

B14

**GREATER PITTSBURGH
CANCER CENTER**

R-08-92-149

1145 Bower Hill Road, Suite 105
Pittsburgh, PA 15243
412-279-3694
Fax 412-279-3678

Radiation Oncologists:
Roger P. Tokars, M.D., Medical Director
Radiation Physicist:
Mitchell J. Jarosz, Jr., M.B.

December 12, 1992

Dr. Carl Paperiello
Team Leader
Incident Investigation Team
Nuclear Regulatory Commission
Mailstop MNBB 5720
Washington DC 20555

Dear Dr. Paperiello

Enclosed please find the 3 items that you requested regarding the incident on 12/7/92 at the Greater Pittsburgh Cancer Center:

1. Wipe test results performed by Omnitron Corp
2. Film badge results for the following personnel
 - [REDACTED] Radiological Physicist
 - [REDACTED] Physician
 - [REDACTED] Technologist
3. Patient Dose Assessment for Patient [REDACTED]

Sincerely,

Mitchell J Jarosz Jr
Mitchell J Jarosz, Jr
Senior Radiological Physicist
Greater Pittsburgh Cancer Center
1145 Bower Hill Road
Pittsburgh PA 15243

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions _____
FOIA- 92-612

cc: Alan Madison NRC IIT Team
Teresa Darden NRC Administrator Region I
James Yusko Western PA DER

E/26

DATE 12-8-92 TIME 1700

LOCATION 21A PRATSBURG

SOURCE NO.

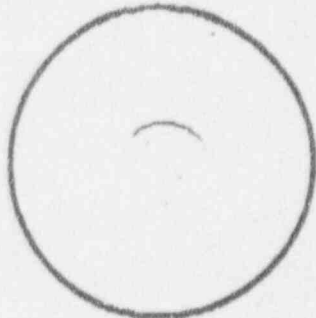
TECHNICIAN [REDACTED]

COUNT | TYPE

PASS
RC-69

IR 192

FOLD HERE



GREATER PITTSBURGH
 CANCER CENTER
 1145 BOWER HILL ROAD
 BRIDGES / SUITE 105
 PITTSBURGH PA 15243

109775 P11

RADIATION DOSIMETRY REPORT

Landauer Inc. 2 Sharon Road, Glenwood, Iowa 50423-1386
 Telephone: (708) 733-7000 Facsimile: (708) 733-7018

Landauer

Approved by the
 National Institute of Standards and Technology
 through NPL

109775 P11

1 - PR 5046 - 51515

PATIENT NUMBER	NAME	SOCIAL SECURITY NUMBER	DOB	HOLLYWOOD	EXPOSURE TO SOURCE (MILLIROENTHRS FROM REPORT) INDICATED BELOW		CAMBIO QUARTER		CAMBIO QUARTER		YEAR TO DATE		PERMANENT		ADJUSTMENTS	DATE	BY
					DEEP	SHALLOW	DEEP	SHALLOW	DEEP	SHALLOW	DEEP	SHALLOW					
	FOR EXPOSURE PERIOD 11/25/92			10	12/24/92												
	OPPLY CONTROL																

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

GREATER PITTSBURGH
CANCER CENTER

1145 Bower Hill Road, Suite 105
 Pittsburgh, PA 15243
 412-279-3694
 Fax 412-279-3678

Radiation Oncologists:
 Roger F. Tokars, M.D., Medical Director

Radiation Physicists:
 Mitchell J. Jarosz, Jr., M.S.

DOSE ESTIMATE FOR HDR PATIENT

On 12/7/92, an HDR patient was being treated for a lung carcinoma using the Omnitron 2000 HDR unit at the Greater Pittsburgh Cancer Center.

Following successful completion of her treatment at approximately 3:52 P.M., the source wire in the Omnitron 2000 HDR (High Dose Rate) Afterloader broke near the quick-disconnect of the afterloader. The source was trapped in the plastic catheter near the afterloader, not in the patient. The source was approximately 2.0 cm from the quick-disconnect and 15" or 38.1 cm from the patient. The activity of the Ir-192 source on 12/7/92 was 3.477 Curies. The estimated time of exposure from the source was 30 seconds.

The catheter was cut and the patient removed from the treatment room. Patient was surveyed with a 410 Victoreen GM meter and no radiation was present from patient. Patient was examined by Dr. Roger Tokars.

The exposure estimate to the above patient is:

$$4.66 \frac{\text{R-cm}}{\text{hr-mCi}} \times 3477 \text{ mCi} \times 0.5 \text{ min} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1}{(38.1 \text{ cm})^2} =$$

0.093 R or 93 mR

Mitchell J. Jarosz Jr.

Mitchell J. Jarosz Jr.
 Senior Radiological Physicist
 Greater Pittsburgh Cancer Center
 1145 Bower Hill Road
 Pittsburgh PA 15243



15101 FROM B F 1 PITTSB PA
3014297142
B12
Recycled paper
Blood R # 0892-115
Test Results
from 506 b
BFI workers.

FAX TRANSMITTAL COVER SHEET

Date 12-15-92

To Cynthia Jones

From: Jim Gajewski
BFI

Fax # 301 ~~429~~ 792-7142

BFI FAX NUMBER: (412)429-8867

RE: RIFC Investigation

Total number of pages transmitting 6 (including this cover letter)

if all pages are not received please contact Jim G at (412)429 2600 ASAP

COMMENTS Blood Test results you requested

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions 6
FOIA- 92-612

Rec'd
12/15/92
5:30 PM
Gajewski

E/27



NATIONAL HEALTH LABORATORIES
Incorporated

13900 PARK CENTER ROAD
HERNDON, VIRGINIA 22071
412-633-5335
PHONE (703) 742-3100

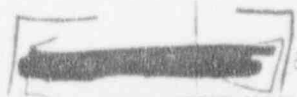
GATEWAY MEDICAL
DR. PETER DICKINSON
100 BROADWAY STREET
CARNEGIE, PA 15106
412-272-8940
Rte/Btch: 06448/55494.003

PATIENT NAME	SEX	AGE	ADMISSION	DATE OF ADMISSION	DATE OF REPORT	ACCOUNT NO.
[REDACTED]	[REDACTED]	[REDACTED]	2434	07-DEC-92	08-DEC-92	32991-2

TEST	RESULTS	FLAG	REFERENCE RANGES
ent ID :	[REDACTED]		
osition No. :	[REDACTED]		
ollected :	07-DEC-92		
ing :	Not indicated		
hysician :	LUCEY		
se :	Not indicated		
(S) ORDERED:	CBC W/PLATELET.		
W/PLATELET:			
H	9.2 THOUS/CU. MM.	*	4-11
H	5.45 MILLION/CU. MM.	*	4.4-6.2
MOGLDBIN	10.5 G/DL	*	13-18
HAEMATOCRIT	46.0 %	*	39-54
M	84 CU. MICRONS	*	80-100
M	26.5 MICRO-MICRO GMS	*	27-34
H	31.8 %	*	31-36
NEUTROPHILES	26 %	*	18-46
LITROPHILS	58 %	*	45-75
LYMFOCYTES	4 %	*	0-11
EINOPHILS	1 %	*	0-6
BOPHILE	1 %	*	0-2
ATELET COUNT	308 THOUS/CU. MM.	*	140-450

I HAVE RECEIVED YOUR TEST
RESULTS AND WOULD LIKE THEM TO BE
NORMAL. PLEASE CALL IF YOU
HAVE ANY QUESTIONS.
NATHAN SHERMAN, MD

NATHAN SHERMAN, MD
Director of Laboratories





NATIONAL HEALTH LABORATORIES
a corporation

13900 PARK CENTER ROAD
HERNDON, VIRGINIA 22071
412-833-5335
PHONE (703) 742-3100

GATEWAY MEDICAL
DR. PETER DICKINSON
100 BROADWAY STREET
CARNEGIE, PA 15106
412-275-8940
Rte/Btch: 38445/58494.003

PATIENT NAME	SEX	AGE	ADMISSION	DATE OF ADMISSION	DATE OF REPORT	ACCOUNT NO
[REDACTED]	[REDACTED]	[REDACTED]	2436 07	DEC-92 08	DEC-92 32991-8	

TEST	RESULTS	FLAG	REFERENCE RANGES
------	---------	------	------------------

nt ID : [REDACTED]
 sition No. : [REDACTED]
 Collected : 07-DEC-92
 Collected : 9:00 AM
 ng : No
 Physician : LUCEY
 e : Not indicated
 9) ORDERED: CBC W/PLATELET.

TEST	RESULTS	FLAG	REFERENCE RANGES
W/PLATELET:			
C	7.9 THOUS/CU. MM.	*	4-11
C	4.15 MILLION/CU. MM.	*	3.8-5.4
MOGLOBIN	14.2 G/DL	*	11.5-16.0
HATOCRIT	41.1 %	*	35-48
7	99 CU. MICRONS	*	80-100
4	34.2 MICRO-MICRO GMS	* HIGH	27-34
4C	36.2 %	*	31-36
TRHODCYTES	28 %	*	18-48
ITROPHILS	61 %	*	48-75
OCYTES	8 %	*	0-11
INOPHILS	8 %	*	0-8
OPHILS	1 %	*	0-2
ATELET COUNT	275 THOUS/CU. MM.	*	140-450

IF YOU'VE REVIEWED YOUR TEST
 RESULTS AND DO NOT SEE THEM TO BE
 NORMAL, PLEASE CALL IF YOU
 HAVE ANY QUESTIONS.
 PETER A. DICKINSON, M.D.

Nathan Sherman
 NATHAN SHERMAN, M.D.



NATIONAL HEALTH LABORATORIES
Incorporated

13900 PARK CENTER ROAD
HERNDON, VIRGINIA 22071
412-823-5335
PHONE (703) 742-3100

GATEWAY MEDICAL
DR. PETER DICKINSON
100 BROADWAY STREET
CARNEGIE, PA 15106
412-279-8940
Rte/Box: 30448/50494, 002

PATIENT NAME	SEX	AGE	ADMISSION	DATE OF ADMISSION	DATE OF REPORT	ACCOUNT NO.
[REDACTED]	[REDACTED]	[REDACTED]	1136	07-DEC-92	08-DEC-92	32791-8

TEST	RESULTS	FLAG	REFERENCE RANGES
ent ID :	[REDACTED]		
osition No. :	[REDACTED]		
Collected :	07-DEC-92		
Collected :	12:50 PM		
ing :	No		
r Physician :	DICKINSON		
ce :	Not indicated		
(S) ORDERED:	CBC W/PLATELET.		
W/PLATELET:			
HC	8.2 THOUS/CU. MM.	*	4-11
HC	4.75 MILLION/CU. MM.	*	4.4-6.2
MOGLOBIN	14.7 G/DL	*	13-18
HAEMATOCRIT	42.9 %	*	39-54
V	90 CU. MICRONS	*	80-100
H	30.6 MICRO-MICRO GMS	*	27-34
HC	34.2 %	*	31-36
MPHOCYTES	40 %	*	18-46
UTROPHILS	46 %	*	45-75
NOCYTES	9 %	*	0-11
BINDOPHILS	1 %	*	0-6
SOPHILS	2 %	*	0-2
ATELET COUNT	244 THOUS/CU. MM.	*	140-450

I HAVE REVIEWED YOUR TEST
RESULTS AND CONSIDER THEM TO BE
NORMAL. PLEASE CALL IF YOU
HAVE ANY QUESTIONS.
PETER A. DICKINSON, M.D.

Nathan Sherman
NATHAN SHERMAN, M.D.



NATIONAL HEALTH LABORATORIES
Incorporated

13900 PARK CENTER ROAD
HERNDON, VIRGINIA 22071
412-833-5335
PHONE (703) 742-3100

GATEWAY MEDICAL
DR. PETER DICKINSON
1100 BROADWAY STREET
DARNEGIE, PA 15106
412-273-8940
Rte/Btch: 38448/55494.002

PATIENT NAME	SEX	AGE	ACCESSION	DATE OF ACCESSION	DATE OF REPORT	ACCOUNT NO.
[REDACTED]	M	[REDACTED]	0541 07	DEC-92 08	DEC-92 32	991-2

TEST	RESULTS	FLAG	REFERENCE RANGES
ent ID	[REDACTED]		
osition No.	[REDACTED]		
Collected	07-DEC-92		
Collected	1:30 PM		
ing	No		
n Physician	LUCEY		
se	Not indicated		
(S) ORDERED:	CBC w/PLATELET.		
w/PLATELET:			
D	5.3 THOUS/CU. MM.	*	4-11
C	5.01 MILLION/CU. MM.	*	4.4-6.2
HOGLOBIN	15.8 G/DL	*	13-18
MATOCRIT	45.6 %	*	39-54
V	91 CU. MICRONS	*	80-100
-	31.5 MICRO-MICRO GMS	+	27-34
AC	34.6 %	+	31-36
MPHOCYTES	36 %	+	18-46
UTROPHILS	66 %	+	45-75
NGOCYTES	5 %	+	0-11
SINDPHILS	2 %	+	0-6
SOPHILS	1 %	+	0-2
ATELET COUNT	261 THOUS/CU. MM.	*	140-450

I HAVE REVIEWED YOUR TEST
RESULTS AND CONSIDER THEM TO BE
NORMAL. PLEASE CALL IF YOU
HAVE ANY QUESTIONS.
NATHAN SHERMAN, M.D.

Nathan Sherman
NATHAN SHERMAN, M.D.



NATIONAL HEALTH LABORATORIES
Incorporated

13900 PARK CENTER ROAD
HERNDON, VIRGINIA 22071
412-833-5335
PHONE (703) 742-3100

GATEWAY MEDICAL
DR. PETER DICKINSON
100 BROADWAY STREET
CARNEGIE, PA 15106
412-279-5940
Rte/Btch: 39445/55454.001

PT. SURNAME	SEX	AGE	ACCESSION	DATE OF ADMISSION	DATE OF REPORT	ACCOUNT NO.
[REDACTED]	M	[REDACTED]	9609 07	DEC-93 08	DEC-93 38	951-E

TEST	RESULTS	FLAG	REFERENCE RANGES
ent ID	[REDACTED]		
osition No.	[REDACTED]		
Collected	07-DEC-93		
Collected	1:00 PM		
ing	No		
r Physician	LUCEY		
ce	Not indicated		
(S) ORDERED: CSC W/PLATELET.			
W/PLATELET:			
C	6.4 THOUS/CU. MM.	*	4-11
C	5.08 MILLION/CU. MM.	*	4.4-6.2
MOGLOBIN	15.4 G/DL	*	12-18
MATOCRIT	43.4 %	*	39-54
V	89 CU. MICRONS	*	80-100
H	33.3 MICRO-MICRO GMS	*	27-34
HC	33.9 %	*	31-36
MPROCYTES	14 %	* LOW	18-46
UTROPHILS	30 %	* HIGH	45-75
NOCYTES	3 %	*	0-11
SINDPHILS	2 %	*	0-6
SOPHILS	1 %	*	0-2
ATELET COUNT	235 THOUS/CU. MM.	*	140-450

I HAVE REVIEWED YOUR TEST
RESULTS AND CONSIDER THEM TO BE
NORMAL. PLEASE CALL IF YOU
HAVE ANY QUESTIONS.
PETER DICKINSON, M.D.

Handwritten signature

C/9

ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION
HEALTH SCIENCES DIVISION

December 14, 1992

Daniel Flynn, M.D.
Department of Radiation Medicine
Massachusetts General Hospital
Boston, MA 02114

Dear Dr. Flynn:

As we discussed on Friday afternoon, December 11, 1992, our laboratory has now completed cytogenetic evaluations of radiation-induced chromosome aberrations in cultured lymphocytes from the six persons considered to have been at the greatest potential risk for exposure to the medical source of iridium 192. The observed frequencies of dicentric chromosomes ranged from 1 to 3 dicentrics in the 500 metaphase samples from these cultures. In persons who have had no exposure other than background, we expect to see on average about 1 dicentric per 500 cells scored. Taking into account statistical uncertainty, our observations of 1, 2, or 3 dicentrics in a sample of 500 cells from cultures from any of the six persons cannot be considered statistically different from background. For this reason, it is not possible for us to produce a precise estimate of the dose that any individual may have received. However, if we look at the set of data from the six persons as a whole, we observed a total of 13 dicentric chromosomes in 3,000 metaphases, where we would have expected to have observed on average 6 dicentrics in 3,000 metaphases. Thus, our data provide evidence that the group as a whole did indeed receive an exposure in excess of background (cytogenetic dose estimate is ~6 rad for the group). Also, because of the exposure scenario, it is likely that each of these persons was exposed, albeit in some instances briefly, to the radiation source. Thus, we calculated a point estimate of dose for each person, although these estimates have large statistical uncertainties. I am also providing you with information on the 90% confidence intervals for these dose estimates, which describe the upper limits of doses that these persons may have received.

I am providing reports for each person individually in the event that any one should want a copy of their own report. Because dicentric frequencies were

E/DS

Dr. Daniel Flynn

- 2 -

December 14, 1992

so similar in all six persons, my explanatory comments are virtually identical on the six reports. If you should have any further questions regarding these findings, please do not hesitate to call.

Sincerely,



L. Gayle Littlefield, Ph.D.
Director, Cytogenetics Laboratory

LGL:dpw

cc: Dr. Shirley Fry, ORISE
Dr. Fun Fong, ORISE
Dr. Robert Ricks, ORISE
Ms Cynthia Jones, NRC

CYTOGENETICS REAC/TS PATIENT REPORT

TO: Dr. Shirley Fry

DATE: December 11, 1992

Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File

SUBJECT NAME: [REDACTED] (10/10/67) REAC/TS ACCIDENT # 1392.0001

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA
(617) 726-8150

Site of Sample Collection: ORAU Other Scenery Hill Manor, Indiana, PA, P.M., 12/3/92

Sample Transit: Via Hand Carried Transit Time ~ 6 hrs Culture Date 12/04/92

Exposure Data: [REDACTED] is a dietician at Scenery Hill Manor, who had considerable contact with the patient.

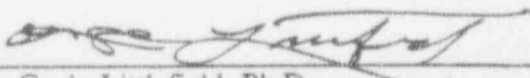
Culture Data: The condition of [REDACTED] blood was excellent and showed no evidence of hemolysis. Her white blood count was 15,379 per mm³, with 36% lymphocytes. [REDACTED] lymphocyte cultures yielded good growth and exhibited only 5% second-divisions at 47-hr harvest. Thus her slides were stained with routine methods for evaluation of radiation-induced chromosome aberrations in first-division lymphocyte metaphases.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases</u> <u>Scored</u>	<u># Dicentrics</u> <u>Observed</u>	<u>Dicentric/</u> <u>Cell</u>	<u>Dose*</u> <u>Estimate</u>	<u>90%</u> <u>Confidence</u> <u>Interval</u>
500	1	.002	0	<1 - 12 rad

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-6}$ dicentrics/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of 1 dicentric chromosome for a dicentric/cell frequency of .002. It should be noted that dicentric frequencies of about one dicentric per 500 lymphocyte metaphases are routinely observed in lymphocyte cultures from persons having no known exposures to radiation other than that due to background radiation. Because the dicentric frequency in [REDACTED] cultures is the same as background, it is not possible for us to give a precise accurate estimate of any radiation dose she may have received; however, taking into account statistical uncertainty associated with this test, we are 90% confident that her exposure could not have exceeded an upper limit of 12 rad.


 L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory

CYTOGENETICS REACTS PATIENT REPORT

TO: Dr. Shirley Fry

DATE: December 11, 1992

Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File

SUBJECT NAME: [REDACTED] (05/27/00) REACTS ACCIDENT # 1392.0002

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA (617) 726-8150

Site of Sample Collection: ORAU Other Scenery Hill Manor, Indiana, PA, P.M., 12/3/92

Sample Transit: Via Hand Carried Transit Time ~ 6 hrs Culture Date 12/04/92

Exposure Data: Patient at Scenery Hill Manor whose bed was head-to-head with that of the victim, separated by a thin wall. It was initially thought that [REDACTED] may have been within a few feet of the source for approximately 100 hrs, but the later information indicates that she was at risk for exposure for a much shorter period of time since she was away from her bed during a good portion of each day.

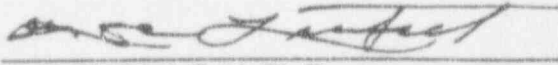
Culture Data: The condition of [REDACTED] blood when received in the laboratory was excellent. No evidence of hemolysis. Her white blood count was 5,544 per mm³, with 22% lymphocytes. Her lymphocyte culture yielded excellent growth and exhibited 8% second-divisions in cultures harvested at 47 hr. Her slides were stained with Giemsa blood stain to allow selective scoring of metaphases in their first in vitro division.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases Scored</u>	<u># Dicentrics Observed</u>	<u>Dicentric/Cell</u>	<u>Dose* Estimate</u>	<u>90% Confidence Interval</u>
500	2	.004	~6 rad	<1 - 20 rad

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-6}$ dicentrics/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of two dicentric chromosomes for a dicentric/cell frequency of .004. It should be noted that dicentric frequencies of about one dicentric per 500 metaphases are routinely observed in lymphocyte cultures from persons having no known exposure to radiation other than that due to background. Because the dicentric frequency in [REDACTED] cultures is so near that observed in unexposed persons, it is not possible for us to produce a precise estimate of any radiation dose she may have received, however, within very wide ranges of statistical error, our cytogenetic dose estimate based on the observed dicentric/cell frequency is about 6 rad. Taking into account statistical uncertainty associated with this dose estimate, we are 90% confident that her exposure ranged from <1 to no greater than 20 rad.


 L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory

CYTOGENETICS REAC/TS PATIENT REPORT

TO: Dr. Shirley Fry DATE: December 11, 1992

Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File

SUBJECT NAME: [REDACTED] (09/03/04) REAC/TS ACCIDENT # 1392.0003

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA
(617) 726-8150

Site of Sample Collection: ORAU Other Scenery Hill Manor, Indiana, PA, P.M. 12/3/92

Sample Transit: Via Hand Carried Transit Time ~ 6 hrs Culture Date 12/04/92

Exposure Data: [REDACTED] is a patient at the nursing home whose bed was located within two-to-four feet from the trash can where the source remained for approximately 3 hr. The estimated dose rate at 1 meter from the trash can was ~2 R/hr.

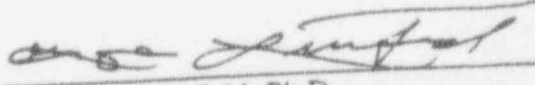
Culture Data: [REDACTED] whole blood arrived in excellent condition and showed no signs of hemolysis. Her white blood count was 4,767 per mm³, with 37% lymphocytes. Growth was excellent in her 47-hr lymphocyte cultures which exhibited 20% second-divisions at that early harvest time. Her slides were stained with fluorescence plus Giemsa blood stain for evaluation of radiation-induced chromosome aberrations in selected first-division metaphases.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases Scored</u>	<u># Dicentrics Observed</u>	<u>Dicentric/Cell</u>	<u>Dose* Estimate</u>	<u>90% Confidence Interval</u>
500	3	.006	~10	3 - 25

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-4}$ dicentrics/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of 3 dicentric chromosomes for a dicentric/cell frequency of .006. It should be noted that dicentric frequencies of about one dicentric per 500 lymphocyte metaphases are routinely observed in lymphocyte cultures from persons having no known exposures to radiation other than that due to background radiation. Because the dicentric frequency in [REDACTED] cultures are so near that observed in unexposed persons, it is not possible for us to produce a precise estimate of any radiation dose she may have received, however, within very wide ranges of statistical error, our cytogenetic dose estimate based on the observed dicentric/cell frequency is about 10 rad. Taking into account statistical variability associated with this dose estimate, we are 90% confident that her exposure could not have exceeded 25 rad.


L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory

CYTOGENETICS REACTS PATIENT REPORT

TO: Dr. Shirley Fry DATE: December 11, 1992
 Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File
 SUBJECT NAME: [REDACTED] (11/28/46) REACTS ACCIDENT # 1392.0004

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA
(617) 726-8150

Site of Sample Collection: ORAU _____ Other Scenery Hill Manor, Indiana, PA, P.M., 12/3/92

Sample Transit: Via Hand Carried Transit Time ~ 6 hrs Culture Date 12/04/92

Exposure Data: Caregiver who administered to patient; gave a lot of care to skin near source.


Culture Data: Condition of blood when received in the laboratory was excellent. No evidence of hemolysis. WBC = 8,164 per mm³, 30% lymphocytes. [REDACTED] lymphocyte cultures yielded excellent growth, and exhibited 19% second-divisions in cultures harvested at 47 hrs. Her slides were stained with fluorescent plus Giemsa techniques to allow selective scoring of metaphases in their first in vitro division.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases</u> <u>Scored</u>	<u># Dicentric</u> <u>Observed</u>	<u>Dicentric/</u> <u>Cell</u>	<u>Dose*</u> <u>Estimate</u>	<u>90%</u> <u>Confidence</u> <u>Interval</u>
500	2	.004	~6 rad	<1 - 20 rad

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-6}$ dicentric/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of 2 dicentric chromosomes for a dicentric/cell frequency of .004. It should be noted that dicentric frequencies of about one dicentric per 500 lymphocyte metaphases are routinely observed in lymphocyte cultures from persons having no known exposures to radiation other than that due to background. Because the dicentric frequency in [REDACTED] cultures is so near that observed in unexposed persons, it is not possible for us to produce a precise estimate of any radiation dose she may have received; however, within very wide ranges of statistical error, our cytogenetic dose estimate based on the observed dicentric/cell frequency is ~6 rad. Taking into account statistical uncertainty associated with this dose estimate, we are 90% confidence that her exposure ranged from <1 to no greater than 20 rad.


 L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory

CYTOGENETICS REAC/TS PATIENT REPORT

TO: Dr. Shirley Fry

DATE: December 11, 1992

Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File

SUBJECT NAME: [REDACTED] (05/15/54) REAC/TS ACCIDENT # 1392.0005

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA (617) 726-8150

Site of Sample Collection: ORAU Other Scenery Hill Manor, Indiana, PA, P.M., 12/3/92

Sample Transit: Via Hand Carried Transit Time ~ 6 hrs Culture Date 12/04/92

Exposure Data: [REDACTED] is a nurse at Scenery Hill Manor who handled the source and placed it in the trash.


Culture Data: Condition of blood when received in the laboratory was excellent. No evidence of hemolysis. White blood count of 7,364 per mm³, 40% lymphocytes. [REDACTED] lymphocyte culture yielded excellent growth and exhibited 36% second-divisions in cultures harvested at 47 hr. Her slides were stained with fluorescence plus Giemsa technique to allow selective scoring of metaphases in their first in vitro division.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases Scored</u>	<u># Dicentrics Observed</u>	<u>Dicentric/Cell</u>	<u>Dose* Estimate</u>	<u>90% Confidence Interval</u>
500	3	.006	~10 rad	3 - 25

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-9}$ dicentrics/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of 3 dicentric chromosomes for a dicentric per cell frequency of .006. It should be noted that dicentric frequencies of about one dicentric per 500 metaphases are routinely observed in lymphocyte cultures from persons having no known exposures to radiation other than that due to background. Because the dicentric frequency in [REDACTED] cultures is so near that observed in unexposed persons, it is not possible for us to produce a precise estimate of any radiation dose she may have received, however, within wide ranges of statistical error, our cytogenetic dose estimate based on the observed dicentric per cell frequency is ~10 rad. Taking into account statistical uncertainty associated with this dose estimate, we are 90% confident that her exposure ranged from 3 to no more than 25 rad.


 L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory

CYTOGENETICS REAC/TS PATIENT REPORT

TO: Dr. Shirley Fry

DATE: December 11, 1992

Copies to: Drs. Fong, Ricks, and Berger; A. Sipe; G. Joiner; RRF; File

SUBJECT NAME: [REDACTED] (05/17/55) REAC/TS ACCIDENT # 1392.0006

Referring Physician: Dr. Daniel Flynn Address/Telephone Massachusetts General Hospital, Boston, MA
(617) 726

Site of Sample Collection: ORAU Other Scenery Hill Manor, Indiana, PA, P.M., 12/3/92

Sample Transit: Via Hand Carried Transit Time - 6 hrs Culture Date 12/04/92

Exposure Data: [REDACTED] works with maintenance services at the nursing and handled the trash can that contained the source. He took the trash to a concrete shed in the back of the facility.


Culture Data: Condition of blood when received in laboratory was excellent. No evidence of hemolysis. White blood count was 9,227 per mm³, 23% lymphocytes. [REDACTED] cultures yielded excellent growth and exhibited 18% second-division metaphases in cultures harvested at 47 hrs. His slides were stained with fluorescence plus Giemsa techniques to allow selective scoring of metaphases in their first in vitro division.

RESULTS AND COMMENTS ON CYTOGENETIC ANALYSES

<u># Metaphases</u> <u>Scored</u>	<u># Dicentrics</u> <u>Observed</u>	<u>Dicentric/</u> <u>Cell</u>	<u>Dose*</u> <u>Estimate</u>	<u>90%</u> <u>Confidence</u> <u>Interval</u>
500	2	.004	~6 rad	<1 - 20 rad

* estimate of "equivalent" dose to whole body for iridium 192 gamma rays, coefficients of $\gamma = .002$, $\alpha = 3.2 \times 10^{-4}$ and $\beta = 6.1 \times 10^{-4}$ dicentrics/cell/rad used in dose calculations.

COMMENTS: We have completed cytogenetic evaluations of 500 first-division metaphases from 47-hr lymphocyte cultures established from blood samples from [REDACTED]. We observed a total of two dicentric chromosomes for a dicentric/cell frequency of .004. It should be noted that dicentric frequencies of about one dicentric per 500 metaphases are routinely observed in lymphocyte cultures from persons having no exposures to radiation other than that due to background. Because the dicentric frequency in [REDACTED] cultures is so near that observed in unexposed persons, it is not possible for us to produce a precise estimate of any radiation dose he may have received, however, within very wide ranges of statistical error, our cytogenetic dose estimate based on the observed dicentric/cell frequency is about 6 rad. Taking into account statistical uncertainty associated with this dose estimate, we are 90% confident that his exposure ranged from <1 to no greater than 20 rad.


 L. Gayle Littlefield, Ph.D.
 Director, Cytogenetics Laboratory