsy" form.

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5. It was recommended that the Registry consider maintaining duplicate records at widely separated storage facilities to reduce the risk of loss of data.

6. The matter of following up on separated transuranic employees was noted to relate back to the specific identification of such employees, and the Committee made no recommendations on this. It did recommend, however, that Drs. Voelz and Breitenstein consider this matter and present their findings and recommendations to the Committee for their subsequent advice.

7. The Committee made very strong recommendations regarding the necessity to obtain samples of bone and bone marrow, in particular the femur. Their recommendation was that femur samples involving full-cross sections (napkin ring) be sought vigorously. The current studies regarding bone marrow separation were encouraged and a specific recommendation was made for the Registry to take a close look at the ethylenediamine extraction method of separation of bone and bone marrow, which has been successful in radium cases.

8. The Committee recognized the number of complications involved in the interpretation and extrapolation of data from the laboratory analyses of autopsy samples to that of the whole body and the subsequent correlation of the data with the health physics in vivo determinations. To assist the Committee in making recommendations on this subject, it appointed Drs. Poston (Chairman) and Mays to investigate and report their findings. Mr. Newton of the USTR staff will work closely with them.

9. The matter regarding the establishment of a transuranic accident and analysis center was noted to be contained in the original charter of the Transuranium Registry and also inherently contained in the epidemiological study being conducted by Dr. Voelz. In addition, Oak Ridge Associated Universities, through Dr. Lushbaugh's staff, is compiling some transuranic accident data. This matter, the Committee noted, needs clarification for better assignment of responsibility. Discussions between Drs. Lushbaugh, Voelz and Breitenstein are needed, with their recommendations to the Committee.

10. The Committee recommended that the Registry continue to seek analyses of autopsy samples for both the transuranic elements and uranium where both depositions may have occurred. It recommended that the Registry not undertake the task of including in their activities a separate registry for uranium (metal) workers at this time. This is not because such an activity would be improper or foreign to the interests of the Registry, but rather that funds are already inadequate for some more vital efforts with the transuranium elements.

11. The Committee recommended that the Energy Research and Development Administration establish contact and attempt to obtain the highly desirable support (financial and administrative) of the Nuclear Regulatory Commission to enhance licensee participation in the USTR. The Committee was hesitant to make any recommendations regarding similar support from Nuclear Energy Liability Property Insurance Association without more specific information regarding their objectives and degree of participation. It was recommended that the Registry make further contact to define these areas and report this to the Committee.

12. The Committee recommended support of special biological studies which will make the best use of autopsy tissue and encouraged collaboration between the USTR and other ERDA sponsored laboratories such as Battelle, Argonne, Oak Ridge and the University of Utah.

13. It was recommended that annual meetings of the USTR Advisory Committee be held, preferably early in the calendar year, so that programmatic and budgetary concerns may be considered in a timely fashion.

cc: USTR Advisory Committee Members
W. H. Weyzen, M.D. - ERDA Headquarters

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ATOMIC ENERGY RESEARCH ESTABLISHMENT,
Environmental & Medical Sciences Division,
Building 364,
HARWELL,
DIDCOT, BERKS.

UKAEA

RECEIVED
AUG 5 1977
U. S. TRANSURANIUM
REGISTRY

Your reference:
Our reference:

telegrams: ATEN, ABINGDON telex: 83135
telephone: ABINGDON 2141 EXT 4717

27 July 1977

Dr. Bryce D. Breitenstein,
Hanford Environmental Health Foundation,
P.O. Box 100,
Richland,
Washington 99352,
USA.

Dear Bryce,

Thank you for sending me the latest report of the USTR.

I was particularly interested in the suggestion that a transuranic accident and analysis centre be established. Despite the occasional reporting at international conferences, etc. of such accidents, I think that there is a definite place for a central repository of such information. This might give rise to an agreed series of investigations which could be conducted without prejudice to the clinical freedom needed in such cases, but which would build up a body of knowledge about metabolism, response to chelates etc.

Deleted paragraph not pertinent to subject.

Kind regards,

Yours sincerely,

A.N.B. Stott

MINUTES

PROCUREMENT AND PREPARATION OF AUTOPSY SAMPLES

A meeting was held at the Hanford Environmental Health Foundation, Richland, Washington September 21, 1977 to discuss the attached agenda items related to securing and preparing autopsy samples for radiochemical analyses. Attendants were:

R. W. Bistline	- Rocky Flats
B. D. Breitenstein	- HEHF/USTR
G. E. Dagle	- BNW
J. F. McInroy	- LASL
W. D. Norwood	- HEHF/USTR
C. E. Newton	- BNW/USTR

It was noted in general that prosectors attending autopsies aid in securing the desired samples. This is particularly true if a favorable rapport has been established. Occasionally, however, prosectors are met with restraint, probably due to uncertainty of the role of the prosector and possible legal complications. It was suggested that ERDA identification cards be issued to the prosectors to indicate their official relationship with the USTR. This is being done.

Although it is desirable to have a prosector at all autopsies, this was not felt practical, but it was advocated that all samples be prepared for analyses by a prosector. This was concurred in by the Registry Director and henceforth all samples will be processed by prosectors.

The USTR Autopsy Specimen Worksheet was reviewed and the modified form is attached. It was suggested that the prosectors include in their kits metal clamps to replace the femur bone section removed and a trephine for removing a calvarium sample.

Whole organ fresh weights should be obtained at the autopsy and the weights of the processed sample are to be carefully recorded at the time they are submitted for analytical analyses. Any supplemental information obtained either from the pathologist or the prosector regarding abnormalities is also to be noted on the worksheet.

A standard nomenclature is to be used and will be from the American College of Pathology publication "Standard Nomenclature of Pathology." Copies are to be obtained and furnished by the USTR. Copies are now on order.

Sample preparation is to include verification of tissue identification, trimming, weighing, node separation where identifiable, and technical notations as applicable.

The preferred method of shipment is by Air Express of frozen autopsy tissue in plastic bags with dry ice inside a 2" thick Styrofoam shipping container enclosed in a cardboard box. The Registry will obtain and distribute these containers at several geographically strategic locations. An opinion is being sought from DOE by USTR as to existence of any regulations restricting or prohibiting air and rail shipments of these samples which may contain minute quantities of plutonium or other transuranics.

The histopathological slides required by the USTR are to be obtained by a physician-physician interface. These costs and any reasonable costs incurred by the prosectors not covered in existing budgets are to be assumed as a USTR obligation. These costs, whether directly reimbursed by USTR or sponsor, need to be specifically identified in the 189 USTR research proposal.

Enclosure

October 18, 1977

1009742

AGENDA
PROCUREMENT, CLARIFICATION AND PREPARATION OF AUTOPSY SAMPLES

- Presence at Autopsy
  Should the prosector routinely attend the autopsy if conducted locally? If so, must an alternate be designated? Provide recommendations for handling offsite autopsies, particularly as related to distance.

- Samples Desired
  Amplify designation of samples of primary interest as defined by the Registry, e.g. specifically, what ribs, what vertebrae, what long bone? Furnish recommendations regarding the adequacy of the Registry sample selection (attached).

- Sample Identification
  Provide recommendations regarding standard nomenclature to be used for all samples.

- Sample Weights
  Provide recommendations as to what weights are to be taken and what they include or should include. For example, drained weights - blood, formaldehyde - frozen weight - dehydrated weight, etc. (Note: Weights of whole organs particularly important to subsequent calculations.)

- Sample Abnormalities
  Advise how much information can be provided regarding sample abnormalities such as enlarged, congested or atrophied organs, if sample is entire organ, etc.

- Sample Preparation
  Advise the extent of sample preparation regarding defatting, trimming, and node separation, particularly what nodes are to be separated and which are to be included in lung tissue.

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- Shipping and Storage
  Provide recommendations for method for shipping of samples which may require transportation of any substantial length, type of preservatives to be used and recommendations as to length of storage that can be tolerated prior to radioanalytical analysis (is dehydration an important consideration?). Registry furnished containers a benefit? If so, what would they constitute?

- Histopathological Slides
  Histopathological slides are required by the Registry. Is this something that the prosector should be obtaining and if so, on what tissues and what is the relationship between the prosector and the pathologist to obtain these?

- Reimbursement
  What charges should reasonably be assumed by the Registry for obligations incurred directly by the prosector and for any of his ancillary activities/obligations.

- Prepare a mutually acceptable protocol regarding agenda items to assure comparable results from the three organizations.

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U. S. TRANSURANIUM REGISTRY

AUTOPSY TISSUE SAMPLES

1. Lung - Right & Left (whole)
2. Lymph Nodes - (Hilar)
3. Liver (whole or min. 400g.)
4. Bone
   - Ribs - one or more whole ribs excluding 1,2,11,12
   - Sternum (whole)
   - Vertebrae - Vertebral Wedge
   - Patella (one)
5. Spleen (whole)
6. Thyroid (whole)
7. Kidneys (both)
8. Ovaries or Testes (both)
9. Wound Site - Excise site and associated lymph nodes
10. Tumor if any

Collect tissues 1 through 10 if the estimated systemic burden is 50% or less.

---

11. Blood from heart (10ml.)
12. Muscle - Iliopsoas
13. Fat from abdomen (panniculus)
14. Skin from both sides of abdominal incision & subcutaneous fat
15. Calvarium (obtained by trephine)
16. Femur (shaft portion, min. 4")
17. Brain - large sample only if brain is removed as part of regular autopsy.

Collect 1 through 17 for estimated systemic burdens greater than 50%

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Appendix III

NUMBER OF AUTOPSY CASES

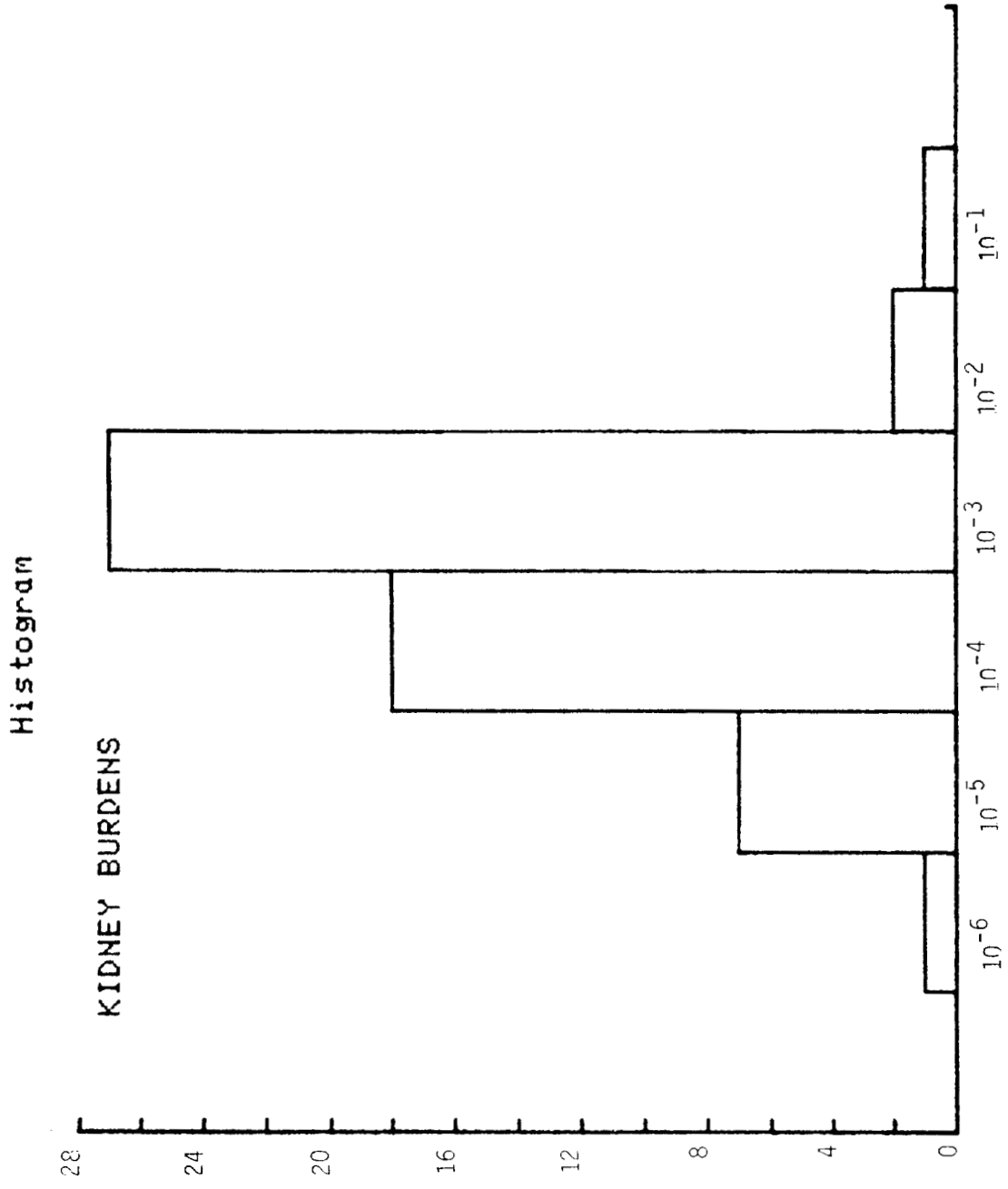

FIGURE 1

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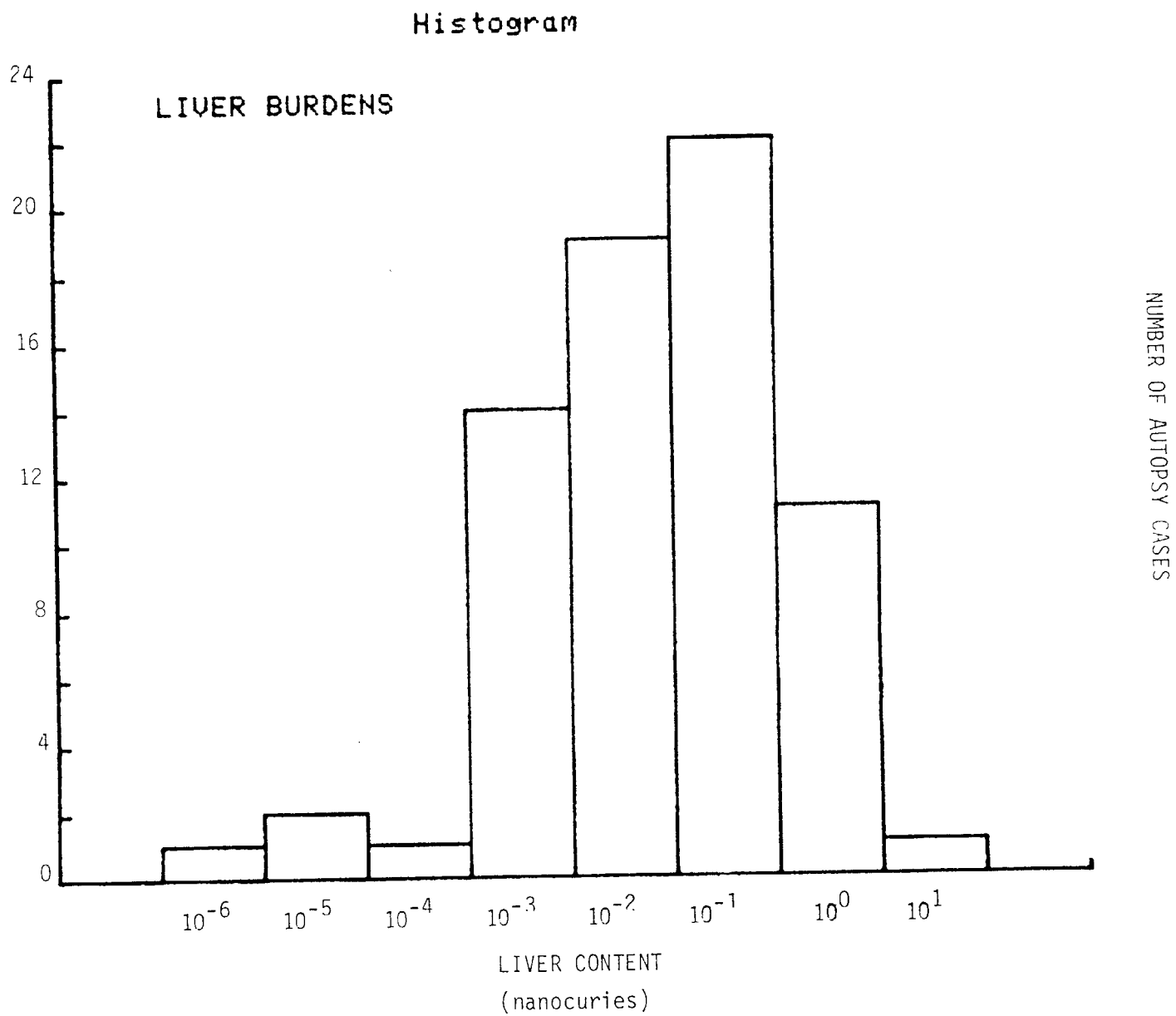

FIGURE 2

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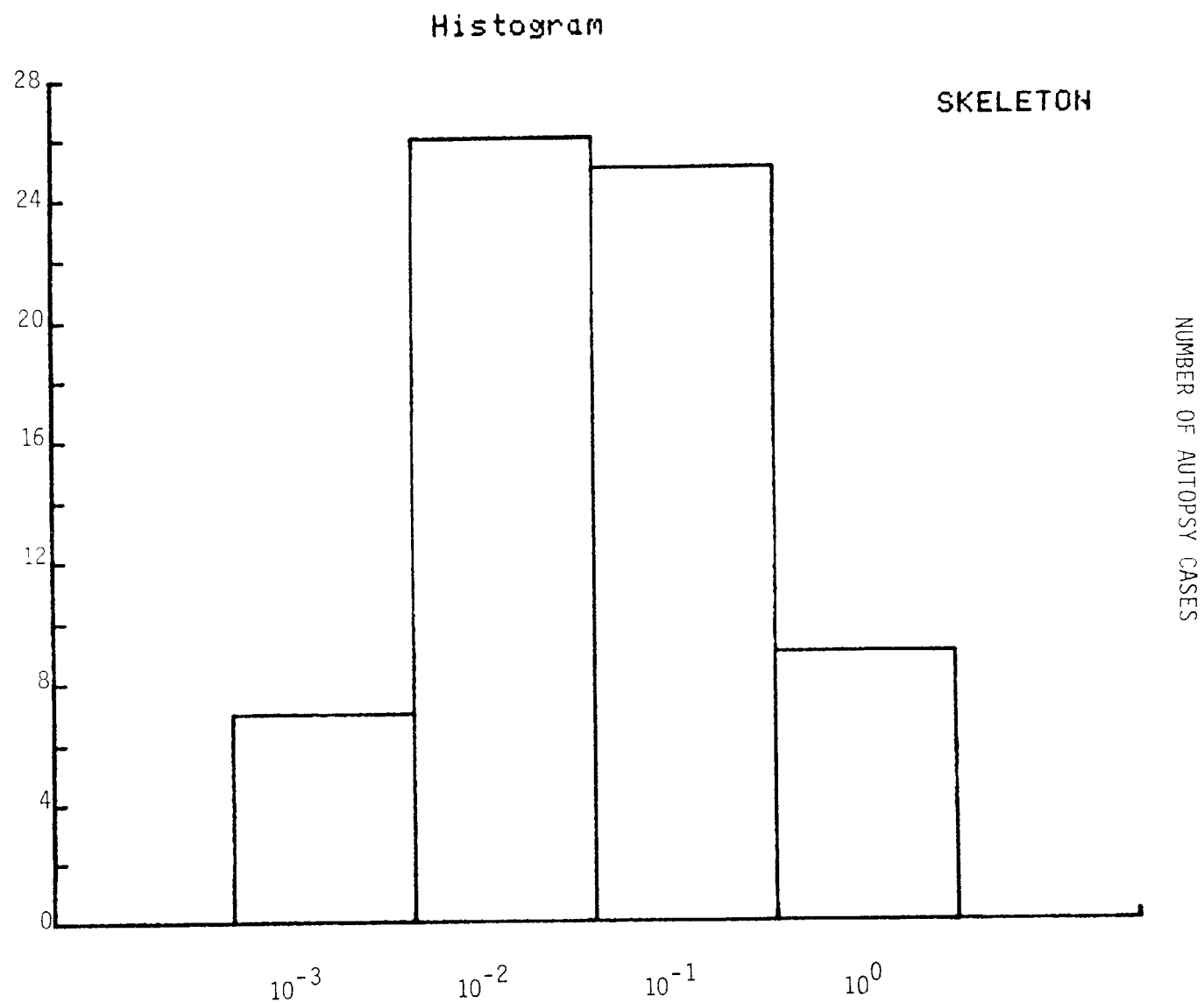

FIGURE 3

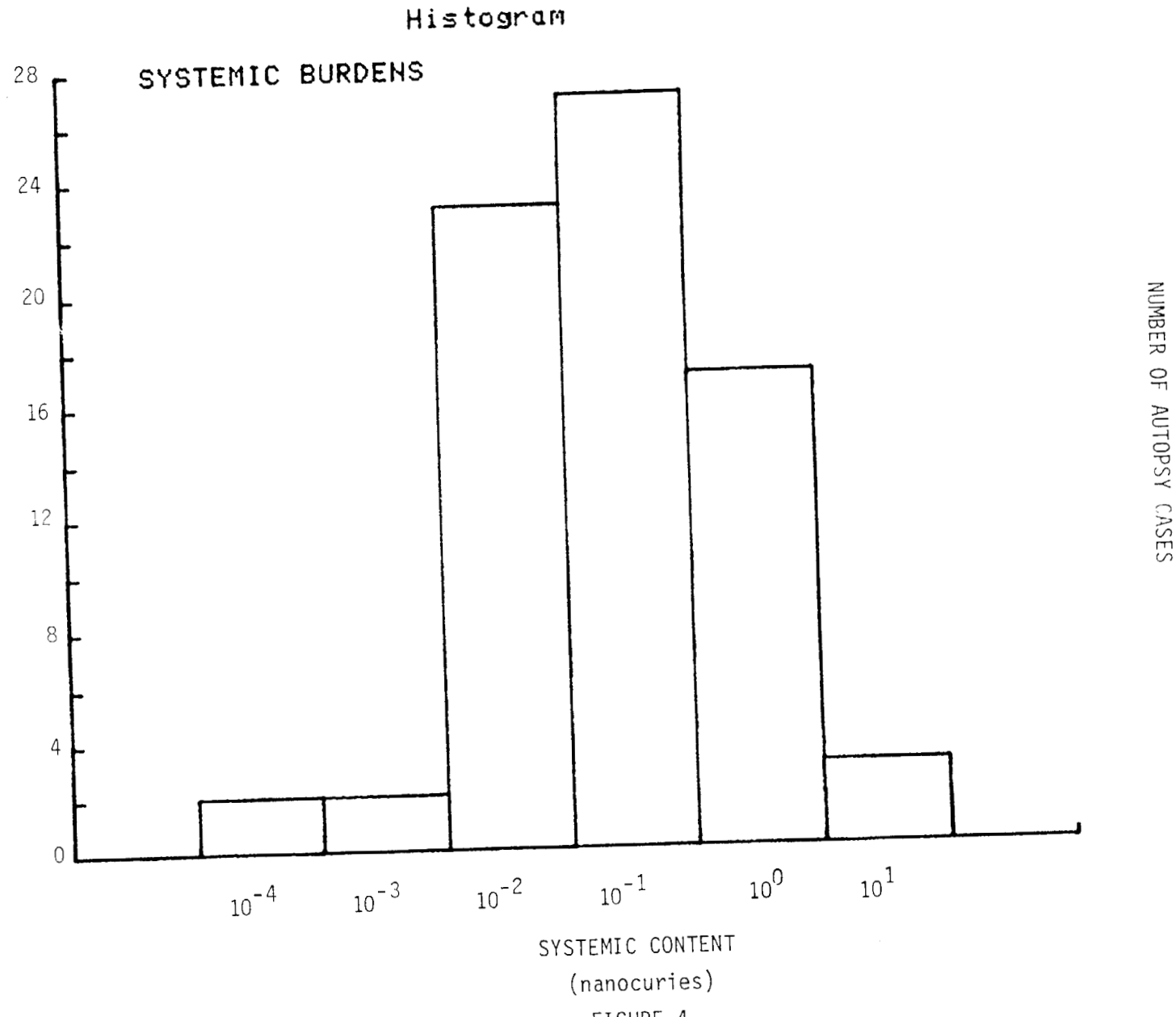

FIGURE 4

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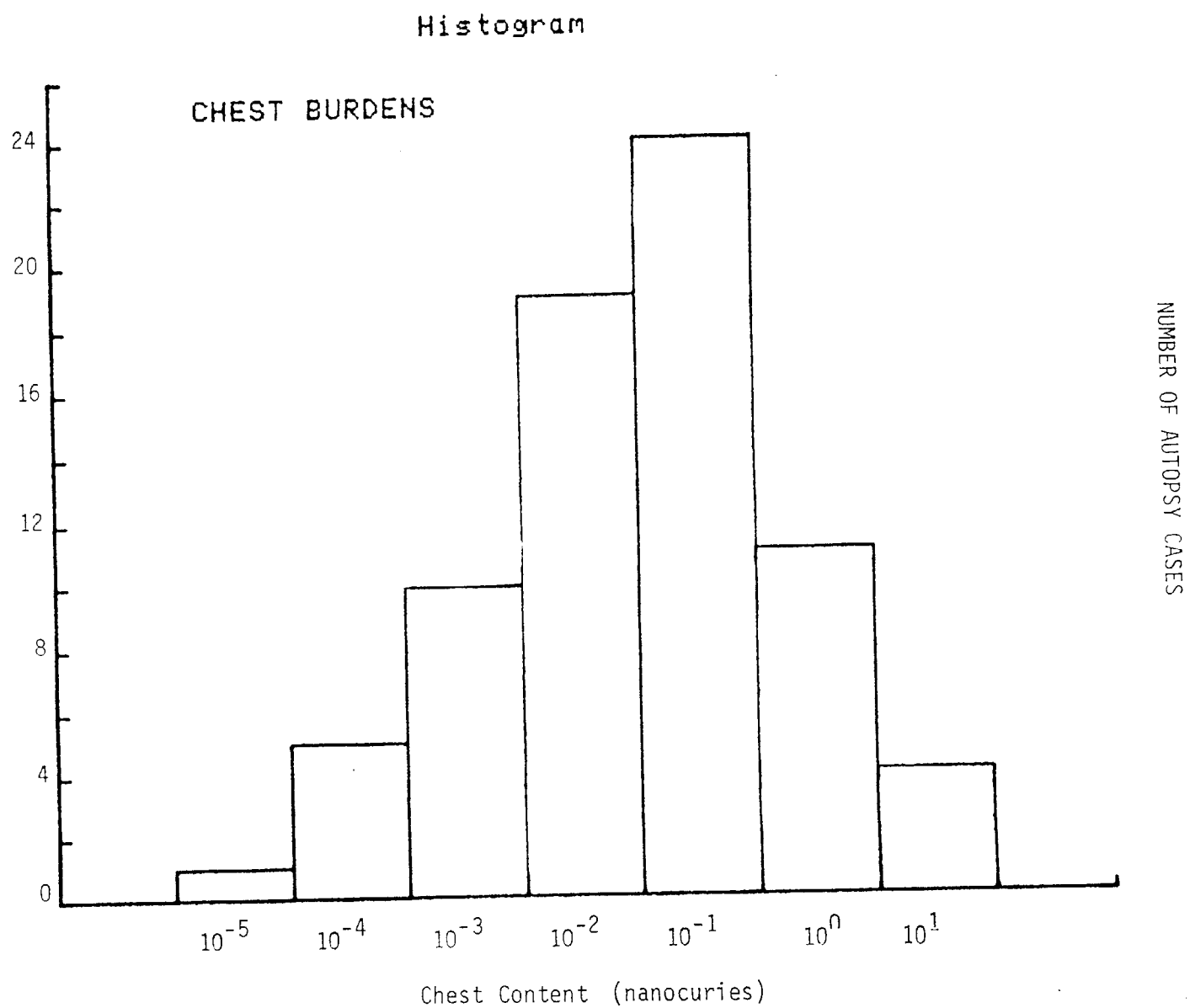

FIGURE 5

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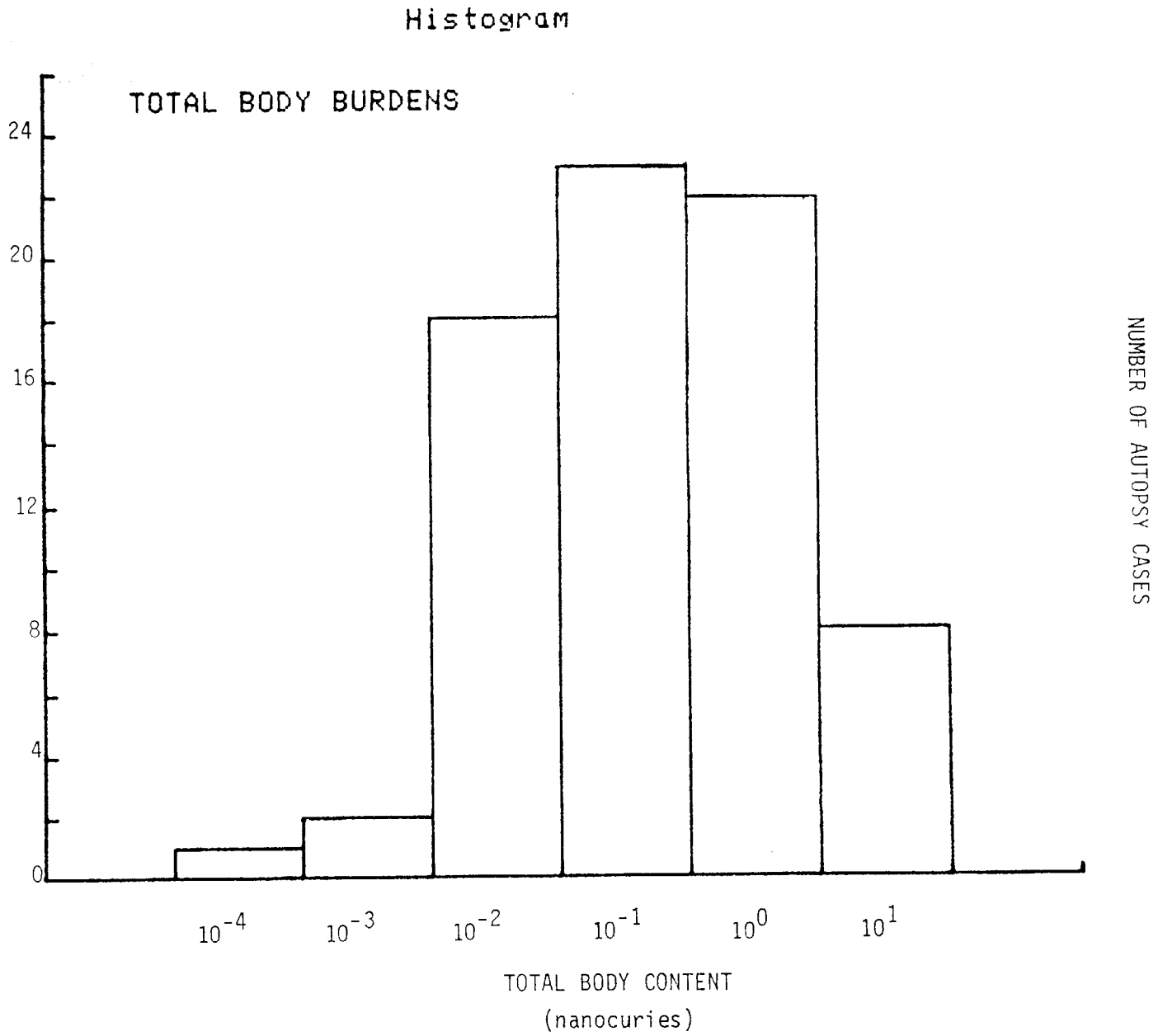

FIGURE 6

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