EPA Region 5 Records Ctr.
383776

COVINGTON & BURLING

1201 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004-2401
TEL 202.662.6000
FAX 202.662.6291
WWW.COV.COM

WASHINGTON, DC
NEW YORK
LONDON
BRUSSELS
SAN FRANCISCO

J. T. SMITH, II
TEL 202.662.5555
FAX 202.778.5555
JTSMITH@COV.COM

June 1, 2001

Debra Regel
Enforcement Specialist
U.S. Environmental Protection Agency
Emergency Enforcement Support
Section, SE-5J
77 West Jackson Blvd.
Chicago, IL 60604-3590

RECEIVED
JUN 0 4 REC'D
EMERGENCY SUPPORT
SECTION

Re: Request for Information Pursuant to Section 104
of CERCLA for 161 East Grand Avenue, Chicago, IL

Dear Ms. Regel:

Kerr-McGee Corporation has asked me to respond to the subject information request of April 30, 2001, which we received May 4, 2001. Set forth below are answers, as appropriate, to questions included in your information request. Also we are appending all non-privileged documents, which Kerr-McGee was able to find, that are responsive to your requests.

1. John D. White, former Kerr-McGee Project Manager, 5300 West Memorial Road, Apt. 14-Q, Oklahoma City, OK 23142, (405) 603-4338. Lisa Thurman, Kerr-McGee Corporation, 123 Robert S. Kerr, Oklahoma City, OK 73102, (405) 270-2879. Ms. Thurman, a legal assistant, conducted a review of files to identify potentially responsive documents, under supervision of William Green.

2. Copies of all documents consulted, examined or referred to in the preparation of answers to these requests are appended to this response at tabs referenced in the answers to which particular documents pertain.

3. We know of no persons who may be able to provide information or documents beyond those persons listed as having received this same information request. We would note that, with regard to your request for identification of possibly knowledgeable "past employees of Lindsay Light," that company ceased operations at this site in 1936, and sold the premises in 1944.

4. As EPA is aware, Kerr-McGee Chemical LLC continues to manage radioactive substances as part of ongoing removal activities at several sites in the Chicago and West Chicago areas. The Project Manager is Mark Krippel, Kerr-McGee Environmental Management Corporation, West Chicago Project Facility, 800 Weyrauch Street, West Chicago, IL 60185, (630) 293-6331.

5. Information in our possession indicates that Lindsay Light acquired the 161 East Grand site in 1908, and we assume that the building was constructed at some time thereafter. A review of historical files of the City of Chicago Department of Buildings shows issuance of permits for miscellaneous alterations and construction activities, but the files do not contain a record of the original construction. We attach at Tab 1 relevant property and permit records.

6. Minutes of the Lindsay Light Company confirm that the 161 East Grand building was used both as a corporate headquarters and for the production of gas mantles. At Tab 2 we enclose various excerpts from the minutes, some of which were previously submitted to EPA in the Company's January 3, 1994, response to a previous Section 104(e) request. These minutes confirm that production of gas mantles at this location ceased by 1936.

7. We are aware of at least three occasions when removal or abatement work was performed by the owner of the building at 161 East Grand. The first occasion was in August 1981, and the work was conducted by Radiation Safety Services, Inc. The second was during a remodeling of the second floor of the building in February 1984. Again, the work was done by Radiation Safety Services, Inc. Documents pertaining to the 1981 and 1984 activities are attached at Tab 3.

In addition, the owner of the building undertook a removal of portions of the chimney in the basement of the building during the spring of 2000. In advance of this removal activity, Kerr-McGee was approached by Eli Port of RSSI, as a representative of the owner, 161 E Grand Associates, and asked to contribute to the cost of this removal. Without admitting any liability, Kerr-McGee agreed to reimburse costs associated with profiling, transporting, and disposing of certain radiological material to be removed. Also, Kerr-McGee requested that the owner give advance notice to the Illinois Department of

Nuclear Safety regarding the intended removal activity and intended disposition of any radiological materials at the Envirocare facility in Utah. Documents pertaining to these events are appended at Tab 4.

8. To the best of our knowledge, the only contractor that has performed work of the sort described in Request 8 is Radiation Safety Services, Inc., or RSSI, with disposal managed by a broker, ADCO Services, Inc., both of which are shown as receiving copies of this Section 104(e) request.

9. Kerr-McGee has no information except that which is included in the documents provided at Tabs 3 and 4.

10. Other than portions of the documents attached at Tab 3, the only documents responsive to Request 10 are ones generated by Region V of EPA and other federal government agencies. We are attaching copies of these government documents at Tab 5.

11. As already noted, the Lindsay Light Company sold the 161 Building in 1944, at which time it had no relationship with any of the other recipients of this request. As EPA is aware, the Lindsay Light Company leased property on Illinois Avenue from Chicago Dock and Canal Trust, a predecessor of River East Chicago LLC., between 1914 and 1932.

12. The only knowledge of Kerr-McGee regarding the "condition of the 161 Building prior to any sale or exchange of ownership interest" in the past year, was based upon the documents appended at Tabs 3-5. Kerr-McGee has no direct knowledge of the condition of this building prior to its sale by Lindsay Light in 1944 other than the references to the building that appear in the corporate minutes appended at Tab 2.

13. The only dealings that Kerr-McGee has had with other recipients of this information request with respect to removal, transport or disposal of radioactive materials at or from the 161 building, is as described in answer to Request 11, and as reflected in the documents appended at Exhibit 3. As EPA is well aware, Kerr-McGee has had other dealings with River East Chicago LLC and its predecessor in respect of other radiological cleanup activities in the Streeterville area.

14. Kerr-McGee has not been able to identify any information aside from that set forth in the documents at Tabs 3 and 4.

15. Kerr-McGee has not performed any radiation contamination removal or control actions at the 161 Building. Documents furnished by 161 E. Grand Associates and appended at Exhibit 4 contain information about disposal of certain materials removed by that owner.

16. Kerr-McGee does not have any such plans.

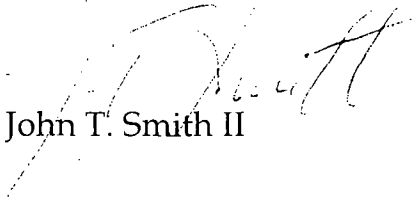
17. Unknown

18. See responses to Requests 1-15 above, and documents appended at Tabs 1-5.

19. See documents at Tabs 1-5.

20. Unknown

Sincerely,



John T. Smith II

Attachments

RALPH HUGH BARGER
Commercial Searcher

Date 03/27

HERE IT IS . . .

To get this to you promptly, I am mailing the enclosed without a formal letter.

Att'n Scott Dane

STEWART TITLE
GUARANTY COMPANY

Chicago Commercial Division
30 North LaSalle, Suite 2100 • Chicago, Illinois 60602
(312) 849-4400 • (800) 261-9800 • FAX: (312) 849-4410

Lots 1 & 2 in the subdivision of Block 18 Kinzie's Add Pin # 17-10-126-009 were deeded to Lindsey Light Doc # 4285197 November 06, 1908 a complete deed chain and copies of deeds to present will follow. A 100 % and a 50 % copy of the Sidwell page are included with this fax.

If you have any questions please call me or Gary.

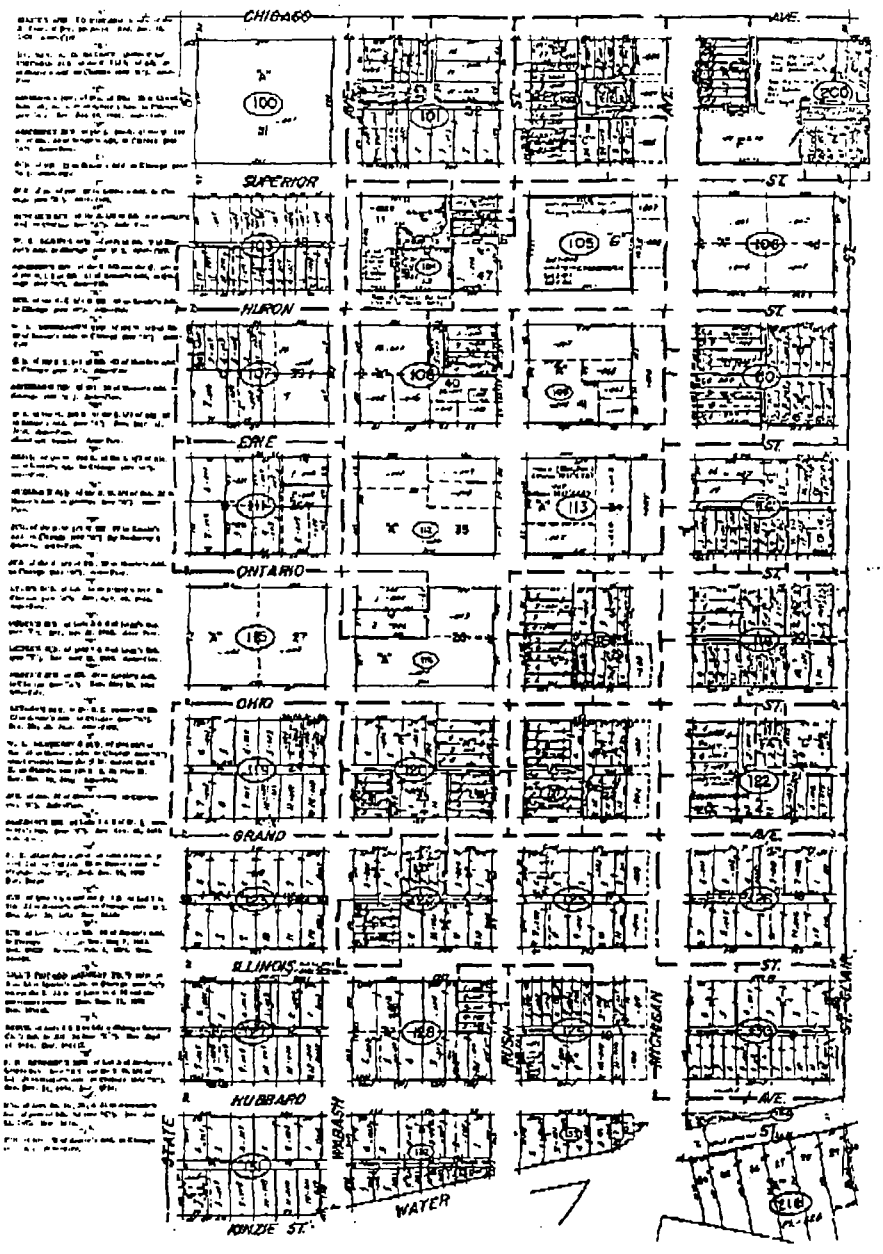
Hugh Barger

Hugh Barger

3 pages

39-14-10 C
17-10

W. 1/2 W. 1/4 Sec. 10-39-14
NORTH TOWN



17 - 119

"U"

OGDEN'S SUB. of Lots 5 & 6 of Legg's Sub. (see "T"). Rec. May 29, 1850. Ante-Fire.

"V"

OGDEN'S SUB. of Lots 7 & 8 of Legg's Sub. (see "T"). Rec. May 29, 1850. Ante-Fire.

"W"

OGDEN'S SUB. of Blk. 20 in Kinzie's Add. to Chicago (see "A"). Rec. May 29, 1850. Ante-Fire.

"X"

BUTLER'S SUB. of the N.E. corner of Blk. 30 in Kinzie's Add. to Chicago (see "A"). Rec. May 29, 1850. Ante-Fire.

"Y"

W. L. NEWBERRY'S SUB. of that part of Blk. 21 in Kinzie's Add. to Chicago (see "A") which extends from the N.W. corner 200 ft. E. on Ohio St. and 118 ft. S. on Pine St. Rec. Nov. 19, 1852. Ante-Fire.

"Z"

SUB. of Blk. 18 of Kinzie's Add. to Chicago (see "A"). Ante-Fire.

"A'"

ASSESSOR'S DIV. of Lots 1 & 2 of W. L. Newberry's Sub. (see "Y"). Rec. Oct. 28, 1870. Ante-Fire.

"B'"

G. C. STANTON'S SUB. of Lots 6 and the N. 19-1/2 ft. of 7 of Blk. 22 in Kinzie's Add. to Chicago (see "A"). Rec. Jan. 15, 1873. Doc. 75000.

"C'"

SUB. of Lots 6 & 7 and the S. 5 ft. of Lot 8 in Blk. 22 in Kinzie's Add. to Chicago (see "A"). Rec. Apr. 29, 1873. Doc. 96169.

"D'"

SUB. of Lots 3 & 4 in Blk. 16 of Kinzie's Add. to Chicago (see "A"). Rec. May 7, 1873. Doc. 96227. Re-rec. Feb. 4, 1876. Doc. 145434.

"E'"

LILL'S CHICAGO BREWERY CO.'S SUB. in Blk. 54 in Kinzie's Add. to Chicago (see "A") except the E. 13 ft. of Lots 11 & 12 and the accretions thereto. Rec. Sept. 13, 1873. Doc. 121006.

"F'"

RESUB. of Lots 1 & 2 in Lill's Chicago Brewery Co.'s Sub. in Blk. 54 (see "E'"). Rec. Sept. 14, 1874. Doc. 185412.

"G'"

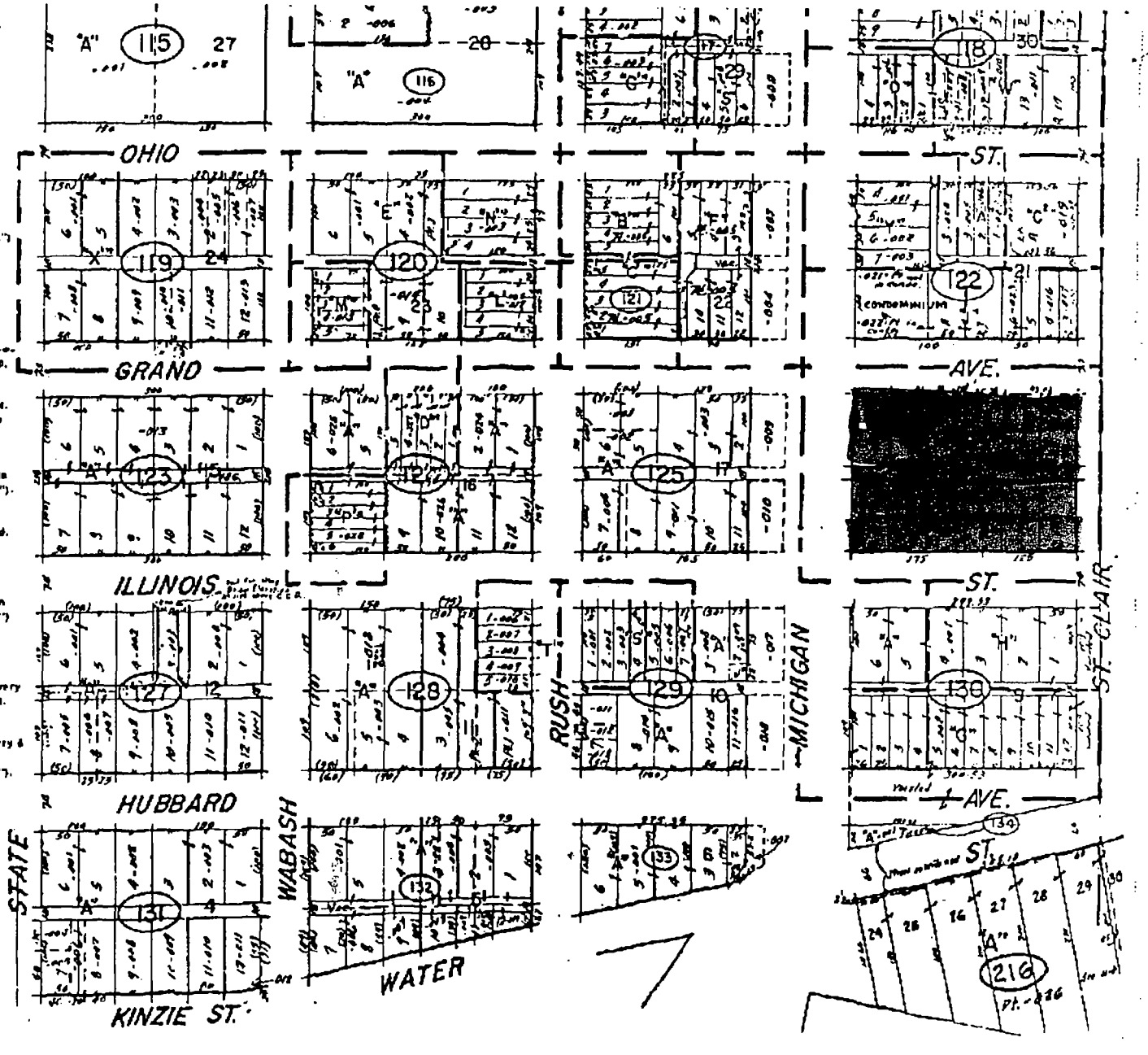
S. H. KERFOOT'S SUB. of Lot 5 of Newberry & Others Sub. (see "R") and the S.W. 1/4 of Blk. 20 in Kinzie's Add. to Chicago (see "A"). Rec. Dec. 24, 1874. Doc. 6714.

"H'"

SUB. of Lots 18, 19, 20, & 21 in Assessor's Div. of part of Blk. 53 (see "C"). Rec. Jan. 12, 1875. Doc. 16116.

"I'"

SUB. of Blk. 32 of Kinzie's Add. to Chicago (see "A"). Ante-Fire.



CITY OF CHICAGO-DEPARTMENT OF BUILDINGS PERMIT NO. B

4470183 0104 159 161 E. GRAND AVE 8 132 0721711

REPAIR ONE FREIGHT ELEVATOR 2

SUNDRY BROWN & STORCH 201 E. OHIO ST 3

1 4357 24 2000 20.00

AUTOMATIC ELEV 1473 W. IRVING PK RD 8

ALPHABETICAL FILE

SAFETY

CITY OF CHICAGO-DEPARTMENT OF BUILDINGS PERMIT NO. B 462854

46[illegible]5416032 C 161 EAST GRAND AVE. 8 132 072872 1

REPAIR & PAINT FIRE ESCAPE 4 STY

[illegible] STORCH INC. 100 E OHIO

1200	20	2000		20.00

FISCHER FIRE ESCAPE 150 W 68TH ST HINSDALE

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO. 554783

PERMIT NO.	WORK CODE	PLAN NO	PRIMARY ADDRESS	P/R	LOCATION ADDRESS	CACT
554783	18083	8221	161 E GRAND	C		0814

DESCRIPTION OF WORK: TENANTS ALTERS ENTIRE 4TH FLOOR

DATE ISSUED: 11-10-78

				CONTRACTOR LICENSE
OWNER	161 E GRAND ASSOC	161 E GRAND		
GENERAL	STREETERVILLE STUDIO	161 E GRAND AVE		
ARCHITECT	MICHAEL LUSTIG	1050 N STATE ST		8758
HEATING	F & M HEATING	6000 S HARLEM	SUMMIT IL	
MASON				
PLUMBING	BERNARD DENTZER	6217 N CLARK		9599

WK	PL FIR	KOMT	STORIES	BSMTS	W	L	H	CLDG. VOL	EST. COST	D.U.	OCC. CLASSIFICATION
		6	3A						100000		

LOT SIZE	PKG SP	LOAD	APPLIC PHONE
			644-1666

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
19	23.00	2E	406.00	2E	43.00	2S	25.00	2V	48.00	2B	45.00		0	590.00

LEGAL DESCRIPTION

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated at the specified horizon at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago and this permit may be revoked at any time for violation of the ordinances in connection with work hereon authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS. (SEC. 05-10) IF WORK DOES NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT, THE PERMIT SHALL BECOME VOID (SEC. 43-9)

DIV	PLAT	PAGE	LAKT	B.L.	L	H	SUBDIVISION

SEC.	TWP.	PG.

OFFERED ON PLAT	S.E.	DATE
		/ /

Commissioner of Buildings

Received amount indicated hereon

Dept. of Revenue

PERMIT CONTROL

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO. 8.

PERMIT NO	WORK CODE	PLAN NO	PRIMARY ADDRESS	FR	SECONDARY ADDRESS	CACT
55183	18085	2021	161-00 E GRAND	0	-00	0817

WORK: ALTERATIONS OF EXISTING BLDG 1ST FLR ONLY

DATE ISSUED: 07/02/79

					CONTRACTOR LICENSE
OWNER	PITRUK INC	625 N MICHIGAN	CHGO	IL	
GENERAL	LUSTIG INC	1050 N STATE	CHGO	IL	
ARCHITECT	MICHAEL LUSTIG	1050 N STATE	CHGO	IL	18758
HEAT VENT	WEATHERMAKERS	220 GREENBAY RD	EVANSTON	IL	11646
MASON					
PLUMBING	MOGANY PLBG	425 N MICHIGAN	CHGO	IL	08467

WARD	FLOOR	ZONE	STORIES	ESMTS	W	L	A	BLDG VOL	EST COST	DU	OCC CLASSIFICATION
	1A	B4-6	1	99	99		4e	473300	201,500		E

OCCUPANCY	PRO SF	LOAD	APPLIC PHONE	
1000	0000	00	642-5364	USE OF BUILDING OFFICE

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
22		22	21200	23	9100			25	6700			
27	28	500	29 29150	30	14250							$ 1,342.00

LEGAL DESCRIPTION

REFRIGERATION ONLY

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated in the schedule hereon, at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS (SEC. 45.10) IF WORK DOES NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT, THE PERMIT SHALL BECOME VOID (SEC. 43.4)

EXPLANATION OF FEE CODES

20 PLUMBING	23 PLUMBING	26 TANKS	29 WATER
21 ELECTRICAL	24 ELEVATOR	27 FURNACE	30 REFRIGERATION
22 CONSTRUCTION	25 HEAT VENT	28 SMOKE STACK	62 WRECKING FLOOR

Any person violating, or assisting or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $500.00 for each offense. Each day such violation shall continue is a separate and distinct offense and any building or contractor who shall construct any building in violation of the provisions of the Code and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the Code.

Commissioner of Buildings

Dept of Revenue

PERMITS MICROFILM

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO. 566183

PERMIT NO	WORK CODE	PLAN NO.	PRIMARY ADDRESS	F/R	SECONDARY ADDRESS	CACT
566183	18085	2021	161-00 E GRAND	0	-00	0817

DESCRIPTION OF WORK: ALTERATIONS OF EXISTING BLDG 1ST FLR ONLY

DATE ISSUED: 07/02/79

OWNER	OPTIMUS INC	625 N MICHIGAN	CHGO	IL	
REFRIG					
GENERAL	LUSTIG LTD	1050 N STATE	CHGO	IL	
ARCHITECT	MICHAEL LUSTIG	1050 N STATE	CHGO	IL	18758
HEAT/VENT	WEATHERMAKERS	220 GREENBAY RD	EVANSTON	IL	11646
MASON					
PLUMBING	MCGANN PLBG	425 N MICHIGAN	CHGO	IL	08467

WH	PL FIX	CONST.	STORIES	BSMTS	W	L	H	BLDG. VOL	EST. COST	D.U.	OCC. CLASSIFICATION
	014	3A	4	1	99	99	48	478800	201,508		E

LOT SIZE	PKG. SP	LOAD	APPLIC PHONE	
0000	0000	000	642-5364	USE OF BUILDING OFFICE

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
19	2300			22	81200	23	9100			25	6600			
27		28	500	29	20150	30	14250							$ 1,342.00

LEGAL DESCRIPTION

"REFRIGERATION ONLY"

PERMISSION is hereby granted the owner named person or firm to construct buildings and do other work as indicated on the schedule hereon, at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and the permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS. (SEC. 15.10) IF WORK DOES NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT, THE PERMIT SHALL BECOME VOID. (SEC. 43.9)

EXPLANATION OF FEE CODES

19-ZONING			29-WATER
20-IRON	23-PLUMBING	26-TANKS	30-REFRIGERATION
21-ELECTRICAL	24-ELEVATOR	27-FURNACE	62-WRECKED BLDGS
22-NEW CONST	25-HEAT/VENT	28-SMOKE ABATEMENT	82-GARAGES

Any person violating, or resisting or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offense. Each day such violation shall continue shall constitute a separate and distinct offense, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by this section.

Commissioner of Buildings

Receive amount indicated hereon

Chief of Revenue

PERMITS MICROFILM

563052

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY ADDRESS	F/R	SECONDARY ADDRESS	CACT
563052	18087	C	161-00 E GRAND	0	-00	0817

DESCRIPTION OF WORK: REVISION PERMIT # 554783 ISSUED 11-16-78

DATE ISSUED: 05/23/79

OWNER: 161 E GRAND ASSOC 161 E GRAND CHGO IL

REFRIG

GENERAL

ARCHITECT

HEAT/VENT

MASON

PLUMBING: BERNARD DENTZER 6217 N CLARK CHGO IL

CONTRACTOR LICENSE: 09599

WH	PL FIX	CONST.	STORIES	BSMTS.	W	L	H	CU. 2 VOL.	EST. COST	O.U.	DOC. CLASSIFICATION
	0001								75		

LOT SIZE		PKG. SP	LOAD	APPLIC PHONE	
0000	0000	0000	00	644-1666	USE OF BUILDING OFFICE BUILDING

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
19							3700									

LEGAL DESCRIPTION

[illegible]

APPROVED [illegible]

[illegible]

20-CONST. 29-PLUMBING 26-TANKS

21-ELECTRICAL 24-ELEVATOR 27-FURNACE 28-WHEELCHAIR CODE

22-NEW CONST. 25-HEAT/VENT 30-SMOKE ABATEMENT 32-GARAGES

Any person violating, or resisting, or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offence. Each day each violation shall continue shall constitute a separate and distinct offence, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the section.

Commissioner of Buildings

Received amount indicated herein

Dept. of Revenue

PERMITS MICROFILM

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

A PERMIT NO. 571487

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY ADDRESS	F/R	SECONDARY ADDRESS	CACT
571487	18082		161-00 E GRAND	0	-00	0817

DESCRIPTION OF WORK: REFRIGERATION ONLY - 5 TON YORK W/ CAP

STREETERVILLE, INC. 161 E GRAND CHGO

REFRIG MURPHY & MILLER, INC. 600 W TAYLOR ST CHGO

GENERAL

ARCHITECT

HEAT/VENT

MASON

PLUMBING

WH	PL FIX	KONST.	STORIES	BSMTS.	W	L	H	BLDG. VOL.	EST. COST	D.U.	OCC. CLASSIFICATION
	0000								4,500		

LOT SIZE		PKG. SP	LOAD	APPLIC PHONE	
0000	0000	0000	000	000-0000	USE OF BUILDING OFFICE

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEE
						30	1900							19

LEGAL DESCRIPTION

REFRIGERATION*

PERMISSION is hereby granted the above named person, or firm to construct buildings and do other work as indicated in the schedule hereon, at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work hereon authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS. SECTION 107.6 WOS 2005 NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT THIS PERMIT SHALL BECOME VOID (SEC 13-9)

19-ZONING	EXPLANATION OF FEE CODES		29-WATER
20-IRON	23-PLUMBING	26-TANKS	30-REFRIGERATION
21-ELECTRICAL	24-ELEVATOR	27-FURNACE	62-WRECKED BLDGS.
22-NEW CONST.	25-HEAT/VENT	28-SMOKE ABATEMENT	63-GARAGES

Any person violating, or resisting, or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offence. Each day such violation shall continue shall constitute a separate and distinct offense, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the section.

Commissioner of Buildings

Recorded amount indicated hereon

Dept. of Revenue

PERMITS MICROFILM

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY LAND USE	V/B
566183	18085	2021	161-00	

DESCRIPTION OF WORK

ALTERATIONS OF EXISTING BLDG - 1ST FLR ONLY

OWNER	OPTIMUS INC	625 N MICHIGAN	CHGO	
REFRIG				
GENERAL	LUSTIG LTD	1050 N STATE	CHGO	
ARCHITECT	MICHAEL LUSTIG	1050 N STATE	CHGO	IL
HEAT/VENT	WEATHERMAKERS	220 GREENBAY RD	EVANSTON	IL
MASON				
PLUMBING	MCGANN PLBG	4154 MICHIGAN	CHICGO	

VOL	PL FOL	CONST	STORIES	PERMITTED	W	L	H	BLDG VOL	EST. COST	O.U.	OCC CLASS	ZONING
	0014	3A	3	12	99	99	48	478800	5201300			

LOT SIZE		FRG. SP.	LOAD	APPLIC PHONE	
0000	0000	00000.00		642-3361	USE OF BUILDING OFFICE

CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	TOTAL
19	2300			22	012000	25	39100			25	000					
27		28	50028		201300	30	14230									

LEGAL DESCRIPTION

REFRIGERATION ONLY

PERMISSION IS GRANTED TO PROCEED WITH WORK ON THE APPROVED PLANS SUBMITTED HEREWITH. THIS NOTE VALIDATES THE PERMIT IS IN ACCORDANCE WITH THE CODE. IF WORK IS NOT START WITHIN SIX MONTHS OF THE DATE OF ISSUANCE THIS PERMIT SHALL BECOME VOID (SEC. 13-3-9).

19-ZONING	EXPLANATION OF FEE CODES	21-WATER	
20-IRON	23-PLUMBING	26-TANKS	30-REFRIGERATION
21-ELECTRICAL	24-ELEVATOR	27-FURNACE	32-WRECKED BLDGS
22-NEW CONST.	25-HEAT/VENT	29-SMOKE ABATEMENT	32-GARAGES

Any person violating, or resisting, or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offense. Each day such violation shall continue shall constitute a separate and distinct offense, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the section.

Received original and 1 copy

Dept. of Revenue

PERMITS MICROFILM

CITY OF CHICAGO DEPARTMENT OF BUILDINGS

PERMIT NO.	WORK CODE	PLAN NO.					
560052	2808	0	151 E GRAND			0	0

DESCRIPTION OF WORK

REVISION PERMIT # 556783 ISSUED 12-10-

OWNER 151-E GRAND ASSOC 151 E GRAND CHGO

REPRIC

GENERAL

ARCHITECT

HEAT/VENT

MASON

PLUMBING BERNARD DENTZER 6217 N CLARK CHGO IL 0993

WH	PL. FOL.	CONST.	STORIES	BSMTS.	W	L	H	BLDG. VOL.	EST. COST	FEE	CONTRACTOR LICENSE
	0001										

LOT SIZE		PKG. SP.	LOAD	APPLIC PHONE	
0000	0000	0000	000	644-1566	USE OF BUILDING OFFICE BUILDING

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL
19						23	37.00							

LEGAL DESCRIPTION

PERMISSION is hereby granted to do the work herein described on the premises described above, provided the building and all work herein described shall be in compliance with the provisions of the City's Building Code and all other ordinances of the City of Chicago. Any violation of the ordinances in connection with the work herein described shall be cause for the revocation of this permit. APPROVED BY THE COMMISSIONER OF BUILDINGS. IF WORK IS NOT STARTED WITHIN SIX MONTHS FROM DATE HEREOF THIS PERMIT SHALL BECOME VOID. SEC. 3.9

19-ZONING 22-EXPLANATION OF FEE CODES 29-WATER
20-IRON 23-PLUMBING 26-TANKS 30-REFRIGERATION
21-ELECTRICAL 24-ELEVATOR 27-FURNACE 32-WRECKED BLDGS
32-NEW CONST. 28-HEAT/VENT 30-SMOKE/ASBESTEMENT 32-GARAGES

Any person violating, or refusing or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offense, and each day shall be a separate offense. Any person who shall continue to construct, operate, and maintain a building, or who shall permit a building to be constructed, shall be liable for the penalties provided by the section.

Department of Buildings

PERMITS MICROFILM

CITY OF CHICAGO - DEPARTMENT OF INSPECTIONAL SERVICES

PERMIT NO. B. 590525

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY ADDRESS	F/R	SECONDARY ADDRESS	CACT
590525	18082		161-00 E GRAND	0	-00	0814

DESCRIPTION OF WORK: INSTALL ONE 1 TON CARRIER A/C

DATE ISSUED: 12/10/90

OWNER: STREETERVILLE STUDIO 161 E GRAND CHGO IL

CONTR: RIG MURPHY & MILLER, INC 600 W TAYLOR CHGO IL

CONTRACTOR LICENSE

GENERAL

ARCHITECT

HEAT/VENT

MASON

PLUMBING

STORIES	PSMTS	W	L	H	BLDG VOL	EST COST	DU	OCC CLASSIFICATION
0000						500		E

LOT SIZE	PKG SP	LOAD	APPLIC PHONE
0000 0000	0000	100	000-0010

USE OF BUILDING RECORDING STUDIO

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
						30	950							$9.50

LEGAL DESCRIPTION

REFRIGERATION*

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated in the schedule hereon at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS. (SEC. 45.10) IF WORK DOES NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT, THE PERMIT SHALL BECOME VOID. (SEC. 43.9)

EXPLANATION OF FEE CODES

19-ZONING			29-WATER
20-IRON	23-PLUMBING	26-TANKS	30-REFRIGERATION
21-ELECTRICAL	24-ELEVATOR	27-FURNACE	82-WRECKED BLDGS
22-NEW CONST	25-HEAT/VENT	28-SMOKE ABATEMENT	82-GARAGES

Any person violating, or resisting, or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offense. Each day such violation shall continue shall constitute a separate and distinct offense, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the section.

Received amount indicated hereon

Dept of Revenue

PERMITS MICROFILM

CITY OF CHICAGO — DEPARTMENT OF INSPECTIONAL SERVICES

PERMIT NO. 636672

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY ADDRESS			SECONDARY ADDRESS	
636672	18082	3406	161-00 E GRAND			0 -00	

DESCRIPTION OF WORK: RENODEL EXISTING 2ND FLR OFFICE SPACE PER PLANS

OWNER	161 ENT-GRAND E ASSO	161 E GRAND	CHGO	IL	
CLERK	IL BLOCK MECH	1300 W 63 ST	LAGRANGE	IL	
GENERAL	OPTIMUS	161 E GRAND	CHGO	IL	
ARCHITECT	STEVEN SHULTZ	1765 MAPLE ST	NORTHFIELD	IL	
HEAT/VENT	BLOCK MECH				
MASON					
PLUMBING	WM. H. WARD	5114 FULLERTON	CHGO	IL	

PERMANENT REAL ESTATE INDEX NO.

WH	PL FIX	CONST.	STORIES					BLDG. VOL.	EST. COST	D.U.	OCC. CL.
	0001	3R	4		100	99	50	95000	60000		

LOT SIZE		PRG. SP.	LOAD	APPLIC PHONE
0100	0099	0000	00	321-0660

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL
19	2300			22	30500	15	4100			25	3900			
						10	1900							

LEGAL DESCRIPTION: REFRIGERATION

PERMISSION [illegible]

APPROVED [illegible]

19-ZONING
20-IRON
21-ELECTRICAL
22-NEW CONST.

EXPLANATION OF FEE CODES: 23-PLUMBING, 24-ELEVATOR, 25-HEAT/VENT, 26-SMOKE ABATEMENT, 27-FURNACE, 28-[illegible]

[illegible] Any person violating, or [illegible] to permit shall be fined not less than $25.00 nor more than $200.00 [illegible] continue shall constitute a separate [illegible] building in violation of the provisions of the City Code and any [illegible] suspension of such building, or who shall permit to be constructed [illegible]

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO.	WORK CODE	PLAN NO.	PRIMARY ADDRESS		
554783	18083	8221	161 E GRAND		

DESCRIPTION OF WORK

TENANTS ALTERS ENTIRE 4TH FLOOR

OWNER 161 E GRAND ASSOC 161 E GRAND

GENERAL STREETERVILLE STUDIO 161 E GRAND AVE

ARCHITECT MICHAEL LUSTIG 1050 N STATE ST

HEAT/VENT P & M HEATING 6000 S HARLEM SUMMIT

MASON

PLUMBING BERNARD DENTZER 6217 N CLARK

WH	PL FIX	CONST.	STORIES	BSMTS							
	6	3A	4						100000		

LOT SIZE	PKG. SP.	LOAD	APPLIC PHONE
			644-1666

CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	CO	FEE	TOTAL FEES
19	23.0022		406.0023		43.0023		25.0027		48.0023		45.00			590.00

LEGAL DESCRIPTION

[illegible] building and do other work as indicated in the schedule hereon, in the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS [illegible] NOT START WITH THIS WORK WITHIN [illegible] MONTHS OF THE DATE OF THIS PERMIT [illegible]

DIV	PLAT	PAGE	PART			

ENTERED ON PLAT | DATE

PERMIT CONTROL

Tank

PERMIT NO. 49804

PLAN NO. _____ WATER NO. _____

FILE NO. 307833 DATE OF PERMIT [illegible]

OWNER _____ ADDRESS _____

MASON _____ ADDRESS _____

ARCHITECT _____ ADDRESS _____

(over)

161 E Branch Ave

Replace 20" M gal tank

PERMIT NO. 129597

PLAN NO. 855 WATER NO.

FILE NO. 308462 DATE OF PERMIT MAR 9 19[illegible]

OWNER ADDRESS

MASON ADDRESS

ARCHITECT ADDRESS

Ht 65 E Grand Ave

ALTERATIONS

PERMIT NO. 59282

PLAN NO. 917 WATER NO. 4562

FILE NO. 308538 DATE OF PERMIT MAR 12 1942

OWNER ADDRESS

MASON ADDRESS

ARCHITECT ENTERED 52 PAGE 526 ADDRESS

SUNDRY

[illegible]

[illegible]

PERMIT NO. [illegible]

PLAN NO. [illegible] WATER NO.

FILE NO. 897112 DATE OF PERMIT JAN 2[illegible]

OWNER ADDRESS

MASON ADDRESS

ARCHITECT ADDRESS

FORM B.C. 35-25M-11-41.

461-67 E. Broad St.
4,000 gal tank

PERMIT NO. A 49347 BLDG. ____ PLUMBING ____ VENT ____

PLAN NO. ____

FILE NO. 401196 DATE OF PERMIT SEP 25 1950

BOOK ____ PAGE ____

Form B.P. 39 10M 5-50 (3142)

161 E. Grand Ave

ALTERATIONS

PERMIT NO. A 10983 BLDG. PLUMBING VENT

PLAN NO. 8265

FILE NO. 396033 DATE OF PERMIT JUL 7 1950

BOOK PAGE

118 Form B.D. 5-10M 5-50 (3147)

161 E Grand Ave

Int. Alts to 3rd floor

PERMIT NO. A 52855 BLDG. ___ PLUMBING ___ VENT ___

PLAN NO. 3128

FILE NO. 405623 DATE OF PERMIT JAN 5 - 1951

BOOK ___ PAGE ___

118 Form B.D. 25 10M 9-50 (3478)

Subscribed and sworn to before me

his 23rd day of January 1969

Hilda Silverman
NOTARY PUBLIC

My Commission Expires Feb. 6, 1972

Chicago, Ill.

CITY OF CHICAGO - DEPARTMENT OF BUILDINGS

PERMIT NO. B 206695

PERMIT NO.	WK. CD.	PLAN	LOCATION	DESCRIPTION OF WORK	DO NOT TYPE IN THIS SPACE
206695	24447		161 E. Grand Ave.	110756	

DESCRIPTION OF WORK

Replace existing wood tank.

HEATING

OWNER'S NAME AND ADDRESS

Browne and Storch 919 N. Michigan

SCHEDULE OF FEES (SEE BELOW FOR EXPLANATION OF CODES)

D.	BLD U	UNITS	CARS	WORK	CD.	FEE	CD.	FEE	CD.	FEE	CD.	FEE	CD.	FEE	TOTAL FEES
	1			3500			22	2000							2000

BUILDING DESCRIPTION

NO	STYS	BSMT	W.	L.	H	NO.	STYS	BSMT.	W.	L.	H.	NO.	STYS.	BSMT.	W.	L.	H.

LEGAL DESCRIPTION:

DATE

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated in the schedule hereon, at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

EXPLANATION OF FEE CODES

21 - ELECTRICAL
22 - BUILDING
23 - PLUMBING
24 - ELEVATORS
25 - HEATING, VENTILATING
26 - TANKS
27 - FURNACE
28 - SMOKE ABATE.
29 - WATER

ARCHITECT'S NAME AND ADDRESS

Melvin A. Nelson 4641 N. Hermitage Ave.

CONTRACTOR'S NAME AND ADDRESS

Johnson and Carlson 848 Eastman St.

COMMISSIONER OF BUILDINGS

FORM NO. 50-1202-SCM-4-68

NUMERICAL FILE

Check TYPE OF WORK

CITY OF CHICAGO-DEPARTMENT OF BUILDINGS PERMIT NO. B 113046

PERMIT NO.	WK. CD.	PLAN	LOCATION	DESCRIPTION OF WORK	
413046	180828962		161 E GRAND AVE 4TH FLR	8 132 050269	1 DO NOT TYPE IN THIS SPACE

DESCRIPTION OF WORK: ALTERATIONS 4TH FLR. RECORDING

MASON	PLUMB.	HEATING	OWNER'S NAME AND ADDRESS	
4333			HOWARD L. STORCH 161 E GRAND 0	3

D.	BLD U.	UNITS	CARS	COST OF WORK	SCHEDULE OF FEES (SEE BELOW FOR EXPLANATION OF CODES) CD.	FEE	CD.	FEE	CD.	FEE	CD	FEE	CD.	FEE	TOTAL FEES
	1			30000	29	570022	1050023		000025		255028		500		192 50

BUILDING DESCRIPTION

NO.	STYS.	BSMT.	W.	L.	H.	NO.	STYS	BSMT	W	L.	H.	NO.	STYS	BSMT.	W.	L.	H.

LEGAL DESCRIPTION:
Z $ 10700 B $ 95.00

EXPLANATION OF FEE CODES:
21 - ELECTRICAL
22 - BUILDING
23 - PLUMBING
24 - ELEVATORS
26 - TANKS
27 - FURNACE
28 - SMOKE ABATE.
29 - WATER
25 - HEATING, VENTILATING

ARCHITECT'S NAME AND ADDRESS
S HILL 235 E DEERPATH LAKE FOREST

CONTRACTOR'S NAME AND ADDRESS
SCHUMACHER MASON

PLUMBING CONTRACTOR'S NAME AND ADDRESS

VENTILATION OR FURNACE CONTRACTOR'S NAME AND ADDRESS

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated in the schedule hereon, at the location given. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

Commissioner of Buildings

ALPHABETICAL FILE

CENTRAL FILE

FEB 17 1969 No Current Notice WB

Page 1

Permit No. 113046
Work Code No. 18082
Plan No. Plans 8-132 (other)

CITY OF CHICAGO
DEPT. OF BUILDINGS
320 N. CLARK ST.
[illegible] FLOOR

Sanctity of Contract
STEWART TITLE
GUARANTY COMPANY
"Quality Since 1893"

Midwest Region Office
30 North LaSalle, Suite 2100
Chicago, Illinois 60602
(312) 849-4400
(800) 261-9800
FAX: (312) 849-4410

OWNERSHIP SEARCH
FILE NUMBER 96030036

Mr. Scott Drane
Hopkins & Sutter
3 First National Plaza Suite 4100
Chicago, IL 60602
Tel. (312) 558-6587 / Fax (312) 558-7764

Mr. Drane:

The following is a listing of the chain of ownership from the vesting of Lindsay Light Company to the effective date of March 03, 1996 for the following legal description. This search should not be construed as passing on the validity of the instruments as listed.

LEGAL

LOTS 1 AND 2 IN BLOCK 18 IN KINZIE'S ADDITION TO CHICAGO (EXCEPT THE WESTERLY PORTION OF LOT 2, BEING 11 3/4 INCHES WIDE ON GRAND AVENUE EXTENDING TO ALLEY AND GRADUALLY DIMINISHING TO 9 5/8 INCHES WIDE) IN SECTION 10, TOWNSHIP 39 NORTH, RANGE 14 EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS. PIN # 17-10-126-009

Deed # 4285197 Book 10574 Page 181 Recorded: November 06, 1908

Grantor: Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife
Grantee: Lindsay Light Company
Legal: Lots 1 & 2 in Block 18 Kinzie's Add.

Deed # 4303594 Book 10726 Page 19 Recorded: December 18, 1908

Grantor: Lindsay Light Company
Grantee: Nelson Landon Hoyt
Legal: Excepts out westerly portion of Lot 2

Deed # 13408045 Book 39591 Page 498 Recorded: December 04, 1944

Grantor: Lindsay Light and Chemical Company
Grantee: Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Legal: Current Property

Deed # 16836910 Book 54553 Page 118 Recorded: February 28, 1957

Grantor. Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Grantee: 161 East Grand Corp.
Legal: Current Property

Deed # 20496067 Recorded: May 21, 1968

Grantor: 161 East Grand Corp.
Grantee: Chicago Home for the Friendless
Legal: Current Property

Deed # 24473879 Recorded: June 02, 1978

Grantor: Chicago Home for the Friendless
Grantee: Thomas E. Woefle, a bachelor
Legal: Current Property

Deed # 24473880 Recorded: June 02, 1978

Grantor: Thomas E. Woefle, a bachelor
Grantee: LaSalle National Bank, as Trustee under the provisions of a trust agreement dated the 14th day of March 1978 known as Trust Number 53962.
Legal: Current Property

Copies of the Deeds are included with this letter. If you have any questions, or if I can be of further service, please call me.

Sincerely,

Timothy Lowe
Commercial Title Officer

made and executed in accordance with power and authority given under and by virtue of the last Will and Testament of Charles H. Quinlan, deceased.

Dated this fourth day of November A. D. 1908.

Ruth E. Quinlan (SEAL)

Charles S. Quinlan (SEAL)

Edward B. Quinlan (SEAL)

Trustees under the last Will and Testament of Charles H. Quinlan, deceased.

State of Illinois,)
: SS.
County of Cook) I, H. N. Tyson a Notary Public in and for said County, in the State aforesaid, Do Hereby Certify That Ruth E. Quinlan, Charles S. Quirlan and Edward B. Quinlan, Trustees under the last Will and Testament of Charles H. Quinlan, deceased, personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said Instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal this Sixth day of November A. D. 1908.

H. N. Tyson
Notary Public.

H. N. Tyson
Notary Public
Cook County, Ill. Commission expires June 30th, A. D. 1912.

4—No.4285175.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Warr. Deed

The Grantors Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife of the Village of Winnetka in the County of Cook and State of Illinois, for and in consideration of the sum of One Hundred Thousand ($100,000.) Dollars in hand paid Convey and Warrant to Lindsay Light Company a corporation created and existing under the Laws of the State of Illinois, of the City of Chicago County of Cook and State of Illinois the following described Real Estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, situated in the City of Chicago in the County of Cook in the State of Illinois, hereby releasing all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois. Subject to all taxes and assessments levied after the year 1908.

Dated this twenty-ninth day of September A. D. 1908

Nelson Landon Hoyt (SEAL)

Blanche Tompkins Hoyt (SEAL)

State of Illinois,)
: SS.
County of Cook) I Ellis Geiger a Notary Public in and for said County in the

State aforesaid Do hereby certify that Nelson London Hoyt and Blanche Tomlins Hoyt his wife personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial seal this 2nd day of November A.D.1908.

Ellis Geiger
Notary Public.

Ellis Geiger
Notary Public
Cook County, Ill. Commission expires July 23rd A.D.1911

4—No.4285197.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Release 11-11-09

Know All Men by these Presents That I, William Heinemann of Cook County, Illinois, the Trustee named in a Certain Trust Deed bearing date the Tenth day of May A. D. 1906, and recorded in the Recorder's Office of Cook County in the State of Illinois, as Document No.3861409 in Book 9531 of Records on page 218 in consideration of the entire payment to the holder thereof of the notes secured by said Deed of Trust, and of the sum of one dollar to me in hand paid do hereby remise, release convey and quit-claim unto Ella Wangeman and Hugo Wangeman of the same place, all the right, title, interest claim and demand which I may have acquired under and by virtue of said Deed of Trust in and to all those lands and tenements, situated in said Cook County, and described as as follows, to-wit:

The South Forty-five (45) feet of Lot Six (6) in Block Six (6) in Skinner and Judd's Subdivision of a part of the North East Quarter of Section Twenty-one (21) Township Thirty-Eight (38) North, Range Fourteen (14) East of the Third Principal Meridian.

Witness my hand and seal this Sixth day of November A.D.1908.

William Heinemann (SEAL)
Trustee.

State of Illinois,)
: SS.
Cook County)

I, Arvene S. Hyde a Notary Public in and for the said County, in the State afiresaid, Do Hereby Certify that William Heinemann Trustee who is personally known to me to be the same person whose name is subscribed to the foregoing instrument appeared before me this day in person and acknowledged that he signed sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set

Dated, this Nin day of December A.D.1908.

Walter D.Peck (seal)

Mabel F.Peck (seal)

State of Illinois)
) ss
County of Cook)

I, Joseph Pearson, a Notary Public in and for said County in the State aforesaid, do hereby certify that Walter D. Peck and Mabel F.Peck, his wife, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal, this eleventh day of December A.D.1908

Joseph Pearson

Notary Public

Cook County, Ill.

Joseph Pearson,

Notary Public

7--- No. 4301238

Filed for Record Dec. 11 A.D.1908 at 4.47 P.M.

ABEL DAVIS , RECORDER.

This Indenture Witnesseth, that the Grantor, Lindsay Light Company, a corporation organized under the laws of the State of Illinois, of the City of Chicago, in the County of Cook and State of Illinois, for the consideration of one dollar ($1.00) and other good and valuable considerations Conveys and Quit Claims to Nelson Landon Hoyt, of the Village of Winnetka, County of Cook and State of Illinois, all interest in the following described Real Estate, to wit:

The Westerly portion of Lot Two (2) being eleven and three quarters inches (113/4") wide on Indiana Street extending to alley and gradually diminishing to Nine and five eights inches (9.5/8") wide , in Block Eighteen (18) in Kinzie's Addition to Chicago., situated in the County of Cook in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of this State of Illinois.

Dated, this fifth (5th) day of November A.D.1908.

Lindsay Light Co (seal)

Chas.R.Lindsay Jr. (seal)

C.F.K eeler (seal)

Secy.

State of Illinois)
) ss
County of Cook)

I, Ellis Geiger, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Chas.R.Lirdsay Jr

personally known to me to be the President of the Lindsay Light Company, a Corporation and C.R.Wheeler personally known to me to be the Secretary of said Corporation, whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed, the said instrument of writing as President and Secretary of said Corporation and caused the Corporate Seal of said Corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said Corporation as their free and voluntary act and as the free and voluntary act and deed of said Corporation, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal, this 16th day of December A.D.1908.

Ellis Geiger
Notary Public
Cook County, Ill

Ellis Geiger,
Notary Public.

5---No. 4303594

23-1908
Irving Larson

Filed for Record Dec. 18 A.D.1908 at 10.16 A.M.

ABEL DAVIS, RECORDER.

This Indenture, Made the fourteenth day of December 1908, between Frank J.Wattenpaugh and Agnes Wattenpaugh, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the first part, and John K.Klein and Edith C.Klein, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the second part:

Witnesseth, That the parties of the first part, for and in consideration of the sum of Twenty one Hundred and fifty and no/100 Dollars, in hand paid, Convey and Warrant to the said parties of the second part, not in tenancy in common, but in joint tenancy, the following described Real Estate, to wit:

Lots Thirty (30) and Thirty one (31) in Block Thirty (30) in D.W.Eldred's Re Subdivision of Blocks Twenty seven (27) to Thirty (30) both inclusive and Thirty five (35) to Thirty eight (38) both inclusive in the Village of Jefferson of Section Nine (9) Township Forty (40) North, Range Thirteen (13) East of the Third (3rd) Principal Meridian.

Situated in the City of Chicago, County of Cook, in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

To have and to hold the above granted premises unto the said parties of the second part forever, not in tenancy in common, but in joint tenancy.

Subject to taxes for the year 1908, also subject to two certain Trust Deeds dated April 18, 1905, made by Frank J.Wattenpaugh and wife, to William F.Tempel, Trustee, aggregating in the sum of Eleven Hundred Dollars.

In Witness Whereof, the said parties of the first part have

THIS INDENTURE, WITNESSETH: THAT the Grantor, LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation created and existing under and by virtue of the laws of the State of Illinois, for the consideration of EIGHTY THOUSAND DOLLARS ($80,000.00), and pursuant to authority given by the BOARD OF DIRECTORS of said corporation, CONVEYS and WARRANTS unto HOWARD L. STORCH, as Trustee under a Trust Agreement dated December 23, 1943, and known as TRUST NUMBER TWO (2), the following described real estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot Two (2), being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at North line of said alley, said strip being that part of said Lot Two (2) conveyed by said Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908, and recorded as Document Number 4303594;

situated in the County of Cook in the State of Illinois.

TO HAVE AND TO HOLD the same upon all the powers, rights and privileges set forth in said Trust Agreement.

THIS CONVEYANCE is made subject to party-wall agreement recorded as Document No. 4303596; grant set forth in the instrument recorded as Document No. 6786580; taxes for the year 1944; and the purchase money mortgage of even date herewith from the Grantee to the Chicago Title and Trust Company, securing $55,000.00, the unpaid portion of the purchase price.

IN WITNESS WHEREOF, the Grantor has caused its corporate seal to be hereto affixed, and has caused its

name to be signed to these presents by its President, and attested by its Secretary, this first (1st) day of DECEMBER, A. D. 1944.

LINDSAY LIGHT AND CHEMICAL COMPANY,

By Chas R. Lindsay II
President.

ATTEST:
Secretary.

BOOK 39591 PAGE 500

STATE OF ILLINOIS,)
COUNTY OF DU PAGE,) SS.

I, L. H. Hansen,

a Notary Public, in and for said County, in the State aforesaid, DO HEREBY CERTIFY that Chas. R. Lindsay, III personally known to me to be the President of LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation, and Mark W. Eichelberger, personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the BOARD OF DIRECTORS of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this First (1st) day of DECEMBER, A. D. 1944.

Notary Public

STATE OF ILLINOIS } SS. NO.
DOCK COUNTY
FILED FOR RECORD
1944 DEC 4 PM 1 33
AND RECORDED IN
BOOK PAGE
RECORDER

16 836 910

THIS INDENTURE, made this 20th day of February, 1957, between Howard L. Storch, not personally but as Trustee under the provisions of a deed or deeds in trust duly recorded and delivered to him in pursuance of a certain Trust Agreement, dated the 23rd day of December, 1943, and known as Trust Number 2, party of the first part, and 261 East Grand Corp., an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00), and other good and valuable considerations in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and two (2), in Block eighteen (18), in Kinzie's Addition to Chicago except a strip of land off the west end of said lot two (2) being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at N. line of said alley, said strip being that part of said lot two (2) conveyed by Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908 and recorded as Document No. 4303594, located in section ten (10), Township thirty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois.

together with the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the same unto said party of the second part, and to the proper use, benefit and behoof forever, of said party of the second part.

This deed is executed by the party of the first part, as Trustee, as aforesaid, pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed or Deeds in Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling, free and clear of any lien of said Trustee; SUBJECT, HOWEVER, to: every lien, encumbrance, restriction or charge upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be valid claims against said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

Howard L. Storch (not personally but as said Trustee.)

16 836 910

STATE OF ILLINOIS } ss.
COUNTY OF C O O K }

I, [illegible], a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his free and voluntary act, not personally but as Trustee, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal this 26 day of February, 1957.

Notary Public

My commission expires [illegible]

THIS DOCUMENT WAS MICROFILMED EXACTLY AS IT APPEARED IN THE ORIGINAL BOUND VOLUME.

16836310

THIS INDENTURE, made this 20th day of February, 1957, between Howard L. Storch, not personally but as Trustee under the provisions of a deed in trust duly recorded and delivered to him in pursuance of a certain Trust Agreement, dated the 23rd day of December, 1955, and known as Trust Number 2, party of the first part, and 101 West Grand Corp., an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00), and other good and valuable considerations in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and two (2), in Block eighteen (18), in Kinzie's Addition to Chicago except a strip of land off the west end of said lot two(2) being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-3/8 inches wide at the end of said alley, said strip being that part of said lot two(2) conveyed by Lindsay Light Company to Nelson Landon Hoyt by deed dated November 2, 1927 and recorded as Document No. 9939591, located in section ten (10), Township thirty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois;

together with the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the same unto said party of the second part, and to the proper use, benefit and behoof forever of said party of the second part.

FILED FOR RECORD

This deed is executed pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed or Deeds in Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling. Free and clear of any lien of said Trustee, SUBJECT, HOWEVER, to: every lien, encumbrance, restriction or charge upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be or which may become said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

STATE OF ILLINOIS }
COUNTY OF C O O K } ss.

Howard L. Storch, not personally but as said Trustee.

I, the undersigned, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his free and voluntary act, not personally but as Trustee, for the uses and purposes therein set forth.

GIVEN under my hand and Notarial Seal this ____ day of

Notary Public

Doc 274

16836310

3 25

COOK COUNTY, ILLINOIS
FILED FOR RECORD

No. 801

WARRANTY DEED—Statutory
(ILLINOIS)
(CORPORATION TO CORPORATION)

MAY 21 '68 2 06 PM 20 496 067 *20496067

Approved By [Chicago Title and Trust Co. / Chicago Real Estate Board]

MAY 21 57-01-6?8 C

(The Above Space For Recorder's Use Only)

THE GRANTOR - - - - - 161 East Grand Corporation - - - - - - - - - - - - - -

a corporation created and existing under and by virtue of the laws of the State of Illinois - - - - and duly authorized to transact business in the State of - - - Illinois - - - - , for and in consideration of Ten Dollars and other valuable considerations - - - - - - - DOLLARS, in hand paid, and pursuant to authority given by the Board of Directors - - - of said corporation CONVEYS and WARRANTS unto CHICAGO HOME FOR THE FRIENDLESS, - - - - not for profit

a corporation organized and existing under and by virtue of the laws of the State of Illinois - - - having its principal office in the -- City -- of-- Chicago --- County of Cook - - - - - - and State of Illinois - - - - - - - - the following described Real Estate situated in the County of Cook - - - - - - and State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot 2 being 11-3/4 inches wide at East Grand Avenue and extending to alley on South diminishing gradually to 9-5/8 inches wide at the North line of said alley, said strip being that part of said Lot 2 conveyed by said Lindsay Light Company to Nelson Landon Hoyt by Deed dated November 5, 1908 and Recorded as Document 4303594, in Cook County, Illinois, commonly known as 161 East Grand Avenue, Chicago, Illinois.

Subject to: General Taxes for Year 1968 and subsequent, Party wall rights and agreements; building, building line and use or occupancy conditions, restrictions and covenants of record, if any; recorded and unrecorded public utility easements, if any.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its - - - - - - - - - - President, and attested by its - - - - - Secretary, this 16th day of May - - - - - , 1968 .

161 EAST GRAND CORPORATION
(NAME OF CORPORATION)

BY Howard L. Storch
ATTEST Marion Caldwell

4.00

State of Illinois County of Cook, ss., I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch - - - - - personally known to me to be the - - - - President of the 161 East Grand Corporation, - - an Illinois - - - corporation, and Marion Caldwell - - personally known to me to be the - - - - - - - Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such - - - - - President and - - - - - Secretary, they signed and delivered the said instrument as - - - - - - President and - - - - - Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors - - - - of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 16th day of May 1968

Commission expires My Commission Expires Feb. 8, 1972 Helena Silverman
NOTARY PUBLIC

attn: J. Ladney

MAIL TO
NAME McDermott Will & Emery
ADDRESS 111 W. Monroe
CITY AND STATE Chicago, Ill

OR RECORDER'S OFFICE BOX NO 533

ADDRESS OF PROPERTY:
161 E. Grand Avenue
Chicago, Ill.

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED

AFFIX "RIDE"

DOCUMENT NUMBER 20 496 067

24 473 879

THE GRANTOR CHICAGO HOME FOR THE FRIENDLESS, a not-for-profit corporation

and duly authorized to transact business in the State of Illinois, for and in consideration of the sum of TEN and 00/100 ($10.00) DOLLARS, and other good and valuable consideration

in hand paid, and pursuant to authority given by the Board of Directors of said corporation CONVEYS and WARRANTS to THOMAS E. MURPHY, a bachelor, whose address is

(NAME AND ADDRESS OF GRANTEE)

135 South LaSalle Street, Chicago, Illinois

the following described Real Estate situated in the County of Cook in the State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

10.00

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated MAY 31, 1978, to Chicago Home For The Friendless; and
f) general taxes for the year 1977 and subsequent years.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its President, and attested by its Secretary, this 31st day of MAY, 1978.

CHICAGO HOME FOR THE FRIENDLESS

By: Joseph L. Stone
President

Attest: John D. Kendall
Secretary

State of Illinois, County of Cook, ss. I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that JOSEPH L. STONE, President of the CHICAGO HOME FOR THE FRIENDLESS, and JOHN D. KENDALL, Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal this 31st day of MAY, 1978.

Commission expires 6-9-80, 1980

Notary Public

This instrument was prepared by John R. Kipnis, Esq., Hall & Berry, 111 West Monroe, Chicago, Illinois 60603

(NAME AND ADDRESS)

IRA A. KIPNIS
100 E. RANDOLPH ST.
CHICAGO, ILL. 60601

101 E. Grand Avenue
Chicago, Illinois

33

24 473 879
DOCUMENT NUMBER

875

CITY OF CHICAGO
REAL ESTATE TRANSACTION TAX
MAY 31 '78
$0.00

17-10-126-017

60-22-1992

COOK COUNTY, ILLINOIS
FILED FOR RECORD

Jun 2 '18 2 45 P.

4473879

WARRANTY DEED

Corporation to Individual

TO

GEORGE E. COLE
LEGAL FORMS

24 473 000

This Indenture Witnesseth, That the Grantor THOMAS E. WOEFLE, a bachelor

of the County of Cook and the State of Illinois for and in consideration of TEN and No/100 ($10.00) Dollars, and other good and valuable consideration in hand paid, Convey Quit-Claims and [redacted] unto LASALLE NATIONAL BANK, a national banking association of 135 South La Salle Street, Chicago, Illinois, its successor or successors as Trustee under the provisions of a trust agreement dated the 14th day of March 19 78 known as Trust Number 53962 the following described real estate in the County of Cook and State of Illinois, to-wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated May 31, 1978, to Chicago Home For The Friendless;

10.00

Exempt under provisions of Paragraph ___ Section 6, Real Estate Transfer Tax.

Permanent Real Estate Index No. 17-10-126-007-

TO HAVE AND TO HOLD the said premises with the appurtenances upon the trusts and for uses and purposes herein and in said trust agreement set forth.

Full power and authority is hereby granted to said trustee to improve, manage, protect and subdivide said premises or any part thereof, to dedicate parks, streets, highways or alleys and to vacate any subdivision or part thereof, and to resubdivide said property as often as desired, to contract to sell, to grant options to purchase, to sell on any terms, to convey, either with or without consideration, to convey said premises or any part thereof to a successor or successors in trust and to grant to such successor or successors in trust all of the title, estate, powers and authorities vested in said trustee, to donate, to dedicate, to mortgage, pledge or otherwise encumber, said property, or any part thereof, to lease said property, or any part thereof, from time to time, in possession or reversion, by leases to commence in presenti or in futuro, and upon any terms and for any period or periods of time, not exceeding in the case of any single demise the term of 198 years, and to renew or extend leases upon any terms and for any period or periods of time and to amend, change or modify leases and the terms and provisions thereof at any time or times hereafter, to contract to make leases and to grant options to lease and options to renew leases and options to purchase the whole or any part of the reversion and to contract respecting the manner of fixing the amount of present or future rentals, to partition or to exchange said property, or any part thereof, for other real or personal property, to grant easements or charges of any kind, to release, convey or assign any right, title or interest in or about or easement appurtenant to said premises or any part thereof, and to deal with said property and every part thereof in all other ways and for such other considerations as it would be lawful for any person owning the same to deal with the same, whether similar to or different from the ways above specified, at any time or times hereafter.

In no case shall any party dealing with said trustee in relation to said premises, or to whom said premises or any part thereof shall be conveyed, contracted to be sold, leased or mortgaged by said trustee, be obliged to see to the application of any purchase money, rent, or money borrowed or advanced on said premises, or be obliged to see that the terms of this trust have been complied with, or be obliged to inquire into the necessity or expediency of any act of said trustee, or be obliged or privileged to inquire into any of the terms of said trust agreement, and every deed, trust deed, mortgage, lease or other instrument executed by said trustee in relation to said real estate shall be conclusive evidence in favor of every person relying upon or claiming under any such conveyance, lease or other instrument, (a) that at the time of the delivery thereof the trust created by this indenture and by said trust agreement was in full force and effect, (b) that such conveyance or other instrument was executed in accordance with the trusts, conditions and limitations contained in this indenture and in said trust agreement or in some amendment thereof and binding upon all beneficiaries thereunder, (c) that said trustee was duly authorized and empowered to execute and deliver every such deed, trust deed, lease, mortgage or other instrument, and (d) if the conveyance is made to a successor or successors in trust, that such successor or successors in trust have been properly appointed and are fully vested with all the title, estate, rights, powers, authorities, duties and obligations of its, his or their predecessor in trust.

The interest of each and every beneficiary hereunder and of all persons claiming under them or any of them shall be only in the earnings, avails and proceeds arising from the sale or other disposition of said real estate, and such interest is hereby declared to be personal property, and no beneficiary hereunder shall have any title or interest, legal or equitable, in or to said real estate as such, but only an interest in the earnings, avails and proceeds thereof as aforesaid.

If the title to any of the above lands is now or hereafter registered, the Registrar of Titles is hereby directed not to register or note in the certificate of title or duplicate thereof, or memorial, the words "in trust" or "upon condition," or "with limitations," or words of similar import, in accordance with the statute in such cases made and provided.

And the said grantor hereby expressly waive and release any and all right or benefit under and by virtue of any and all statutes of the State of Illinois, providing for the exemption of homesteads from sale on execution or otherwise.

In Witness Whereof, the grantor aforesaid has hereunto set his hand and seal this 31st day of May 19 78.

This Instrument Prepared By:
James E. Lentz, McDermott, Will & Emery
111 West Monroe, Chicago, Illinois 60603

THOMAS E. WOEFLE

24 473 880

66-28-199.2

17-10-126-007

STATE OF ILLINOIS
COUNTY OF COOK SS

Notary Public in and for said County, in the State aforesaid, do hereby certify that THOMAS E. WOEFLE, a bachelor

personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

GIVEN under my hand and notarial seal this 14th day of June A.D. 1978

Vicki Kerrigan
Notary Public
COOK

COOK COUNTY, ILLINOIS
FILED FOR RECORD

JUN 2 10 2 45 P

Kindney P. Olson
RECORDER OF DEEDS

24473880

BOX 350

Deed in Trust

WARRANTY DEED

ADDRESS OF PROPERTY

TO

LaSalle National Bank

TRUSTEE

0027 AP

Sanctity of Contract

STEWART TITLE

GUARANTY COMPANY

"Quality Since 1898"

Midwest Region Office
30 North LaSalle, Suite 2100
Chicago, Illinois 60602
(312) 849-4400
(800) 261-9800
FAX: (312) 849-4410

OWNERSHIP SEARCH
FILE NUMBER 96030036

Mr. Scott Drane
Hopkins & Sutter
3 First National Plaza Suite 4100
Chicago, IL 60602
Tel. (312) 558-6587 / Fax (312) 558-7764

Mr. Drane:

The following is a listing of the chain of ownership from the vesting of Lindsay Light Company to the effective date of March 03, 1996 for the following legal description. This search should not be construed as passing on the validity of the instruments as listed.

LEGAL

[redacted] (EXCEPT THE WESTERLY PORTION OF LOT 2, BEING 11 3/4 INCHES WIDE ON GRAND AVENUE EXTENDING TO ALLEY AND GRADUALLY DIMINISHING TO 9 5/8 INCHES WIDE) IN SECTION 10, TOWNSHIP 39 NORTH, RANGE 14 EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS. PIN # 17-10-126-009

Deed # 4285197 Book 10574 Page 181 Recorded: November 06, 1908

Grantor: Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife
Grantee: [redacted]
Legal: Lots 1 & 2 in Block 18 Kinzie's Add.

Deed # 4303594 Book 10726 Page 19 Recorded: December 18, 1908 36 yrs.

Grantor: Lindsay Light Company
Grantee: Nelson Landon Hoyt
Legal: Excepts out westerly portion of Lot 2

Deed # 13408045 Book 39591 Page 498 Recorded: December 04, 1944

Grantor: Lindsay Light and Chemical Company
Grantee: [redacted]
Legal: Current Property

Deed # 16836910 Book 54553 Page 118 Recorded: February 28, 1957

Grantor. Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Grantee: 161 East Grand Corp.
Legal: Current Property

Deed # 20496067 Recorded: May 21, 1968

Grantor: 161 East Grand Corp.
Grantee: Chicago Home for the Friendless
Legal: Current Property

Deed # 24473879 Recorded: June 02, 1978

Grantor: Chicago Home for the Friendless
Grantee: Thomas E. Woefle, a bachelor
Legal: Current Property

1996

Deed # 24473880 Recorded: June 02, 1978

18 yrs

Grantor: Thomas E. Woefle, a bachelor
Grantee: [redacted]
Legal: Current Property

Copies of the Deeds are included with this letter. If you have any questions, or if I can be of further service, please call me.

Sincerely,

Timothy Lowe
Commercial Title Officer

made and executed in accordance with power and authority given under and by virtue of the last Will and Testament of Charles H. Quinlan, deceased.

Dated this fourth day of November A. D. 1908.

Ruth E. Quinlan (SEAL)

Charles S. Quinlan (SEAL)

Edward B. Quinlan (SEAL)

Trustees under the last Will and Testament of Charles H. Quinlan, deceased.

State of Illinois,)
: SS.
County of Cook) I, H. N. Tyson a Notary Public in and for said County, in the State aforesaid, Do Hereby Certify That Ruth E. Quinlan, Charles S. Quinlan and Edward B. Quinlan, Trustees under the last Will and Testament of Charles H. Quinlan, deceased, personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said Instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal this Sixth day of November A. D. 1908.

H. N. Tyson
Notary Public.

H. N. Tyson
Notary Public
Cook County, Ill. Commission expires June 30th, A. D. 1912.

A—No.4285175.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Grant Gift

The Grantors Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife of the Village of Wilmetka in the County of Cook and State of Illinois, for and in consideration of the sum of One Hundred Thousand ($100,000.00.) Dollars in hand paid [redacted] the City of Chicago County of Cook and State of Illinois the following described Real Estate, to-wit:

[redacted] hereby releasing all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois. Subject to all taxes and assessments levied after the year 1908.

Dated this twenty-ninth day of September A. D. 1908

Nelson Landon Hoyt (SEAL)

Blanche Tompkins Hoyt (SEAL)

State of Illinois,)
: SS.
County of Cook) I Ellis Geiger a Notary Public in and for said County in the

State aforesaid Do hereby certify that Nelson London Hoyt and Blanche Tomlins Hoyt his wife personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial seal this 2nd day of November A.D.1908.

Ellis Geiger
Notary Public.

Ellis Geiger
Notary Public
Cook County, Ill. Commission expires July 23rd A.D.1911

4—No.485197.

Filed for Record Nov. 5, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Release 11-11-09

Know All Men by those Presents That I, William Heinemann of Cook County, Illinois, the Trustee named in a Certain Trust Deed bearing date the Tenth day of May A. D. 1906, and recorded in the Recorder's Office of Cook County in the State of Illinois, as Document No.3861409 in Book 9531 of Records on page 218 in consideration of the entire payment to the holder thereof of the notes secured by said Deed of Trust, and of the sum of one dollar to me in hand paid do hereby remise, release convey and quit-claim unto Ella Wangeman and Hugo Wangeman of the same place, all the right, title, interest claim and demand which I may have acquired under and by virtue of said Deed of Trust in and to all those lands and tenements, situated in said Cook County, and described as as follows, to-wit:

The South Forty-five (45) feet of Lot Six (6) in Block Six (6) in Skinner and Judd's Subdivision of a part of the North East Quarter of Section Twenty-one (21) Township Thirty-Eight (38) North, Range Fourteen (14) East of the Third Principal Meridian.

Witness my hand and seal this Sixth day of November A.D.1908.

William Heinemann (SEAL)
Trustee.

State of Illinois,)
: SS.
Cook County)

I, Arvene S. Hyde a Notary Public in and for the said County, in the State afiresaid, Do Hereby Certify that William Heinemann Trustee who is personally known to me to be the same person whose name is subscribed to the foregoing instrument appeared before me this day in person and acknowledged that he signed sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set

Dated, this Ninth day of December A.D.1908.

Walter D.Peck (seal)

Mabel F.Peck (seal)

State of Illinois)
) ss
County of Cook)

I, Joseph Pearson, a Notary Public in and for said County in the State aforesaid, do hereby certify that Walter D. Peck and Mabel F.Peck, his wife, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal, this eleventh day of December A.D.1908

Joseph Pearson

Notary Public

Cook County, Ill.

Joseph Pearson,

Notary Public

7--- No. 4301238

Filed for Record Dec. 11 A.D.1908 at 4.47 P.M.

ABEL DAVIS , RECORDER.

This Indenture Witnesseth, that the Grantor, Lindsay Light Company, a corporation organized under the laws of the State of Illinois, of the City of Chicago, in the County of Cook and State of Illinois, for the consideration of one dollar ($1.00) and other good and valuable considerations Conveys and Quit Claims to Nelson Landon Hoyt, of the Village of Winnetka, County of Cook and State of Illinois, all interest in the following described Real Estate, to wit:

The Westerly portion of Lot Two (2) being eleven and three quarters inches (113/4") wide on Indiana Street extending to alley and gradually diminishing to Nine and five eights inches (9.5/8") wide , in Block Eighteen (18) in Kinzie's Addition to Chicago., situated in the County of Cook in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of this State of Illinois.

Dated, this fifth (5th) day of November A.D.1908.

Lindsay Light Co (seal)

Chas.R.Lindsay Jr. (seal)

C.F.W Geiler (seal)

Secy.

State of Illinois)
) ss
County of Cook)

I, Ellis Geiger, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Chas.R.Lindsay Jr

personally known to me to be the President of the Lindsay Light Company, a Corporation and C.R.Wheeler personally known to me to be the Secretary of said Corporation, whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed, the said instrument of writing as President and Secretary of said Corporation and caused the Corporate Seal of said Corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said Corporation as their free and voluntary act and as the free and voluntary act and deed of said Corporation, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal, this 16th day of December A.D.1908.

Ellis Geiger
Notary Public
Cook County, Ill

Ellis Geiger,
Notary Public.

5---No. 4303594

Filed for Record Dec. 18 A.D.1908 at 10.16 A.M.

ABEL DAVIS, RECORDER.

This Indenture, made the fourteenth day of December 1908, between Frank J.Wattenpaugh and Agnes Wattenpaugh, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the first part, and John K.Klein and Edith C.Klein, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the second part:

Witnesseth, That the parties of the first part, for and in consideration of the sum of Twenty one Hundred and fifty and no/100 Dollars, in hand paid, Convey and Warrant to the said parties of the second part, not in tenancy in common, but in joint tenancy, the following described Real Estate, to wit:

Lots Thirty (30) and Thirty one (31) in Block Thirty (30) in D.W.Eldred's Re Subdivision of Blocks Twenty seven (27) to Thirty (30) both inclusive and Thirty five (35) to Thirty eight (38) both inclusive in the Village of Jefferson of Section Nine (9) Township Forty (40) North, Range Thirteen (13) East of the Third (3rd) Principal Meridian.

Situated in the City of Chicago, County of Cook, in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

To have and to hold the above granted premises unto the said parties of the second part forever, not in tenancy in common, but in joint tenancy.

Subject to taxes for the year 1908, also subject to two certain Trust Deeds dated April 18, 1905, made by Frank J.Wattenpaugh and wife, to William F.Tempel, Trustee, aggregating in the sum of Eleven Hundred Dollars.

In Witness Whereof, the said parties of the first part have

THIS INDENTURE, WITNESSETH: THAT the Grantor, LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation created and existing under and by virtue of the laws of the State of Illinois, for the consideration of EIGHTY THOUSAND DOLLARS ($80,000.00), and pursuant to authority given by the BOARD OF DIRECTORS of said corporation, CONVEYS and WARRANTS unto HOWARD L. STORCH, as Trustee under a Trust Agreement dated December 21, 1943, and known as TRUST NUMBER TWO (2), the following described real estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot Two (2), being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at North line of said alley, said strip being that part of said Lot Two (2) conveyed by said Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908, and recorded as Document Number 4303594.

situated in the County of Cook in the State of Illinois.

TO HAVE AND TO HOLD the same upon all the powers, rights and privileges set forth in said Trust Agreement.

THIS CONVEYANCE is made subject to party-wall agreement recorded as Document No. 4303596; grant set forth in the instrument recorded as Document No. 6786580; taxes for the year 1944; and the purchase money mortgage of even date herewith from the Grantee to the Chicago Title and Trust Company, securing $55,000.00, the unpaid portion of the purchase price.

IN WITNESS WHEREOF, the Grantor has caused its corporate seal to be hereto affixed, and has caused its

name to be signed to these presents by its President and attested by its Secretary, this First (1st) day of DECEMBER, A. D. 1944.

LINDSAY LIGHT AND CHEMICAL COMPANY,

By Chas R. Lindsay III

President.

ATTEST:

Secretary.

BOOK 39591 PAGE 500

STATE OF ILLINOIS,)
COUNTY OF DU PAGE,) SS.

I, L. H. Hansen,

a Notary Public, in and for said County, in the State aforesaid, DO HEREBY CERTIFY that Chas. R. Lindsay, III personally known to me to be the President of LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation, and Mark W. Eichelberger, personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the BOARD OF DIRECTORS of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this First (1st) day of DECEMBER, A. D. 1944.

Notary Public

18408045
STATE OF ILLINOIS } SS. NO.
DOOK COUNTY
FILED FOR RECORD
1944 DEC 4 PM 1 33
AND RECORDED IN
BOOK PAGE
RECORDER

BOOK 54553 PAGE 118

16 836 910

A

THIS INDENTURE, made this 20th day of February, 1957, between Howard L. Storch, not personally but as Trustee under the provisions of a deed or deeds in trust duly recorded and delivered to him in pursuance of a certain Trust Agreement, dated the 23rd day of December, 1943, and Known as Trust Number 2, party of the first part, and 161 East Grand Corp., an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00), and other good and valuable considerations in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and two (2), in Block eighteen (18), in Kinzie's Addition to Chicago except a strip of land off the west end of said lot two (2) being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at N. line of said alley, said strip being that part of said lot two (2) conveyed by Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908 and recorded as Document No. 4303594, located in section ten (10), Township thirty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois.

together with the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the same unto said party of the second part, and to the proper use, benefit and behoof, forever, of said party of the second part.

This deed is executed by the party of the first part, as Trustee, as aforesaid, pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed or Deeds in Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling, free and clear of any lien of said Trustee, SUBJECT, HOWEVER, to: every lien, encumbrance, restriction or charge upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be valid claims against said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

Howard L. Storch

STATE OF ILLINOIS } SS.
COUNTY OF COOK }

Howard L. Storch, not personally but as said Trustee.

16 836 910

I, Harriet L. Armstrong, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me [illegible] day in person and acknowledged that he signed and delivered the [illegible] instrument as his free and voluntary act, not personally but as [illegible] for the uses and purposes therein set forth.

GIVEN under my hand and Notarial Seal this 26 day of [illegible]

Harriet L. Armstrong
Notary Public

[illegible] expires [illegible]

[illegible] 27/1957

THIS DOCUMENT WAS MICROFILMED EXACTLY AS IT APPEARED IN THE ORIGINAL BOUND VOLUME.

[illegible]

[illegible] day of February, 1957, between [illegible] under the provisions of a certain trust agreement dated the 23rd day of [illegible] and delivered to [illegible] in trust, dated the 23rd day of [illegible] and known as Trust Number 2, party of the first part, and [illegible] Trust Corporation, an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and one (2), in Block eighteen (18), in Kinzie's Addition to Chicago, except a strip of land off the west end of said lots, lying 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 2-3/8 inches wide, the of said alley, said strip being that part of said lot two (2) conveyed by Lindsay Light Company to Moldon Leadon Hoyt by deed dated November 3, 1[illegible]

as Document No. 4303391, located in section ten (10), Township forty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois.

[illegible] the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the premises unto said party of the second part, and to the proper use, benefit and behoof forever of said party of the second part.

[illegible]

This deed is executed pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed and Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling. This deed is made subject to the lien of every trust deed or mortgage upon real estate, and of any lease of record in Cook County, Illinois; any pending litigation, encumbrance, restriction or claims upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be valid claims against said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

STATE OF ILLINOIS }
COUNTY OF C O O K } ss

[illegible] Gerard L. Storch, not personally but as said Trustee.

[illegible] a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that [illegible] Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his free and voluntary act, not personally but as aforesaid, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal this ____ day of [illegible]

[illegible]

No. 801

COOK COUNTY, ILLINOIS
FILED FOR RECORD

WARRANTY DEED—Statutory
(ILLINOIS)
(CORPORATION TO CORPORATION)

MAY 21 '68 2 06 PM 20 496 067 *20496067

Approved By (Chicago Title and Trust Co. / Chicago Real Estate Board)

MAY 21 57-01-6?8 C

(The Above Space For Recorder's Use Only)

THE GRANTOR - - - - - 161 East Grand Corporation - - - - - - - - - - - - - -

a corporation created and existing under and by virtue of the laws of the State of Illinois - - - - and duly authorized to transact business in the State of - - - Illinois - - - - , for and in consideration of Ten Dollars and other valuable considerations - - - - - - DOLLARS, in hand paid, and pursuant to authority given by the Board of Directors - - - of said corporation CONVEYS and WARRANTS unto CHICAGO HOME FOR THE FRIENDLESS, - - - - not for profit

a corporation organized and existing under and by virtue of the laws of the State of Illinois - - - having its principal office in the -- City -- of-- Chicago --- County of Cook - - - - - - and State of Illinois - - - - - - - - the following described Real Estate situated in the County of Cook - - - - - - and State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot 2 being 11-3/4 inches wide at East Grand Avenue and extending to alley on South diminishing gradually to 9-5/8 inches wide at the North line of said alley, said strip being that part of said Lot 2 conveyed by said Lindsay Light Company to Nelson Landon Hoyt by Deed dated November 5, 1908 and Recorded as Document 4303594, in Cook County, Illinois, commonly known as 161 East Grand Avenue, Chicago, Illinois.

Subject to: General Taxes for Year 1968 and subsequent; Party wall rights and agreements; building, building line and use or occupancy conditions, restrictions and covenants of record, if any; recorded and unrecorded public utility easements, if any.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its - - - - - - - - - - President, and attested by its - - - - - - Secretary, this 16th day of May - - - - - , 1968 .

161 EAST GRAND CORPORATION
(NAME OF CORPORATION)

BY Howard L. Storch
ATTEST Marion Caldwell
SECRETARY

State of Illinois, County of Cook, ss., I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch - - - - - personally known to me to be the - - - - President of the 161 East Grand Corporation, - - an Illinois - - - corporation, and Marion Caldwell - - personally known to me to be the - - - - - - - Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such - - - - - President and - - - - - Secretary, they signed and delivered the said instrument as - - - - - - President and - - - - - Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors - - - - of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 16th day of May 1968

Commission expires My Commission Expires Feb. 8, 1972 Helen Silverman
NOTARY PUBLIC

MAIL TO: NAME attn. J. Ladney McDermott Will & Emery
ADDRESS 111 W. Monroe
CITY AND STATE Chicago, Ill.

OR RECORDER'S OFFICE BOX NO. 533

ADDRESS OF PROPERTY:
161 E. Grand Avenue
Chicago, Ill.

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED

AFFIX "RIDE"

DOCUMENT NUMBER 20 496 067

24 473 860

This Indenture Witnesseth, That the Grantor THOMAS E. WOEFLE, a bachelor

of the County of Cook and the State of Illinois for and in consideration of TEN and No/100 ($10.00) Dollars

and other good and valuable consideration in hand paid, Convey [redacted] and Quit-Claims [redacted] unto LASALLE NATIONAL BANK, a national banking association of 135 South La Salle Street, Chicago, Illinois, its successor or successors as Trustee under the provisions of a trust agreement dated the 14th day of March 19 78 known as Trust Number 53962 the following described real estate in the County of Cook and State of Illinois, to-wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

Subject [redacted]

Exempt under provisions of Paragraph [illegible], Section [illegible], Real Estate Transfer [illegible]

10.00

Permanent Real Estate Index No. 17-10-126-007-

TO HAVE AND TO HOLD the said premises with the appurtenances, upon the trusts and for uses and purposes herein and in said trust agreement set forth.

Full power and authority is hereby granted to said trustee to improve, manage, protect and subdivide said premises or any part thereof, to dedicate parks, streets, highways or alleys and to vacate any subdivision or part thereof, and to resubdivide said property as often as desired, to contract to sell, to grant options to purchase, to sell on any terms, to convey, either with or without consideration, to convey said premises or any part thereof to a successor or successors in trust and to grant to such successor or successors in trust all of the title, estate, powers and authorities vested in said trustee, to donate, to dedicate, to mortgage, pledge or otherwise encumber said property, or any part thereof, to lease said property, or any part thereof, from time to time, in possession or reversion, by leases to commence in praesenti or in futuro, and upon any terms and for any period or periods of time, not exceeding in the case of any single demise the term of 198 years, and to renew or extend leases upon any terms and for any period or periods of time and to amend, change or modify leases and the terms and provisions thereof at any time or times hereafter, to contract to make leases and to grant options to lease and options to renew leases and options to purchase the whole or any part of the reversion and to contract respecting the manner of fixing the amount of present or future rentals, to partition or to exchange said property, or any part thereof, for other real or personal property, to grant easements or changes of any kind, to release, convey or assign any right, title or interest in or about or easement appurtenant to said premises or any part thereof, and to deal with said property and every part thereof in all other ways and for such other considerations as it would be lawful for any person owning the same to deal with the same, whether similar to or different from the ways above specified, at any time or times hereafter.

In no case shall any party dealing with said trustee in relation to said premises or to whom said premises or any part thereof shall be conveyed, contracted to be sold, leased or mortgaged by said trustee, be obliged to see to the application of any purchase money, rent, or money borrowed or advanced on said premises, or be obliged to see that the terms of this trust have been complied with, or be obliged to inquire into the necessity or expediency of any act of said trustee, or be obliged or privileged to inquire into any of the terms of said trust agreement, and every deed, trust deed, mortgage, lease or other instrument executed by said trustee in relation to said real estate shall be conclusive evidence in favor of every person relying upon or claiming under any such conveyance, lease or other instrument, (a) that at the time of the delivery thereof the trust created by this Indenture and by said trust agreement was in full force and effect, (b) that such conveyance or other instrument was executed in accordance with the trusts, conditions and limitations contained in this Indenture and in said trust agreement or in some amendment thereof and binding upon all beneficiaries thereunder, (c) that said trustee was duly authorized and empowered to execute and deliver every such deed, trust deed, lease, mortgage or other instrument, and (d) if the conveyance is made to a successor or successors in trust, that such successor or successors in trust have been properly appointed and are fully vested with all the title, estate, rights, powers, authorities, duties and obligations of its, his or their predecessor in trust.

The interest of each and every beneficiary hereunder and of all persons claiming under them or any of them shall be only in the earnings, avails and proceeds arising from the sale or other disposition of said real estate, and such interest is hereby declared to be personal property, and no beneficiary hereunder shall have any title or interest, legal or equitable, in or to said real estate as such, but only an interest in the earnings, avails and proceeds thereof as aforesaid.

If the title to any of the above lands is now or hereafter registered, the Registrar of Titles is hereby directed not to register or note in the certificate of title or duplicate thereof, or memorial, the words "in trust" or "upon condition," or "with limitations," or words of similar import, in accordance with the statute in such cases made and provided.

And the said grantor hereby expressly waive and release any and all right or benefit under and by virtue of any and all statutes of the State of Illinois, providing for the exemption of homesteads from sale on execution or otherwise.

In Witness Whereof, the grantor aforesaid has hereunto set his hand and seal this 31st day of May 19 78.

This Instrument Prepared By:
James E. Lentz, McDermott, Will & Emery
111 West Monroe, Chicago, Illinois 60603

THOMAS E. WOEFLE

24 473 860

66-28-199R

17-10-126-007

STATE OF ILLINOIS
COUNTY OF COOK SS

Notary Public in and for said County, in the State aforesaid, do hereby certify that THOMAS E. MOFFLE, a bachelor

personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

GIVEN under my hand and notarial seal this 1st day of June AD 1978

VICKI KERRIGAN NOTARY PUBLIC COOK

COOK COUNTY, ILLINOIS
FILED FOR RECORD

JUN 2 10 2 45 P

24473880

BOX 350

Deed in Trust

WARRANTY DEED

ADDRESS OF PROPERTY

TO

LaSalle National Bank

TRUSTEE

8027 AP

GEORGE E. COLE
LEGAL FORMS

September, 1975

WARRANTY DEED

Statutory (Illinois)

24 473 879

(Corporation to Individual)

(The Above Space For Recorder's Use Only)

THE GRANTOR CHICAGO HOME FOR THE FRIENDLESS, a not-for-profit corporation

~~xxxxxxxxxx~~ created and existing under and by virtue of the laws of the State of Illinois and duly authorized to transact business in the State of Illinois for and in consideration of the sum of TEN and No/100 ($10.00) DOLLARS, and other good and valuable consideration

in hand paid, and pursuant to authority given by the Board of Directors of said corporation CONVEYS and WARRANTS to THOMAS E. MOETLE, a bachelor, whose address is

(NAME AND ADDRESS OF GRANTEE)

135 South LaSalle Street, Chicago, Illinois

the following described Real Estate situated in the County of Cook in the State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

10.00

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated May 31, 1978, to Chicago Home For The Friendless; and
f) general taxes for the year 1977 and subsequent years.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its President, and attested by its Secretary, this 31st day of May, 1978.

CHICAGO HOME FOR THE FRIENDLESS
(Name of Corporation)

By: Joseph E. Stone
President

Attest: John B. Murnighan
Secretary

State of Illinois, County of Cook ss. I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that Joseph E. Stone personally known to me to be the President of the Chicago Home for the Friendless corporation, and John B. Murnighan personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 31st day of May, 1978.

Commission expires 6-1, 1980

James E. Lentz
Notary Public

This instrument was prepared by James E. Lentz, McDermott, Will & Emery, 111 West Monroe, Chicago, Illinois 60603
(NAME AND ADDRESS)

IRA A. KIPNIS
400 E. RANDOLPH ST.
CHICAGO, ILL. 60601

Address of Property:
161 E. Grand Avenue
Chicago, Illinois

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED

SEND SUBSEQUENT TAX BILLS TO:

CITY OF CHICAGO
REAL ESTATE TRANSFER TAX
JUN 7 '78
REVENUE STAMP
$875

24 473 879
DOCUMENT NUMBER

33

COOK COUNTY, ILLINOIS
FILED FOR RECORD

Jan 6 '18 2 45 P.

9473879

WARRANTY DEED

Corporation to Individual

GEORGE E. COLE
LEGAL FORMS

The regular meeting of BOARD OF DIRECTORS held in the office of Lindsay Light Company, 161 East Grand Avenue, Chicago, Illinois, September 8th, 1914, four P. M.

There were present:

Chas. R. Lindsay, Jr.
George P. Gilman,
Jos. M. Sherburne

Same being a majority of the directors of Lindsay Light Company.

Chas. R. Lindsay, Jr. in the chair.

The following resolution was adopted:

Resolved that Lindsay Light Company rent building #316 to #322 Illinois Street, Chicago, for manufacturing purposes necessary to this business for a period of five years and four months beginning from January 1st, 1915 to April 30th, 1920 at $150.00 a month, this building to be rented from The Chicago Dock & Canal Company as per their lease September 3rd, 1914.

There being no further business before the meeting, it was adjourned.

Jos M. Sherburne

SECRETARY.

TRADE MARK REGISTERED

JOS. M. SHERBURNE, PRESIDENT
HERBERT N. McCOY, VICE PRES'T
OTTO N. BERNDT, SEC'Y & TREAS.

Lindsay Light Company

Chicago September 9, 1922.

To the Stockholders of

Lindsay Light Company:

Enclosed herewith is a formal notice and blank proxy relative to the special meeting of our stockholders to be held on September 20th, 1922.

Your Directors feel that an explanation is proper at this time as to the reason why it is desired to increase our capital stock.

The real estate and buildings carried on our books at $146,955.76, have recently been appraised and show a replacement value of over $200,000.00. The Directors and the Officers of this Company have realized that this property which they now occupy is far too valuable for manufacturing gas mantles. The lease on the monazite refinery which we occupy on Illinois Street expires April 30th, 1923.

We all feel that the time has now arrived when arrangements should be made to get into a location where the entire operations of this business might be concentrated and operated with greater economy. It would seem to us unwise to go into new property with the investment that would be required if it were possible to take over a property engaged in this kind of business adapted to our needs.

Because of the above reasons we have concluded that our interests would be best served by completing negotiations which have been carried on for some time. This $200,000.00 increase in Preferred Capital Stock of this Company is to be used toward acquiring the manufacturing property of the Block Gas Mantle Company of Youngstown, Ohio, if the deal, as now planned, can be consummated, which consists of approximately three acres of land, exceedingly well located for shipping facilities, etc. Of course, if for any reason the deal cannot be consummated as now planned, the capital stock will not be increased or the stock will not be issued at this time.

Your Officers and Directors have investigated the value of the property to be acquired very carefully and are of the opinion that it is reasonably worth considerably in excess of the par value of the Lindsay Preferred Stock to be issued in exchange therefor.

We believe it is an economic move of considerable value and will tend to increase the earnings and the value of the stock of the Lindsay Light Company.

For the reasons above stated your Directors and Officers believe this move an exceedingly wise one and we hope that you will send in your proxy at once.

Yours very truly,

JOS. M. SHERBURNE,
President.

Minutes of the regular annual meeting of the Stockholders of Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, January 20th, 1920 at the hour of four o'clock P. M., pursuant to notice.

-:-

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

The Secretary presented to the meeting a copy of the notice which had been mailed to each of the Stockholders. Said notice to the Stockholders, to which is attached an affidavit showing the mailing thereof, to each and every Stockholder, is in the words and figures following, viz:

Chicago, January 6-1920.

To the Stockholders of the
LINDSAY LIGHT COMPANY:

YOU ARE HEREBY NOTIFIED that the regular annual meeting of the Stockholders of the Lindsay Light Company will be held on Tuesday, the 20th day of January, 1920, at the hour of four o'clock P. M., at the general offices of the Company, 161 East Grand Avenue, Chicago, Illinois, for the purpose of electing Directors for the ensuing year, and for the transaction of such other business as shall come before said meeting.

You are also hereby notified that at said meeting, the question of increasing the number of Directors of the Lindsay Light Company from five to seven will be presented to the Stockholders for consideration and action.

If you have not already done so, please send in a proxy so that your stock may be voted at the meeting.

Yours very truly,
LINDSAY LIGHT COMPANY
Otto N. Berndt.
SECRETARY.

State of Illinois }
County of Cook } ss.

Mr. Otto N. Berndt, being first duly sworn on oath says that a duplicate of the above notice was mailed to each and every Stockholder of the Lindsay Light Company at Chicago, Illinois, postage prepaid, at the last known address of each Stockholder, respectively, on January 9th, 1920.

Subscribed and sworn to before me, this day, the 20th day of January 1920.

Thereupon, the roll of Stockholders was called with the result that the following were found to be present:

Present in Person	Number of Shares Common	Preferred
Bremner, John B.	150	
Davis, J. W.	400	
Laubenheimer, Geo.	200	
McCoy, Herbert N.	520	400
Starr, Arthur P. Estate of	100	
Stenersen, G.	70	
Tydings, Oliver	100	200
Wilsey, Robert E.		50
Beste, H. C.		
Berndt, Otto N.		
Coffelt, O. T.		
Cordell, F. P.		
Buchannan, W. W.		
Hoggins, E.		
Hannah, W. P.		
Hellerman, L.		
Lanthrop, Jos. C.		
Lindsay, Jr., Chas. R.		
Sherburne, Jos. M.		
Sinai, Alexander		
	1540	650

Total present in Person ----------2,190

Present by Proxy	Number of Shares Common	Preferred
Mr. Jos. M. Sherburne, personally, holding proxies for the following:		
Alcan, Irvin	20	
Antonisen, W. M.	100	
Baecker, F. G.	10	
Bangs, Emma Ruth	10	
Bangs, Ruth	10	
Barton, Wm. S.	50	
Barrett, Oliver H.	100	
Baumbauer, John V.	5	
Bauer, Joseph	10	
Beattie, John	60	
Behrend, M. A.	50	
Bennett, J. Frank	200	
Berndt Sr., Otto		500
Beste, H. C.		1025
Beste, Mary H.		100

	Common	Preferred
B[illegible]el, Clarence A.	50	
Bigley, Joseph	25	
Blank, Emma	12	100
Blazek, Jos. F.	20	
Blanckencie, E. E.	10	
Blodgett, John J.	50	
Blomquist, A. F.	10	
Blonquist, Carl I.	50	
Boand, Lena J.		100
Boisot, Louis	300	
Boisot, Mary	20	
Bosker, Harry E.	30	
Bosshart, Chas. M.	160	
Boye, C. L.	200	
Broadhurst, Wallace C.	25	
Brinton, C. W.	15	
Breen, May E.	115	
Brown, Clarence	10	
Buettner, Louis F.	100	
Burns, Thomas	20	
Byer, Peter W.	30	
Bender, Geo. S.	10	
Carrie, Miss Beatrice	25	
Castle, R. S.	75	
Cederholmes, N. E.	10	
[illegible]ark, Geo. D.	50	
Clement, Curtis & Co.	585	
Cokins & Company	30	
Colby, J. A.	100	
Colligan, Patrick J.	30	
Colvin & Co., Wm. H.	2770	55
Conrad, J. W.	50	
Cross, Jas. W.	32	
Curtis, Robert M.	200	
Crowley, Martin J.	10	
Davison, Jessie E.	50	
Daly, Joseph D.	100	
Danahy, Nellie	10	
Danahy, Arthur	30	
Denvir, John F.	20	
De Mauriac, Antoinette	5	
Dohrman, Will H.	10	
Doran, Harry E.	25	
Dresher, Mrs. Elizabeth	10	
Dumais, Leo J.	10	
Dunlevy, Lorimer	15	
Donahoe, E. S.	10	
Enright, Teresa E.	100	
Edwards, Emma L.	10	
Egan, R. Ben.	50	
Eifrig, E. G.	10	
Esdohr, Herman H.	200	
Esdohr, Fred H.	100	
Falk, M. L.	100	
Farrell, Michael	115	
Faude, William	85	

	Common	Preferred
Favel, Nellie	10	
Fenimore, Alvin S.	50	
Feldmann, John L.	10	
Field, Wentworth G.	166	
Finesilver, Joe	35	
Ford, Arthur	3	
Frank, Fred W.	25	
Gauer, Nicholas J.	50	
Gazlay, William S.	20	
Gazlay, Richard C.	1	
Gardiner, Mary P.	20	
Geiger, May S.	20	
Gielow, Martha	25	
Gilman, Hattie S.	50	
Gilmore, Emma C.	10	
Goldsmith, Nathan	30	
Goldstone, David		20
Grant, Joseph O.	40	
Gunther, John	50	
Gunton, Ruby V.	5	
Gillis, Sadie Jones	5	
Haggerty, Mary J.	50	
Halvorson, Hedwig E.		50
Haines, Ernest H.	30	
Harmke, Charles	150	
Harris, Winthrop & Co.	585	
Hawley, Mrs. Frances H.	20	
Heffernan, Richard J.	40	
Heffernan, John J.	150	
Hefter, Mrs. Nettie	25	
Heiden, Wm. H.	15	
Henger, C. W.	120	80
Hector, Beatrice L.	40	
Henn, Frank J.	40	
Hinde, Thos. M.	100	
Hoebel, F. C.	50	
Holmquist, Anna		110
Hoggins, Edwin	10	
Hornblower & Weeks	925	
Hoover, Harry	10	
Hoover, W. W.	100	
Hulburd, Warren & Chandler	35	50
Hill, Frederick	10	
Hahn, Evelyn	5	
Ireland, Andrew J.	5	
Irvin, A. J.	100	
Isaacson, Roger S.	100	
Isaacson, Thora K.	50	
Jensen, Emilie J.	15	
Jensen, Julia E.	5	
Jensen, Agnes C.	15	
Joiner, Zella M.	20	
Johnson, Harry O.	15	

	Common	Preferred
Johnson, George L.	20	
Jones, Roy E.	10	
Jones, J. B.	10	
Jones, Bernard T.	30	
Kane, Helen L.	10	
Keller, Lewis A.	10	
Kelley, Walter J.	10	
Kelly, Nonie E.	30	
Kelly, James J.	30	
Kelly, Arthur J.	10	
Kelly, W. H.	15	
Kelly, Mrs. Bessie G.	35	
Kennedy, George A.	150	
Kesner, Isaac L.	85	
Klatte, Wm. A.	30	
King, Geo. S.	25	
King, Farnum & Co.	25	
Krouch, John L.	100	
Kroeber, Ottilie H.	10	
Kenoyer, Welden R.	50	
Kelly, James J.	10	
Laird, Marion	20	
Lane, Jr., James H.	30	
Lally, R. T.	15	
Laverty, James	25	
Lauzon, David J.	10	
Lee, Susie	80	
Leitmer, Leo H.	25	
Lester, Carter & Co.		50
Lindsay Jr., Chas. R.		23694
Lindsay Jr., Chas. R. Guardian of C. R. Lindsay, 3rd.		3868
Lindsay Jr., Mrs. C. R.		600
Lindsay, Ella W.		200
Lindstein, Edward J.	100	
Loeffel, John C.	50	
Logan & Bryan	455	
Logan, Anne Shay	50	
Lommatzech, Otto	12	
Lowenstine, Mandel	500	
Lutz, Jos. A.	50	
Lux, William A.	50	
Lyons, Tom	40	
Mac Farlane, R. E.	5	
Maginnis, C. S.	40	
Mann, A. G.	50	
Markle, A. M.		100
Marcuse & Company	25	
Massey & Company, Harry A.	3103	
Maurd, Martin	10	
Mayer, David	40	
Mayer, John M.	400	110

	Common	Preferred
Lagher, M.		232
Merrill, Lynch & Co.	325	
Hemmel, Simon G.	5	
Meyer, G. A.	45	
Meyers, Richard L.	30	
Metcalf, Arthur G.	200	
Miller, Robert W.	30	
Miller, Emma	90	
Miller, Lucile	5	
Milmine, John	150	
Milmine, Mrs. Mabel Clare	100	
Morrisey, John J.	50	
McCarty, John A.	65	
McGonagil, W. J.	10	
McHugh, Mary E.	20	
McLaughlin F. L.	50	200
McManus, Mary G.	60	
McMahon, Stephen E.	75	
Nason, Frank	150	
Nenneman, W. T.	15	
Newhall, Walter W.	20	
Noyes & Jackson	260	
Olds, Caryl E.	30	
Oliphant & Co., Jas. H.	415	3135
Mann, Louisa	40	
penheim, A.		100
Osgood, Roy C.	15	
Olson, Ebba J.	39	
Paulus, Lizzie M.	50	
Palash, Bernard	25	
Palma, Domenico	10	
Paine, Webber & Co.	465	
Peckhouldt, William	10	
Pendell, C. M.	50	
Phillips, Parker	30	
Pinkowitz, Julius G.	50	
Pickett, Ada H.	10	
Pond, George F.	22	
Postma, Frances G.	5	
Powell, William H.	100	
Price, J. Edward	25	
Pynchon & Company	120	
Peterson, John O.	25	50
Radewagen, Alfred	100	
Radewagen, Richard	68	
Randall, Frank C.	50	50
Raff, Mary E.	10	
Reinlie, Albert	100	
Reinhardt, Fred W.	100	
Risdon, Ambrose	60	
Robinson, Adelia E.	5	
Olley, J. R.	30	
Rosenburg, C. T.	35	
Rosenfeld, Julia S.	25	

	Common	Preferred
Rose, Belle	50	
Rubey, Clara	5	
Russell, Brewster & Co.	430	
Russokov, Milton	50	
Ryan, Margaret J.	90	
Roney, Harry K.	30	
Roach, C. Myrtle	10	
Salzman, Jack L.	50	
Saunders, Charles L.	30	
Scanlan, William J.	260	
Scheer, W. N.	10	
Schneider, Lillian E.	20	
Schweer, Fred J.	125	
Schweer, A. W.	50	
Schuetzner, John	300	
Schmidt, Walter C.	10	
Schmitz, Louis	100	
Semrad, Earl L.	10	
Shearson, Hammill & Co.	750	
Shaver, Mary L.	30	
Siebken, Bertha	30	
Simmons, India S.	30	20
Simmons, J. W.	660	440
Sincere & Co., Charles	522	
Smith, Julian C.	75	
Smith, C. A.	25	
Smith, Claude F.	50	
Smith, C. T. E.	100	
Smith, Marion	55	
Smith, Amos R.	150	
Spies, Geo. H.	20	
Spitler, Anna L.	75	
Sonnenschein, J.	50	
Stern, Milton	20	
Stein, Adolph Estate of	100	
Stevens, Robert W.	50	
Stapleton, Mae	63	
Stone, Elmer L.	25	30
Stretch, Mary	20	
Suess, Geo. P.	40	
Sullivan, Ella	5	
Sullivan, Mrs. Julia	10	
Swenson, Axel E.	25	
Sheehan, Lillie	20	
Sherburne, Anne E.		100
Sherburne, Jos. M.	10	750
Slayton, Florence E.	50	
Talbot, James R.	10	
Taylor, Edward B.	5	
Temple, Frances C.	10	
Thorsen, R. Thor	100	
Thompson, Racine	10	
Thomas, George W.	40	
Toole, Sellie H.	50	
Townsend & Co., J. J.	110	
Twitchell, Mrs. S. Geraldine	25	
Ulrich, Rhoda	10	

	Common	Preferred
Van Alstyne, Mabelle	27	
Van Duzer, Obie W.	35	
Waldmann, Henry A.	275	
Wade, R. M.	25	
Wagg, Mrs. Eunice	10	
Walkowiak, Anthony E.	20	
Ward, Hayden W.	20	
Ware & Leland	275	
Weber, Josephine	25	
Westpfahl, Frank C.	200	
Wharton, Francis A.	60	
Wheeler, E. C.	5	
White, William S.	15	
Whitcher, Mrs. C. M.		800
Wilson, Eleanor Spry	100	
Wilmot, Ross H.	100	
Williams, Oliver A.	35	
Williams, Miss Margaret	25	
Winger, Marie K.	10	
Wiseman, Evelyn	15	
Wolff, Mrs. Sarah	50	
Wolf, Mrs. Eva	50	
Woitek, June	10	
Woitek, Laurine C.	10	
Woitek, Mrs. F.	10	
Wright, Rachal M.	8	
Weber, Agnes	25	
Wilsey, Robert E.		50
Zacharias, Jr., John L.	50	
Zearing, Louis A.	30	
Zeiler & Co., F. M.	590	
Zinnbrabe, Louis	10	
Zwicky, Mrs. Michael	21	14
	27344	36783

Total number of Shares represented by proxies, held by Mr. Sherburne ---------- 64,127

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Mr. Otto N. Berndt, as Secretary of Lindsay Light Company, holding proxies for the following:

Adams, Alice	5	10
Andreoni, Louis		50
Aschermann, Elmer S.	10	
Berndt, Otto N.	100	200
Berryman, Bertha B.	30	
Berryman, Lloyd V.	10	
Berryman, Martha J.	25	
Bolle Henry		100
Bolley, John R.		50
Burke, Thos. J.	35	

	Common	Preferred
Cahill, Nora	30	10
Cameron, F. L.	50	
Chevaux, Emil		50
Clader, Emma E.	30	
Coffelt, O. T.	5	
Coleman, Emil	100	
Corn, Frances	50	
Counter, Dray H.		50
Cramer, Harry W.	20	
Crowe, John V.	200	
Cumming, George H.	50	
Cumming, Margaret R.	25	
Desjardines, Emma	10	
Desjardines, Noel D.	30	
Donovan, Daniel J.	10	
Doniat, Josephine C.	25	
Dunne, William J.	40	
Egbert, Eva	20	
Ehrlicher, George	20	
Enright, Michael E.	25	
Enright, Teresa E.	100	
Eppstein, Joe R.	100	
Erion, Jr., John	200	
Flynn, Michael J.		20
Gadbois, Mabel		10
Geegan, Thomas J.	40	
Gensert, Carrie W.	25	
Gerlach, Margaret T.	10	
Gillen, Mary	10	
Gohs, Mabelle R.		50
Goldberg, S. M.	10	
Griesemer, Charles J.		10
Haines, Ernest H.	30	
Hannifin, Catherine	200	
Hansen, L. H.	15	
Hellerman, Leslie		10
Hopkins, Maude D.	5	
Hoyne & Co., Eugene M.	25	
Hunter, Anna	50	
Inderrieden, Jos. S.	100	
Jackson, V. T.	8	35
Jellum, E.	20	
Jones & Baker	20	
Kavanagh, Edward	50	
Keil, Mayme	25	
Keuper, Harriet M.	10	
Lalor, Wm. H.	75	
Landsberg, Edward		100
Latham, Amelia		50
Lewis, Charles L.	100	
Lomax, Mrs. Louise E.	100	
McDermott, Lillian	30	20
McGhee, Mary		20
McGovern, Elizabeth,		200
Mahoney, Julia C.	20	
Martin, Patrick	10	

	Common	Preferred
Masters, Joanna	20	20
Melody, Estella	50	
Milroy, Admirelda	100	
Moss, F. J.	15	
Nevins, M.	200	
Newburn, John W.	140	
Newhall, Walter W.	20	
Periolat, E. J.	63	
Periolat, John A.	62	
Peterson, Arvid L.	10	
Peterson, Frank	50	
Peterson, Ingolf	50	
Phelan, Margaret		60
Platt, Frank J.		100
Platzer, Carl	25	
Postma, Gertrude	10	
Ratty, Anna	10	
Ratty, Mary	10	
Ratty, Catharine	50	25
Rau, Emanuel	30	
Raymond, Cora E.	10	
Reinecker, Louis	30	
Richards, George F.	20	
Ricker, Elizabeth Shay	25	
Robinson, Edward	10	
Rothschild & Co.	170	
Rowen, R. W.	25	
Salisbury, John R.		60
Schaller, Peter J.	20	
Shane, Seymour	100	
Sheehan, Lillie	20	
Sinai, Alexander	125	100
Sinai, Ray Miss		60
Shorter, Fred J.	10	
Smith, Dr. Angie C.		20
Smith, William T.	25	
Spiro, Philip	25	
Stein, Ignatz	175	
Steinberg, Wm. R.	150	
Stenhouse, Bessie C.	8	
Stenhouse, Evangeline	9	
Stoneman, Ernest		50
Strebbell, Irene		20
Sullivan, Dennis	40	
Test, Wm. H.	10	
Trainor, Rose A.	100	
Volkens, William J.	20	
Watson, Alice C.	5	
Westerlund, Gustaf A.		50
Williams, C. E.	25	
Williams, Katherine I.	50	
Wiseman, Evelyn H.	15	

	Common	Preferred
Yavitts, Jacob M.		10
Young, Aloysisus L.	10	
	4480	1620

Total number of Shares represented by proxies, held by Mr. Berndt ---------- 6,100

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Mr. Herbert N. McCoy holding proxy for:

Wells, Francis R.	2000
Total ----------	2,000

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Mr. W. W. Buchannan holding proxies for the following:

Block, Maloney & Co.	595
Stein, Alstrin Co.	1890
	2485
Total ----------	2,485

-:-

Total present by Proxy -------- 74,722 Shares.

	Common	Preferred
Total Present In Person ----------	1540	650
Total Present By Proxy ----------	36309	38403
	37849	39053

Total Present In Person and By Proxy ----------76,902

The President thereupon stated that there was present in person or represented by proxy at the meeting a total of 37,849 shares of Common and 39,053 shares of Preferred, making a grand total of 76,902 shares of the total of 100,000 shares outstanding, and that as considerably more than two-thirds of the total stock of the Company was represented at the meeting, it would now be in order to take up any business coming before the meeting.

Thereupon, on motion duly made and unanimously carried, it was voted to dispense with the reading of the minutes and said minutes were approved without reading.

Thereupon, the President of the Company presented a report covering the operations of the Company during the year 1919, which report on vote duly had and taken was unanimously accepted, approved and ordered spread upon the records of this meeting. The president also presented to the meeting a statement showing the comparative assets and liabilities of the Company on December 31, 1918 and December 31, 1919. These two reports are in the words and figures following, to wit:

	18th Annual Statement Ending Dec.31-1919.	17th Annual Statement Ending Dec.31-1918.
ASSETS:		
BUILDING AND REAL ESTATE	$144,016.00	$143,966.00
MERCHANDISE	353,148.86	348,772.52
MACHINERY AND FIXTURES	43,002.72	32,521.06
ACCOUNTS RECEIVABLE	159,139.63	289,657.11
GOOD WILL, TRADE MARKS & PATENTS	600,000.00	600,000.00
U. S. LIBERTY BONDS, 4-1/4%	0.00	287,500.00
ACCEPTANCES	0.00	3,456.00
CASH	71,852.65	32,842.14
	$1,371,159.86	$1,738,714.83
LIABILITIES:		
CAPITAL STOCK:		
7% CUMULATIVE PREFERRED	400,000.00	400,000.00
COMMON	600,000.00	600,000.00
ACCOUNTS PAYABLE	52,507.63	77,249.57
NOTES PAYABLE, BANK	0.00	100,000.00
RESERVED FOR FEDERAL TAXES 1918	14,711.36	77,480.88
RESERVED FOR FEDERAL TAXES 1919	7,500.00	
SURPLUS	296,440.87	483,984.38
	$1,371,159.86	$1,738,714.83

OTTO N. BERNDT,
TREASURER.

After reading the above statement, the President's report continued as follows:

"The resignation of Mr. Gilman as President and Director and Mr. Baxter as Secretary and Director effective December 31, 1919 made it necessary to call a special meeting of the majority of your Directors January 2, 1920 and at this meeting, Mr. Charles R. Lindsay, Jr. was elected Director, Mr. Otto N. Berndt, elected Director and Secretary-Treasurer, Mr. Jos. M. Sherburne was elected President having resigned as Vice-President and Treasurer and Mr. H. N. McCoy was elected Vice-President.

We have charged off our books as of December 31, 1919, the following accounts.

A/C Merchandise ----------	$68,013.57
A/C Loss in Sale of Liberty Bonds -----	27,570.00
A/C Polish ----------	42,453.85
A/C Dye Plant ----------	28,033.79
Total ----------	$166,071.21

The surplus account of December 31st, 1918 of $483,984.38 has been decreased to $296,440.87. This decrease of $187,543.51 is accounted for as follows:

Paid in Common Dividends ----------	$70,000.00
Paid in Preferred Dividends ----------	30,333.33
Charged Off ----------	166,071.21
Reserved for 1919 Taxes ----------	7,500.00
Leaves----------	273,904.54
Deduct Decrease in Surplus ----------	187,543.51
Leaves ---------	86,361.03
Deduct Credit Received from London SAND	56,219.45
Leaves - Earned from Operations -------	$30,141.58

This amount was earned in the business during 1919 but cannot be applied to surplus because of the foregoing deductions.

The amount charged off of merchandise is principally on account of Monazite Sand and is the difference between the cost of this material during the war and its replacement at present prices December 31st, 1919.

We sold in December $350,000.00 worth of Liberty Bonds at market for $27,570.00 less than their cost.

The polish department was started last Spring and during the first few months a very considerable amount of business was obtained which seemed to indicate a possibility worth while and one which would fit into our general business and help reduce our selling cost. The future policy of this department must be determined by your Directors. "LINDSAY LIGHT POLISH" is of unquestionable merit.

We started to equip the Dye Plant in May. Up to September 1st nothing was produced by the man that we had in charge and he was therefore released. On September 1st this department was put into the hands of our Doctor McCoy and our Chemists who zealously went to work and by November began to produce METHYLENE BLUE in very small quantities but of most excellent quality. These quantities have been increased until it has now reached about one-half of what we hope to have within the next few months, if the additions necessary to accomplish this are approved by your Directors.

I believe that this can be made a desirable part of our general business and slowly enlarged to considerable volume, especially as it seems to be quite clearly a plan of our Government to protect the dye industry as a part of the policy of National Defense.

The monazite refinery produced in 1919 - 90,065 pounds of Thorium Nitrate against the production in twelve months ending December 31st, 1918 of 181,605 pounds. Thorium sold in 1919 at about 40% less than in 1918.

It now appears likely that a considerable portion, if not all, of our foreign market will be lost due to the restrictions to be imposed by producers of monazite sand who can, and likely will, control the refiners and allocate the countries in which such refiners may sell their production. We will undoubtedly be confined to sales in U.S.A. with the possibility of this business being divided between ourselves and other manufacturers, and while we at this time furnish the larger percentage of American mantle manufacturers with Thorium Nitrate, and expect to continue to do so, there is a possibility that the German refiners may not be controlled by the producers and therefore may become a factor in the American market until it is possible for Congress to take some action in the way of protection either by tariff or by licenses and as a part of the problem of National Defense. This has already been taken up with the proper authorities in Washington with that end in view.

Fortunately, some of the equipment formerly devoted to the manufacture of Thorium Nitrate and no longer necessary on account of reduced production, is now being utilized in our refinery in the manufacture of other materials. These show a steady increase in volume at a small profit. Such production is small but much larger than it was the year before and is continuously growing and it is believed that it can be maintained and still increased further, and thus in a small way contribute to the general profits of this business.

The gas mantle business shows a decrease in production of 22%, which is accounted for by our inability to obtain usual quantities of supplies and by the shortage of labor. We now have on unfilled orders, 1,760,080 mantles at better average prices, and are now running about sixty percent of our capacity. There is a considerable shortage in the production of gas mantles and much higher prices are prevailing than last year.

You have received notice that at this meeting you will be called upon to decide as to the advisability of increasing the number of Directors from five to seven, and if favorably voted upon at this meeting, will result in the addition of men whom it is felt will be of considerable value to the management during this year.

I cannot make any predictions for 1920, as conditions generally are very much unsettled; labor such as we require is difficult to obtain at the price we can afford to pay; material costs are today as high and in many cases considerably higher than during the war."

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The President thereupon stated that the next thing in order would be to consider the question of increasing the number of Directors from five to seven. The matter was thereupon discussed by the Stockholders, after which the following resolution was unanimously adopted, the entire 76,902 shares voting in favor of the adoption of said resolution, viz:

RESOLVED, that the number of Directors of the Lindsay Light Company be and the same is hereby increased from five (5) to seven (7).

The Chairman thereupon announced that the foregoing resolution, having received the votes of 76,902 shares, had been duly and regularly adopted.

The Chairman thereupon announced that the next thing in order would be the election of seven Directors for the ensuing year, and suggested that five of these Directors be elected to take the place of the five Directors whose terms expired this year, and that two additional Directors be elected to fill the two additional places created by the proposed increase in the number of Directors.

Thereupon, on motion duly made by Mr. Chas. R. Lindsay, Jr., seconded by Mr. Alexander Sinai and unanimously adopted, the following persons were elected Directors of the Company for the ensuing year:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Otto N. Berndt
Mr. H. C. Beste
Mr. Robert E. Wilsey

Thereupon, on motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously adopted, the following persons were elected Directors of the Company to serve during the ensuing fiscal year to fill the two additional places created by the increase in the number of Directors.

Mr. Chas. R. Lindsay, Jr.
Mr. Alexander Sinai.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

Otto N. Berndt
SECRETARY.

Minutes of a regular meeting of the Board of Directors of the Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, July 20th, 1920, at the hour of three o'clock P. M., pursuant to notice.

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The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

There were present:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Otto N. Berndt
Mr. Chas. R. Lindsay, Jr.
Mr. Harry C. Beste
Mr. Alexander Sinai
Mr. Robert E. Wilsey

Same being all the seven Directors of Lindsay Light Company.

The first order of business was the reading of the quarterly report ending June 30th, 1920, which is as follows:

2ND QUARTERLY STATEMENT ENDING JUNE 30-1920.

	JUNE 30-1919	JUNE 30-1919
ETS:		
BUILDING & REAL ESTATE	$141,516.00	$144,016.00
MERCHANDISE	324,508.44	481,349.21
MACHINERY & FIXTURES	47,453.85	32,584.17
ACCOUNTS RECEIVABLE	253,394.40	165,761.28
GOOD WILL, TRADE MARKS & PATENTS	600,000.00	600,000.00
BONDS & STOCK	48,691.79	351,000.00
CASH	19,654.79	5,544.94
	$1,435,219.27	$1,780,255.60
ABILITIES:		
CAPITAL STOCK:		
7% CUMULATIVE PREFERRED	400,000.00	400,000.00
COMMON STOCK	600,000.00	600,000.00
ACCOUNTS PAYABLE	25,319.38	56,775.44
NOTES PAYABLE (BANK)	0.00	200,000.00
RESERVED FOR TAXES	38,169.97	46,942.36
SURPLUS	371,729.92	476,537.80
	$1,435,219.27	1,780,255.60

EARNINGS FOR SECOND QUARTER

NET EARNINGS FROM OPERATIONS	52,323.66	11,699.36
DIVIDEND PAID ON PREFERRED STOCK	7,000.00	7,000.00
DIVIDEND PAID ON COMMON STOCK	0.00	30,000.00
RESERVED FOR TAXES	13,000.00	0.00
CARRIED TO SURPLUS	32,323.66	x 25,300.64
	$52,323.66	$11,699.36
ADDED TO SURPLUS A/C OVERPAYMENT FEDERAL TAXES 1918-1919	14,767.18	

x-WITHDRAWN FROM SURPLUS ACCOUNT.

	1920	1919	
ATEMENT FOR SIX MONTHS ENDING JUNE 30TH:			
EARNINGS FROM OPERATIONS - 1ST QUARTER	$42,198.21	$10,449.00	
" " " - 2ND QUARTER	52,323.66	11,699.36	
	$94,521.87	$22,148.36	(A)
IDENDS PAID ON PREFERRED STOCK	$14,000.00	$16,333.33	(C)
" " " COMMON "	0.00	70,000.00	(D)
ERVED FOR TAXES	20,000.00	0.00	
RIED TO SURPLUS	60,521.87	7,446.58	(B) x
	$94,521.87		

x: ADD "C" & "D"
DEDUCT "A" & "B"
EQUALS SPECIAL
CREDIT FIRST
QUARTER ----
$56,738.39.

DEPARTMENT PROFIT & LOSS ACCOUNT FOR SIX MONTHS ENDING 6/30/20.

	MONAZITE	MANTLES	POLISH	DYE	
NED 1ST QUARTER	38,046.25	10,802.83	1544.99x	5105.88x	
NED 2ND QUARTER	29,367.94	17,162.52	1391.00x	7184.20	
FOR SIX MONTHS	67,414.19	27,965.35	2935.99x	2078.32	=$94,521.87

	1920	1919	
NED 1ST QUARTER	9,343.11	1,105.89	
NED 2ND QUARTER	16,655.53	4,956.17x	
	25,998.64	3,850.28x	=$22,148.36

x-DEFICIT.

Thereupon, our Chairman read a report showing that our stock of Thorium on hand January 1st, 1920 was 31,860 pounds; the shipments for six months equaled 46,700 pounds, making a total of 78,560 pounds. The inventory of June 30th, 1920 shows 44,565 pounds, which leaves a balance of 33,995 pounds. Our Chairman thereupon read the recommendation as made by our London Agent.

Upon motion duly made by Mr. Robert E. Wilsey, seconded by Mr. Harry C. Beste and approved by all, it was RESOLVED that the authority be given for the further shipment to our London warehouse of not to exceed 500 cases of Thorium Nitrate as soon as such can be conveniently manufactured, and ratify the foreign

business done through our London Agent for the first six months of 1920.

The Board ratified and approved of the action taken by the Officers, in which we have transferred a liability of $10,000.00, accruing to us for sales of Thorium Nitrate to the Beacon Lighting Company, into a second mortgage on their two-story building and lot located at #7000 Bennett Street, Pittsburgh, Pa.

On motion duly made by Mr. Harry C. Beste, seconded by Mr. Alexander Sinai and approved by all, it was decided to invest up to $10,000.00 in Canadian Bonds, all moneys paid to us by the Hamilton Gas Mantle Company, Ltd., of Hamilton, Ontario, and any other Canadian accounts to whom we may sell goods, thereby saving the exchange premium.

Our Chairman made the gratifying report that the Welsbach suit, regarding the infringement of certain baking processes has been finally dismissed, each party to bear their own respective costs.

The Board of Directors authorized our President, Mr. Jos. M. Sherburne, to have a conference with Mr. Sidney Mason, President of the Welsbach Company, and to disclose to him that we are ready for a proposal and wish to obtain an expression of opinion from him and his Directors regarding a possible merger or consolidation.

After a very lengthy discussion regarding the acquisition of land and the erection of new buildings for the manufacture of chemicals therein before we definitely decided to purchase, Mr. Sherburne was authorized to instruct Mr. Bowes, the real estate Agent, to submit within ten days a definite tangible proposition regarding the rental for a 20-year period of the premises owned by us at #161 East Grand Avenue.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. Harry C. Beste and approved by all, a quarterly dividend of 2% was declared upon the Common Stock of this Company, payable August 31st, 1920 to Stockholders of record at the close of business July 31st, 1920. The following letter was sent to all Stockholders under date of July 20th:

J3Y 7/21/20

CHICAGO, JULY 20-1920.

To the Stockholders of
Lindsay Light Company:

At a regular meeting of the Board of Directors of this Company held this day, a quarterly dividend of 2% was declared upon the Common Stock, payable August 31st, 1920 to Stockholders of record at the close of business July 31st, 1920.

Transfer books will not be closed.
Checks will be mailed on August 31st, 1920.

In case of any change in your post office address please notify us promptly.

Yours very truly,
LINDSAY LIGHT COMPANY
OTTO N. BERNDT,
SECRETARY.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

Otto N. Berndt
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company and having been present at the meeting of said Directors held on July 20th, 1920, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

J. A. M. Fierkurus
Herbert N. McCoy
Otto N. Berndt
R. Gloussey
Harry C. Beeston
C. Lindsay
Alexander Dinai

Minutes of a regular meeting of the Board of Directors of the Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, September 21st, 1920, at the hour of four o'clock P. M., pursuant to notice.

-:-

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and as the Secretary of the Company, Mr. Otto N. Berndt, was out of the City and therefore not present, Mr. Herbert N. McCoy acted as Secretary of the meeting.

There were present:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Harry C. Beste
Mr. Robert E. Wilsey

Same being four of the seven Directors of Lindsay Light Company.

The Chairman informed the Directors present that on the 10th day of September, with the sanction of Mr. Herbert N. McCoy and Mr. Otto N. Berndt, this Company loaned Mr. Clifford W. Stabenau, the Chemist in charge of our Monazite Plant, $750.00 to enable him to make his first payment on a home, to be paid back at the rate of $75.00 per month, beginning October 1st, for which he has given notes with interest at six percent. Explanation was given that it was thought best to do this through the Company rather than individually, so as to have a hold on this man's services.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously approved, this action was ratified.

The Chairman then proposed that a loan for $600.00 be made to Mr. R. P. Sullivan for this same purpose on October 2nd, to be paid back at the rate of not less than $75.00 per month and partly secured by collateral.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously approved, this authority was issued.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. R. E. Wilsey and unanimously approved, the Chairman was instructed to send to Mr. J. H. Fall, Jr., of the Benjamin Electric Manufacturing Company, a check for $100.00 on behalf of the work of the United Americans, who, by propaganda, are endeavoring to act as a counter influence against such outrages as recently occurred in New York.

The Chairman reported the following, according to instructions given at the regular meeting of the Board of Directors held on August 17th to obtain a definite proposal regarding the rental of this building and figures of the estimated cost of new buildings on acreage.

He stated that up to this time Mr. Bowes had not made a proposal or been able to obtain a customer who would take over the property at #161 East Grand Avenue on a long lease at not less than $40,000.00 per year, but that he was working very hard on this and believed the season was now approaching when such a lease can be made and such an amount obtained net to this Company from reliable sources.

The Chairman also reported that plans had been made by Mr. Ernest Mayo at no cost and the estimated cost of the new buildings as shown on such plans would be in the vicinity of $400,000.00 plus the architects' fee of five percent. This estimate is believed to be very much higher than the actual work can be done for but it is given on this basis for the sake of being safe.

The additional cost of land would mean approximately another $100,000.00, making a total cost for land and new buildings of about $500,000.00. No action on these matters was taken because of the various proposals before this Company regarding a possible consolidation.

The Chairman reported that the mantle plant was averaging about 90% production - the monazite plant was working to capacity - and the dye plan for the present is without orders and is accumulating a little stock.

This is due to the fact that the textile industry is very, very quiet, but it is believed that there is no danger in accumulating a stock of dyes during the next few months, because it is known that they can be sold at any time against market competition now prevailing, but it is believed that they can be sold for much higher prices within the next sixty or ninety days. This does not apply to the Methylene Blue U.S.P., the usual quantity of which is being made and shipped to our Friends, Merck & Company, New York City.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

VICE PRESIDENT.

We, the undersigned, being Directors of the Lindsay Light Company and having been present at the meeting of said Directors held on September 21st, 1920, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

Minutes of the Special Meeting of the Board of Directors of the Lindsay Light Company held in lieu of the February regular meeting on March 9, 1923, at the Old Colony Club at the hour of 1:00 p.m.

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

Five of the Directors were present, namely;-

Mr. Jos. M. Sherburne
Mr. H. N. McCoy
Mr. O. N. Berndt
Mr. R. E. Wilsey
Mr. H. C. Beste

Same being five Directors of the Lindsay Light Company, thereby constituting a quorum.

The first order of business was the taking up of the renewal of leases. Upon motion duly made by H. N. McCoy, seconded by H. C. Beste, and unanimously approved, it was decided to renew our lease for our chemical plant at 316 E. Illinois St., for the same terms and conditions at the same rental for another year, which will make our term of occupancy expire April 30, 1924.

Thereupon motion duly made by Mr. R. E. Wilsey, seconded by H. N. McCoy, and unanimously approved, it was decided to renew the lease of our New York office at 91 Chambers Street, for a period of one year at a rental of $3500 per year. It was pointed out by the President that inasmuch as the New York office had sub-leased a loft at an annual rental of $900 and as the rental mentioned above showed a saving of $500 over the previous rental, the total net saving to the New York Department amounts to $1400, making the net cost for rental of our New York office $2600 annually.

Thereupon ensued a discussion upon the Thorium contracts which Mr. Sherburne has been negotiating with The Coleman Lamp Company, of Wichita, and The Block Gas Mantle Company, of Youngstown. It was regularly moved by Mr. R. E. Wilsey, seconded by H. C. Beste, and unanimously approved by all present, that the contracts as tentatively made by Mr. Sherburne were fully approved and authorized.

Mr. Sherburne thereupon brought up the subject matter of the Monazite Sand contracts with the Travancore Minerals Company, London, and after a very thorough comprehensive discussion of same, it was deemed advisable to postpone any definite decision on this subject matter until the regular March meeting of the Board of Directors.

Thereupon, Mr. Sherburne read the following proposal from Mr. C. R. Lindsay to purchase our building at 161 E. Grand Ave.:

> "I will buy the building and real estate located at 161 E. Grand Ave., Chicago, owned by Lindsay Light Company for $275,000.00, payable in Lindsay Light 7% preferred stock at par, and if the Company desires to lease same from me, will make a one, three, or five year lease at $15,000 per year, they to assume all taxes, insurance, and repairs to building. If this is favorable to the Directors and legal, it can be acted on at once, but if lawyers think it should be submitted to a vote of the stockholders, it would be satisfactory to me."

After a thorough discussion of the matter, it was suggested that no decision be reached until the regular March meeting.

Thereupon motion duly made by Mr. R. E. Wilsey, seconded by H. N. McCoy, and unanimously approved, it was decided to withdraw our building at 161 E. Grand Ave., from sale. The officers were likewise authorized to vacate any floor and make diligent effort to rent same under the most favorable rental prices obtainable, if the manufacturing operations could be so arranged.

Otto N. Bender
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company, and having been present at the meeting of said Directors held on March 9, 1923, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

John M. Sherburne

Otto N. Bender

R E Wilsey

H C Best

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

NOVEMBER MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 E. GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY NOVEMBER THE 24TH, 1925, AT THE HOUR OF 3 P.M.

There were five Directors present, viz:

C. R. Lindsay, Jr.
J. M. Sherburne
H. N. McCoy
H. C. Beste
C. R. Lindsay III

Same being five of the Directors of the Lindsay Light Company, thereby constituting a quorum.

Mr. C. R. Lindsay, Jr. acted as Chairman and Mr. C. R. Lindsay III as Secretary of the meeting.

Minutes of the September meeting were approved.

As the first order of business, Mr. C. R. Lindsay, Jr. brought up the name of Mr. Frederick J. Clifford to serve as a Director to fill the unexpired term of the late Otto N. Berndt. Mr. Sherburne nominated Mr. Clifford for this position and Mr. McCoy seconded this. Mr. Clifford was then unanimously elected by the Directors and the Secretary was instructed to notify him accordingly of this action.

The Chairman then proceeded to read a report to the meeting of his work, since August the 1st, while in charge of the Company's affairs. This reads as follows:

- TO THE DIRECTORS OF LINDSAY LIGHT CO. -

Our regular October Meeting was omitted, as I was in New York at the time, but I sent each of you a statement showing our net worth as of September 30, 1925 to be $334,788.34, after charging off for depreciation, bad debts, etc. $77,532.18. For that Quarter our operating loss was $6,039.89, which compares with $16,778.58 for the corresponding quarter last year. Both of these losses are figured before depreciation, etc.

On my arrival in Chicago, July 26, I found instead of our business showing improvement, it showed an increase in losses; that our Second Quarter showed a loss of $20,978.58 before deducting for depreciation, etc. This was the worst loss in any quarter we have had for years, so I decided to remain in Chicago and was put in charge of the business by the Directors at the July 28 meeting, until the annual meeting, January 1926, at which time the Directors for 1926 will be elected by the stockholders, and the Directors will then, in turn, elect the Officers.

During these four months radical changes have been made, overhead being reduced over $60,000.00 annually, prices advanced on merchandise which showed little or no profit, residential electric line, of which we had an enormous stock, and which was and is one of the main causes for our losses, (thousands of dollars of which have been returned to us in the past few months and thousands of dollars worth of which we have disposed of at less than $0.25 on the dollar) is being cut down to a small line of profitable merchandise most of which we shall manufacture ourselves, our New York Department has been turned into an office in place of an expensive branch, and when our present lease expires April 30, we will move into less expensive quarters.

Bankruptcy surely would have followed if these radical changes had not been made, and today I am pleased to report we owe the bank $45,000.00 compared to $90,000.00 last July and have a fair deposit in the bank instead of a continued overdraft as then.

Our gas mantle business is comparatively good, manufacturing and selling about thirteen thousand (13,000) per day, which is about the same amount compared with the same period last year.

We have very little electric business direct with dealers and Public Service Corporations, but our business with Western Electric Company shows an increase, for the first ten months of this year, of 60%, compared with the same period last year and would show higher were it not for the residential electric fixtures which we were obliged to take back.

In chemicals we were fortunate in closing a contract with National Carbon Company for a by-product from our Monazite Sand, delivery to start March 1, 1926 at a 23% higher price. This will enable us to keep our Refinery going from now on at 100% increase in capacity for a year and a half. I, therefore, renewed our lease on the Illinois Street property for one year to May 1, 1927.

Our gross business during the past four months shows but 10% increase for the corresponding four months last year, and 40% of our total business is through Western Electric Company. The reasons our gross business has not proved more are that last year we sold more Thorium and considerably more in sundries, but what we are doing today is with seven less salesmen. We have at present but five men selling. While our business with Western Electric Company is not so large as we had been led to expect, still, it shows a good continued increase.

I believe we are now making money for the first time in years and that this, our last quarter, will show a profit after charging off depreciation, etc., unless we reduce our inventory on the present stock of Thorium from $2.50 per pound old cost to about $2.02 per pound present cost, which is on account of making double the quantity of the Rare Earths, which we supply National Carbon Company; but even at the new cost of $2.02 we figure the entire cost of the sand into the Thorium. If we make this depreciation of $0.48 per pound, it will amount to about $11,000.00. I recommend that this be done.

I have nothing of further importance to bring up at this meeting, so if there are any questions or suggestions

to offer, I would be pleased to hear them. I might add that we will, in a short time, have to get out our proxies for the annual meeting and decide amongst ourselves as to the Directors and Officers for next year, so it is up to you as to whether it should be done at this meeting or regular December Meeting.

Chas. R. Lindsay Jr.
Chairman - Board of Directors

This report as submitted was given the full approval of the Directors.

The Chairman then suggested the advisability of cutting down the inventory value of Thorium in stock from $2.50 per pound to $2.02 per pound, based upon new cost of production data recently obtained. This cut he suggested as being effective in the next inventory of December 31st. Mr. Sherburne accordingly made the motion to lower inventory price of Thorium to present revised cost, figured on basis of 250% overhead, with the understanding that the actual figure would be definitely decided upon at the next meeting. Mr. Beste seconded this motion and was passed unanimously.

The Chairman then announced that he had received information that the Company would be able to secure about $4,000.00 refund from the Government on 1918 taxes. He further stated that under a new court ruling, the Company might recover 1919 and 1920 tax refunds in addition. This ruling was to the effect "that invested capital cannot be reduced by taxes paid in previous years".

The Chairman then explained to the Directors that due to the recent failure of Gaites, Peace Company, Lindsay Light Company had definitely made arrangements to manufacture certain staple residential fixtures. He believed that by so doing, cost could be reduced very materially.

The Chairman brought up again the suggestion that the Company buy in on the open market a certain amount of its Preferred Stock. It was decided to defer decision on this until a later meeting.

There being no further business, the meeting was adjourned.

Chas. R. Lindsay Jr.
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company, and having been present at the meeting of said Directors held on November 24th, 1925, hereby certify that the foregoing record hereof is a true record and we consent thereto.

Chas R Lindsay Jr

J A D M Pierburne

Chas. R. Lindsay III

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

APRIL 1934 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 EAST GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY, APRIL THE 24TH, 1934, AT THE HOUR OF 2 P. M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary of the meeting.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

Mr. Lindsay, Jr., reviewed the statement for the quarter ending March 31st, 1934.

Mr. Lindsay, Jr., also advised that The New England Mutual Life Insurance Company had offered the Company a ten-year mortgage dated May 1st, 1934, for $90,000.00 at 5½%, $5,000.00 to be paid annually on the principal. This offer was made through E. G. Krumrine and Company whose commission charges are to be $1,800.00. This mortgage is to replace mortgage for $105,000.00 which expires August 1st, 1934. This means that we are to pay The New England Mutual Life Insurance Company $15,000.00 with accrued interest before May 1st, 1934. Mr. Little motioned that this mortgage be accepted which was seconded by Mr. Stabenau and unanimously approved.

It was decided to pay Dr. McCoy an extra bonus of $500.00 for work he has done and will do during the Year 1934.* A motion to this effect was made by Mr. Lindsay, III, seconded by Mr. Stabenau and unanimously approved.

At the suggestion of Mr. Lindsay, Jr., a motion was made by Mr. Eichelberger, seconded by Mr. Stabenau, and unanimously approved that effective May 1st, 1934, salaries be restored to a basis prior to that of May 1st, 1932, with a few minor exceptions at the Grand Avenue Plant. All employees at the West Chicago Plant with Saturday off will receive less 15% and employees with any additional day off will receive a further reduction of 20%.

*Revised as per May 1934 meeting: "All Directors present unanimously decided to change "for work he has done and will do during the Year 1934" to "for extra services to date."

There being no further business, the meeting was adjourn

Respectfully submitted,

Mark W Eichelberger
SECRETAR

We, the undersigned, being Directors of Lindsay Light Company and having been present at the meeting of said Directors held on April 24th, 1934, hereby certify that the foregoing recor hereof is a true record and we consent thereto.

Chas R Lindsay

C. W. Stabenow

Robert L Little

Chas R Lindsay Jr

Mark W Eichelberger

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

_____

_____

24th April, 1934.

TO THE DIRECTORS OF
LINDSAY LIGHT COMPANY:

I hand you herewith statement for the quarter ending March 31st, 1934, showing net profit of $6,316.86. The actual net profit was $7,888.26, but the Government assessed us an additional tax of $1,571.40 for the Year 1932. The reasons for this are that our final City and County Taxes for that year were later reduced and the Government would allow us but 10% for depreciation on Machinery and Fixtures instead of 20%.

The best I have been able to accomplish on our mortgage for $105,000.00 which expires August 1, 1934, is a new ten year mortgage dated May 1st, 1934, for $90,000.00 at 5½%, $5,000.00 to be paid annually on the principal; this renewal to be made through E. G. Krumrine and Company and their commission to be $1,800.00; we to pay The New England Mutual Life Insurance Company $15,000.00 with accrued interest before May 1st. We will be able to take care of this transaction without borrowing from the bank or selling Treasury Preferred Stock, as some of our larger customers have increased their purchases from us which I hope will continue.

Respectfully submitted,

Chas R Lindsay

President

CRL/EA

NOVEMBER 1935 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT & CHEMICAL COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 EAST GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY, NOVEMBER 26TH, 1935, AT THE HOUR OF 2 P.M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light & Chemical Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

Upon motion by Mr. Stabenau, seconded by Mr. Little, and unanimously carried, the regular quarterly dividend of 1¾% was declared upon the Preferred Stock for the quarter ending December 31st, 1935, payable December 16th, 1935, to stockholders of record at the close of business December 7, 1935.

Mr. Lindsay, Jr., submitted a report to the Directors which is found incorporated in the minutes of this meeting. Due t a misunderstanding, he reports that it was not his intention to obligate the Company to repurchase the 500 shares Lindsay Light Preferred Stock at par. In this report he also outlined his views regarding the removal of our operations at 161 East Grand Avenue, Chicago, including the offices to our West Chicago Plant. The Directors entered into a discussion of the advisability of immediately preparing our West Chicago Plant for such a move, and it was unanimously agreed that it was advisable at this time to make this move as rapidly as possible, preferably before July 1st, 1936, but in all events not later than September of 1936. It was also decided to rebuild the portion of the West Chicago Plant which is to be used for office space, as the offices at West Chicago in its present condition is both inadequate and unsuitable.

Mr. Lindsay, Jr., submitted the following savings which he estimated would be accomplished by the removal of our Chicago operations to West Chicago:

Electricity	$2,000.00
Gas	300.00

Coal	$2,000.00
Personal Property Taxes	1,600.00
Two Watchmen	1,800.00
One Engineer	1,000.00

or a total saving of between eight and nine thousand dollars per year. It was roughly estimated that the total cost of this remova including the rebuilding of the offices would not exceed $15,000.(

There being no further business, the meeting was adjourr

Respectfully submitted,

Mark Weichelberger
SECRETARY

We, the undersigned, being Directors of Lindsay Light & Chemical Company and having been present at the meeting of said Directors held on November 26th, 1935, hereby certify that the fo: going record hereof is a true record and we consent thereto.

C. W. Stabenau

R. L. Little

Chas. R. Lindsay Jr.

Mark Weichelberger

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

26th November, 1935

TO THE DIRECTORS OF
LINDSAY LIGHT & CHEMICAL COMPANY:

On account of sickness I was absent from the October Meeting and wish to correct that part of it where I was willing and did purchase 500 shares Lindsay Preferred Stock at par with an option of selling it back to the Company at the same price at any future date, as I had no intention of obligating the Company to repurchase this stock at par.

It has been over four years since we purchased our West Chicago property with the hope that we would be able to sell our Chicago property and move our entire business there. I now recommend that as soon as possible we prepare our West Chicago Plant so that we may move our entire business there within a year. My reasons for this are that taxes on Chicago Personal Property have almost doubled and our expenses with one plant would be considerably further reduced, as gas, electricity and water, watchman and engineer services, and other duplications that we have would not be necessary under one plant.

The cost of moving and putting the West Chicago Plant in proper condition for offices and mantle and electric departments would be quite an item, but it would have to be done sooner or later and I believe the sooner we get at it, the better it will be for our future business.

Respectfully submitted,

Chas R Lindsay

President

CRL/EA

FEBRUARY 1937 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT & CHEMICAL COMPANY, DULY CALLED AND HELD IN ITS OFFICE AT WEST CHICAGO, ILLINOIS, ON TUESDAY, FEBRUARY 23RD, 1937, AT THE HOUR OF 2:00 P.M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light & Chemical Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

On motion of Mr. Little, seconded by Mr. Lindsay, III, and unanimously carried, the regular quarterly dividend of 1¾% was declared upon the Preferred Stock for the quarter ending March 31st, 1937, payable March 15th, 1937, to stockholders of record at the close of business March 6th, 1937.

A motion was made by Mr. Stabenau, seconded by Mr. Little, and unanimously carried, that proxies be sent out on Thursday, March 11th, 1937, together with the audited statement of the Company's 1936 business.

Mr. Lindsay, Jr., then read the enclosed report. Upon motion made by Mr. Little and seconded by Mr. Stabenau, this report was unanimously approved. It was, therefore, decided that, starting March 1st, 1937, a 10% increase be given to all wage earners and salaried employees of the Company.

There being no further business, the meeting was adjourned.

Respectfully submitted,

Mark W. Eichelberger
SECRETARY

We, the undersigned, being Directors of Lindsay Light & Chemical Company and having been present at the meeting of said Directors held on February 23rd, 1937, hereby certify that the foregoing record hereof is a true record and we consent thereto.

Chas R Lindsay

Chas. R. Lindsay III

C. W. Stabenau

A. L. Little

Mark W Eichelberger

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

DECONTAMINATION ACTIVITIES

AT

LINDSAY LIGHT BUILDING (I)
161 E. Grand Avenue
Chicago, Illinois

INTRODUCTION

The 161 E. Grand Avenue Building housed the Lindsay Light Company from about 1910 to the mid-1930's. The company first imported and then manufactured incandescent gas light mantles employing natural thorium compounds and incidental to its operations deposited thorium materials on surfaces, particularly floors, of the building.

The United States Environmental Protection Agency (EPA) reported on the results of several surveys performed at 161 E. Grand Avenue and recommended that, although there is no statutory requirement, the building be decontaminated where practicable. This recommendation was made to reduce the dose from radiation exposure to members of the general public who work in or frequent the building.

The building management chose Radiation Safety Services, Inc., to evaluate and, where appropriate, attempt to decontaminate the more heavily contaminated floors in the building. This was to be accomplished by removal of contaminated floor surfaces followed by replacement of the floors with new material. The work took place during the month of August, 1981.

Technical Approach.

The building management and Radiation Safety Services identified areas where the gamma dose rate at 1 meter above the floor was 100 microrads per hour or greater. These areas were candidates for decontamination.

The first step for most of the areas was the removal of the existing floor coverings, exposing the oak floors. These floors were surveyed and were frequently found to contain significant surface alpha contamination. The building engineer supplied laborers and tools with which the surface layer of the flooring could be removed.

When contamination was found to extend to a greater depth in the oak flooring, the floor boards were cut and removed. Frequently, the subfloor, which was the original plank flooring in the building, was found to be badly contaminated indicating the oak flooring had been installed subsequent to the initiation of Lindsay Light operations. Since the planking was structural, the decision was made to attempt to chisel out contamination to a depth of 1/2 inch. It was felt that removal of more material might compromise the structural integrity of the floors.

Where contamination did not appear to extend to a great depth into the floor the floors were power sanded. The dust from sanding operations was controlled by the use of plastic

sheets. Personnel respiratory protection and hearing protection was supplied to the building laborers.

The operations were terminated at the request of an owner-tenant. And the areas in which work had been performed were resurveyed. The survey reports are in Appendix A.

Results and Recommendations

Areas on the basement, second and fourth floor levels were decontaminated. The areas for decontamination were selected by the building management and decontamination was interrupted at the request of the owner-tenant. The areas decontaminated represent the most significant contamination for areas which are generally occupied and doses were significantly reduced or eliminated at a height of 1 meter from the floor.

The basement pump room, which is immediately north of the boiler room, had a hot spot due to contaminated material used as fill around a pipe. The contaminated material was removed and the created void was filled with concrete. This reduced the external gamma dose from 225 microrads per hour at contact with the floor to 60 microrads per hour at contact and 50 microrads per hour at 1 meter.

The highest readings in the building were found in the basement in Room 8 which was not decontaminated since this is an area which is not occupied. If this area is to be occupied in the future, decontamination is strongly recommended and would be mandated by State law.

The EPA reported dose rates of 800 microrads per hour at 1 meter from the floor in the vicinity of the secretary's desk in Room 202. The floor covering and oak flooring were removed and the planking chiseled to a depth of 1/2 inch reducing the dose rate in the vicinity of the secretary's desk to 250 microrads per hour at 1 meter from the floor.

We recommend that where possible the planking be sealed with bituminous material to retard radon escape and that a 1/2 inch plate of lead be installed prior to replacement of the floor and floor covering. This should further reduce the dose rate by approximately a factor of 2.

The conference room in 202 received treatment similar to the floor adjacent to the secretary's desk. This reduced the dose rate at 1 meter from the floor from the EPA reported maximum of 155 microrads per hour to a maximum of 90 microrads per hour.

We recommend that the floor be sealed with bituminous material to retard radon escape prior to the replacement of the floor and floor covering material.

On the fourth floor Streeterville post-production room the thin concrete floor was broken up, the oak flooring removed, and the planking chiseled and sanded. This reduced the dose rate from the 300 microrads per hour reported by the EPA to 150 microrads per hour at 1 meter from the floor.

We recommend that the floor be sealed with bituminous material to retard the release of radon from this floor.

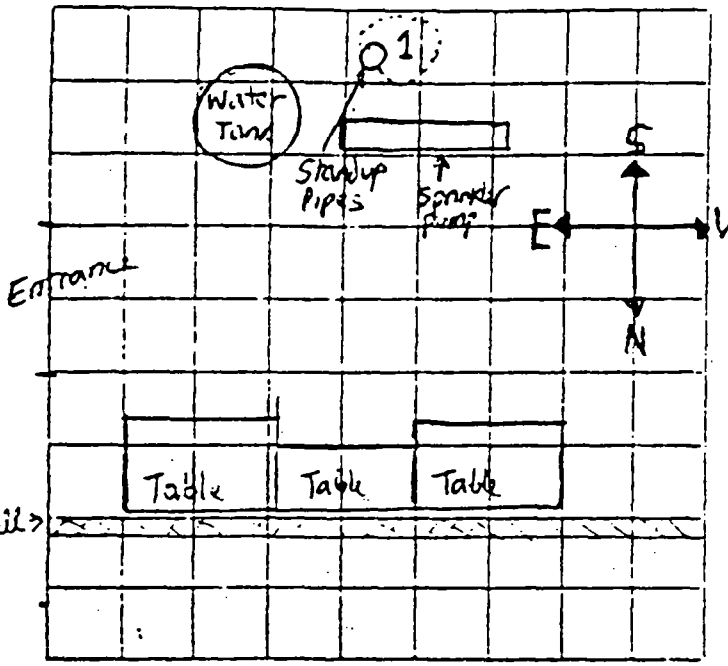
Although decontamination was terminated before completion, the most important occupied areas demonstrated a significant dose reduction consistent with the decontamination effort. Changing space utilization, particularly in the basement, may dictate further decontaminations to the levels recommended by the EPA. It is recognized that there is a very serious trade-off between reductions in already low doses and the expense of decontamination.

SURVEY REPORT

BUILDING: 61 E Grand ROOM: Basement - Pump Room DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nitrate		

Ventilation:

Comments:

SURVEY FINDINGS

AREA	(uR/hr) Contact	(uR/hr) 1 meter above floor	
1 - around standup pipe	60	50	

Background

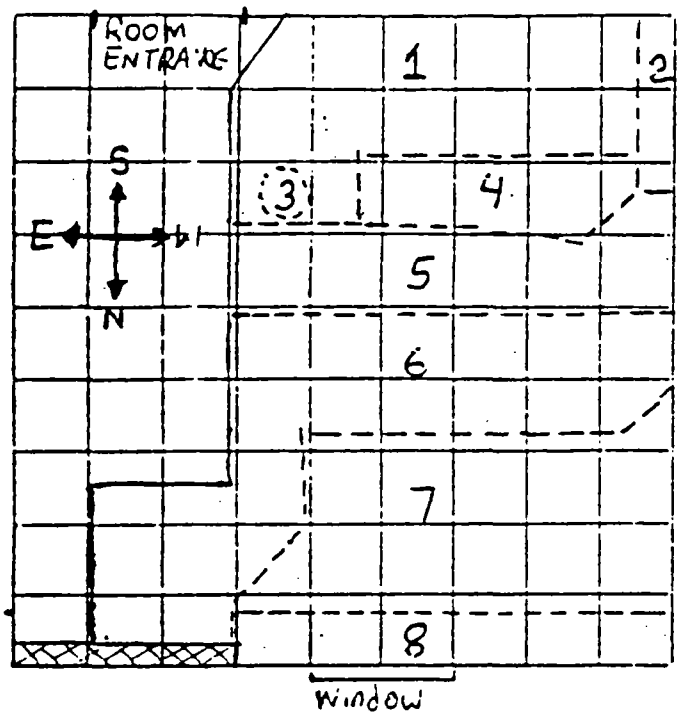
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 101 E. Grand ROOM: 202 Conference Room DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat		

Ventilation:

Comments: All reported exposure rates represent the highest readings observed.

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	80	—	
2	550	—	
3	250	—	
4	150	90	
5	100	70	
6	80	60	
7	200	—	
8	500	—	

Background

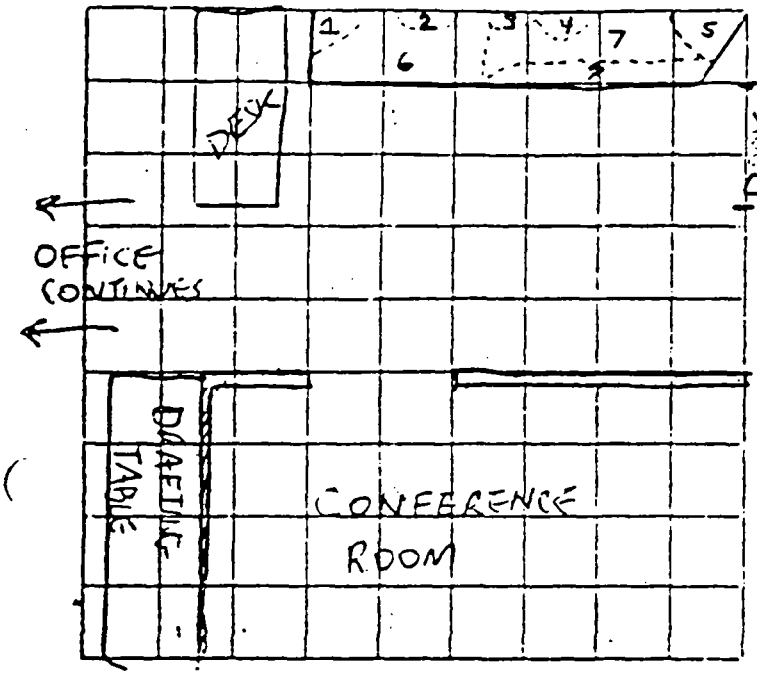
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 16 E. Grand ROOM: 202 DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat		

Ventilation:

Comments:

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	600	—	
2	900	—	
3	800	—	
4	400	—	
5	400	—	
6	500	250	
7	300	200	
8	200	—	

Background

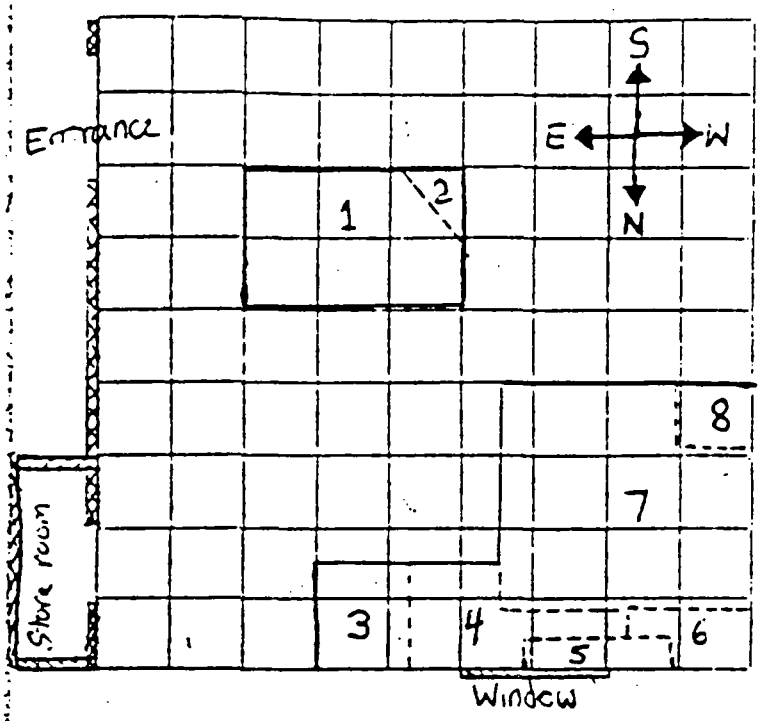
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 161 E. Grand ROOM: 4th FL. Streeterville Post-Production 2m DATE: 9-8-81 BY: B.H.

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat.		

Ventilation:

Comments: All reported readings are the highest readings.

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	80	60	
2	90	—	
3	70	40	
4	100	—	
5	700	150	
6	140	—	
7	80	80	
8	120	—	

Background

RECOMMENDATIONS:

RADIATION SAFETY SERVICES, Inc.
1564 Ashland Avenue
Evanston, Illinois 60201
312/866-7744

April 11, 1984

Ron Klyber
161 East Grand Associates
161 East Grand Avenue
Chicago, IL 60611

Dear Ron:

Attached is the final report of the radiological aspects of the remodeling operation. As is clear in the report, no construction workers or other individuals were exposed to any significant radiological hazard nor was there any significant amount of radioactive rubble produced.

Should you have any questions or require further information regarding these activities or contamination of the building, please feel free to contact me at 866-7744.

Sincerely,

Eli A. Port
Certified, American Board of Health Physics
Registered Professional Engineer (Safety)

EAP:ts

Enclosure

RADIOLOGICAL ASPECTS OF THE FEBRUARY 1984 REMODELING OF THE 161 E. GRAND AVENUE BUILDING

Prepared by

RADIATION SAFETY SERVICES, INC.

April 9, 1984

INTRODUCTION

Remodeling on the second floor of the 161 E. Grand Avenue building during February 1984 included work in areas previously identified by the EPA as contaminated with small quantities of natural thorium. Monitoring was performed to locate contamination on building materials disturbed or removed during the remodeling. Protective actions were taken by workers as recommended by the City of Chicago Department of Inspectional Services.

TRAINING

A one-hour training session was conducted by Eli A. Port, CHP. The sign-up sheet is attached in Appendix A.

The training was based upon a presentation developed by the Health Physics Society for non-technical audiences and included information regarding the production of radiation and its interaction with matter, biological effects, dose-effect relationships, the concept of risk and protective measures.

PROTECTIVE ACTIONS

Workers and ancillary personnel in the construction area were issued Tyvek coveralls and 3-M dust masks. Instructions were given regarding proper wearing and use of the protective apparel. Workers' clothing, gloves and shoes were checked for contamination at the end of each work period. As contaminated portions of the original floor were uncovered, surface wipes were taken to determine if removable contamination was present. While the contaminated floor was uncovered a rope barrier was erected to prevent access. The exposed portions of the contaminated floor were covered with an epoxy paint to seal the surface and prevent dispersal of contamination.

RADIATION SURVEY RESULTS

No removable contamination was detected at a 95% confidence level on filter paper wipes taken from the contaminated floor. Contamination was not found on dust which had accumulated in the walls.

Low-level contamination was detected on several 2" x 4" wood beams in direct contact with the contaminated floor. Water stains on the beams suggest that water-soluble contamination may have been transferred during a past flood which originated on the

roof. Slight contamination was found on tar paper which was in direct contact with the original floor under several superficial layers of flooring.

Dose rate and surface contamination surveys were conducted after the contaminated floor was uncovered. The contaminated areas ranged up to 5,000 dpm/100cm^2. From the data the size and shape of the contaminated area was determined. See Appendix B for survey results.

No contamination was found on any shoes, coveralls, gloves or tools. Surveyed dust masks also revealed no contamination. Air samples were collected and used as an early indicator of possible airborne contamination. The results of air sampling from a cooperative effort were obtained from the USEPA and are reproduced in Appendix C.

WASTE DISPOSAL

Debris from contaminated areas was surveyed with a Ludlum Model 6/Eberline HP210T survey meter. Contaminated material was segregated pending disposal. Uncontaminated debris and debris from uncontaminated areas was collected in waste bins and surveyed with a Ludlum Model 2220 analyzer utilizing an Eberline SPA-2" x 2" NaI (Tl) detector in a low background area. No additional contamination was detected on this material which was

released to a scavenger service. Material with detectable activity was collected in a DOT spec container and will be transferred by ADCO, a licensed radioactive waste collector, for transfer to a radioactive waste disposal site in Richland, Washington.

CONCLUSIONS

Radiation surveys demonstrate that radioactive contamination in the construction area was not readily transferable. A small amount of contamination was transferred to building materials in direct contact with the contaminated floor for many years. Remaining removable contamination was sealed into the floor with epoxy paint which will inhibit the release of Rn-220, a gaseous daughter of Th-232.

Contamination detected on a small quantity of debris slightly exceeded 3,000 dpm/100 cm^2, the USNRC limit for release of thorium contaminated facilities for unrestricted use. While consumer products containing significantly larger quantities of radioactive material are routinely and legally disposed of as ordinary trash, the rubble was transferred to a USNRC licensed radioactive waste collector for disposal.

No contamination was detected on protective apparel or tools used during the construction. Results of air sampling by the EPA and RSSI did not indicate an increase in airborne radioactivity levels in the work area.

APPENDIX A

TRAINING

SIGN-UP SHEET

Feb 7, 1984 1 hr Training

Attendance List 161 E. Grand Ave.

Marge Thurlault
Johnston Bell
Christie Brown
Ron Klyber
Ellin Manowitz
Joseph Stancle

APPENDIX B

RADIATION SURVEY RESULTS

SURVEY REPORT

BUILDING: 161 E. Grand ROOM: 2nd floor DATE: 02/07&08/84 BY: Dave Derenzo & Eli A. Port

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument ~~Dose Rate- HPI 1010~~ Wipes-Ludlum 2220/HP-210

Source of Ionizing Radiation Natural Thorium

See Attached Drawing

TYPE	FORM	ACTIVITY

Ventilation:

Comments:

SURVEY FINDINGS

AREA	WIPES		DOSE RATE
1 Floor	131 c/1min	158c/1min (After 2x4 removed)	See separate survey attached
2 Floor	125c/1min		
3 Floor	118c/1min		
4 Floor	105c/1min		
5 Floor after removal of tile	133 c/1min		
6 Floor after removal of tile	142c/1min		
7 Floor after removal of tile	123c/1min		

Background 680c/6min = 113cpm

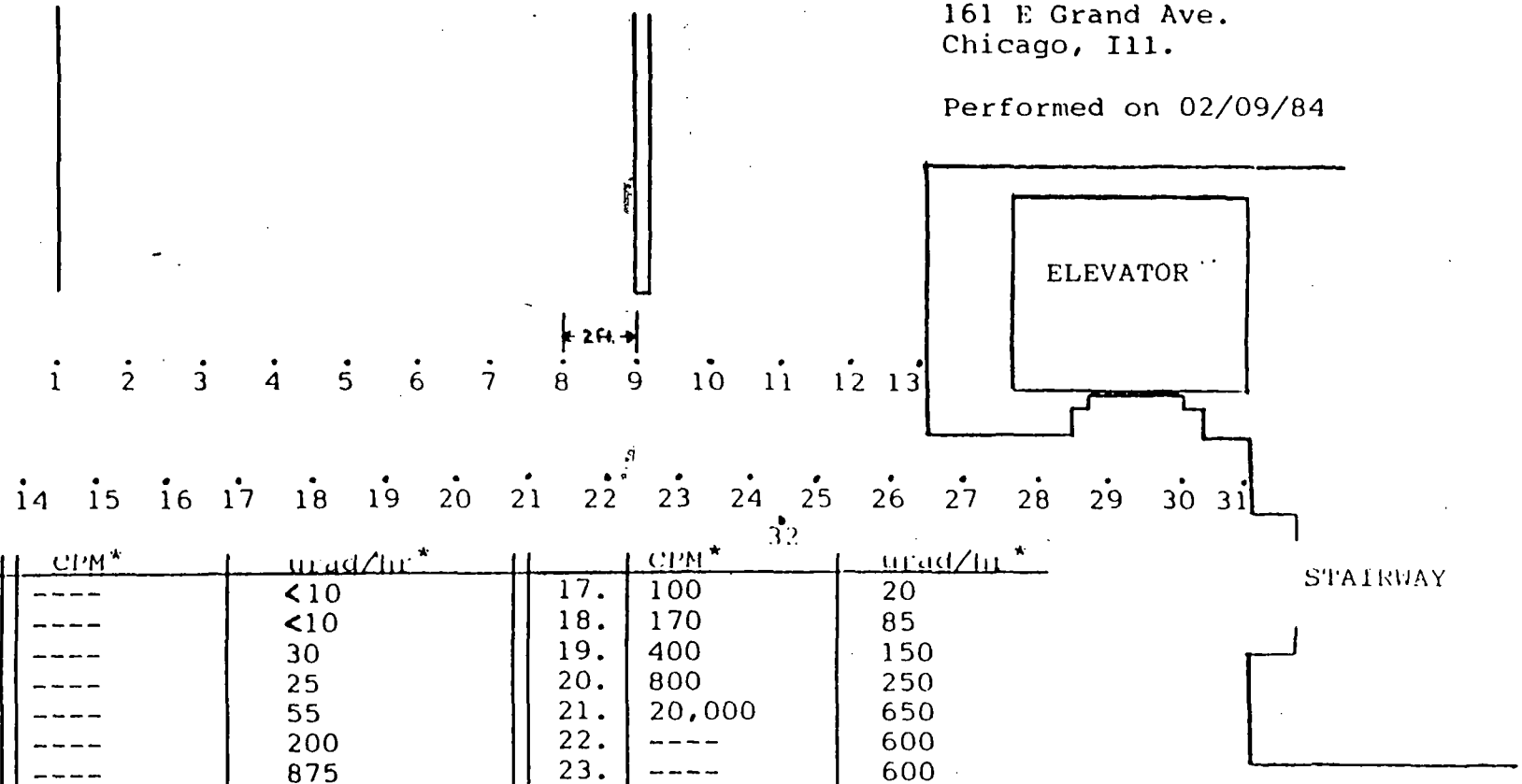
RECOMMENDATIONS:

Ld 95% = 40.5 cpm ∴ Activity detected at 95% confidence level if 113 + 40.5 = 154 cpm is exceeded.

Radiation Safety Services, Inc.

2nd Floor
161 E Grand Ave.
Chicago, Ill.

Performed on 02/09/84



	CPM*	urad/hr*		CPM*	urad/hr*
1.	----	<10	17.	100	20
2.	----	<10	18.	170	85
3.	----	30	19.	400	150
4.	----	25	20.	800	250
5.	----	55	21.	20,000	650
6.	----	200	22.	----	600
7.	----	875	23.	----	600
8.	----	350	24.	----	400
9.	----	300	25.	16,000	300
10.	----	250	26.	2,000	100
11.	----	200	27.	1,100	60
12.	----	100	28.	2,100	80
13.	----	90	29.	900	65
14.	60	15	30.	2,000	50
15.	60	10	31.	1,300	60
16.	70	10	32.	90,000	---

PERFORMED BY:
Radiation Safety Services, Inc
1564 Ashland Ave
Evanston, Ill. 60201
312-866-7744

DJD 02/13/84

INSTRUMENTS: All CPM readings taken with a Ludlum Model 16 using an Eberline HP-210T detector. All urad/hr readings taken with a Health Physics Instruments, Inc Model 1010.

BACKGROUND: The background in relatively uncontaminated portions of the building are 10 to 15 urad/hr. In these areas the Model 16/HP-210T background was 50-70 CPM.

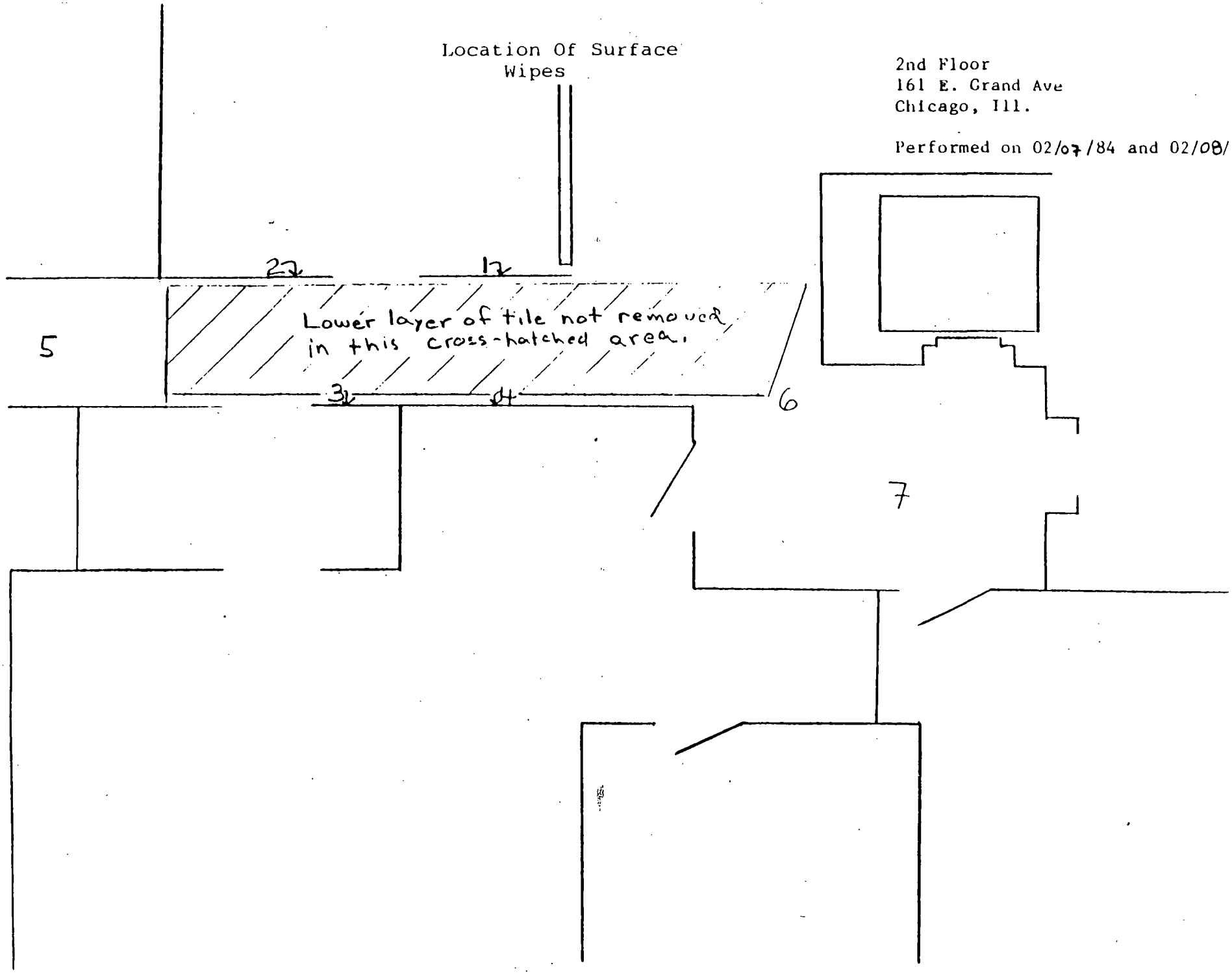
SCALE
1"=5'

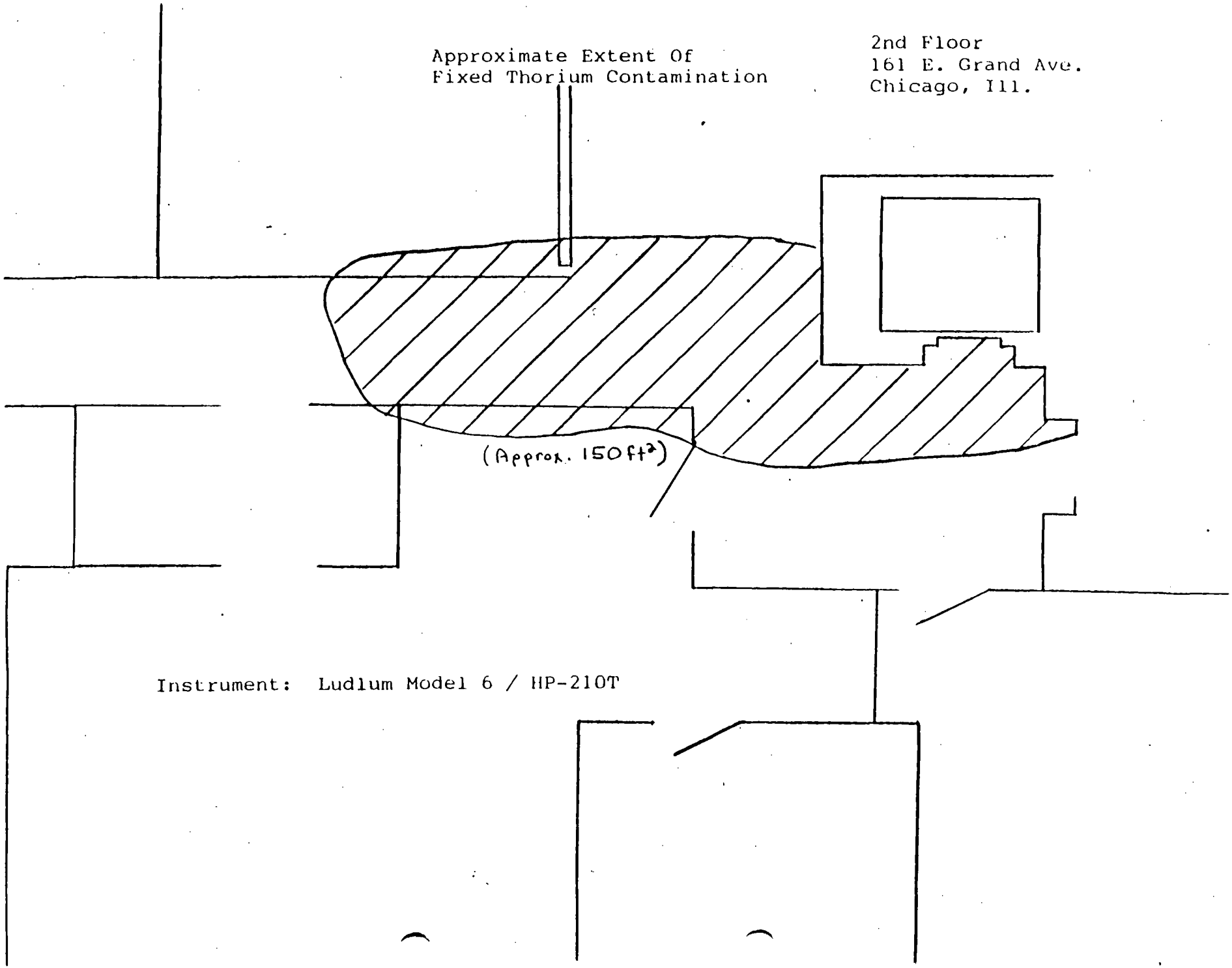
*Readings taken at the surface of the existing floor. The HPI 1010

Location Of Surface Wipes

2nd Floor
161 E. Grand Ave
Chicago, Ill.

Performed on 02/07/84 and 02/08/84




Approximate Extent Of
Fixed Thorium Contamination
2nd Floor
161 E. Grand Ave.
Chicago, Ill.
(Approx. 150 ft²)
Instrument: Ludlum Model 6 / HP-210T

APPENDIX C

AIR SAMPLING RESULTS

FROM

USEPA REPORT

Dated

February 2, 1984

Background airborne radon and thoron daughter concentrations were measured on February 7, before demolition activities. Thoron daughter concentrations were collected for 30 minute intervals during the day. Samples were collecte at 20 liters per minute on Metricel filters with 0.45 micron pore size. Collection and analysis was by the method given in "Radiation Monitoring" published by the U.S. Department of Labor, Mine Safety and Health Administ(Results are given in Table 1 and in Figure 3. The background radon daughte concentration was 0.005 working levels, a normal indoor level, but the thoron daughter concentration was 0.038 working levels, showing the presence of thor decay products in the air. Generally, it would be expected thoron daughter levels would be less than radon daughter levels. During the course of demolition activities thoron daughter levels fluctuated, reaching a maximum of 0.060 working levels.

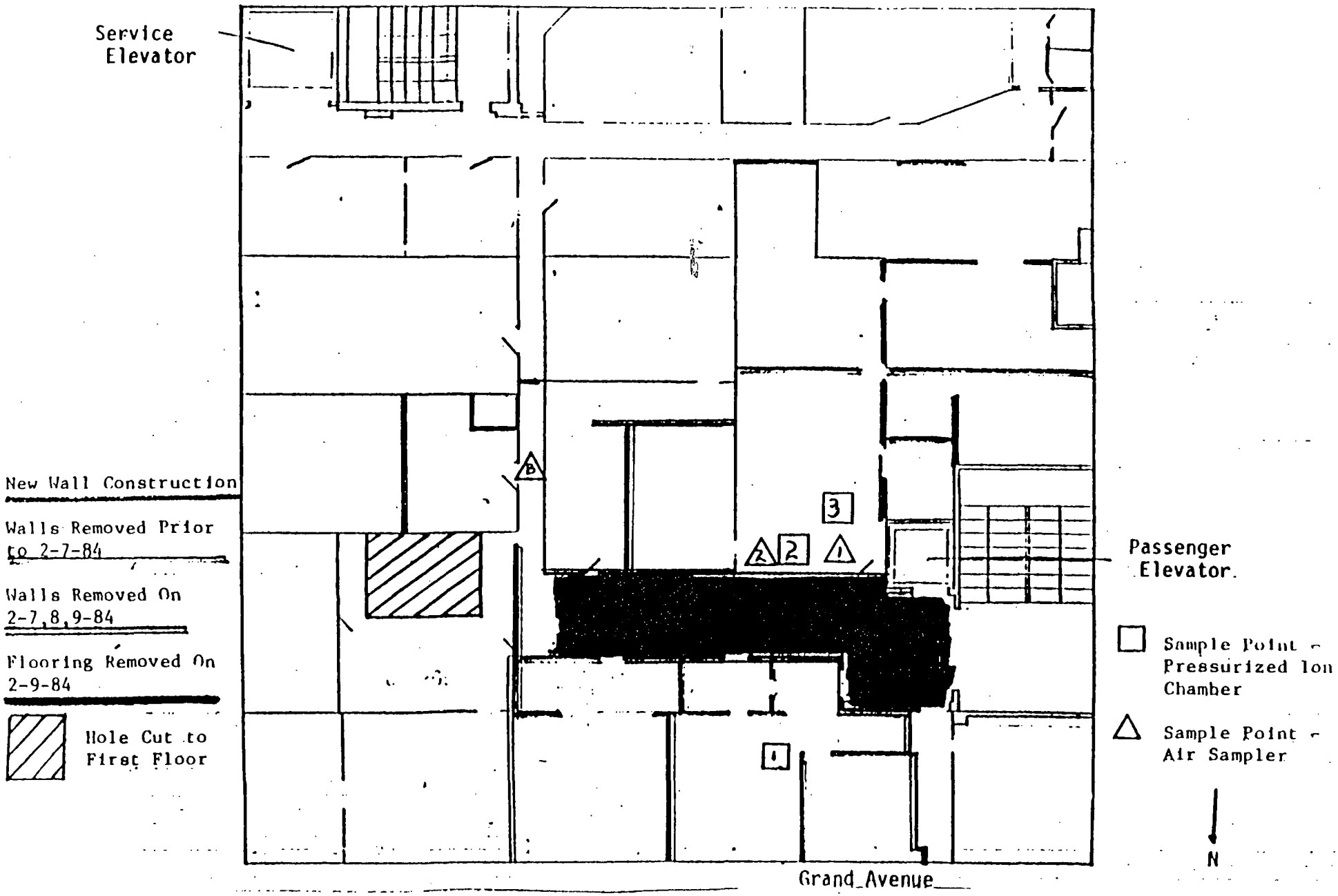
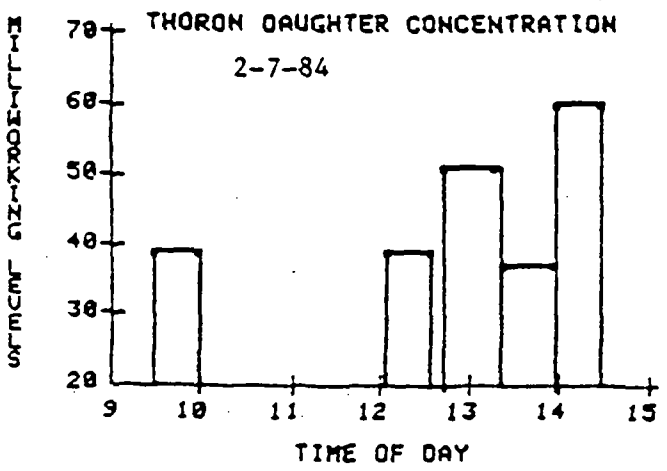


Figure 1: Floor Plan of Second Floor Showing Work Areas and Sample Collection Results

Table 1: Radon/Thoron Daughter Concentrations - Air Sample Results

	DATE	TIME PERIOD	DAUGHTER CONCENTRATION RADON (MILLIWORKING LEVELS)	DAUGHTER CONCENTRATION THORON (MILLIWORKING LEVELS)	
B	2-7-84	9:12 - 9:17	5	39	BACKGROUND
1	2-7-84	9:28 - 9:28		39	
1	2-7-84	12:04 - 12:34		51	
1	2-7-84	12:43 - 1:14		37	
1	2-7-84	1:22 - 1:55		40	
1	2-7-84	1:59 - 2:29			
2	2-9-84	12:18 - 12:48		28	
2	2-9-84	12:55 - 1:25		45	
2	2-9-84	1:25 - 1:55		35	
2	2-9-84	1:56 - 2:26		35	

△ Air Sampler Location - See Figure 1



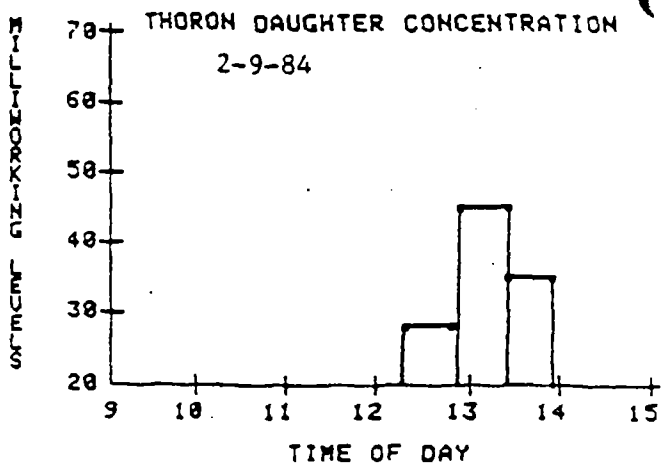


Figure 3: Radon/Thoron Daughter Concentrations - Air Sample Results

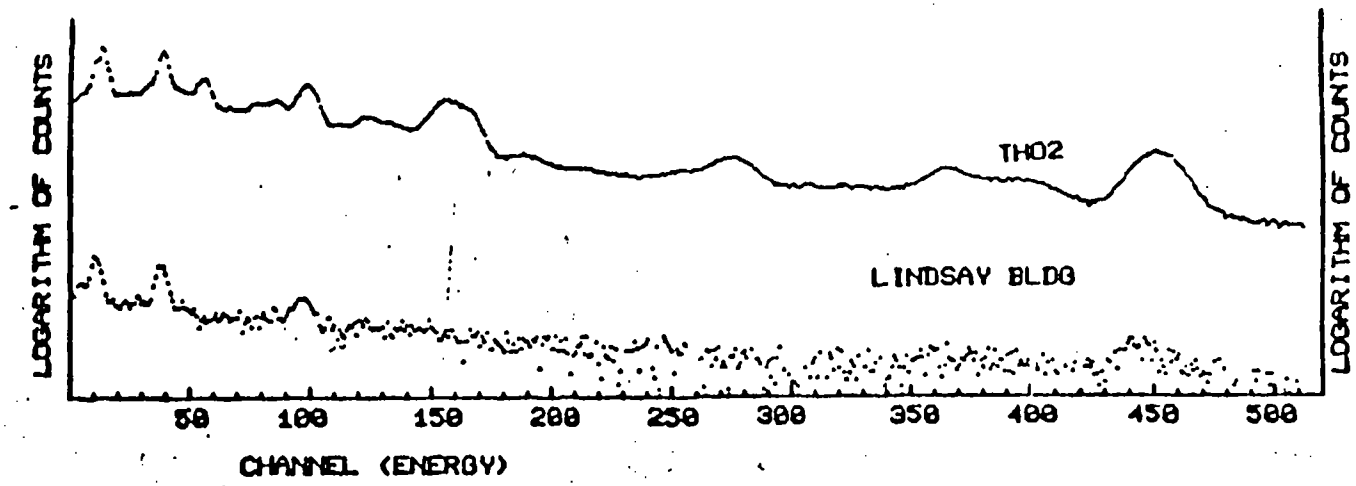


Figure 4: Gamma-ray Spectra - 2/8/84 Air Filters versus Thorium Oxide

APPENDIX D

USNRC GUIDELINES
FOR THE RELEASE OF FACILITIES
FOR UNRESTRICTED USE

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

July 1982

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organizati continuing work with radioactive materials, or conversion of facilit to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

   Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
nat, U-235, U-238, and sociated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
onsuranics, Ra-226, Ra-228, -230, Th-228, Pa-231, -227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
nat, Th-232, Sr-90, -223, Ra-224, U-232, I-126, 131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
ta-gamma emitters (nuclides th decay modes other than pha emission or spontaneous ssion) except Sr-90 and ers noted above.	5000 dpm βγ/100 cm^2	15,000 dpm βγ/100 cm^2	1000 dpm βγ/100 cm^2

ere surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting uclides should apply independently.

; used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the ounts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

easurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average ould be derived for each such object.

e maximum contamination level applies to an area of not more than 100 cm^2.

he amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft bsorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of nown efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced roportionally and the entire surface should be wiped.

e average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of otal absorber.

ENDANGERMENT ASSESSMENT
LINDSAY LIGHT COMPANY BUILDING
161 EAST GRAND AVENUE
CHICAGO, ILLINOIS

FOI EXEMPT

1.0 Site Description and History

1.1 Description

The Lindsay Light Company Building is a four-story commercial building located at the corners of Grand Avenue and St. Clair Street in Chicago, Illinois. Grand Avenue is about one-half mile north of the central Chicago "Loop" area and St. Clair Street is about one-fourth mile west of Lake Michigan. The geographical location is 41° 53' 30" north latitude and 88° 36' 30" west longitude.

1.2 History

The Lindsay Light Company manufactured incandescent gas mantles for home and street lighting in this building from at least 1910 until 1936. Over the period of about 1931-36 operations were relocated to West Chicago, Illinois. The building is presently owned by the 161 East Grant Associates who are major tenants and is managed by Browne and Storch, a real estate firm. Offices not occupied by the owners are rented to a variety of small businesses.

2.0 Hazardous Properties of the Substances

The principal ingredient in gas mantle manufacture is thorium as a nitrate. Small amounts of cerium, beryllium and magnesium nitrates are also used. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium radionuclides are also found in the Uranium Decay Series and the Actinium Decay Series. It is believed that the principal source of contamination in this building is the Thorium Decay Series.

FOI EXEMPT

Radiological properties of the constituents are listed in Figure 1. The parent of the series, thorium-232, has a radiological half-life exceeding the estimated life of the Earth, thereby making it an essentially permanent contaminant and a continuing source of daughter products. Daughters have radiological half-lives less than 7 years and can therefore be expected to return to equilibrium throughout the Thorium Decay Series about 35 years after any chemical separation of thorium.

Alpha particles, beta particles, X-rays and gamma-rays are all emitted from the Thorium Decay Series. The primary hazards arise from external whole-body exposure to gamma-rays emitted by actinium-228, lead-212 and thallium-208 and from lung exposure to alpha particles emitted by daughter products of the noble gas radon-220. Gamma-rays are highly penetrating and can expose persons at a distance from the source even when there are intervening shielding materials. Radon-220 is a gas and has high mobility once in the ambient air. Its short radiological half-life of 55.6 seconds can limit its impact because it may decay back to a solid before it penetrates overlying materials. Health risks for radon-220 occur not so much from the gas as from its solid decay products which attach to ambient dust, are breathed in, trapped in the mucus layer in the airways of the lung and irradiate the surrounding tissue before being expelled. The radon-220 decay product lead-212 will also be transferred from the lung to red blood cells, kidneys, and bone surfaces.

3.0 Form, Amount and Levels of Substances

3.1 Form

Based upon research into the industrial process of gas mantle manufacture and several on-site inspections it is believed that material deposited

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in flooring and structural elements of the building is a soluble form of thorium, probably thorium nitrate. The thorium materials appear to have been absorbed into porous flooring materials. Powder forms of thorium compounds may also be present.

3.2 Amount

No estimation of the total activity or mass of contaminant in the building has been made. Fourteen areas of contamination have been identified. One is a chimney along the west wall of the building. The remaining thirteen areas of contamination cover regions on the order of hundreds of square feet and are located on all floors of the building, including the basement.

3.3 Levels

3.3.1 Gamma-ray Exposure Rates

Detailed results of the original survey are given in "Final Report On a Survey of the Former Lindsay Light Company Building at 161 East Grand Avenue, Chicago, Illinois" (May, 1981). Limited cleanup was performed subsequently by the building owner's consultant and results of the EPA followup survey, given in "Confirmatory Survey At The Former Lindsay Light Company Building" (December, 1981), show some reductions in contact exposure rates in some areas. Floor plans derived from the original report giving gamma-ray exposure rates one meter off the floor are provided in Figures 2-9.

Background for the building was estimated to be about 10 microroentgens per hour (uR/hr) based upon the lowest measured values

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during the original survey. This is consistent with commonly reported background levels for uncontaminated buildings in general. The highest gross exposure rate was 1600 uR/hr measured on contact with a concrete plug in the chimney in the basement. Gross exposure rates for the remainder of the building ranged between background and 150 uR/hr measured one meter off the floor.*

3.3.2 Gamma-Ray Doses

3.3.2.1 By Thermoluminescent Dosimeters

During the original survey thermoluminescent dosimeters (TLDs) were placed in 14 areas of concern that showed elevated gamma-ray exposures and in one background location. Results, based upon 40 hour per week, 50 week per year exposure periods, ranged up to 136 millirem per year in excess of background. Complete results are given in "Final Report On a Survey of the Former Lindsay Light Company Building at 161 East Grand Avenue, Chicago, Illinois" but will not be reported here because they will not be used later in this risk assessment. It was felt the gamma-ray exposure rates in the original survey were preferable for the risk assessment because they provided more detail.

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* Survey results were obtained with both a Micro-R Meter and a Pressurized Ion Chamber (PIC). The Micro-R Meter has an energy dependent gamma-ray response. It was found to overrespond by a factor of two when compared to the energy independent PIC. Where Micro-R Meter readings were reported in the original survey, they have been converted to equivalent PIC readings in this report by dividing by two.

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3.2.2.2 By Film Badges

During June of 1983, at the request of the building owners, 7 film badges were furnished for dose measurements at specific locations of concern to them. Twenty-five day gross dose equivalents ranged from "minimal" (5 badges) to 20 millirem (2 badges). Complete information is included in EPA - Region V files. Because this set of measurements was performed for the owner's information and, in spite of specific directions, complete control could not be maintained over exposure locations and conditions, it was felt that these dose equivalent values are not appropriate for this endangerment assessment. Foremostly, however, it was felt the gamma-ray exposure rates in the original survey provided more detail for the risk assessment.

3.3.3 Radon Daughter Concentrations

During the original survey radon-220 and radon-222 daughters were collected on air filters in the basement and in rooms on the second and third floors for periods between 12 and 19 hours. These results are 0.013, 0.010 and 0.002 working levels (WL) for radon-222 daughters, respectively, and 0.211, 0.149, and 0.024 WL for radon-220 daughters, respectively.

During remodeling work on the second floor in February, 1984, EPA measured radon daughter concentrations. Before demolition activities began the levels were 0.005 WL (radon-222 daughters) and 0.039 WL (radon-220 daughters). Seven half-hour samples for radon-220 daughters were taken during 3 days of work. These ranged from 0.028 - 0.060 WL.

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4.0 Exposure Pathways

4.1 Whole-body Exposure to Gamma-rays

Gamma-ray emissions from the radioactive decay of the Thorium Decay Series producing potential human exposures will continue as long as contaminants remain in the building. The extremely long half-life of thorium-232, the series parent, means there will be a continual replenishment of daughters in the series and there will be no expectation that eventually the contaminants will decay to acceptable levels.

Recent remodeling on the second floor where walls were moved, offices restructured, new work stations established and a hole for a new stairway cut to the first floor clearly establishes that the building environment is a dynamic structure. Consequently, it was seriously considered to treat every area of contamination conservatively as an area of full-time workyear exposure. This was rejected in favor of assessing the situation as it exists now (or as it is expected to exist shortly) with exposure periods based upon estimates as close to the present situation as possible.

The risk estimates for whole-body exposure to gamma-rays are based on NAS-BEIR 3 estimates of fatal cancer due to ionzing radiation. This estimate was made using a relative risk projection model for solid tumors, and an absolute risk projection model for leukemia and bone tumors in a linear dose response model for a working lifetime (ages 18-65). The single coefficient risks are based on a life table analysis of an adult population having the vital statistics of the 1970 U.S. population and was prepared by the Bioeffects Analysis Branch in the

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EPA's Office of Radiation Programs. Single coefficient sex-specific risk estimates, so calculated, are 311 male cancer fatalities and 407 female cancer fatalities, respectively, per million person-rem.

Area average exposure rates were computed from exposure rates reported in the original survey report (May, 1981) or as modified by the limited cleanup and reported in the followup survey (December, 1981). Contaminated areas were originally identified as extended regions with exposure rates exceeding 30 uR/hr measured with a PIC. This level is compatible with recent standards promulgations by EPA for active and inactive uranium sites (40 CFR 192) and was kept as the basis of contamination for this endangerment assessment.

Fourteen contaminated areas were identified. One of these, a chimney on the west wall, probably contains a considerable quantity of radioactive material judging by the 1600 uR/hr exposure rates on the outside of the chimney. It represents a potential risk should the chimney be opened and an ongoing exposure risk to people who enter Room 8 in the basement. Since the chimney interior is inaccessible only the latter risk was assessed. For each of the thirteen remaining areas equivalent area-average net PIC exposure rates* were computed and annual doses determined based upon best estimates of occupancy times. Full-time work exposure was taken as 40 hours per week, 50 weeks per year. Annual doses, in person-millirem, were estimated based on expected occupancy in the area and measured dose rates. From these, the lifetime risk for exposure during the working lifetime was calculated for an

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* Micro-R Meter readings adjusted to equivalent PIC readings, exposure rates averaged over contaminated area, net readings from gross reading less background reading.

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individual who was in the area for the expected time. Data and estimates of lifetime risk of fatal cancers are given in Table 1.

4.2 Inhalation of Radon-220 Daughters

The decay of radon-220 gas produces charged solid decay products that attach to ambient dust, can be breathed in, trapped in the mucus layer in the airways of the lungs and expose the surrounding tissue before being expelled. Absorption of the decay product lead-212 can result in irradiation of red blood cells, kidneys and bone surfaces.

EPA - Office of Radiation Programs has computed lifetime cancer mortality risk coefficients for occupational exposure as 1.8×10^{-2} per 0.1 working levels (WL) ("Informal Technical Note on Thoron risk, W.H. Ellett and N.S. Nelson, May 1984"). Several short-term air samples have been taken in the Lindsay Light Company Building that show a range of 0.028 - 0.211 thoron working levels. Thoron levels may fluctuate on a daily and a seasonal basis depending upon the building ventilation rate, ambient air pressure, wind speed and other factors making a longterm average on the order of a year more representative of the average concentration. Nevertheless, based upon the available data, the lifetime cancer mortality risk for occupational exposure is

$$(0.028 - 0.211)\ \frac{1.8 \times 10^{-2}}{0.1\ \text{WL}} = 0.5 - 3.8 \times 10^{-2}$$

The risk for males is 1.5 times the general population risk while the female risk is 0.4 times the general population risk under equal exposure conditions. Therefore,

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Lifetime Cancer Mortality Risk for Lifetime Occupational Exposure

Males	$0.75 - 5.7 \times 10^{-2}$
Females	$0.2 - 1.5 \times 10^{-2}$

5.0 Extent of Migration or Release

The thorium materials appear to be contained in flooring and structural members of the building. Much of this appears to be soluble materials that have been trapped in the wood. Smears taken at contaminated locations have been negative. Except for radon gases which are emitted from contaminated areas, it appears that the radioactive materials are fixed and should be expected to remain in place unless solubilized. Daughter products from radon gas decay are present throughout the ambient air in the building.

6.0 Conclusions

Calculations of the net annual dose received by an individual exposed for expected working occupancy times in thirteen areas of the building showed a range of 2- 120 millirem.

Calculations of the lifetime risk of fatality from all forms of cancer due to workday gamma-ray exposure (ages 18-65) were made for these same 13 areas and ranged from $0.03\text{-}2 \times 10^{-3}$ for males and $0.04\text{-}2 \times 10^{-3}$ for females.

Grab samples for radon-220 daughters showed a range of 0.028 - 0.211 working levels. Calculations for the lifetime fatal cancer risk showed a range of $0.75 - 5.7 \times 10^{-2}$ for males and $0.2 - 1.5 \times 10^{-2}$ for females.

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The gamma exposure risk and the thoron exposure risk are independent so that the total individual risk is the sum of the risks associated with each type of exposure

Lifetime Cancer Mortality Risk for Lifetime Occupational Exposure

	Males	Females
Gamma-ray Exposure Risk	$0.03 - 2 \times 10^{-3}$	$0.04 - 2 \times 10^{-3}$
Thoron-Daughter Esposure Risk	$0.8 - 5.7 \times 10^{-2}$	$0.2 - 1.5 \times 10^{-2}$
Total Exposure Risk	$0.8 - 5.9 \times 10^{-2}$	$0.2 - 1.7 \times 10^{-2}$

TABLE 1: Lifetime Gama-ray Exposure Risks

	GROSS		NET			Lifetime Risk of Fatal Cancer for Occupational Exposure (ages 18-65)	
	Average Micro-R Meter Reading	Average Pressurized Ion Chamber Reading	Equivalent Average Pressurized Ion Chamber Reading	Occupancy	Net Annual Dose	Male	Female
	(uR/hr)	(ur/hr)	(uR/hr)	(hr/wk)	(mrem/year)	(fatal cancers) / (10^6 person-rem)	(fatal cancers) / (10^6 person-rem)
BASEMENT							
Room 8	272		125	1	6	9×10^{-5}	11×10^{-5}
1st FLOOR							
Room A	70		25	20	25	4×10^{-4}	5×10^{-4}
Room B	120		50	40	100	1×10^{-3}	2×10^{-3}
Room C	100		40	40	80	1×10^{-3}	2×10^{-3}
2nd FLOOR							
Rooms 201/202		60	50	40	100	1×10^{-3}	2×10^{-3}
Hallway		90	80	5	20	3×10^{-4}	4×10^{-4}
3rd FLOOR							
Area A	117		50	1	2	3×10^{-5}	4×10^{-5}
Area A'	130		55	30	82	1×10^{-3}	2×10^{-3}
Area B	65		20	10	10	1×10^{-4}	2×10^{-4}
Area C	65		20	40	40	6×10^{-4}	8×10^{-4}
4th FLOOR							
Area A	195		90	1	4	6×10^{-5}	8×10^{-5}
Area A'	100		40	20	40	6×10^{-4}	8×10^{-4}
Area B	120		50	40	120	2×10^{-3}	2×10^{-3}

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Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10} y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (15%) 0.908 (25%) 0.96c (20%)
$^{228}_{90}Th$	Radiothorium	1.910v	5.34 (28%) 5.43 (71%)	---	0.084 (1.6%) 0.214 (0.3%)
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.7%)
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.07%)
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (47%) 0.300 (3.2%)
$^{212}_{83}Bi$ (64.0%)	Thorium C	60.6m	6.05 (25%) 6.09 (10%)	1.55 (5%) 2.26 (55%)	0.040 (2%) 0.727 (7%) 1.620 (1.8%)
$^{212}_{84}Po$	Thorium C'	304ns	8.78 (100%)	---	---
$^{208}_{81}Tl$ (36.0%)	Thorium C''	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 (23%) 0.583 (86%) 0.860 (12%) 2.614 (100%)
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

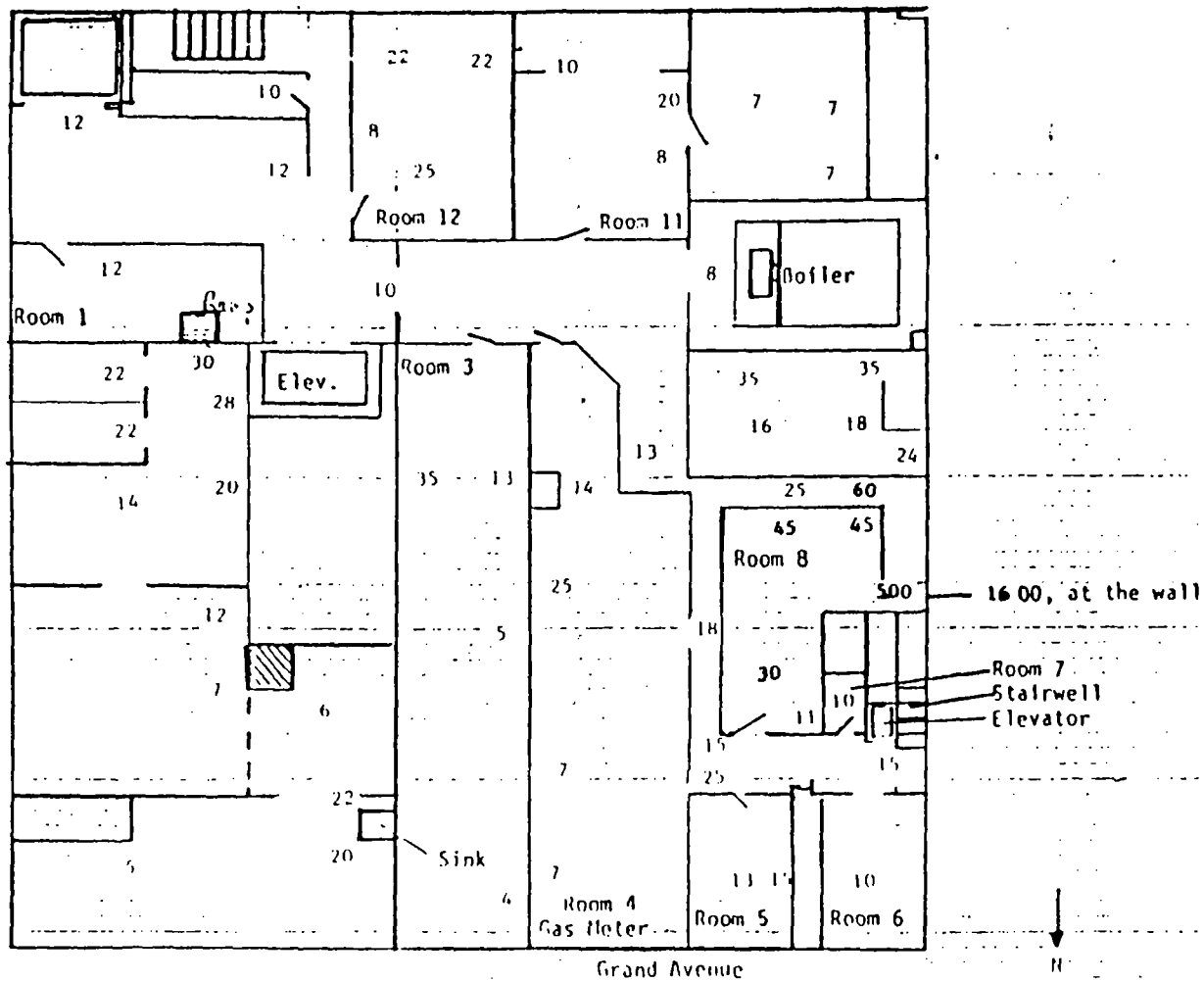
*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{232}_{90}Th$ (4n).....4(58) = 232

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons, Inc., 1967) and Hogan, O. H., Zigman, P. E., and Mackin, J. L., Beta Spectra (USNRDL-TR-802 [Washington, D.C. U.S. Atomic Energy Commission, 1964]).

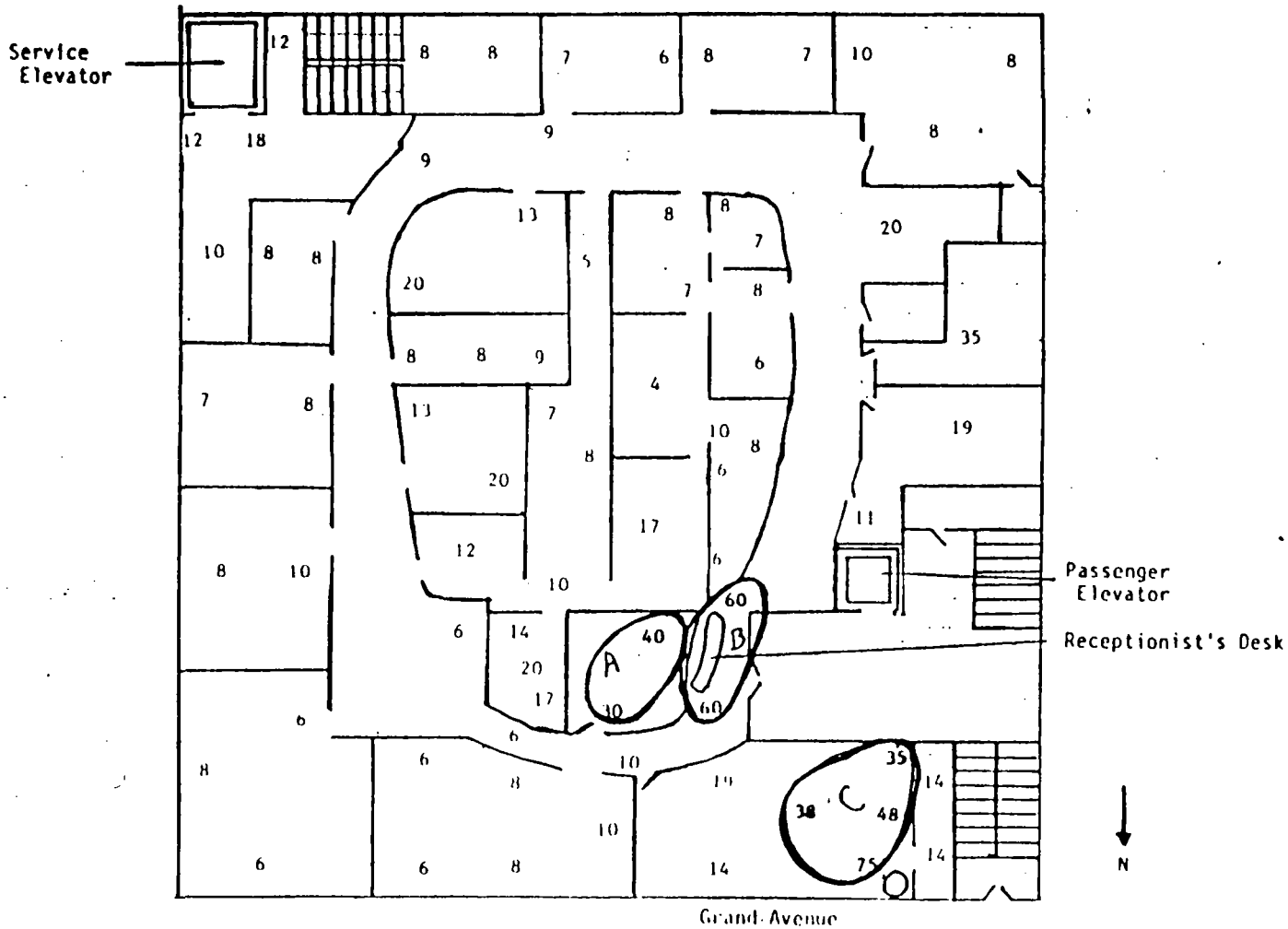
FIGURE 1: Thorium Decay Series
(Source: Radiological Health Handbook, U.S. Department of Health, Education, and Welfare, Revised January 1970)



Basement

FIGURE 2: Gross Gamma-ray Exposure Rate Readings [illegible] basement
(All readings in m[illegible] roentgen per hour, uR/hr, converted fr[illegible] micro-R
[illegible] chamber readings.

FOI EXEMPT



First Floor

FIGURE 1: Gross Gamma-ray Exposure Rate Readings on 1st Floor
(All readings [illegible] Microroentgen per hour, uR/hr, converte[illegible] [illegible]m Micro R
Meter readings [illegible] equivalent pressurized ion chamber readings)

FOI EXEMPT

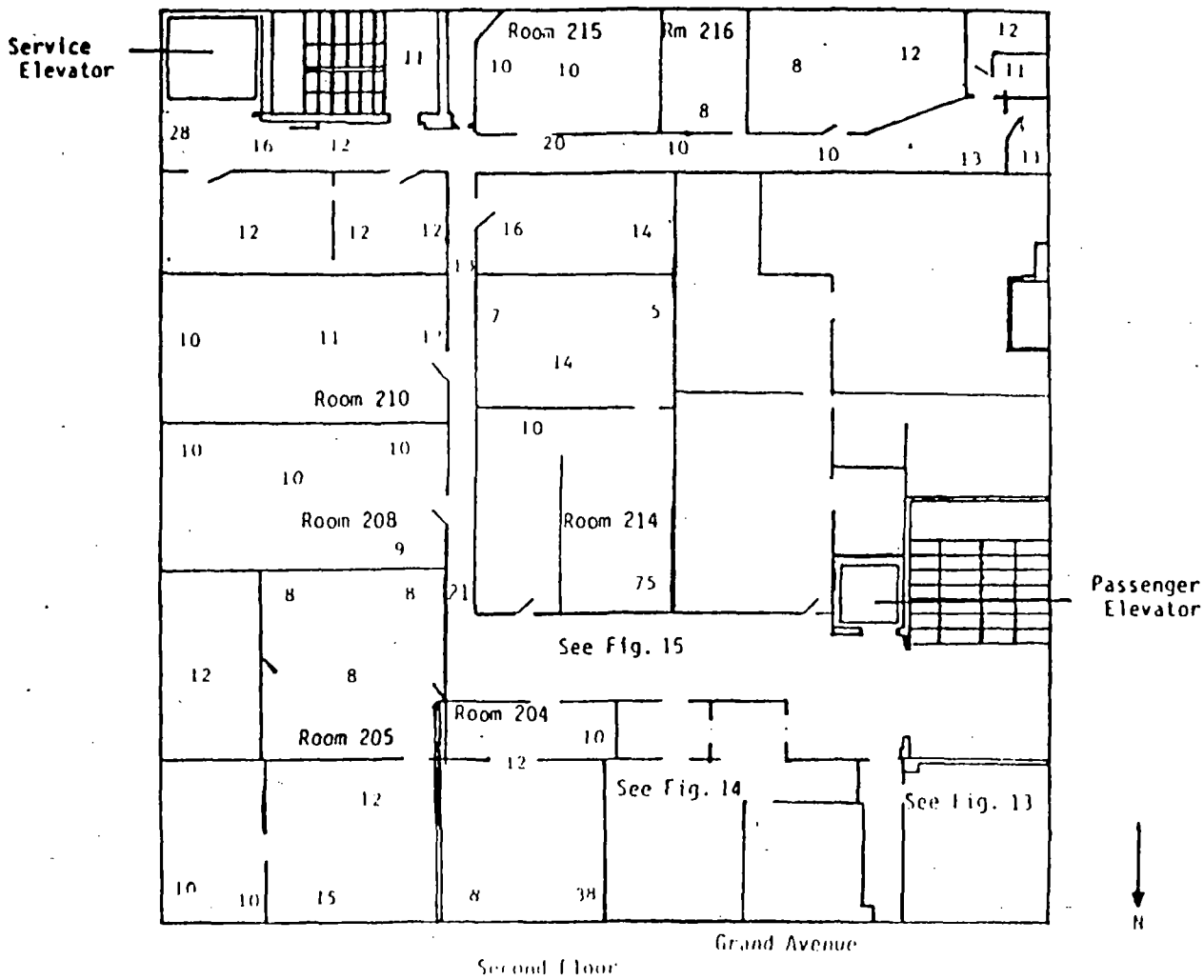
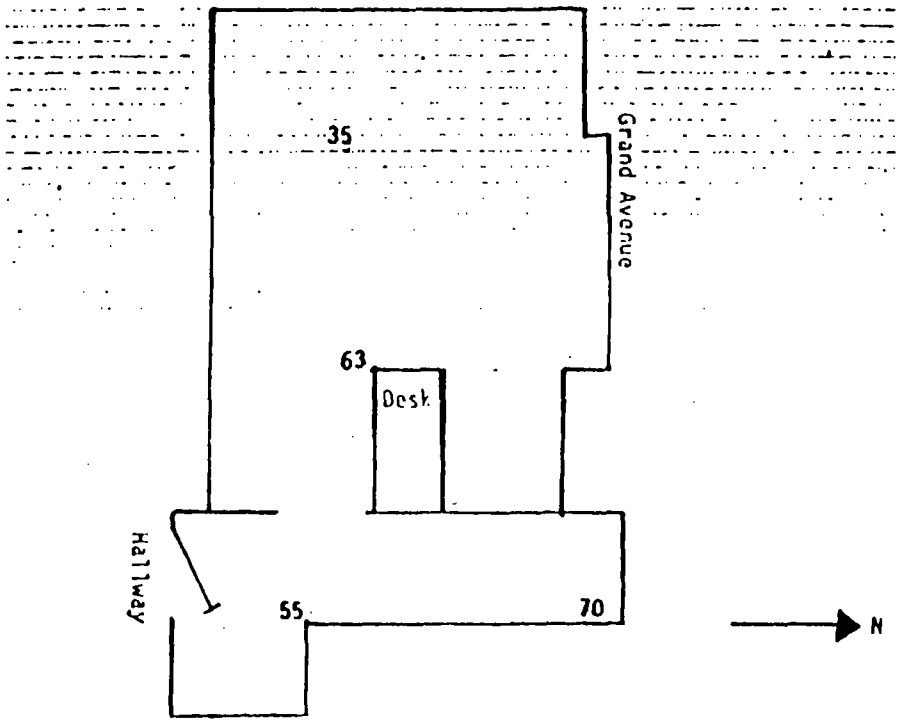


FIGURE 4: Gross Gamma-Ray Exposure Rate Readings on 2nd Floor
(All readings in microroentgen per hour, uR/hr, converted from Micro-R Meter readings to equivalent pressurized ion chamber readings)

HOI EXEMPT

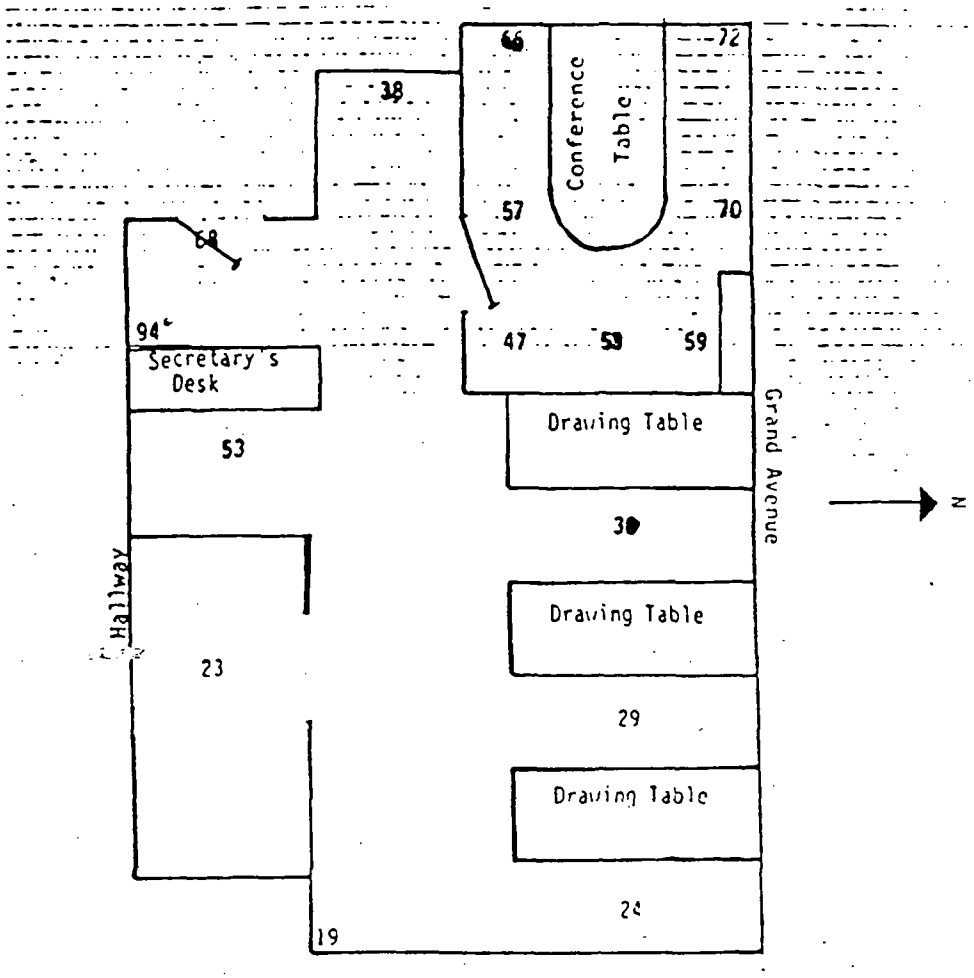


Second Floor - Room 201

FIGURE 5: Gross Gamma-ray Exposure Rate Readings In Room 201
(All readings in microroentgen per hour, uR/hr, with a pressurized ion chamber)

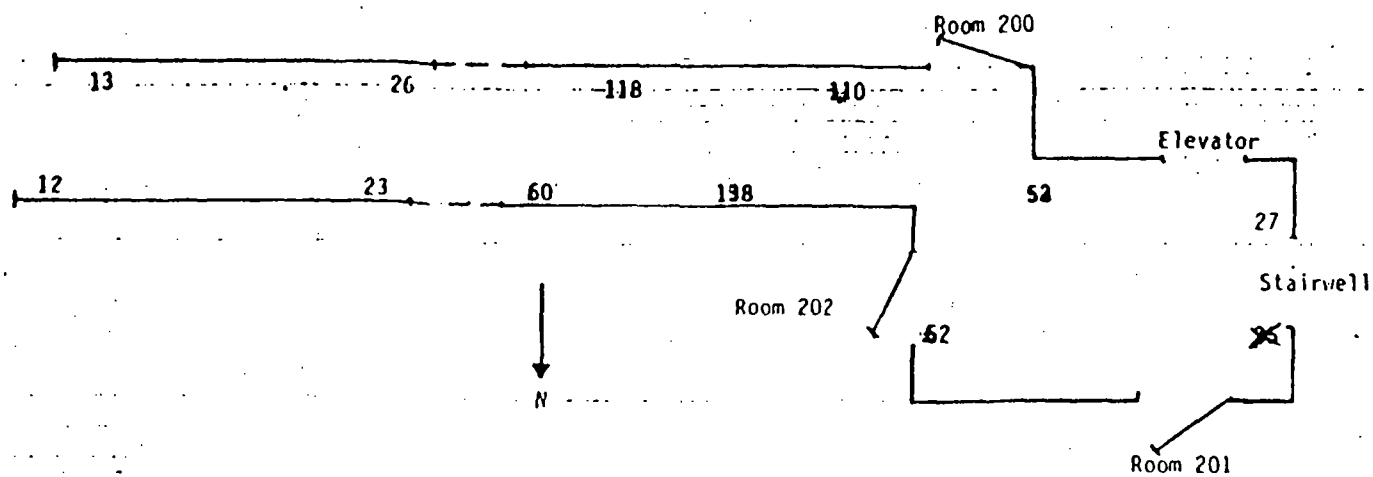
FOI EXEMPT

FOI EXEMPT



Second Floor - Room 202

FIGURE 6: Gross Gamma-ray Exposure Rate Readings in Room 202
(All readings in microroentgen per hour, uR/hr, with a pressurized ion chamber)



Second Floor - Hallway

FIGURE 7: Gross Gamma Dose Exposure Rate Readings In Hallway near Room 202 (All readings in microroentgen per hour, uR/hr, with a pressurized ion chamber)

FOI EXEMPT

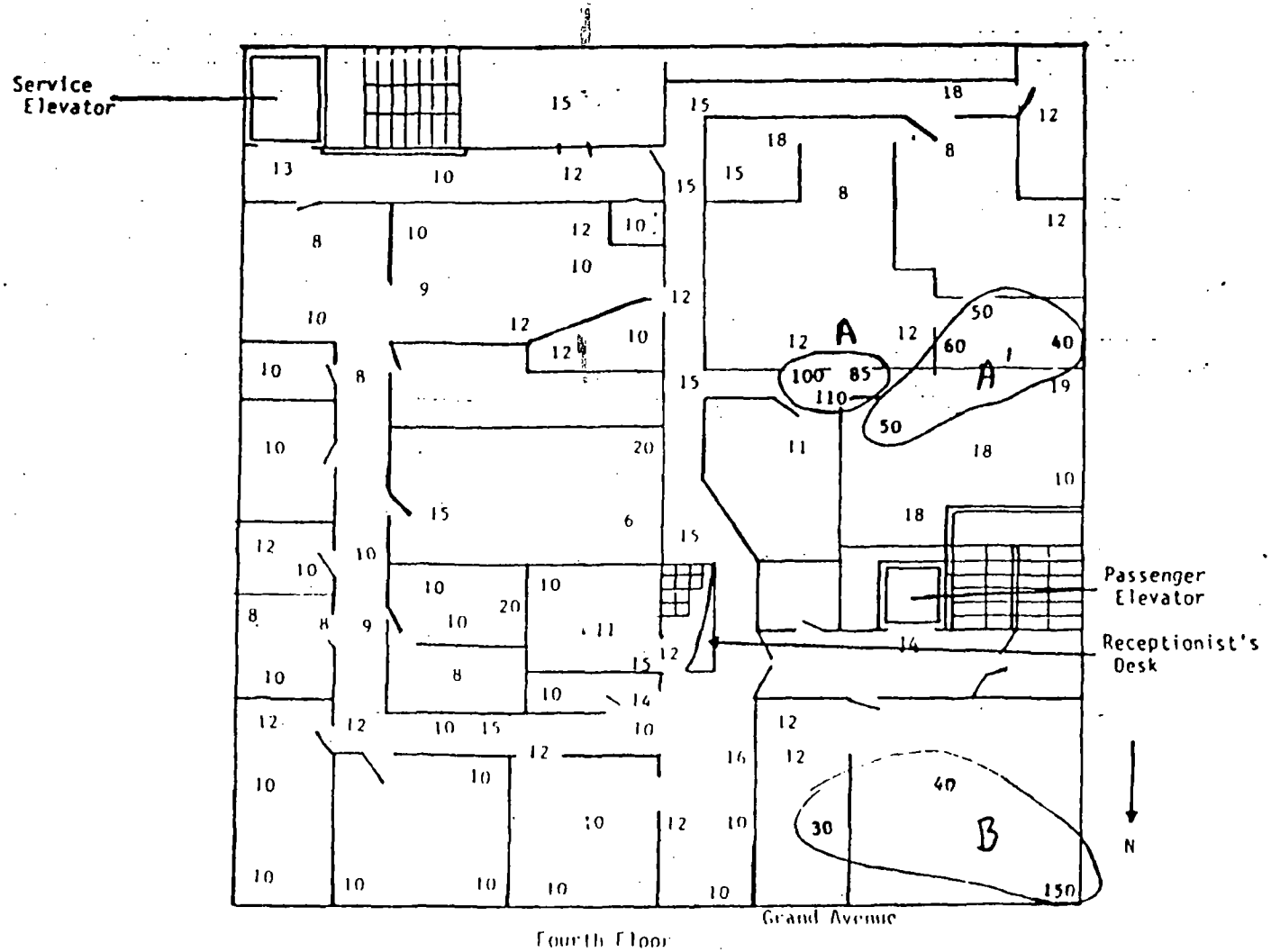
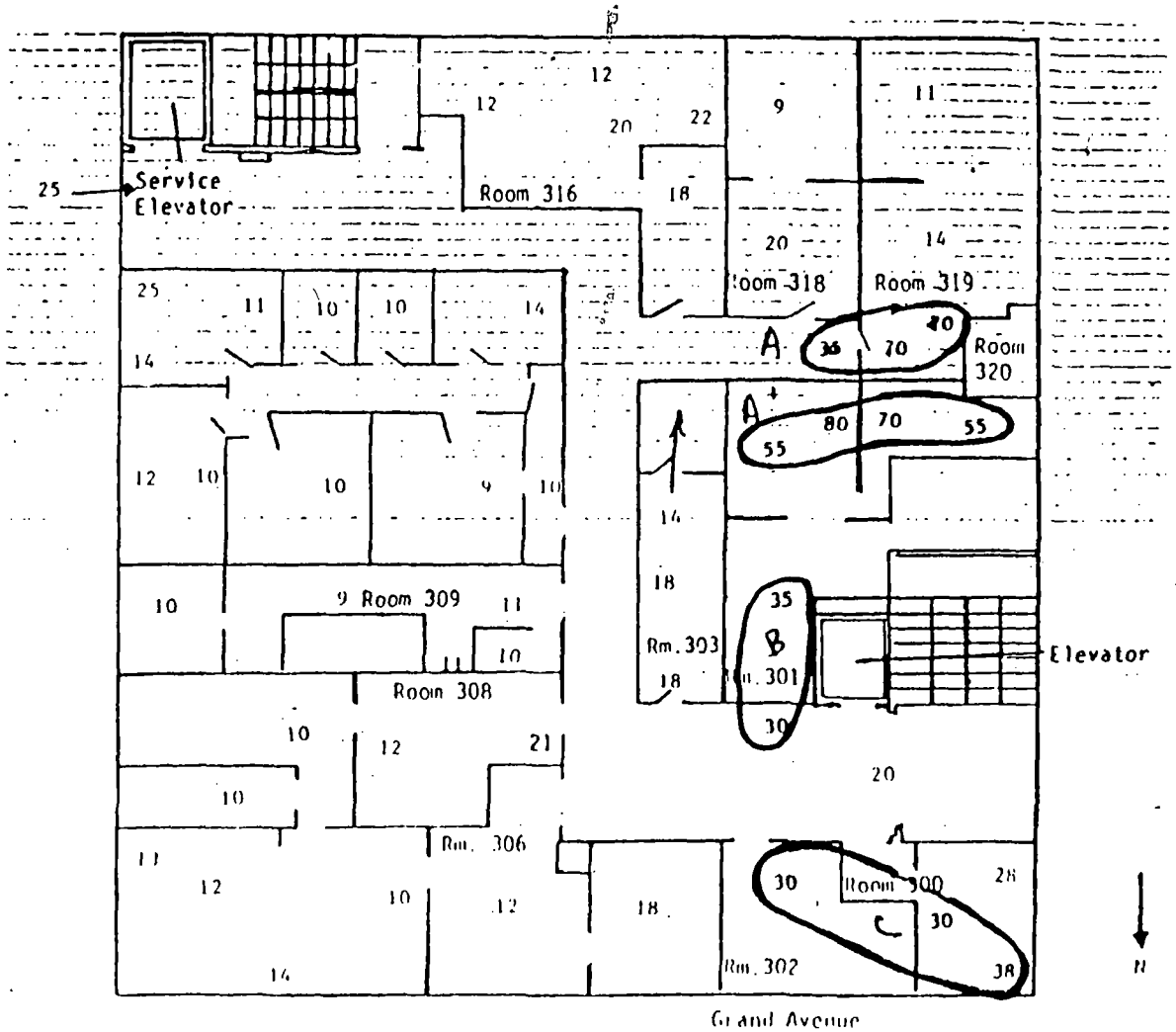


FIGURE 9: Gross Gamma-ray Exposure R[illegible] Readings on 4th Floor
(All readings in microroe[illegible] per hour, uR/hr, converted from Micro-R Meter readings to equivalent pressurized ion chamber readings)

FOI EXEMPT



Third Floor

FIGURE 8: Gross Gamma-ray Exposure Rate Readings on 3rd Floor
(All readings [illegible] microroentgen per hour, uR/hr, convert [illegible] from Micro-R [illegible] not corrected for chamber re[illegible]gs)

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Sample Calculation for Gamma-Ray Exposure Risk

Assume: 100 mrem/yr exposure dose
exposure period 18 - 65 years
risk estimator $\frac{311 \text{ fatalities}}{10^6 \text{ person-rem}}$

Thus:

$$.1 \frac{\text{rem}}{\text{yr}} \times 47 \text{ years} \times \left(311 \times 10^{-6} \frac{\text{fatalities}}{\text{person-rem}}\right) \sim 1 \times 10^{-3} \text{ fatalities}$$

Risk / REM

Please make check payable to

161 E. Grand Associates
c/o EKO
205 E. Grand
Chicago, Il. 60611

Mr. George D. Christianson
Vice President
Kerr- McGee Chemical LLC
Kerr-McGee Center
P.O. Box 25861
Oklahoma City, Oklahoma 73125

May 17,2000

Invoice:

Costs for disposal of radiolgical material from the building at 161 E. Grand Ave., Chicago, Il. per attached invoice from ADCO Services, Inc. and our agreement dated November 30, 1999 (attached).

$10,307.50

Paid
6/28/00

Return check to Diana Bell, MT 2002,

Ext. 3788

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.	7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F .I.N. 836-2652895

DISCLAIMER: [illegible]

MAKE CHECKS PAYABLE TO:

TOTAL AMOUNT 10,307.50

FAX

Date 6/23/00

Number of pages including cover sheet 2

TO: Diana Bell

Kerr-Mcgee
Chemical LLC

Phone

Fax Phone 405-270-3787

FROM: Ron Steele
161 E. Grand Associates
205 East Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440

Fax Phone 312-467-0867

CC:

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please Comment

Dear Diana,

Attached is a letter regarding the disposal of the thorium materials from 161 E. Grand, Chicago, Il. It certifies that they will be properly disposed of.

Sincerely,

Ron Steele

George Christiansen:

Will this suffice for payment of Ron Steele's invoice?

Dan

Yes — this is okay

Dan

CC: D. Bell
B. Green

ADCO Services, Inc.

June 23, 2000

Mr. Ron Steele
161 East Grand Association
161 East Grand Avenue
Chicago, IL 60611

Dear Mr. Steele,

This letter is to certify to you that the material contaminated with Thorium that was removed from your facility will and must be disposed of at a Low Level Radioactive Waste disposal site. As of this writing I can not give you a date as to when this occur. Once a radioactive waste is manifested and received by a waste broker, a paper trial is started and that broker is responsible to local, state and federal agencies to prove, if questioned, as to location of said waste at any time.

If you should have any further question, please feel free to contact me.

Sincerely,

Len Warblany
Customer Service Manager

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9760

FAX

Date 6/23/00

Number of pages including cover sheet 2

TO: Diana Bell

Kerr-Mcgee
Chemical LLC

Phone

Fax Phone 405-270-3787

FROM: Ron Steele
161 E. Grand Associates
205 East Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440

Fax Phone 312-467-0867

CC:

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please Comment

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Ron Steele

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Will this suffice for payment of Ron Steele's invoice?
Dan

CC: D. Bell
B. Green

RECEIVED
JUN 27 2000
LAW DEPARTMENT

ADCO Services, Inc.

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161 East Grand Avenue
Chicago, IL 60611

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Sincerely,

Len Warblany
Customer Service Manager

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9759

Eli Post

(847) 965-1999

ADCO

BROKER

THRU PROCESSOR

(MANIFESTS)

[redacted] Telecon w/ Eli.

160 Illinois St.

Bldg. behind 161 East Grand.

Old Warehouse building.

LL-II supposedly used it for storage.

Same age as LL-I Bldg.

Eli investigated for owner. Bldg. is clean.

DAN WHITE

from Beverly Sangle

✓ T. Goresen
W. Chicago
IL II

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

RECEIVED
MAR 09 2000
LAW DEPARTMENT

November 30, 1999

BY FEDERAL EXPRESS

Mr. Ronald Steele
% EKO, Second Floor
205 East Grand Avenue
Chicago, IL 60611

Re: 161 E. Grand Avenue, Chicago, Illinois

Dear Mr. Steele:

This letter is simply to confirm the arrangements that have been made with your consultant, Eli Port, concerning removal of certain radiological material from your building at 161 E. Grand Avenue, Chicago, Illinois. Kerr-McGee Chemical L.L.C. ("Kerr-McGee") agrees to reimburse the costs, up to a maximum of forty thousand ($40,000.00) for waste profile testing as required by a licensed disposal site and the transportation of such material to, and its disposal at, a properly licensed disposal site. Your contractor under your supervision will perform the work, and you will pay all other costs associated with the remediation. Kerr-McGee understands that you are the owner of the aforementioned real property.

It is agreed by you that Kerr-McGee's undertaking to reimburse these costs does not constitute an admission or a denial by Kerr-McGee that it has any liability or responsibility for the presence of radiological material at or about the property at 161 E. Avenue or for its remediation.

I would appreciate it if you would countersign this letter and return it to me.

Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ Partner 161 E. Grand Associates

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

S Green
xc: D. White
J. Reichenberger

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

November 30, 1999

BY FEDERAL EXPRESS

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Chicago, IL 60611

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Dear Mr. Steele:

This letter is simply to confirm the arrangements that have been made with your consultant, Eli Port, concerning removal of certain radiological material from your building at 161 E. Grand Avenue, Chicago, Illinois. Kerr-McGee Chemical L.L.C. ("Kerr-McGee") agrees to reimburse the costs, up to a maximum of forty thousand ($40,000.00) for waste profile testing as required by a licensed disposal site and the transportation of such material to, and its disposal at, a properly licensed disposal site. Your contractor under your supervision will perform the work, and you will pay all other costs associated with the remediation. Kerr-McGee understands that you are the owner of the aforementioned real property.

It is agreed by you that Kerr-McGee's undertaking to reimburse these costs does not constitute an admission or a denial by Kerr-McGee that it has any liability or responsibility for the presence of radiological material at or about the property at 161 E. Avenue or for its remediation.

I would appreciate it if you would countersign this letter and return it to me.

Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ Partner 161 E. Grand Associates

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

RECEIVED
MAR 09 2000
LAW DEPARTMENT

161 E. Grand Associates
161 E. Grand
Chicago,Il. 60611

May 24, 2000 VIA FAX 405-270-3787

Dan White, Senior Project Manager
Kerr-McGee Corporation
Kerr-McGee Center
123 Robert S. Kerr Ave., MT 2003
Oklahoma City, OK 73102-6406

RE: Thorium Contamination at Lindsay Light Building, 161 E. Grand

Dear Mr. White:

The thorium contaminated chimney at the 161 E. Grand building has been removed and the rubble has been transferred to ADCO Services Incorporated (ADCO) for ultimate disposal as radioactive waste at Envirocare of Utah. A copy of the ADCO waste manifest is attached.

We have received the attached bill from ADCO and ask that, as agreed upon, Kerr-McGee issue a check to pay this bill. The check may be payable either to ADCO or to 161 E. Grand Associates. In either case, please mail the check to me at:

Ronald Steele
C/O EKO, 2nd Floor
205 E Grand Ave
Chicago, IL 60611

If you have any questions or require additional information, please contact me at 312-467-5440.

Sincerely,

Ron Steele

Ron Steele

ADCO Services, Inc.
17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

BILL TO:
161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

SHIP TO:
161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

DESCRIPTION AND SIZE OF CONTAINER	DATE OF PICK-UP	SPECIAL REMARKS OR COMMENTS	T	UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.		7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F.E.I.N. #36-2652895

DISCLAIMER: Title to all materials which were previously owned by the customer or supplier contained in or furnished for [illegible] as listed on this form or under this contract shall be deemed to be vested in Adco Services upon delivery [illegible] facilities or placed upon our vehicle. [illegible]

MAKE CHECKS PAYABLE TO:

TOTAL 10,307.50

ATG

FORM 641 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1 MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams) U 233	U 235	Pu	TOTAL
6	m3 1.0620 / ft3 37.5000	kg 453.6926 / lb 1000.0000	NP	NP	NP	NP

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE	
MBq	1.1137E+01	NP	NP	NP	NP	(kgs)	NA
mCi	3.0100E-01	NP	NP	NP	NP	(lbs)	NA

2 MANIFEST NUMBER 01-0183 L

3 PAGE 1 OF 1 PAGE(S)

4 SHIPPER NAME 161 PARTNERS /FOR THE ACCO

SHIPMENT ID NUMBER 01-0183 L

DISPOSAL CONTAINER DESCRIPTION: 5 CONTAINER IDENTIFICATION NUMBER / SC PERMIT	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) (lb)	9 SURFACE RADIATION LEVEL mSv/hr mrem/hr	10 SURFACE CONTAMINATION MBq/100 cm2 dpm/100 cm2 ALPHA	BETA-GAMMA	WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER: PHYSICAL DESCRIPTION: 11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME (S) IN CONTAINER (m3) (ft3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3 & Note 3A)	14 CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (>0.1%)	15 RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	MBq	mCi	16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
01-0183-00 .05 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.15	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	3.7000E+00	1.0000E-01	AU
		7.5000	200.0000	15.0	NP	NP		7.5000				Subtotal	3.7000E+00	1.0000E-01	
												Total	3.7000E+00	1.0000E-01	
01-0183-02/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.03	NP	NP	39-H	0.2124	100 100	RUBBLE NP0	0.00	Th-232	3.7000E+00	1.0000E-01	AU
		7.5000	200.0000	3.0	NP	NP		7.5000				Subtotal	3.7000E+00	1.0000E-01	
												Total	3.7000E+00	1.0000E-01	
01-0183-03/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.01	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	1.8500E+00	5.0000E-02	AU
		7.5000	200.0000	1.0	NP	NP		7.5000				Subtotal	1.8500E+00	5.0000E-02	
												Total	1.8500E+00	5.0000E-02	
01-0183-04/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.03	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	1.8500E+00	5.0000E-02	AU
		7.5000	200.0000	3.0	NP	NP		7.5000				Subtotal	1.8500E+00	5.0000E-02	
												Total	1.8500E+00	5.0000E-02	
01-0183-00 .01 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.002	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	3.7000E-02	1.0000E-03	AU
		7.5000	200.0000	.2	NP	NP		7.5000				Subtotal	3.7000E-02	1.0000E-03	
												Total	3.7000E-02	1.0000E-03	
Shipment Totals		1.0620	453.6926										1.1137E+01	3.0100E-01	
		37.5000	1000.0000												

NOTE 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks the numerical code must be followed by "-OP."

1 Wooden Box or Crate
2 Metal Box
3 Plastic Drum or Pail
4 Metal Drum or Pail
5 Metal Tank or Liner
6 Concrete Tank or Liner
7 Polyethylene Tank or Liner
8 Fiberglass Tank or Liner
9 Demineralizer
10 Gas Cylinder
11 Bulk, Unpackaged Waste
12 Unpackaged Components
13 High Integrity Container
19 Other. Describe in Item 8, or additional page

Note 1A: Barnwell Specific Container Description Codes. (Choose one code as many as applicable.)

A High Integrity Container - Poly
B High Integrity Container - Poly with Steel Shell
C High Integrity Drum Overpack - Poly
D High Integrity Container - Stainless Steel
E High Integrity Container - Fiberglass
F Liner - Steel

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20 Charcoal
21 Incinerator Ash
22 Soil
23 Gas
24 Oil
25 Aqueous Liquid
26 Filter Media
27 Mechanical Filter
28 EPA or State Hazardous
29 Demolition Rubble
30 Cation Ion-exchange Media
31 Anion Ion-exchange Media
32 Mixed Bed Ion exchange Media
33 Contaminated Equipment
34 Organic Liquid (except oil)
35 Glassware or Labware
36 Sealed Source/Device
37 Paint or Plating
38 Evaporator Bottoms/Sludges/ Concentrates
39 Compactible Trash
40 Noncompactible Trash
41 Animal Carcass
42 Biological Material (except animal carcass)
43 Activated Material
50 Other. Describe in Item 11, or additional page

Note 2A: Barnwell Specific Waste Descriptor Codes (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S" and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification
90 Cement
91 Concrete (encapsulation)
92 Bitumen
93 Vinyl Chloride
94 Vinyl Ester Styrene
99 Other. Describe in Item 13, or additional page
100 None Required

Note 3A: Barnwell Specific Solidification and Stabilization Media Codes (Choose this code if applicable)

M Waste Binder

FORM 541 (10-96)

ATG

01-0183

161 E. Grand Associates

FORM 540 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1 EMERGENCY TELEPHONE NUMBER (Include Area Code): 847-965-1990

ORGANIZATION: 161 PARTNERS

2 IS THIS AN "EXCLUSIVE USE" SHIPMENT? [X] YES [ ] NO

3 TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 6

4 DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [X] NO
If "Yes," provide Manifest Number =====>

EPA MANIFEST NUMBER: NA

5 SHIPPER – NAME AND FACILITY [redacted] /FOR THE ACCOUNT OF
ADCO SERVICES, INC
161 EAST GRAND
CHICAGO, IL

SC PERMIT: NA

SHIPMENT NUMBER: 01-0183 L

CONTACT: ELI PORT

6 CARRIER – Name and Address
ADCOM EXPRESS, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: BOB BASSETT

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPMENT I.D. NUMBER: 01-0183 L

[ ] COLLECTOR
[ ] PROCESSOR
[X] GENERATOR TYPE (Specify) 1

TELEPHONE NUMBER (Include Area Code): 847-965-1995

EPA I.D. NUMBER: ILD 847267364

SHIPPING DATE: 5-10-00

TELEPHONE NUMBER (Include Area Code): 708-429-3013

DATE: 5-10-00

7 FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8 MANIFEST NUMBER (Use this number on all continuation pages): 01-0183 L

9 CONSIGNEE – Name and Facility Address
ADCO SERVICES, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: LEN WARBIANY

TELEPHONE NUMBER (Include Area Code): 708-429-1660

SIGNATURE – Authorized consignee acknowledging waste receipt:

DATE:

10 CERTIFICATION

This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature]

TITLE:

DATE: 5-10-00

11 U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number and any additional information)	12 DOT LABEL "RADIOACTIVE"	13 TRANSPORT INDEX	14 PHYSICAL AND CHEMICAL FORM	15 INDIVIDUAL RADIONUCLIDES	16 TOTAL PACKAGE ACTIVITY MBq	mCi	17 LSA/SCO CLASS	18 TOTAL WEIGHT OR VOLUME (Use appropriate units)	19 IDENTIFICATION NUMBER OF PACKAGE
~~NON-REGULATED MATERIAL~~ RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	3.7000E+00	1.0000E-01	NA II	200. LBS; 7.5 FT3	01-0183-~~00~~ 05
~~NON-REGULATED MATERIAL~~ RADIOACTIVE MATERIAL LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	3.7000E+00	1.0000E-01	NA II	200 LBS; 7.5 FT3	01-0183-02
~~NON-REGULATED MATERIAL~~ RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	1.8500E+00	5.0000E-02	NA II	200 LBS; 7.5 FT3	01-0183-03
~~NON-REGULATED MATERIAL~~ RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	1.8500E+00	5.0000E-02	NA II	200 LBS; 7.5 FT3	01-0183-04
NON-REGULATED MATERIAL	NA	NA	Solid RUBBLE	Th-232	3.7000E-02	1.0000E-03	NA	200. LBS; 7.5 FT3	01-0183-~~00~~ 01

FOR CONSIGNEE USE ONLY

Packages listed as "NON-REGULATED" MATERIAL" on this manifest are classified in accordance with 49 CFR 173.403 (Definition of Radioactive Material). These materials must still be disposed of at a licensed disposal facility.

20 Customer represents and warrants that all data set forth in this Uniform Low-Level Radioactive Manifest is true and correct in all respects.

Date 5-10-00 Signature [signature]

Title and Organization

Telephone No. ( ) _____

FORM 540 (10-96)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

ISOTOPES REPORT

For Manifest # 01-0183 L
ADCO SERVICES, INC.

ATG

Isotope	Total Activity (mCi)
Th-232	3.0100E-01

ADCO Services, Inc.

Agreement,

Adco Services, Inc. reserves the right to open, inspect, and sample the contents of containers we accept for disposal, and if found to be other than stated on the Uniform Low-Level Radioactive Disposal Manifest, we will charge for any repackaging, the difference in disposal costs, or return the material to the generator.

ADCO SERVICES, INC.	161 E. Grand Associates
Company	Generator
R Barrett	
Signature	Signature
Tech	
Title	Title
5-10-00	5-10-00
Date	Date

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9759

161 East Grand Associates

161 E. Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440 Fax: 312-467-0867

TO: Mr. Dan White / Kerr-McGee

FROM: Ron Steele / 161 E. Grand Associates

DATE: 5/24/00

NUMBER OF PAGES: 2 INCLUDING COVER SHEET.

RE:

Thorium Contamination Removal

Call Ron Steele
Manager

ADCO Services, Inc.
17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-6759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

[illegible]	[illegible]	SPECIAL REMARKS OR COMMENTS		UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.		7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F.E.I.N. #36-2652895

DISCLAIMER [illegible] to all materials which were previously owned by the customer or supplier contained [illegible] furnished for [illegible] as listed on this form or under this contract shall be deemed to be vested in Adco Services [illegible] upon delivery [illegible] facilities or placed aboard our vehicle. The customer or supplier shall have no rights [illegible]

MAKE CHECKS PAYABLE TO: ADCO SERVICES, INC.

TOTAL AMOUNT 10,307.50

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	0045
CONNECTION TEL	812027785555
CONNECTION ID	
ST. TIME	05/25 14:03
USAGE T	01'27
PGS. SENT	5
RESULT	OK

PHONE CALL

FOR B6 DATE 5-25 TIME 1:28 A.M. P.M.

M Diane Bell

OF

PHONED

RETURNED YOUR CALL

DONE ☐ FAX ☐ MOBILE 3788

AREA CODE NUMBER EXTENSION

MESSAGE

PLEASE CALL

Look this over & initial. Diane will be out tomorrow & will take to George today.

WILL CALL AGAIN

CAME TO SEE YOU

WANTS TO SEE YOU

SIGNED

FORM 4003

KERR-McGEE CORPORATIC

P. O. Box 25861 • OKLAHOMA CITY, OKLAHOMA 73125

FACSIMILE

May 25, 2000

NUMBER OF PAGES: 5

TO:

J. T. SMITH, II
COVINGTON & BURLING
1201 Pennsylvania Ave., N.W.
Washington, D.C. 20044
Fax(202)778-5555
Phone (202)662-5555

FROM:

W. O. "Bill" Green, III
KERR-McGEE CORPORATION
Fax (405)270-2803
Phone (405)270-2791

MESSAGE

Re: 161 E. Grand

FYI - Please see attached.

****

NOTICE OF CONFIDENTIALITY

The information contained in and transmitted with this facsimile is:

1. SUBJECT TO THE ATTORNEY-CLIENT PRIVILEGE;
2. ATTORNEY WORK PRODUCT; AND/OR
3. CONFIDENTIAL.

It is intended only for the individual or entity designated above. You are hereby notified that any dissemination, distribution, copying, or use of or reliance upon the information contained in and transmitted with this facsimile by or to anyone other than the recipient designated above by the Sender is unauthorized

Only Code Sub-Total (Prior to Tax & Freight)

Codesheet for Non-Purchase Order Related Invoices

Completed by: D. L. Bell
Ext. #: 3788
LPO#:

CHEMICAL

AP Voucher # _____

AP CODE SHEET

Account Code for Non-Project Invoices

Plant (4 Characters)	Center (5 Characters)	Account (7 Characters)	Product (4 Characters)	Amount	Descriptive FlexField	Description	Do Not Prorate Tax
				$			
				$			
				$			
				$			
				$			
				$			
				$			
				$			
				$			
				$			
				$			
Tax Accrual * 9910	00000		0	$		AC	

Project Code (for AFE's, Environmental & Research & Development)

Dollar Amount	Project # (5 Characters)	Task (2 Characters)	Sub-Task (2 Characters)	Expenditure Type (Account #)	Expenditure Org. (PLANT+COST CENTER #)	Do Not Prorate Tax	Description
$ 10,307.50	10153	55		925 5920	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$							
$							
$							
$							

* Select a... for State you are accruing. Indicate total tax amount accrued. Rate should be noted in description column. Do Not Prorate Tax" box if you do not want tax prorated to a line of distribution.

Check payable to:

161 E. Grand Associates
c/o EKO
205 E. Grand
Chicago, Il. 60611

RECEIVED
MAY 24 2000
WEST CHICAGO PROJECT

Mr.George D. Christianson
Vice President
Kerr- McGee Chemical LLC
Kerr-McGee Center
P.O. Box 25861
Oklahoma City, Oklahoma 73125

May 17,2000

Invoice:

Costs for disposal of radiolgical material from the building at 161 E. Grand Ave., Chicago, Il. per attached invoice from ADCO Services, Inc. and our agreement dated November 30, 1999 (attached).

$10,307.50

N/O

Ok per J. D. White 5/25/00
by DL Bell
5/25/00

May 18,00 7:45 No.001 P.01

TEL:

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

BILL TO:
161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

SHIP TO:
161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

DESCRIPTION AND SIZE OF CONTAINER	DATE OF PICK-UP	SPECIAL REMARKS OR COMMENTS	T	UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.		7.75	10,307.50

Approved for Payment
By G. D. Christiansen

Initials Date

FORM APPROVED
LAW DEPT.

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F.E.I.N. #36-2652895

DISCLAIMER: Title to all materials which were previously owned by the customer or supplier contained in w[illegible] furnished for b[illegible] listed on this form or under this contract shall be deemed to be vested in Adco Services. Upon delivery t[illegible] facilities or placed aboard our vehicle. The customer or supplier shall have no right to the [illegible]

MAKE CHECKS PAYABLE TO:
ADCO SERVICES, INC.

TOTAL AMOUNT 10,307.50

RSSI

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 4
To Mark Krippel	From Eli Port
Co.	Co. RSSI
Dept.	Phone # 847-965-1999
Fax # 630-231-3990	Fax # 847-965-1991

6312 West Oakton Street
Morton Grove, IL 60053-2723
847-965-1999
Fax 847-965-1991

FAX COVER SHEET

DATE: Oct 20, 1999

TO: Ron Steele

COMPANY: 161 Grand

FAX#: 312-467-0867

FROM: Eli Port

COMMENTS: Kerr-McGee requested that we submit a notice to IDNS regarding the planned cleaning removal. Please review & comment so it can be sent to IDNS. By copy of this fax, the draft letter is being sent to Kerr-McGee and their attorney.
fc Mark Krippel KM 630-231-3990
Richard Mauro CGB 202-778-5304

Total number of pages _____ *(including this page)*

If you have trouble receiving this transmission, please call _____ at 847-965-1999.

gpc\faxtran.doc

Post-it® Fax Note 7671	Date 10-21-99 # of pages ▸ 3
To Dan White	From Mark Krippel
Co./Dept.	Co.
Phone #	Phone #
Fax #	Fax #

DRAFT

October 20, 1999

Richard A. Allen, CHP
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

RE: 161 East Grand, Chicago, IL

Dear Mr. Allen:

During the week of October 11, we spoke by telephone about the 161 Grand Avenue building, also known as Lindsay Light I. I am providing an informal courtesy notification of the planned action to remove a chimney. The chimney is suspected of containing unlicensed thorium residuals from former operations of the Lindsay Light Company.

A May 1981, US EPA report discussed a basement area with elevated exposure levels in the vicinity of the chimney. The elevated levels were attributed by the EPA to residual Lindsay Light material in the chimney. The owner of the property has asked RSSI to remove the chimney and any contained material.

The 161 Grand building is not the subject of a license or other regulatory action. Nonetheless, exposure of workers and releases to the environment shall be controlled so the limits in 32 IAC

340and 29 CFR 1910.1096 will not be exceeded. Removed material shall be transferred for disposal at Envirocare of Utah, Inc. If you have any questions or require additional information, please contact me at 847-965-1999.

Sincerely,

Eli A. Port, CHP, CIH, P.E.

\400001\idna04.doc

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

November 30, 1999

BY FEDERAL EXPRESS

Mr. Ronald Steele
% EKO, Second Floor
205 East Grand Avenue
Chicago, IL 60611

Re: 161 E. Grand Avenue, Chicago, Illinois

Dear Mr. Steele:

This letter is simply to confirm the arrangements that have been made with your consultant, Eli Port, concerning removal of certain radiological material from your building at 161 E. Grand Avenue, Chicago, Illinois. Kerr-McGee Chemical L.L.C. ("Kerr-McGee") agrees to reimburse the costs, up to a maximum of forty thousand ($40,000.00) for waste profile testing as required by a licensed disposal site and the transportation of such material to, and its disposal at, a properly licensed disposal site. Your contractor under your supervision will perform the work, and you will pay all other costs associated with the remediation. Kerr-McGee understands that you are the owner of the aforementioned real property.

It is agreed by you that Kerr-McGee's undertaking to reimburse these costs does not constitute an admission or a denial by Kerr-McGee that it has any liability or responsibility for the presence of radiological material at or about the property at 161 E. Avenue or for its remediation.

I would appreciate it if you would countersign this letter and return it to me.

Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ PARTNER 161 E. GRAND ASSOCIATES

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 3

To Richard Mesure	From Eli Port
Co.	Co. RSSI
Dept.	Phone # 8479651999
Fax # 202-778-5304	Fax # 8479651991

RSSI

6312 West Oakton Street
Morton Grove, IL 60053-2723
847-965-1999
Fax 847-965-1991

FAX COVER SHEET

DATE: Oct 20, 1999

TO: Ron Steele

COMPANY: 161 Grand

FAX#: 312-467-0867

FROM: Eli Port

COMMENTS: Kerr-McGee requested that we submit a notice to IDNS regarding the planned cleaning removal. Please review & comment so it can be sent to IDNS. By copy of this fax, the draft letter is being sent to Kerr-McGee and their attorney.
fc Mark Krippel KM 630-231-3990
Richard Mesure GB 202-778-5304

Total number of pages _____ *(including this page)*

If you have trouble receiving this transmission, please call _____ at 847-965-1999.

gpr\faxtran.doc

DRAFT

October 20, 1999

Richard A. Allen, CHP
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

RE: 161 East Grand, Chicago, IL

Dear Mr. Allen:

During the week of October 11, we spoke by telephone about the 161 Grand Avenue building, also known as Lindsay Light I. I am providing an informal courtesy notification of the planned action to remove a chimney. The chimney is suspected of containing unlicensed thorium residuals from former operations of the Lindsay Light Company.

A May 1981, US EPA report discussed a basement area with elevated exposure levels in the vicinity of the chimney. The elevated levels were attributed by the EPA to residual Lindsay Light material in the chimney. The owner of the property has asked RSSI to remove the chimney and any contained material.

The 161 Grand building is not the subject of a license or other regulatory action. Nonetheless, exposure of workers and releases to the environment shall be controlled so the limits in 32 IAC

340and 29 CFR 1910.1096 will not be exceeded. Removed material shall be transferred for disposal at Envirocare of Utah, Inc. If you have any questions or require additional information, please contact me at 847-965-1999.

Sincerely,

Eli A. Port, CHP, CIH, P.E.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	0045
CONNECTION TEL	812027785555
CONNECTION ID	
ST. TIME	05/25 14:03
USAGE T	01'27
PGS. SENT	5
RESULT	OK

PHONE CALL

FOR B6 DATE 5-25 TIME 1:28 A.M. P.M.

M Diane Bell

OF

PHONE ☐ FAX ☐ MOBILE AREA CODE 3788 NUMBER EXTENSION

MESSAGE Look this over & initial. Diane will be out tomorrow & will take to George today.

SIGNED

PHONED | RETURNED YOUR CALL | PLEASE CALL | WILL CALL AGAIN | CAME TO SEE YOU | WANTS TO SEE YOU

OTOPS FORM 4003

KERR-McGEE CORPORATIC

P. O. Box 25861 • OKLAHOMA CITY, OKLAHOMA 73125

FACSIMILE

May 25, 2000

NUMBER OF PAGES: 5

TO: J. T. SMITH, II
COVINGTON & BURLING
1201 Pennsylvania Ave., N.W.
Washington, D.C. 20044
Fax(202)778-5555
Phone (202)662-5555

FROM: W. O. "Bill" Green, III
KERR-McGEE CORPORATION
Fax (405)270-2803
Phone (405)270-2791

MESSAGE

Re: 161 E. Grand

FYI - Please see attached.

****

NOTICE OF CONFIDENTIALITY

The information contained in and transmitted with this facsimile is:

1. SUBJECT TO THE ATTORNEY-CLIENT PRIVILEGE;
2. ATTORNEY WORK PRODUCT; AND/OR
3. CONFIDENTIAL

It is intended only for the individual or entity designated above. You are hereby notified that any dissemination, distribution, copying, or use of or reliance upon the information contained in and transmitted with this facsimile by or to anyone other than the recipient designated above by the Sender is unauthorized and

Only Code Sub-Total (Prior to Tax & Freight)

Codesheet for Non-Purchase Order Related Invoices

Completed by: D. L. Bell
Ext. #: 3788
LPO#:

CHEMICAL

AP Voucher # _____

AP CODE SHEET

Account Code for Non-Project Invoices

	Plant (4 Characters)	Center (5 Characters)	Account (7 Characters)	Product (4 Characters)	Amount	Descriptive FlexField	Description	Do Not Prorate Tax
					$			
					$			
					$			
					$			
					$			
					$			
					$			
					$			
					$			
					$			
					$			
Tax Accrual *	9910	00000		0	$		AC	

Project Code (for AFE's, Environmental & Research & Development)

Dollar Amount	Project # (5 Characters)	Task (2 Characters)	Sub-Task (2 Characters)	Expenditure Type (Account #)	Expenditure Org. (PLANT+COST CENTER #)	Do Not Prorate Tax	Description
$ 10,307.50	10153	55		925 5920	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$				925	954010300		
$							
$							
$							
$							

* Select a[illegible] for State you are accruing. Indicate total tax amount accrued. Rate should be noted in description column. Do Not Prorate Tax" box if you do not want tax prorated to a line of distribution.

Check payable to:

161 E. Grand Associates
c/o EKO
205 E. Grand
Chicago, Il. 60611

RECEIVED
MAY 24 2000
WEST CHICAGO PROJECT

Mr.George D. Christianson
Vice President
Kerr- McGee Chemical LLC
Kerr-McGee Center
P.O. Box 25861
Oklahoma City, Oklahoma 73125

May 17,2000

Invoice:

Costs for disposal of radiolgical material from the building at 161 E. Grand Ave., Chicago, Il. per attached invoice from ADCO Services, Inc. and our agreement dated November 30, 1999 (attached).

$10,307.50

N/O

Ok per J. D. White 5/25/00
by [illegible]
5/25/00

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

DESCRIPTION AND SIZE OF CONTAINER	DATE OF PICK-UP	SPECIAL REMARKS OR COMMENTS	T	UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.		7.75	10,307.50

Approved for Payment
By G. D. Christiansen

Initials Date

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

FORM APPROVED LAW DEPT.

F.E.I.N. #36-2652895

DISCLAIMER: Title to all materials which were previously owned by the customer or supplier contained in a [illegible] furnished for bi[illegible] listed on this form or under this contract shall be deemed to be vested in Adco Services, upon delivery t[illegible] facilities or placed aboard our vehicle. The customer or supplier shall have no right to the [illegible]

MAKE CHECKS PAYABLE TO: ADCO SERVICES, INC.

TOTAL AMOUNT 10,307.50

LL I

Date: 29-JUN-00

Vendor No.: 2379 99 161 E GRAND ASSOCIAT Check No.: 164401

INVOICE NUMBER	INVOICE DATE	INVOICE DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
(700 99	17-MAY-00 RUSH	3788 DIANA BELL CALL - EXT#	0.00	10,307.50
			0.00	10,307.50

File when drawer files are established.

Please detach this statement and retain for your records

000109 382578

THIS MULTI-TONE AREA OF THE DOCUMENT CHANGES COLOR GRADUALLY AND EVENLY FROM DARK TO LIGHT WITH DARKER AREAS BOTH TOP AND BOTTOM.

Kerr-McGee Chemical LLC
A Subsidiary of Kerr-McGee Corporation
Kerr-McGee Center
Oklahoma City, OK 73125

Citibank, Delaware
A Subsidiary of Citicorp
One Penn's Way
New Castle, DE 19720

62-20
311

CHECK DATE	CHECK NO	NET AMOUNT
29-JUN-00	164401	$*****10,307.50

VOID AFTER 90 DAYS

PAY Ten Thousand Three Hundred Seven and 50/100 Dollars

TO THE ORDER OF

161 E GRAND ASSOCIATES
% EKO
205 E GRAND
CHICAGO IL 60611

Vice President & Treasurer

⑈00164401⑈ ⑆031100209⑆ 38558173⑈

Please make check payable to

161 E. Grand Associates
c/o EKO
205 E. Grand
Chicago, Il. 60611

Mr.George D. Christianson
Vice President
Kerr- McGee Chemical LLC
Kerr-McGee Center
P.O. Box 25861
Oklahoma City, Oklahoma 73125

May 17,2000

Invoice:

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$10,307.50

Invoice 6/28/00

Return check to Diana Bell, MT 2002, Ext. 3788

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

[illegible]	[illegible]	SPECIAL REMARKS OR COMMENTS	[illegible]	[illegible]
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.	7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F .I.N. #36-2652895

DISCLAIMER: Title to all materials which were previously owned by the customer or supplier contained in [illegible] furnished [illegible] as listed on the form or under this contract shall be deemed to be vested in Adco Services [illegible] [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible]

MAKE CHECKS PAYABLE TO:

TOTAL AMOUNT 10,307.50

FAX

Date 6/23/00

Number of pages including cover sheet 2

TO: Diana Bell

Kerr -Mcgee
Chemical LLC

Phone

Fax Phone 405-270-3787

FROM: Ron Steele
161 E. Grand Associates
205 East Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440

Fax Phone 312-467-0867

CC:

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please Comment

Dear Diana,

Attached is a letter regarding the disposal of the thorium materials from 161 E. Grand, Chicago, Il. It certifies that they will be properly disposed of.

Sincerely,

Ron Steele

George Christiansen:

Will this suffice for payment of Ron Steele's invoice?

Dan

Yes — this is okay

Dan

CC: D. Bell
B. Green

ADCO Services, Inc.

June 23, 2000

Mr. Ron Steele
161 East Grand Association
161 East Grand Avenue
Chicago, IL 60611

Dear Mr. Steele,

This letter is to certify to you that the material contaminated with Thorium that was removed from your facility will and must be disposed of at a Low Level Radioactive Waste disposal site. As of this writing I can not give you a date as to when this occur. Once a radioactive waste is manifested and received by a waste broker, a paper trial is started and that broker is responsible to local, state and federal agencies to prove, if questioned, as to location of said waste at any time.

If you should have any further question, please feel free to contact me.

Sincerely,

Len Warblany
Customer Service Manager

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9760

FAX

Date 6/23/00

Number of pages including cover sheet 2

TO: Diana Bell

Kerr -Mcgee
Chemical LLC

Phone

Fax Phone 405-270-3787

FROM: Ron Steele

161 E. Grand Associates
205 East Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440

Fax Phone 312-467-0867

CC:

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please Comment

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Sincerely,

Ron Steele

George Christiansen:

Will this suffice for payment of Ron Steele's invoice?

Dan

CC: D. Bell
B. Green

RECEIVED
JUN 27 2000
LAW DEPARTMENT

ADCO Services, Inc.

June 23, 2000

Mr. Ron Steele
161 East Grand Association
161 East Grand Avenue
Chicago, IL 60611

Dear Mr. Steele,

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If you should have any further question, please feel free to contact me.

Sincerely,

Len Warblany
Customer Service Manager

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9769

Eli Porte

(847) 965-1999

ADCO BROKER

TITLE PROCESSOR (MANIFESTS)

[redacted] Telecon w/ Eli.

160 Illinois St.

Bldg. behind 161 East Grand.

Old Warehouse building.

LL-II supposedly used it for storage.

Same age as LL-I Bldg.

Eli investigated for owner. Bldg. is clean.

DAN WHITE

✓ T. Goresen
W. Chicago
LL II

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

RECEIVED
MAR 09 2000
LAW DEPARTMENT

November 30, 1999

BY FEDERAL EXPRESS

Mr. Ronald Steele
% EKO, Second Floor
205 East Grand Avenue
Chicago, IL 60611

Re: 161 E. Grand Avenue, Chicago, Illinois

Dear Mr. Steele:

This letter is simply to confirm the arrangements that have been made with your consultant, Eli Port, concerning removal of certain radiological material from your building at 161 E. Grand Avenue, Chicago, Illinois. Kerr-McGee Chemical L.L.C. ("Kerr-McGee") agrees to reimburse the costs, up to a maximum of forty thousand ($40,000.00) for waste profile testing as required by a licensed disposal site and the transportation of such material to, and its disposal at, a properly licensed disposal site. Your contractor under your supervision will perform the work, and you will pay all other costs associated with the remediation. Kerr-McGee understands that you are the owner of the aforementioned real property.

It is agreed by you that Kerr-McGee's undertaking to reimburse these costs does not constitute an admission or a denial by Kerr-McGee that it has any liability or responsibility for the presence of radiological material at or about the property at 161 E. Avenue or for its remediation.

I would appreciate it if you would countersign this letter and return it to me.

Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ PARTNER 161 E. GRAND ASSOCIATES

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

B. Green
xc: D. White
J. Reichenberger

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

November 30, 1999

BY FEDERAL EXPRESS

Mr. Ronald Steele
% EKO, Second Floor
205 East Grand Avenue
Chicago, IL 60611

Re: 161 E. Grand Avenue, Chicago, Illinois

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Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ Partner 161 E. Grand Associates

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

RECEIVED
MAR 09 2000
LAW DEPARTMENT

161 E. Grand Associates
161 E. Grand
Chicago,Il. 60611

May 24, 2000 VIA FAX 405-270-3787

Dan White, Senior Project Manager
Kerr-McGee Corporation
Kerr-McGee Center
123 Robert S. Kerr Ave., MT 2003
Oklahoma City, OK 73102-6406

RE: Thorium Contamination at Lindsay Light Building, 161 E. Grand

Dear Mr. White:

The thorium contaminated chimney at the 161 E. Grand building has been removed and the rubble has been transferred to ADCO Services Incorporated (ADCO) for ultimate disposal as radioactive waste at Envirocare of Utah. A copy of the ADCO waste manifest is attached.

We have received the attached bill from ADCO and ask that, as agreed upon, Kerr-McGee issue a check to pay this bill. The check may be payable either to ADCO or to 161 E. Grand Associates. In either case, please mail the check to me at:

Ronald Steele
C/O EKO, 2nd Floor
205 E Grand Ave
Chicago, IL 60611

If you have any questions or require additional information, please contact me at 312-467-5440.

Sincerely,

Ron Steele

Ron Steele

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO 01-0183

DATE 05/11/00

BILL TO

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

SHIP TO

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 3582

DESCRIPTION AND SIZE OF CONTAINER	DATE OF PICKUP	SPECIAL REMARKS OR COMMENTS	T	UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.		7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F.E.I.N. #36-2652895

DISCLAIMER Title to all materials which were previously owned by the customer or supplier contained in or furnished for b[illegible] as listed on this form or under this contract shall be deemed to be vested in Adco Services upon delivery [illegible] facilities or placed aboard our vehicle. The customer or supplier shall have no right to [illegible]

MAKE CHECKS PAYABLE TO:

TOTAL 10,307.50

TEL:

ATG

FORM 641 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	TOTAL
5	m3	1.0620	kg	453.5926	NP	NP	NP	NP
	ft3	37.5000	lb	1000.0000				

	ALL NUCLIDES	TRITIUM	ACTIVITY C-14	Tc-99	I-129	SOURCE	
MBq	1.1137E+01	NP	NP	NP	NP	(kgs)	NA
mCi	3.0100E-01	NP	NP	NP	NP	(lbs)	NA

2. MANIFEST NUMBER 01-0183 L

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME 161 PARTNERS /FOR THE ACCO

SHIPMENT ID NUMBER 01-0183 L

DISPOSAL CONTAINER DESCRIPTION: 5 CONTAINER IDENTIFICATION NUMBER / SC PERMIT	6 CONTAINER DESCRIPTION (See Note 1 & Note 1A)	7 VOLUME (m3) (ft3)	8 WASTE AND CONTAINER WEIGHT (kg) (lb)	9 SURFACE RADIATION LEVEL mSv/hr mrem/hr	10 SURFACE CONTAMINATION MBq/100 cm2 dpm/100 cm2 ALPHA	BETA-GAMMA	WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER: 11 WASTE DESCRIPTOR (See Note 2 & Note 2A)	12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (ft3)	13 SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3 & Note 3A)	14 CHEMICAL DESCRIPTION: CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT (if>0.1%)	15 RADIOLOGICAL DESCRIPTION: INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT: RADIONUCLIDES	MBq	mCi	16 WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
01-0183-00 of 3 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.15	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	3.7000E+00	1.0000E-01	AU
		7.5000	200.0000	15.0	NP	NP		7.5000				Subtotal	3.7000E+00	1.0000E-01	
												Total	3.7000E+00	1.0000E-01	
01-0183-01/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.03	NP	NP	39-H	0.2124	100 100	RUBBLE NPG	0.00	Th-232	3.7000E+00	1.0000E-01	AU
		7.5000	200.0000	3.0	NP	NP		7.5000				Subtotal	3.7000E+00	1.0000E-01	
												Total	3.7000E+00	1.0000E-01	
01-0183-03/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.01	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	1.8500E+00	5.0000E-02	AU
		7.5000	200.0000	1.0	NP	NP		7.5000				Subtotal	1.8500E+00	5.0000E-02	
												Total	1.8500E+00	5.0000E-02	
01-0183-04/ 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.03	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	1.8500E+00	5.0000E-02	AU
		7.5000	200.0000	3.0	NP	NP		7.5000				Subtotal	1.8500E+00	5.0000E-02	
												Total	1.8500E+00	5.0000E-02	
01-0183-05 of 01 161 EAST GRAND CHICAGO, IL	4	0.2124	90.7185	.002	NP	NP	39-H	0.2124	100 100	RUBBLE NP	0.00	Th-232	3.7000E-02	1.0000E-03	AU
		7.5000	200.0000	.2	NP	NP		7.5000				Subtotal	3.7000E-02	1.0000E-03	
												Total	3.7000E-02	1.0000E-03	
Shipment Totals		1.0620	453.5926										1.1137E+01	3.0100E-01	
		37.5000	1000.0000												

NOTE 1: Container Descriptor Codes. For containers/waste requiring disposal in approved structural overpacks the numerical code must be followed by "-OP."

1 Wooden Box or Crate
2 Metal Box
3 Plastic Drum or Pail
4 Metal Drum or Pail
5 Metal Tank or Liner
6 Concrete Tank or Liner
7 Polyethylene Tank or Liner
8 Fiberglass Tank or Liner
9 Dehydrator
10 Gas Cylinder
11 Bulk, Unpackaged Waste
12 Unpackaged Components
13 High Integrity Container
19 Other Describe in Item 8, or additional page

Note 1A: Barnwell Specific Container Descriptor Codes. (Choose one code as may be applicable.)

A High Integrity Container - Poly
B High Integrity Container - Poly with Steel Shell
C High Integrity Drum Overpack - Poly
D High Integrity Container - Stainless Steel
E High Integrity Container - Fiberglass
F Liner - Steel

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20 Charcoal
21 Incinerator Ash
22 Soil
23 Gas
24 Oil
25 Aqueous Liquid
26 Filter Media
27 Mechanical Filter
28 EPA or State Hazardous
29 Demolition Rubble
30 Cation Ion-exchange Media
31 Anion Ion-exchange Media
32 Mixed Bed Ion exchange Media
33 Contaminated Equipment
34 Organic Liquid (except oil)
35 Glassware or Labware
36 Sealed Source/Device
37 Paint or Plating
38 Evaporator Bottoms/Sludges/ Concentrates
39 Compactible Trash
40 Noncompactible Trash
41 Animal Carcass
42 Biological Material (except animal carcass)
43 Activated Material
59 Other Describe in Item 11, or additional page

Note 2A: Barnwell Specific Waste Descriptor Codes (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting dispersal site structural stability requirements, the numerical code must be followed by "-S" and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED.

Solidification

90 Cement
91 Concrete (encapsulation)
92 Bitumen
93 Vinyl Chloride
94 Vinyl Ester Styrene
99 Other Describe in Item 13, or additional page
100 None Required

Note 3A: Barnwell Specific Solidification and Stabilization Media Codes (Choose this code if applicable)

M Wax Binder

FORM 641 (10-90)

ATG

01-0183

FORM 540 — ADCO SERVICES, INC.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1 EMERGENCY TELEPHONE NUMBER (Include Area Code): 847-966-1990

ORGANIZATION: 161 PARTNERS

2 IS THIS AN "EXCLUSIVE USE" SHIPMENT? [X] YES [ ] NO

3 TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST =====> 8

4 DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [X] NO
If "Yes," provide Manifest Number =====> EPA MANIFEST NUMBER: NA

5 SHIPPER – NAME AND FACILITY
[redacted] /FOR THE ACCOUNT OF
ADCO SERVICES, INC
161 EAST GRAND
CHICAGO, IL

SC PERMIT: NA
SHIPMENT NUMBER: 01-0183 L

CONTACT: ELI PORT

6 CARRIER – Name and Address
ADCOM EXPRESS, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: BOB BASSETT

SIGNATURE – Authorized carrier acknowledging waste receipt: [signature]

SHIPMENT ID NUMBER: 01-0183 L
[ ] COLLECTOR
[ ] PROCESSOR
[X] GENERATOR TYPE (Specify): I

TELEPHONE NUMBER (Include Area Code): 847-966-1990

EPA ID NUMBER: ILD 047267364

SHIPPING DATE: 5-10-00

TELEPHONE NUMBER (Include Area Code): 708-429-3013

DATE: 5-10-00

7 FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8 MANIFEST NUMBER (Use this number on all continuation pages): 01-0183 L

9 CONSIGNEE - Name and Facility Address
ADCO SERVICES, INC.
17650 DUVAN DRIVE
TINLEY PARK, IL 60477

CONTACT: LEN WARBIANY
TELEPHONE NUMBER (Include Area Code): 708-429-1660

SIGNATURE – Authorized consignee acknowledging waste receipt:

DATE:

10 CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE: [signature] TITLE: DATE: 5-10-00

11 U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12 DOT LABEL "RADIOACTIVE"	13 TRANSPORT INDEX	14 PHYSICAL AND CHEMICAL FORM	15 INDIVIDUAL RADIONUCLIDES	16 TOTAL PACKAGE ACTIVITY MBq	mCi	17 LSA/SCO CLASS	18 TOTAL WEIGHT OR VOLUME (Use appropriate units)	19 IDENTIFICATION NUMBER OF PACKAGE
[redacted] RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	3.7000E+00	1.0000E-01	NA II	200. LBS; 7.5 FT3	01-0183-05
[redacted] RADIOACTIVE MATERIAL LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	3.7000E+00	1.0000E-01	NA II	200. LBS; 7.5 FT3	01-0183-02
[redacted] RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	1.8500E+00	5.0000E-02	NA II	200. LBS; 7.5 FT3	01-0183-03
[redacted] RADIOACTIVE MATERIAL, LSA, NOS, 7, UN2912	NA	NA	Solid RUBBLE	Th-232	1.8500E+00	5.0000E-02	NA II	200. LBS; 7.5 FT3	01-0183-04
NON-REGULATED MATERIAL	NA	NA	Solid RUBBLE	Th-232	3.7000E-03	1.0000E-03	NA	200. LBS; 7.5 FT3	01-0183-08 01

FOR CONSIGNEE USE ONLY

Packages listed as "NON-REGULATED" MATERIAL" on this manifest are classified in accordance with 49 CFR 173.403 (Definition of Radioactive Material). These materials must still be disposed of at a licensed disposal facility.

20. Customer represents and warrants that all data set forth in this Uniform Low-Level Radioactive Manifest is true and correct in all respects.
Date: 5-10-00 Signature: [signature]
Title and Organization: _____
Telephone No. (____) _____

FORM 540 (10-95)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

ISOTOPES REPORT

For Manifest # 01-0183 L
ADCO SERVICES, INC.

ATG

Isotope	Total Activity (mCi)
Th-232	3.0100E-01

ADCO Services, Inc.

Agreement,

Adco Services, Inc. reserves the right to open, inspect, and sample the contents of containers we accept for disposal, and if found to be other than stated on the Uniform Low-Level Radioactive Disposal Manifest, we will charge for any repackaging, the difference in disposal costs, or return the material to the generator.

ADCO SERVICES, INC.	161 E. Grand Associates
Company	Generator
R Barsett	
Signature	Signature
Tech	
Title	Title
5-10-00	5-10-00
Date	Date

17650 Duvan Drive • Tinley Park, Illinois 60477 • (708) 429-1660 • Fax (708) 429-9759

161 East Grand Associates

161 E. Grand Avenue
Chicago, Illinois 60611

Phone 312-467-5440 Fax: 312-467-0867

TO: Mr. Dan White / Kerr-McGee

FROM: Ron Steele / 161 E. Grand Associates

DATE: 5/24/00

NUMBER OF PAGES 2 INCLUDING COVER SHEET.

RE:

Thorium Contamination Removal

Call Ron Steele
Manager

ADCO Services, Inc.

17650 Duvan Drive, Tinley Park, IL 60477 • (708) 429-1660 FAX (708) 429-9759

INVOICE

064416 Page 1 of 1

CUSTOMER ORDER NO. Verbal Eli Port

LOT NO. 01-0183

DATE 05/11/00

161 East Grand Associates
Attn: Ron Steele
161 East Grand Ave.
Chicago, IL 60611

161 East Grand Associates
161 East Grand Ave.
Chicago, IL 60611

TERMS: Net 10 Account Number: 35 2

[illegible]	[illegible]	SPECIAL REMARKS OR COMMENTS	UNIT	AMOUNT
1,330.00 Ea.	05/10/00	Disposal of Solid Rubble 1,330 Lbs. @ 7.75/Lb.	7.75	10,307.50

PLEASE RETURN GOLD COPY WITH YOUR PAYMENT

F.E.I.N. #36-2652895

DISCLAIMER: Title to all materials which were previously owned by the customer or supplier contained in or furnished for [illegible] as listed on this form or under this contract shall be deemed to be vested in Adco Services upon delivery [illegible] facilities or placed aboard our vehicle. The customer or supplier shall have no right to [illegible]

MAKE CHECKS PAYABLE TO: ADCO SERVICES, INC.

TOTAL AMOUNT 10,307.50

RSSI

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 4
To Mark Krippel	From Eli Port
Co.	Co. RSSI
Dept.	Phone # 847-965-1999
Fax # 630-231-3990	Fax # 847-965-1991

6312 West Oakton Street
Morton Grove, IL 60053-2723
847-965-1999
Fax 847-965-1991

FAX COVER SHEET

DATE: Oct 20, 1999

TO: Ron Steele

COMPANY: 161 Grand

FAX#: 312-467-0867

FROM: Eli Port

COMMENTS: Kerr-McGee requested that we submit a notice to IDNS regarding the planned chimney removal. Please review & comment so it can be sent to IDNS. By copy of this fax, the draft letter is being sent to Kerr-McGee and their attorney.
fc Mark Krippel KM 630-231-3990
Richard Mercer CGB 202-778-5304

Total number of pages _____ *(including this page)*

If you have trouble receiving this transmission, please call _____ at 847-965-1999.

gpe\faxtran.doc

Post-it® Fax Note 7671	Date 10-21-99 # of pages ▸ 3
To Dave White	From Mark Krippel
Co./Dept.	Co.
Phone #	Phone #
Fax #	Fax #

DRAFT

October 20, 1999

Richard A. Allen, CHP
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

RE: 161 East Grand, Chicago, IL

Dear Mr. Allen:

During the week of October 11, we spoke by telephone about the 161 Grand Avenue building, also known as Lindsay Light I. I am providing an informal courtesy notification of the planned action to remove a chimney. The chimney is suspected of containing unlicensed thorium residuals from former operations of the Lindsay Light Company.

A May 1981, US EPA report discussed a basement area with elevated exposure levels in the vicinity of the chimney. The elevated levels were attributed by the EPA to residual Lindsay Light material in the chimney. The owner of the property has asked RSSI to remove the chimney and any contained material.

The 161 Grand building is not the subject of a license or other regulatory action. Nonetheless, exposure of workers and releases to the environment shall be controlled so the limits in 32 IAC

340and 29 CFR 1910.1096 will not be exceeded. Removed material shall be transferred for disposal at Envirocare of Utah, Inc. If you have any questions or require additional information, please contact me at 847-965-1999.

Sincerely,

Eli A. Port, CHP, CIH, P.E.

\40000\\idru04.doc

KERR-McGEE
KERR-McGEE CENTER • P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

November 30, 1999

BY FEDERAL EXPRESS

Mr. Ronald Steele
% EKO, Second Floor
205 East Grand Avenue
Chicago, IL 60611

Re: 161 E. Grand Avenue, Chicago, Illinois

Dear Mr. Steele:

This letter is simply to confirm the arrangements that have been made with your consultant, Eli Port, concerning removal of certain radiological material from your building at 161 E. Grand Avenue, Chicago, Illinois. Kerr-McGee Chemical L.L.C. ("Kerr-McGee") agrees to reimburse the costs, up to a maximum of forty thousand ($40,000.00) for waste profile testing as required by a licensed disposal site and the transportation of such material to, and its disposal at, a properly licensed disposal site. Your contractor under your supervision will perform the work, and you will pay all other costs associated with the remediation. Kerr-McGee understands that you are the owner of the aforementioned real property.

It is agreed by you that Kerr-McGee's undertaking to reimburse these costs does not constitute an admission or a denial by Kerr-McGee that it has any liability or responsibility for the presence of radiological material at or about the property at 161 E. Avenue or for its remediation.

I would appreciate it if you would countersign this letter and return it to me.

Very truly yours,

George D. Christiansen
Vice President

AGREED TO: Ronald Steele
Ronald Steele, ~~OWNER~~ PARTNER 161 E. GRAND ASSOCIATES

3/3/00
Dated

cc: Mark Krippel

BCC: W.O. Green
T.P. Goresen

RSSI

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 3
To Richard Mesure	From Eli Port
Co.	Co. RSSI
Dept.	Phone # 8479651999
Fax # 202-778-5304	Fax # 8479651991

6312 West Oakton Street
Morton Grove, IL 60053-2723
847-965-1999
Fax 847-965-1991

FAX COVER SHEET

DATE: Oct 20, 1999

TO: Ron Steele

COMPANY: 161 Grand

FAX#: 312-467-0867

FROM: Eli Port

COMMENTS: Kerr-McGee requested that we submit a notice to IDNS regarding the planned cleaning removal. Please review & comment so it can be sent to IDNS. By copy of this fax, the draft letter is being sent to Kerr-McGee and their attorney.
fc Mark Krippel KG 630-231-3990
Richard Mesure GB 202-778-5304

Total number of pages _____ *(including this page)*

If you have trouble receiving this transmission, please call _____ at 847-965-1999.

gpr\fluctran.doc

DRAFT

October 20, 1999

Richard A. Allen, CHP
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

RE: 161 East Grand, Chicago, IL

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Richard A. Allen, CHP
October 20, 1999
Page Two

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Sincerely,

Eli A. Port, CHP, CIH, P.E.

\[illegible]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

C-14J

May 18, 2001

J.T. Smith II, Esq.
Covington & Burling
1201 Pennsylvania Ave. NW
Washington, D.C. 20004-2401

Re: Lindsay Light Building, 161 E. Grand, Chicago, Illinois

Dear Mr. Smith:

Enclosed per your request please find a letter dated June 7, 1994 from Gary Anderson, OSHA to Verneta Simon, U.S. EPA, enclosing a copy of a letter dated June 1, 1994 from Gary Anderson to 161 E. Grand Association.

If you have any questions please contact me at (312) 886-7166.

Sincerely,

Cathleen R. Martwick

Cathleen R. Martwick
Associate Regional Counsel

Enclosures

cc: Mary Fulghum

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U.S. Department of Labor

Occupational Safety and Health Administration
1600 167th Street, Suite 12
Calumet City, IL 60409
(708) 891 - 3800
(708) 862 - 9659 (FAX)

June 7, 1994

U.S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, Illinois 60604
ATTN: Verneta Simon

Dear Ms. Simon:

In response to your referral concerning safety and/or health hazards at:

161 East Grand Association
161 East Grand Avenue
Chicago, Illinois 60611

An inspection was conducted by the Occupational Safety and Health Administration which was completed on May 11, 1994.

The results of our investigation of your referral items are as follows:

Sampling for thoron gas was conducted at the site. This data was evaluated by a number of agency contacts. The final outcome of the investigation is as follows:

At the time of the inspection the thoron gas levels on all floors of the building were estimated to be considerably less than 0.1 WL (working level). Therefore, no further action needs to be taken by the building managers. Sample results are attached for your information.

If you do not agree with our inspection results, you may contact me for a clarification of the matter. You also have the right to an informal review by the OSHA Area Director who may be contacted at the following location:

Gary J. Anderson
Area Director
U.S. Department of Labor - OSHA
1600 167th Street, Suite 12
Calumet City, Illinois 60409
(708) 891-3800

Thank you for your concern for a safe and healthful workplace.

Respectfully,

Gary J. Anderson
Area Director

Enclosure

GJA/csm

U.S. Department of Labor Occupational Safety and Health Administration
1600 167th Street, Suite 12
Calumet City, IL 60409
(708) 891 - 3800
(708) 862 - 9659 (FAX)

June 1, 1994

161 E. Grand Association
161 E. Grand Avenue
Chicago, IL 60611

The results of the samples taken at the 161 E. Grand site on 1/12/94 and 2/23/94 indicated that employees in the facility were exposed to radon 220 (thoron) and radon 222 at Derived Air Concentrations (DAC) below the Nuclear Regulatory Commission's Ionizing Radiation Standards published in 10 CFR 20, Table 1 of Appendix B. Therefore no citation concerning ionizing radiation will be issued. The sampling result values are a conservative estimate which indicate the highest expected exposure, actual exposures are believed to be considerably lower. The sample results are as follows:

SAMPLE	CHEMICAL	RESULTS	DAC
1/12/94			
SAMPLE/RADON 222			
4th floor (control room)	Radon 222	1.2 pCi/L	30 pCi/L
4th floor (post production)	Radon 222	0.7 pCi/L	30 pCi/L
3rd floor (Cleo's office)	Radon 222	1.5 pCi/L	30 pCi/L
2nd floor (hallway)	Radon 222	2.6 pCi/L	30 pCi/L
Basement (close to chimney)	Radon 222	4.4 pCi/L	30 pCi/L
Basement (aisleway)	Radon 222	1.0 pCi/L	30 pCi/L

2/24/94
SAMPLE

4th floor (post production)	Radon 222	1.2 pCi/L	30 pCi/L
	Radon 220	0.10 WL* 13.0 pCi/L**	1.0 WL
3rd floor (Cleo's office)	Radon 222	1.5 pCi/L	30 pCi/L
	Radon 220	0.046 WL* 5.7 pCi/L**	1.0 WL
2nd floor (Cat's office)	Radon 222	2.6 pCi/L	30 pCi/L
	Radon 220	0.14 WL* 18.0 pCi/L**	1.0 WL
2nd floor (president's office)	Radon 222	3.1 pCi/L	30 pCi/L
	Radon 220	0.00 WL* 0.0 pCi/L*	1.0 WL
1st floor (Terry's desk)	Radon 222	1.4 pCi/L	30 pCi/l
	Radon 220	0.03 WL* 3.7 pCi/L**	1.0 WL
Basement (Lunchroom)	Radon 222	1.2 pCi/L	30 pCi/L
	Radon 220	0.04 WL* 5.5 pCi/L**	1.0 WL

* - Exposure level after adjusting sample results with an factor of 125 pCi/L for a 6% equilibrium factor. This is a conservative estimate and represents the highest level expected in the building. Actual exposure is believed to be considerably less.

** - Actual measurement of thoron gas sampled.

WL - Working levels
pCi/L - pico curies per liter
Radon 222 - Radon
Radon 220 - Thoron
DAC - Derived Air Concentration

Pursuant to 29 CFR 1910.20 you are required to provide your employees with a copy of these sampling results. If there are any additional questions regarding these sampling results, please feel free to contact the Calumet City Area Office.

Sincerely,

Gary J. Anderson
Area Director

GJA/bls

cc:
Eli Porte
Tom Nolan
Jim Dolan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

VIA FAX AND EXPRESS MAIL

REPLY TO THE ATTENTION OF

May 1, 2001

John T. Smith II, Esq.
Covington & Burling
1201 Pennsylvania Av NW
Washington, D.C. 20004-2401

Re: Lindsay Light Building, 161 E. Grand, Chicago, Illinois

Dear Mr. Smith:

Recently, the City of Chicago and U.S. EPA conducted a radiological survey of the former Lindsay Light Building at 161 E. Grand, Chicago, Illinois. The survey results show that the thorium-contaminated ash and dust have spread from the chimney. It is U.S. EPA's understanding that the chimney was partially removed and left open with the Kerr-Gee Chemical L.L.C.'s knowledge and assent. The results also indicate that the open chimney is the likely source of elevated levels of radon 220 also known as thoron. These levels appear to significantly exceed Nuclear Regulatory Commission regulations regarding exposure to radon 220, with daughters present, at 10 CFR 20, Appendix B, Table 1, Col. 3 and at Appendix B, Table 2, Col.1. To their credit, the new owners of the building immediately cordoned off this area of the basement upon the discovery of the problem.

In addition to the chimney area, gamma levels as high as 800,000 counts per minute (FIDLER) against a background of 7,000 cpm and 130 micro rem per hour. Of particular concern is the area around the receptionist's desk where readings of 50 micro rem per hour were obtained.

As the corporate successor to Lindsay Light and Chemical Company, the former owner and operator of the thorium mantle manufacturing facility at 161 E. Grand, U.S. EPA would like to meet with you and the current building owner, at your earliest availability, to discuss temporary measures to safeguard the building occupants and long-term plans to further examine the condition of the building and determine the appropriate manner of managing the contaminated material.

I have enclosed the field notes from the March 24 gamma walkover survey conducted by U.S. EPA (Verneta Simon, OSC, Fred Micke OSC, and Larry Jensen, HP) and Chicago Department of Environment staff (Don Smith), the results of the March 24 through March 31 radon monitoring, and the March 27 smear tests and bootie sampling (Fred Micke and Larry

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Jensen). U.S. EPA is preparing a report containing this surveillance and monitoring data which will be presented to Kerr-McGee following the Chicago Department of Environment's review and approval.

Over the past decade, at other Lindsay Light sites in the Streeterville neighborhood and in the City of West Chicago and DuPage County, Kerr-McGee has publicly supported safety and environmental responsibility, I hope that Kerr-McGee will take a proactive approach to the safety and environmental issues remaining at the former Lindsay Light manufacturing facility in Chicago as well. Please call me as soon as you have had the opportunity to review this information and we can set up a meeting with the new owners of the Lindsay Light Building and the City of Chicago to take steps to immediately abate any threat to health and the environment.

Sincerely,

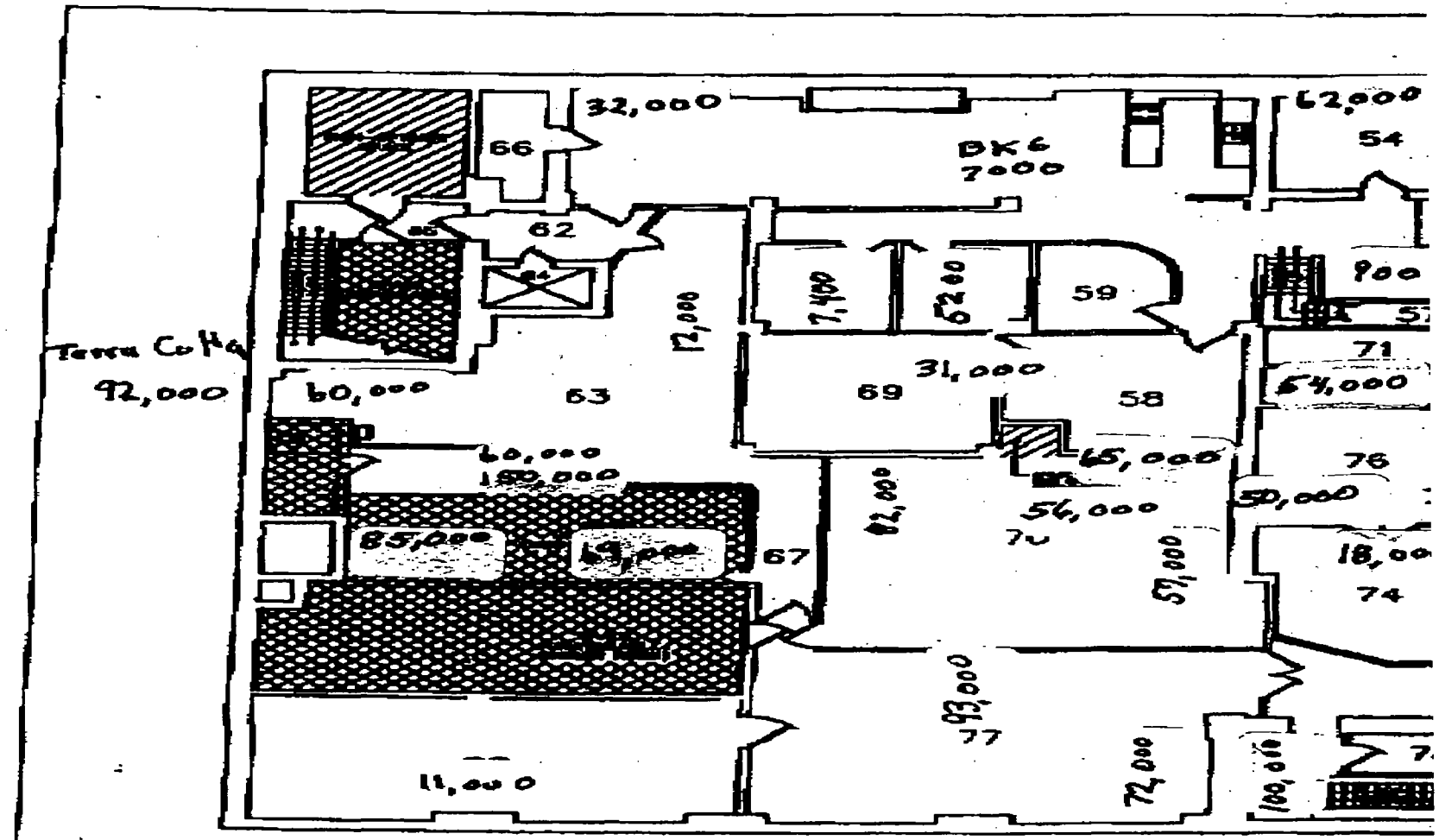
Mary L. Fulghum
Associate Regional Counsel

enclosures

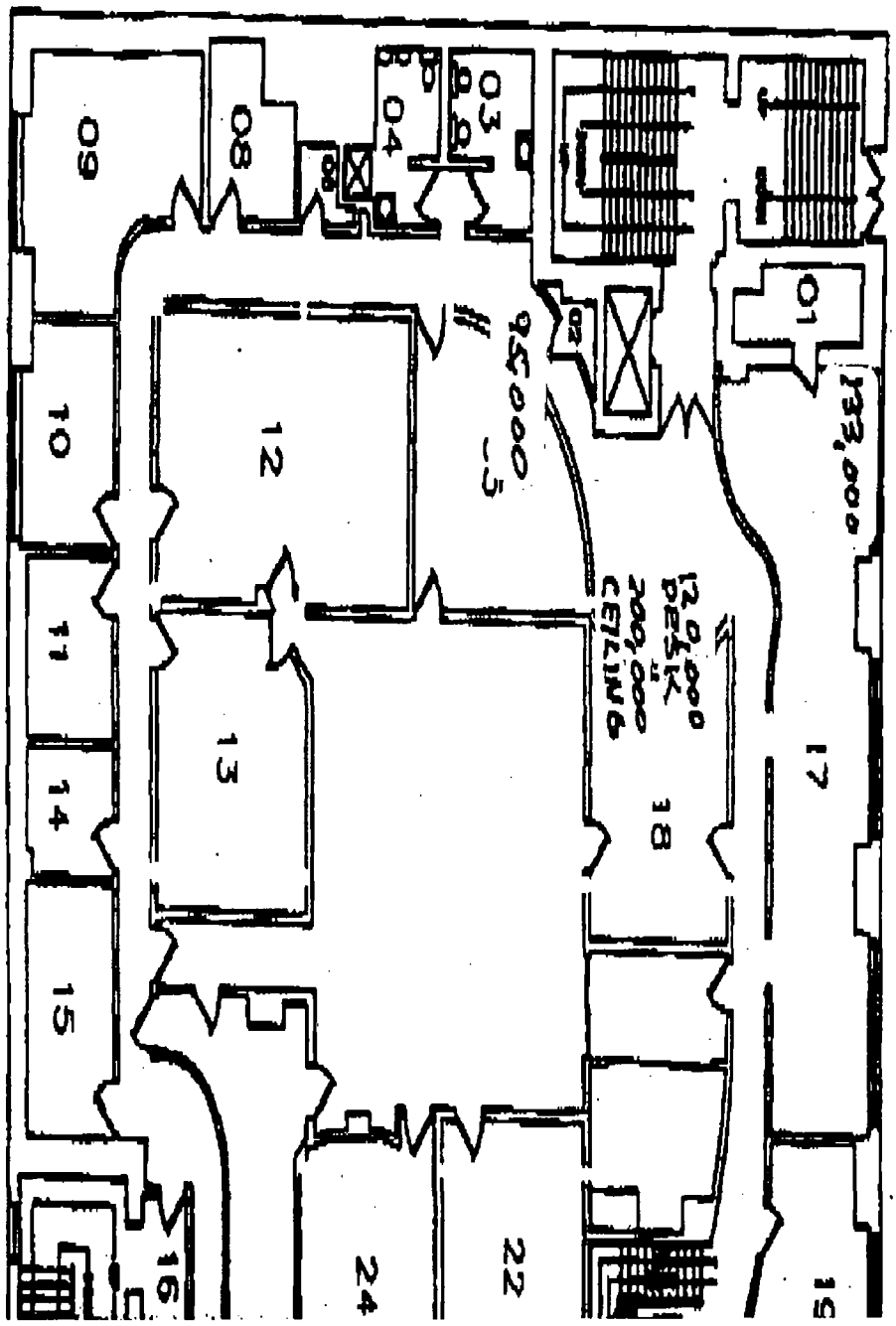
cc: Thomas P. Goresen, Kerr-McGee Chemical LLC w/encl.
Christopher W. Zibart, Foley & Lardner w/encl.
Mark Krippel, Kerr McGee w/encl.
Mort Ames, City of Chicago Counsel
Joseph Madonia, Wildman, Harrold
Richard Hickey, Hickey, Driscoll
Cathleen Martwick, U.S. EPA

Appendix 1

FIDLER MEASUREMENTS BY FLOOR

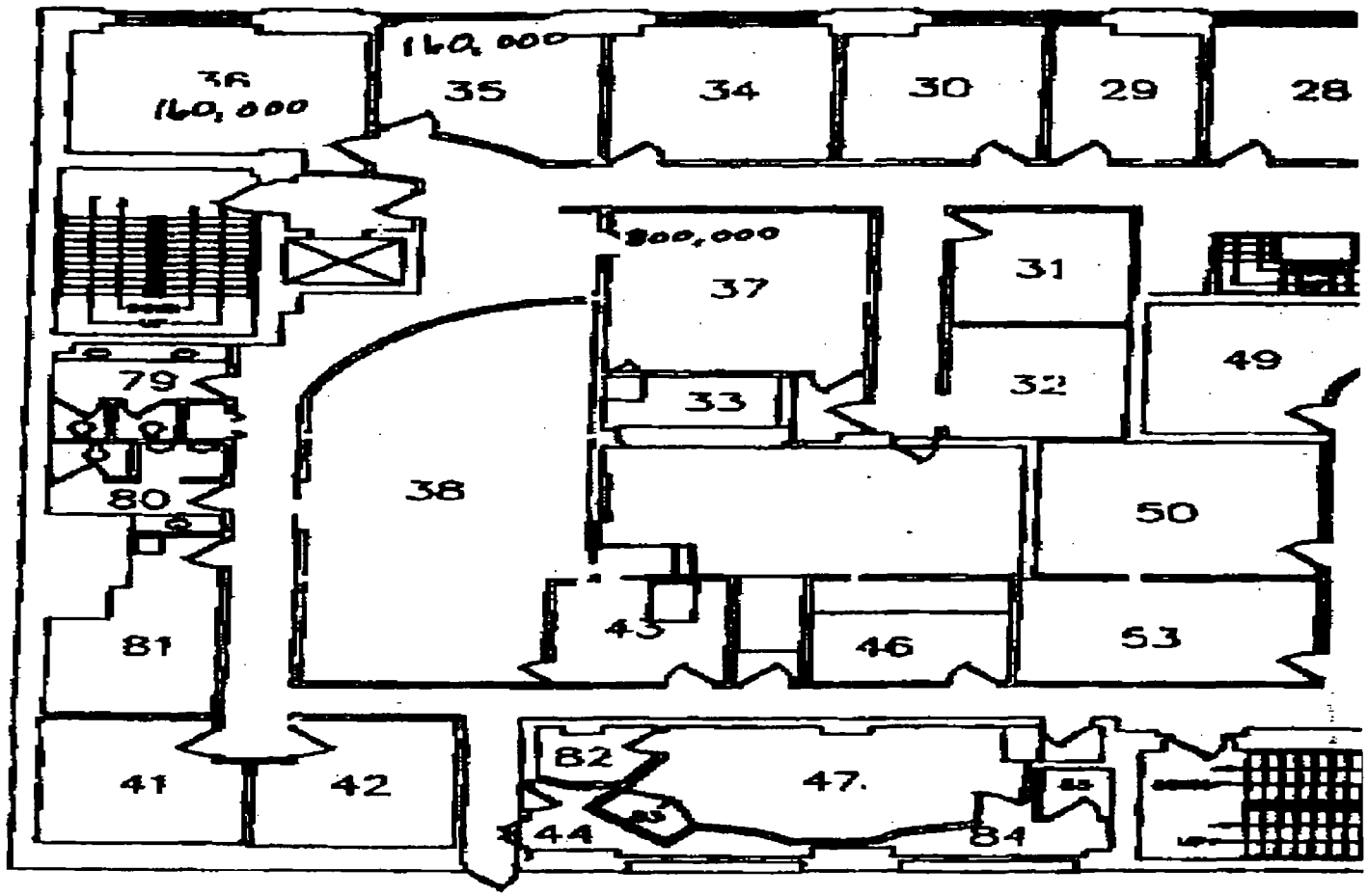


BASEMENT FLOOR PLAN
OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL 60611



1st FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611

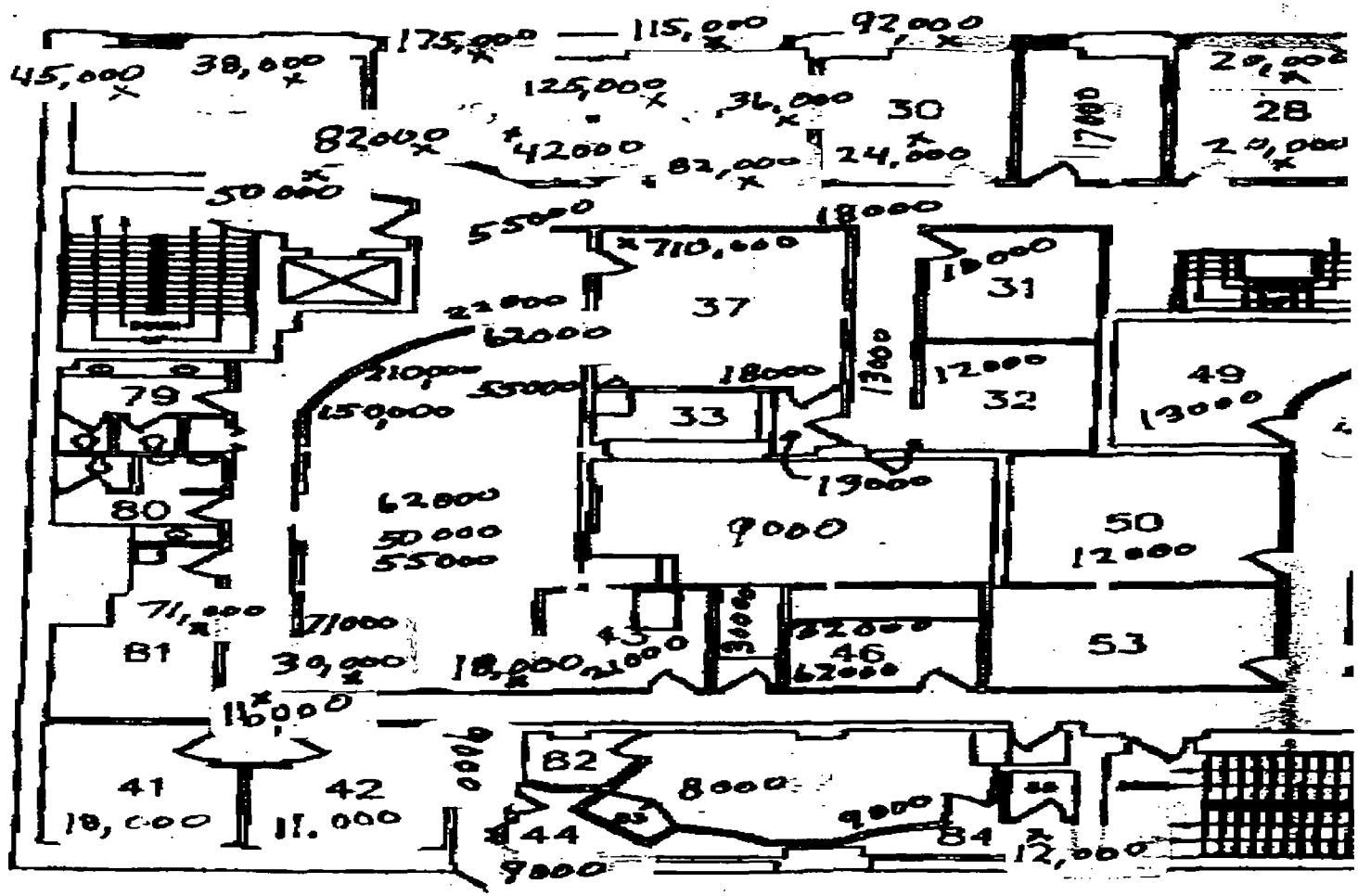


2nd FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL 60611

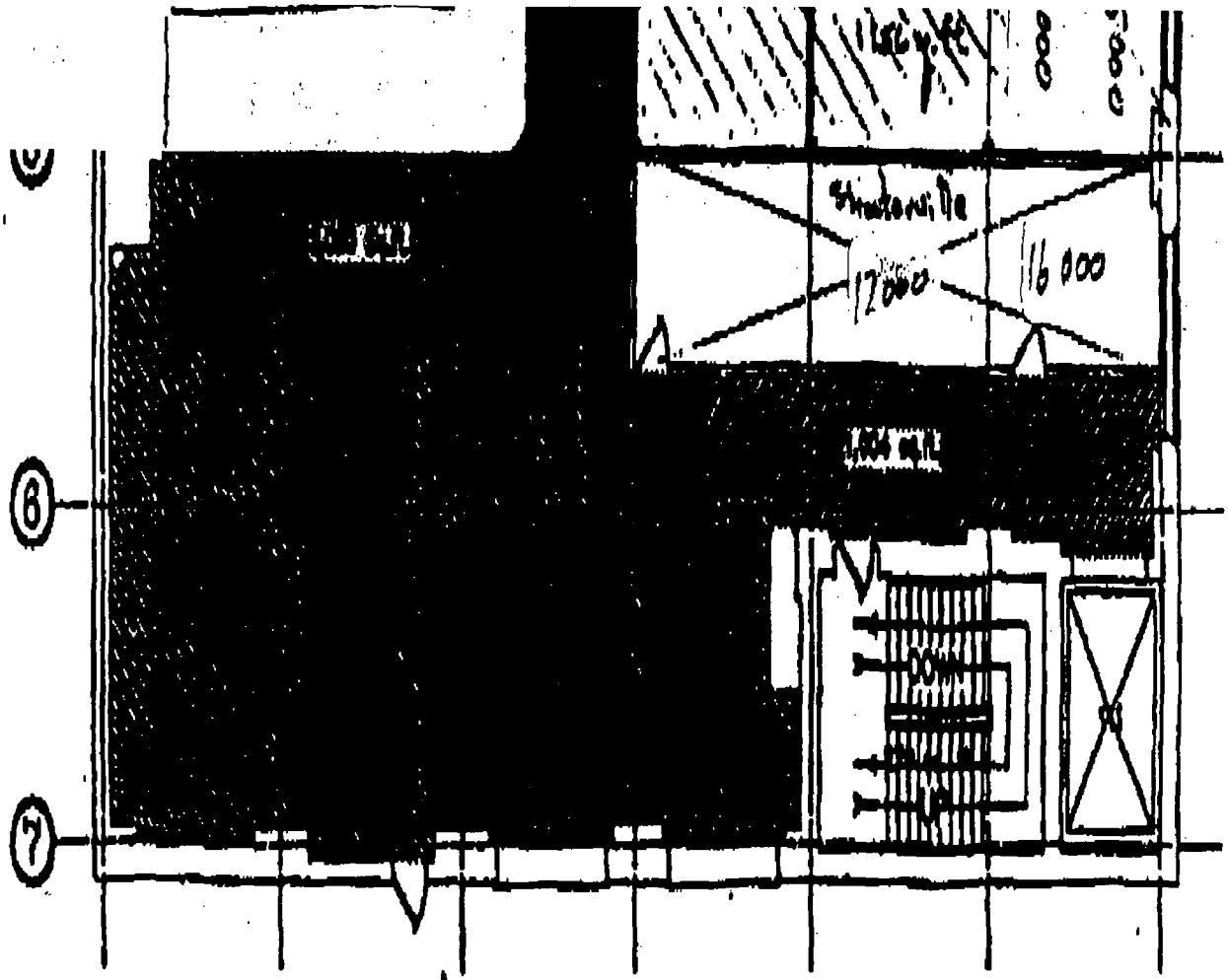
Appendix 2

SODIUM IODIDE 2 X 2 MEASUREMENTS



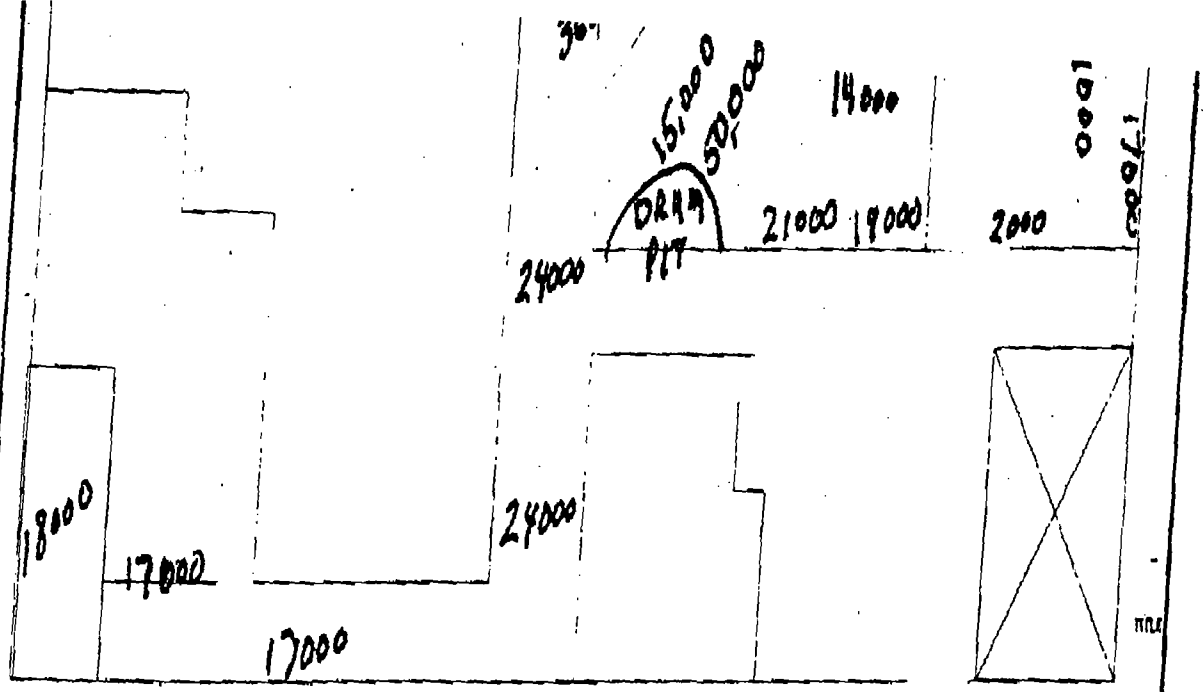
2nd FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL 60611



3rd Floor - 161 E. Grand Building

SCALE 1/16" = 1'-0"

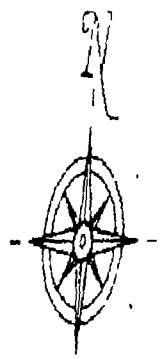


Floor Contact readings (unless indicated differently)

Readings include the correction factor

The instrument reads higher by a factor of 2.

LEGEND



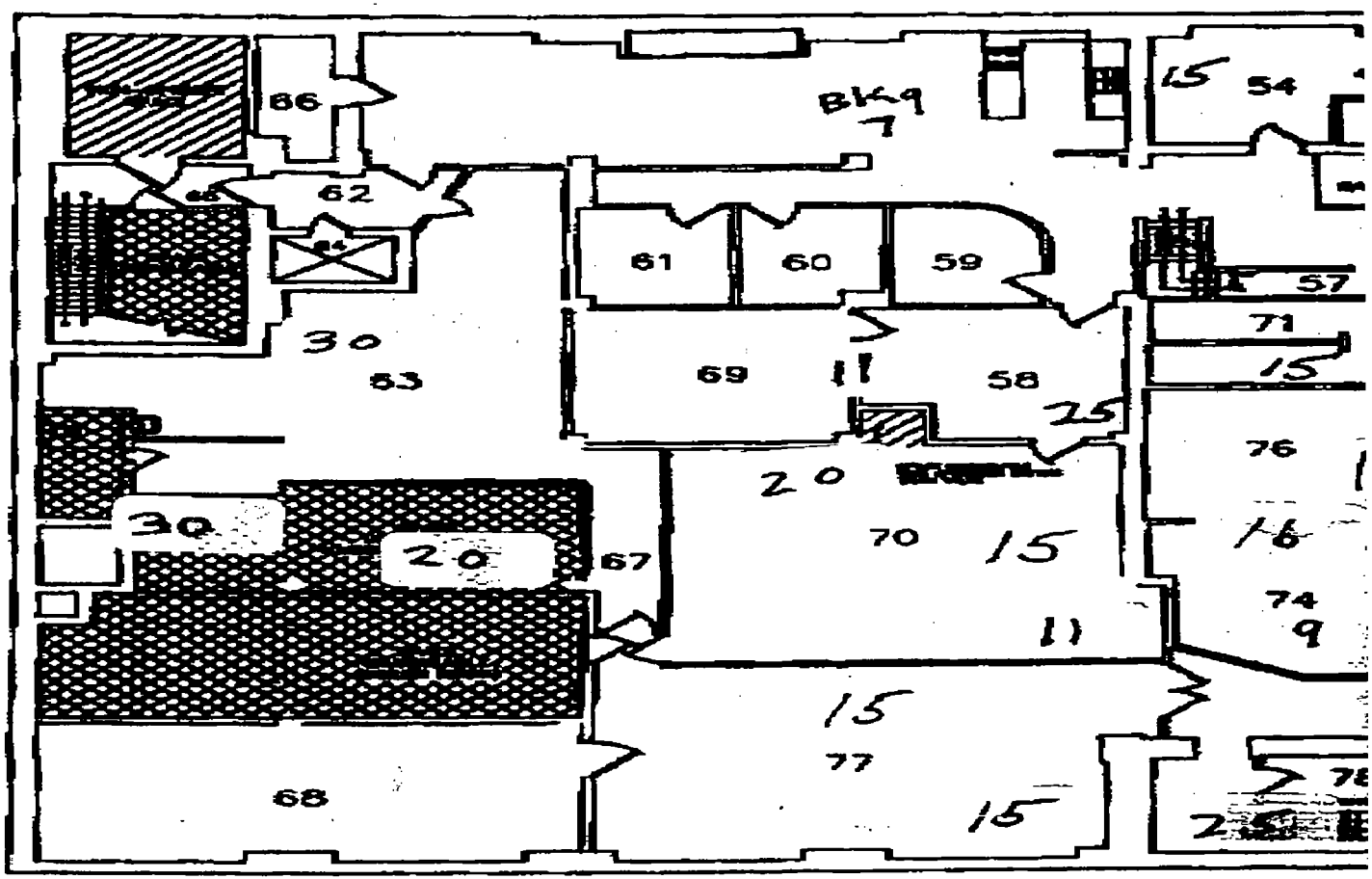
ecology and environment, inc.

Technical Assistance Team
Region V

TITLE 161 E. Grand Ave. 4th Floor (Streeterville)	FIGURE # Figure 4
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 15, 1993 REVISED

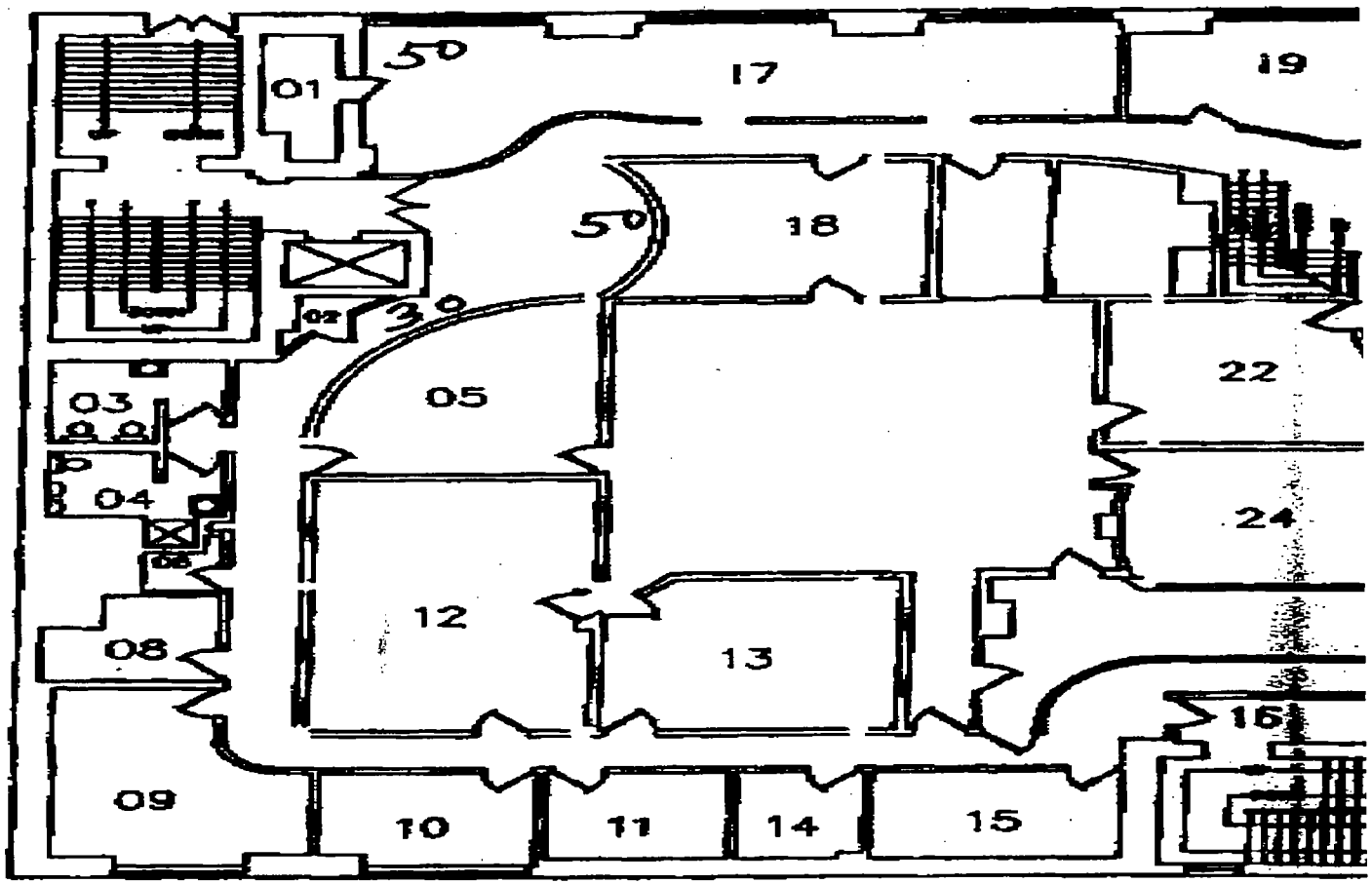
5TH FLOOR

Bicron micro rem m
(micro rem per hour, pre
(1 meter off floo



BASEMENT FLOOR PLAN
OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611

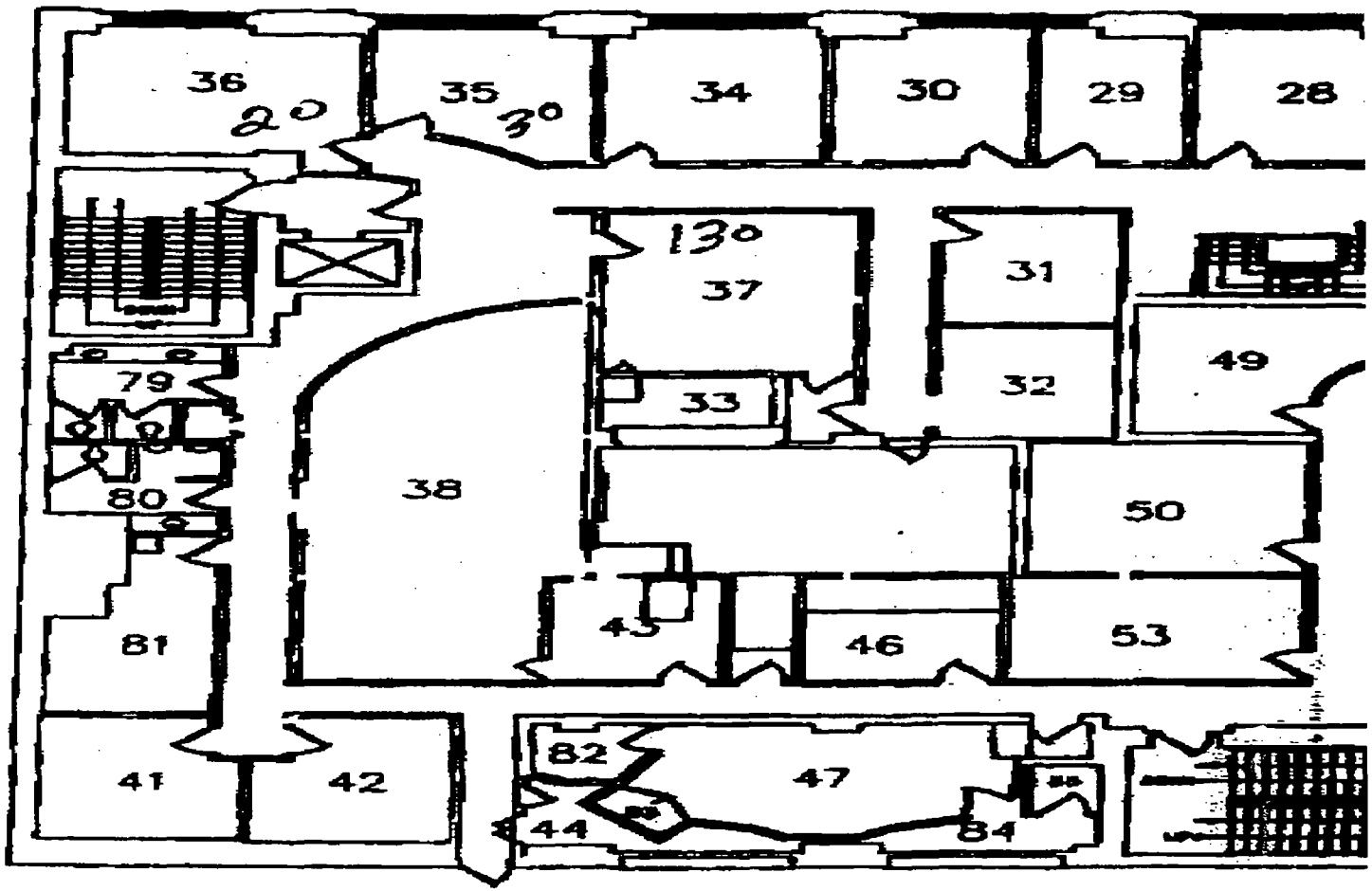
Bicron micro re
(microrem per hou
(1 meter off fl



1st FLOOR PLAN

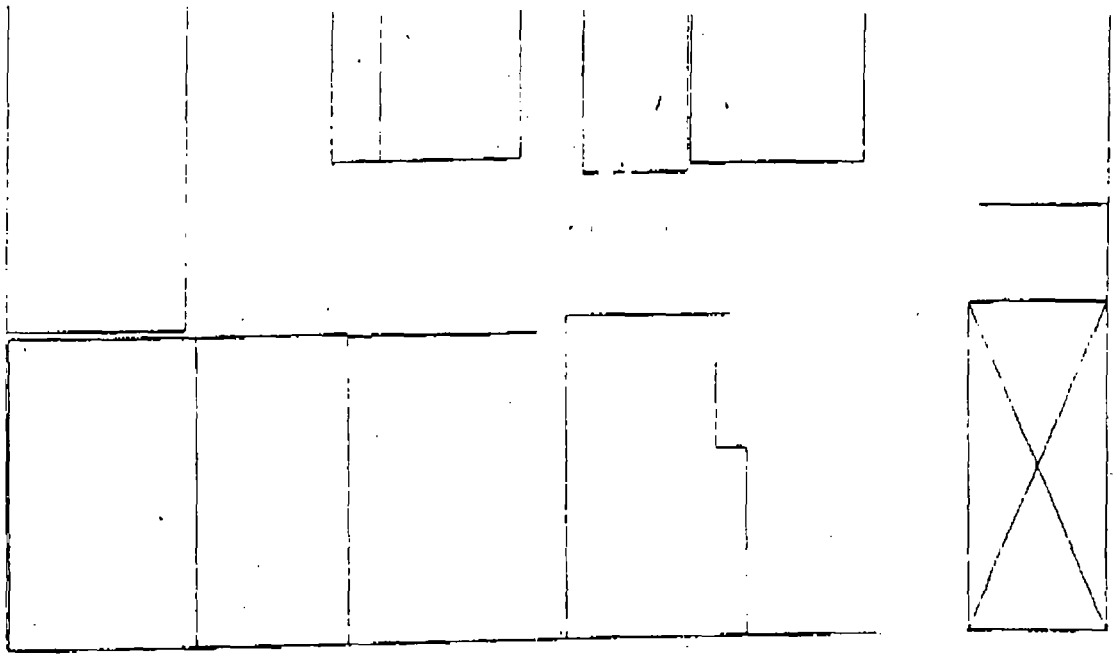
OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611

Bicron micro rem
(micro rem per hour,,)
(1 meter of floo

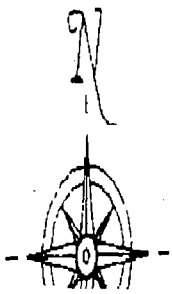


2nd FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611



Readings include correction factor
The instrument reads higher by a factor of 2



Appendix 4

MICRO R METER MEASUREMENTS

ecology and environment, inc.
Technical Assistance Team
Region V

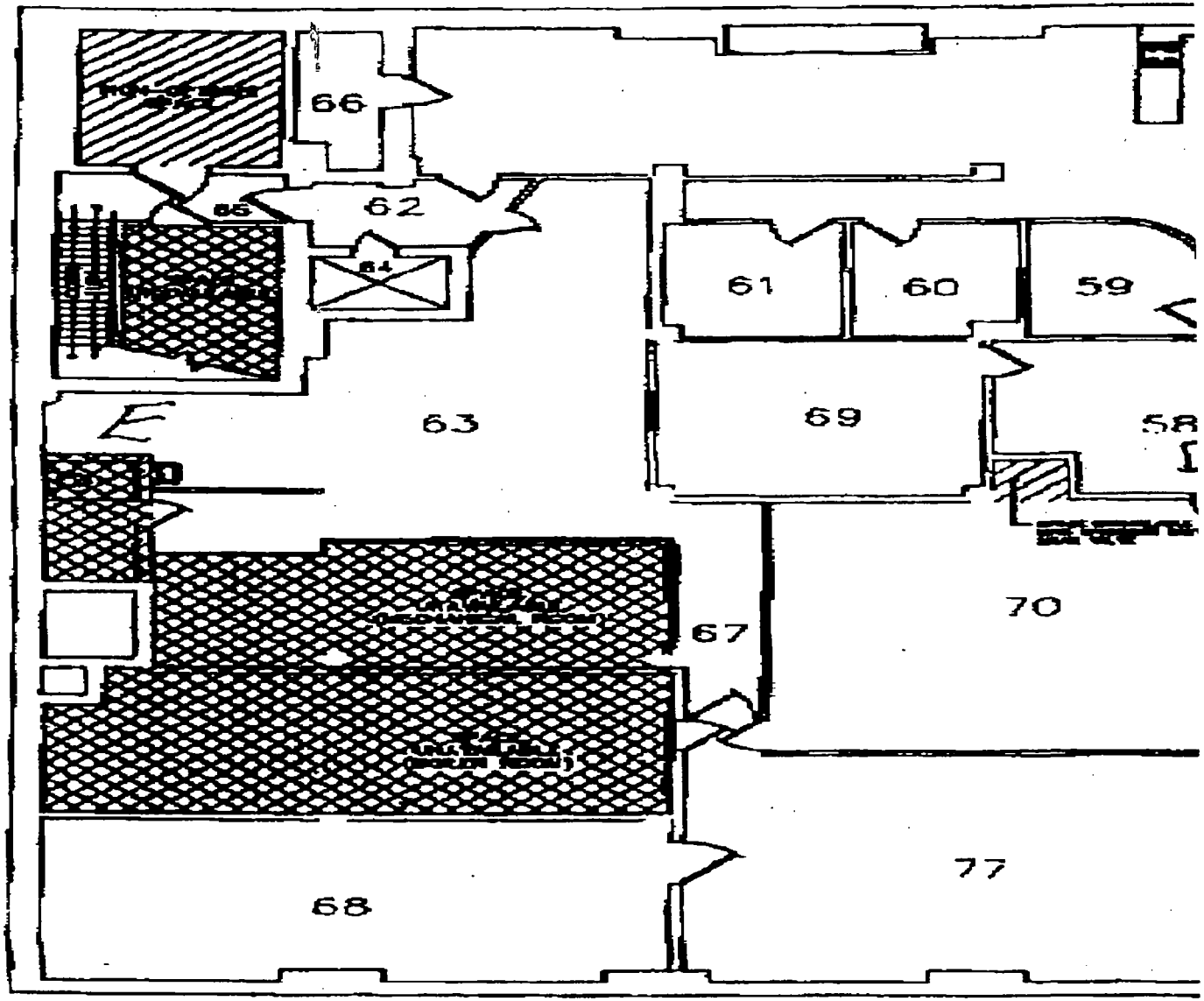
TITLE 161 E. Grand Ave. 2nd Floor (Optumus)	FIGURE # Figure 2
SITE Lindsay Light Company	TOD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993
	REVISED

Concentrations of radon-220 gas, radon-220 decay products, radon-222, a

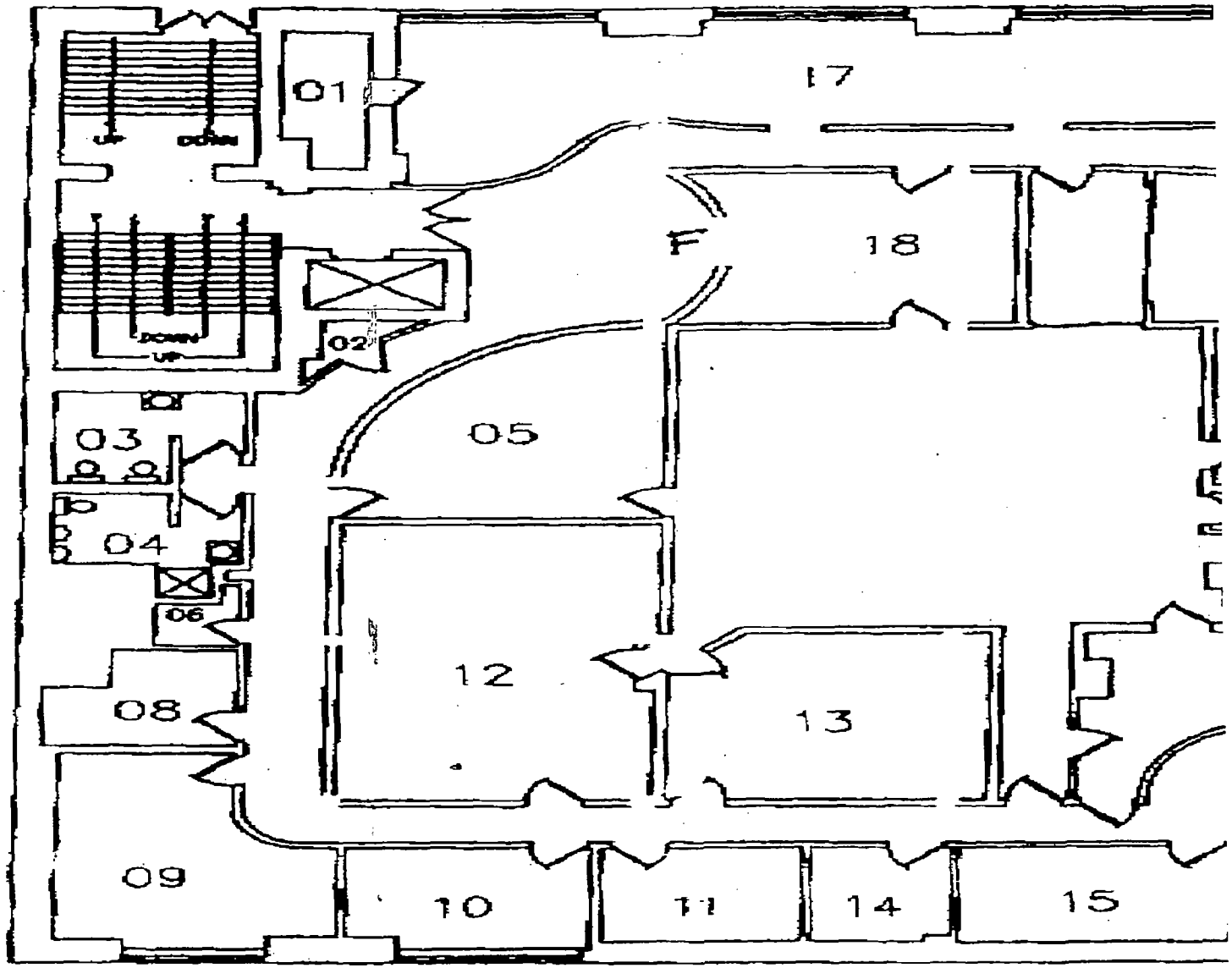
Area	Description	Radon-220 gas (pCi/L)	Radon-220 decay products (WL)	Rac (p
E	Basement Chimney	89.5	0.361	
D	Basement PC Workstation	2.0	0.008	
F	1st Floor Reception	4.9	0.020	
B	2nd Floor Room 35	#	#	
A	2nd Floor Room 36	2.8	0.011	
C	2nd Floor Room 37	0.6	0.002	
I	3rd Floor Room 84	4.8	0.019	
G	4th Floor Sound Mixing Room	2.0	0.008	
H	5th Floor Ledge over couch	3.6	0.015	

- data lost when electret accidently discharged

Negative concentrations treated as zero

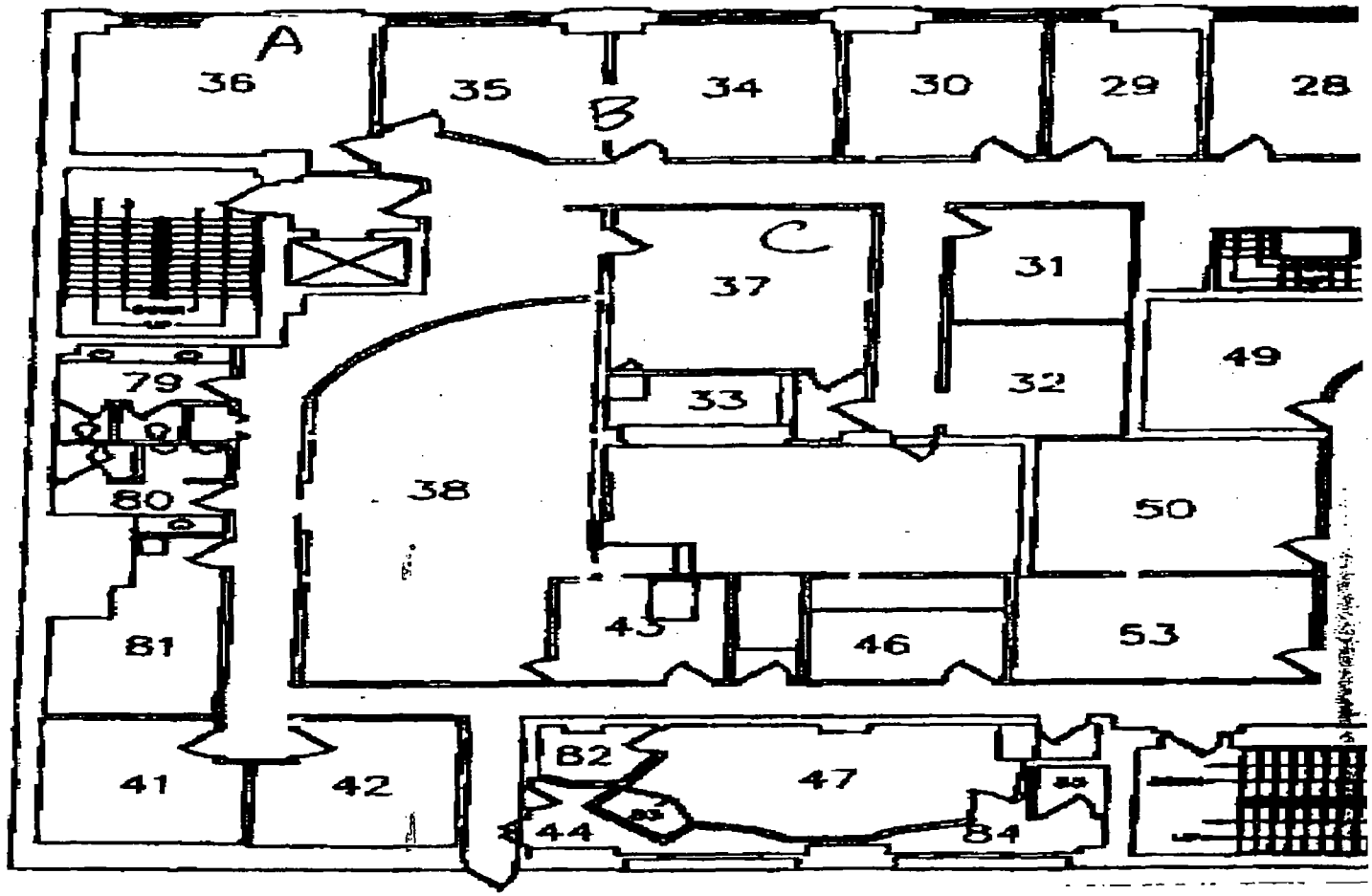


BASEMENT FLOOR PLAN
OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL 60611



1st FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611

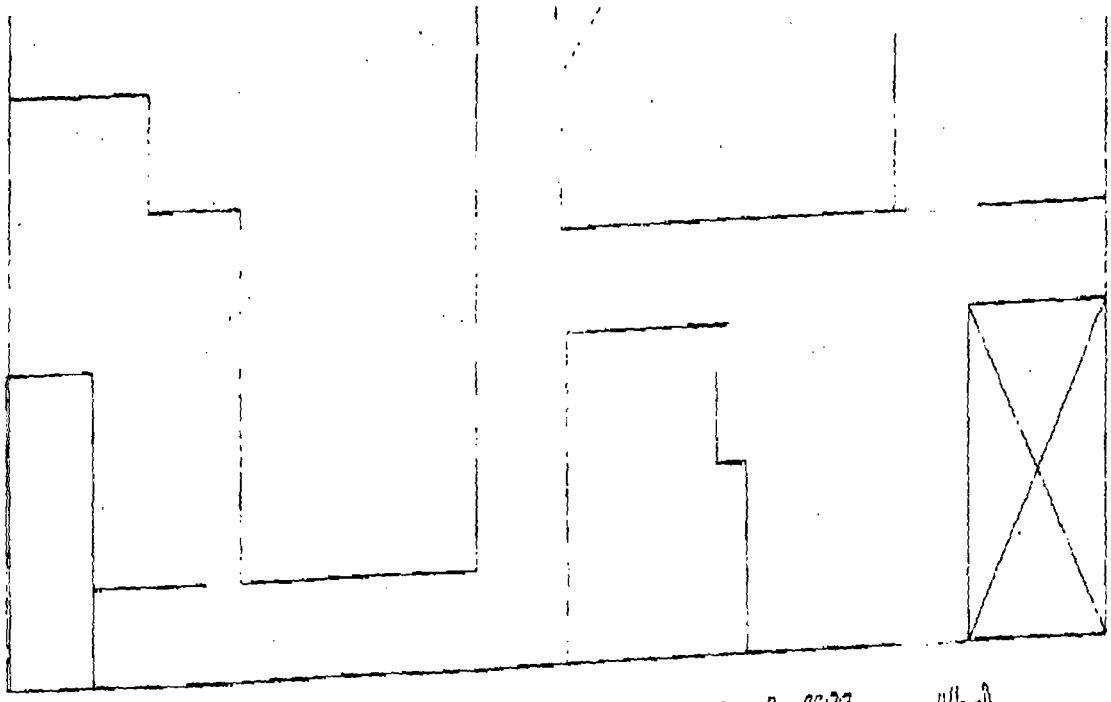


2nd FLOOR PLAN

OPTIMUS
161 EAST GRAND AVENUE
CHICAGO, IL. 60611

E - perm
Monitoring

TOTAL P.16

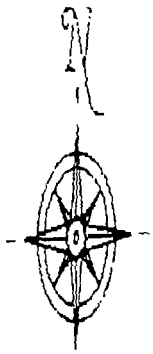


Floor Contact readings (unless indicated differently)

Readings include the correction factor

The instrument reads higher by a factor of 2.

LEGEND



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Region V

TITLE 161 E. Grand Ave. 4th Floor (Streeterville)	FIGURE # Figure 4
SITE Lindsay Light Company	TOD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 15, 1993
	REVISED

5TH FLOOR

Smears from basement floor near chimney

	Gross beta (pCi)	Gross alpha (pCi)
At base of wall	37.8	75.9
2 feet from wall	41.1	61.6
4 feet from wall	26.0	53.7
6 feet from wall	21.5	33.8
8 feet from wall	22.2	39.9
10 feet from wall	16.6	36.9

Material from in and around chimney

Thorium Decay Series	At wall (pCi/g)	Duplicate At wall (pCi/g)	2 feet from wall (pCi/g)	4 feet from wall (pCi/g)	6 feet from wall (pCi/g)	fr
Th-232						
Ra-228		14.3		10.3		
Ac-228						
Th-228						
Ra-224	16.4	18.2				
Rn-220						
Po-216						
Pb-212	16.4	15.7	14.0	9.8	8.23	
Bi-212						
Po-212						
Tl-208	4.21	4.80	2.98	3.4	2.84	

Uranium Decay Series	At wall (pCi/g)	Duplicate At wall (pCi/g)	2 feet from wall (pCi/g)	4 feet from wall (pCi/g)	6 feet from wall (pCi/g)	fr (
U-238						
Th-234						
Pa-234m						
U-234						
Th-230						
Ra-226						
Rn-222						
Po-218						
Pb-214						
Bi-214						
Po-214						
Pb-210						
Bi-210						
Po-210						

Other	At wall (pCi/g)	Duplicate At wall (pCi/g)	2 feet from wall (pCi/g)	4 feet from wall (pCi/g)	6 feet from wall (pCi/g)	f
K-40	11.4			9.4	15.7	

APPENDIX

Material from in and around chimney

Thorium Decay Series	Concentration (pCi/g)	Duplicate Concentration (pCi/g)	Average Concentration (pCi/g)
Th-232			
Ra-228	90.5	84.3	87.4
Ac-228			
Th-228	101	84.4	92.7
Ra-224	105	93.7	92.7
Rn-220	211	90.8	99.4
Po-216			
Pb-212	97.6	90.9	94.3
Bi-212	87.4	82.2	84.8
Po-212			
Tl-208	30.2	27.5	28.9

Uranium Decay Series

U-238
Th-234
Pa-234m
U-234
Th-230
Ra-226
Rn-222
Po-218
Pb-214
Bi-214
Po-214
Pb-210
Bi-210
Po-210

Other	Concentration (pCi/g)	Duplicate Concentration (pCi/g)	Average Concentration (pCi/g)
K-40	18.0	17.6	17.8
Tl-201		1.80	

Removable material on booties

			Gross Alpha (cpm)
Blank bootie			2.4
Fred's booties			
	Bootie 1	Side 1	5.2
	Bootie 1	Side 2	5.0
	Bootie 2	Side 1	7.2
	Bootie 1	Side 2	4.6
Larry's booties			
	Bootie 1	Side 1	10.8
	Bootie 1	Side 2	4.0
	Bootie 2	Side 1	9.6
	Bootie 1	Side 2	3.8

G. Pilcher
B. Green
FYI

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
(AT-18J)

OCT 1 1 1995

Dan White
Kerr-McGee Chemical Corporation
Kerr-McGee Center
Oklahoma City, Oklahoma 73125

Dear Mr. White:

Pursuant to our conversations on September 8, 1995, I am enclosing copies of data associated with the Lindsay Light Company Building in Chicago, Illinois. Specifically,

1. Site Assessment Report for Lindsay Light Company Site, [TDD: T05-9305-014, PAN: EIL0794SAA], August 2, 1993.

2. Thermoluminescent dosimeter results, figures 1-4, dated July 16, 1993.

3. Recommendation of the Agency for Toxic Substances and Disease Registry, dated September 14, 1993.

If you have any questions on this material, please feel free to call me at (312) 886-5026.

Sincerely yours,

Larry Jensen

Larry Jensen, CHP
Regional Radiation Expert
Radiation and Indoor Air Section

RECEIVED
OCT 1 6 1995
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N. ZUSMAN
B. GURIA
D. REGEL

ARD:ATRB:RAIS:JENSEN:lj:10/10/95 DISKETTE/FILE: F: JENSEN.4

SITE ASSESSMENT REPORT
FOR
LINDSAY LIGHT COMPANY SITE
U.S. EPA ID: N/A
SSID#: N/A
TDD: T05-9305-014
PAN: EIL0794SAA

August 2, 1993

Prepared By: Ronald W Bugg Date: 8/5/93

Reviewed By: William Sass Date: 8/5/93

Approved By: [signature] Date: 8/5/93

ecology and environment, inc.

111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415

International Specialists in the Environment

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3.0	SITE ACTIVITIES	3
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1.0 SITE DESCRIPTION

The Lindsay Light Company Building : a four story commercial building located at 161 E. Grand, at t corner of Grand Avenue and St. Clair Street, in Downtown Chicago, Illinois. Grand Avenue is about one-half mile north of the central Chicago "Loop" area. The geographical location is 41° 53' 30" north latitude and 88° 36' 30" west longitude (See Figure 1 for site location). The site is currently being occupied several companies including audio/video production companies called Optimus and Streeterville Studio, Inc..

2.0 SITE HISTORY

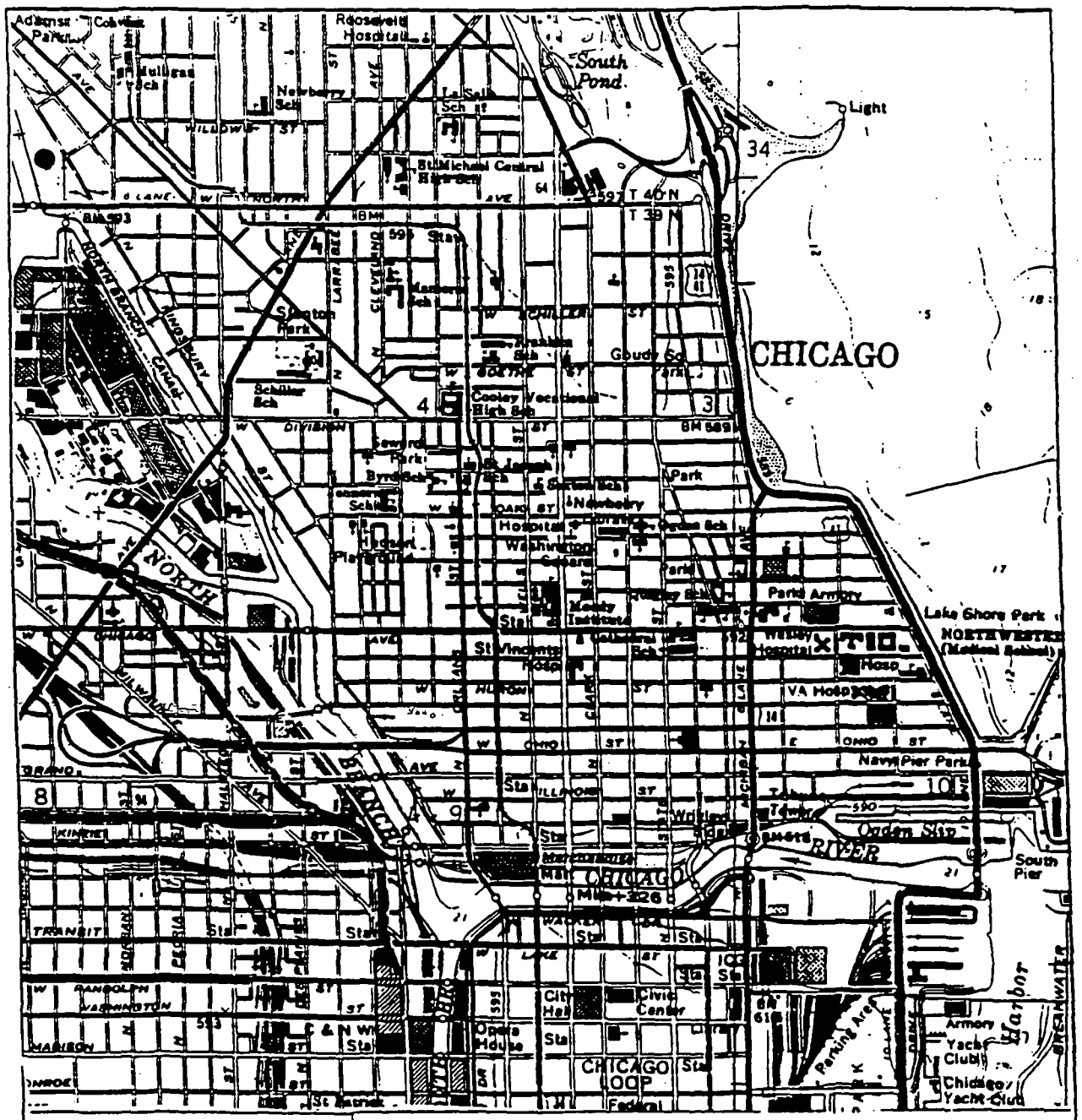
The Lindsay Light Company manufactured incandescent gas mantles for home and street lighting in this building from at least 1910 until 1936. Lindsay Light moved to West Chicago and was later purchased by American Potash, which was later purchased by Kerr McGee Chemical Company in 1967. The principal ingredient in gas mantle manufacture are the gauze mantle bags which were dipped into thorium nitrate solution. Small amounts of cerium, beryllium and magnesium nitrates were also used. The present owners of the building, Browne and Storch, a real estate firm, purchased the building in 1978.

In August of 1981, The building owners attempted to decontaminate part of the second and fourth floor. The building owners hired Radiation Safety Services (RSSI) to determine the contaminated areas. RSSI identified areas of gamma dose rate at one meter above the floor in the building. Any readings above 100 micro-Roentgen per hour at one meter above the floor were candidates for decontamination. The building owners supplied the laborers and tools to assist RSSI in decontamining the second and fourth floor.

After the area of oak floor was determined to be contaminated, the floor was removed. All subflooring found to be contaminated was either removed or chiseled down a half inch. The decontamination was only performed on occupied work areas.

During June of 1983, as part of the U.S. EPA survey, 7 film badges were placed at specific locations of concern to collect dose measurements. The range of the 25 day gross dose equivalent ranged from minimal (5 badges) to 20 millirem (2 badges).

In February 1984, The building owners began reconstruction on the second floor. Prior to performing the reconstructioning project, RSSI conducted one hour training on radiation and collected wipe samples at the areas of concern. RSSI surveyed the area while the removal of the contaminated material was being conducted.



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Region V

TITLE: Site Location Map	FIGURE #: Figure 1
SITE: Lindsay Light Co.	SCALE: 1 : 24,000
CITY: Chicago IL	PAN: EILO797SAA

3.0 SITE ASSESSMENT

At 1700 hours, on June 2, 1993, U.S. EPA On-Scene Coordinator (OSC) Verneta Simon, U.S. EPA Emergency Response Team (ERT) Art Ball, U.S. EPA Air and Radiation Division (ARD) personnel Larry Jensen, Betsy Karr, and Michael Murphy, Illinois Department of Nuclear Safety (IDNS) representatives Tim Runyon and Vince Muzzalupo, and Technical Assistance Team (TAT) member Ron Bugg met with the building manager Ron Steele of 161 E. Grand Associates to perform a site assessment using gamma survey meters. The meters used were Micro-R meters, Ludlum Model 19 (measuring in micro-Roentgens per hour), radiation count rate meter with a sodium iodide (NaI) probe (measuring in counts per minute (cpm)) and a radiation count rate meter with an alpha probe (cpm). The four floor building, plus a basement was divided into floors to conduct a survey readings throughout each floor.

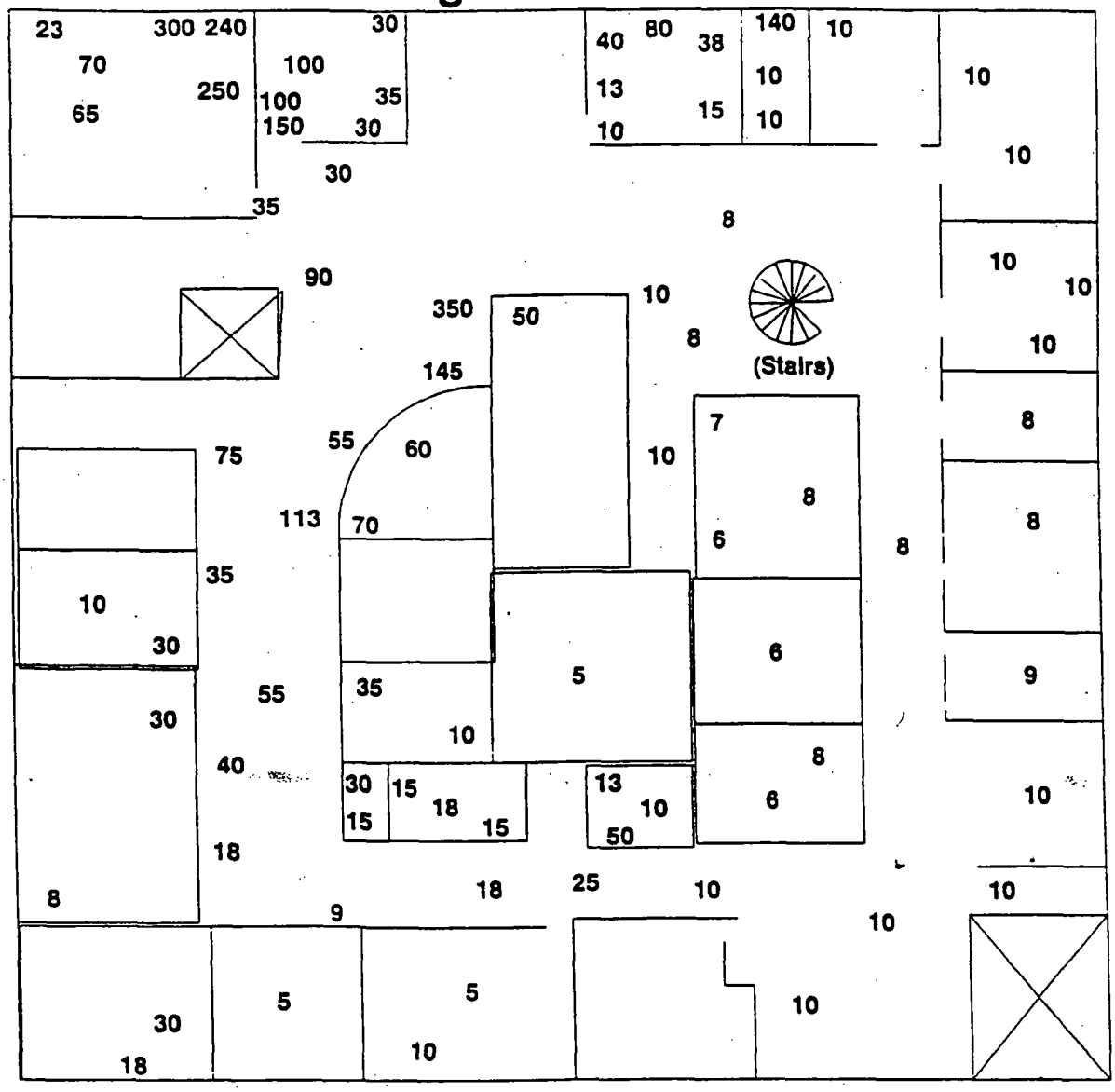
At 1745 hours, the group began to perform monitoring of the third floor with the micro-R meter and radiation monitors using a NaI probe. Due to the Ludlum Model 19 crystal over response to thorium, the levels were compensated by dividing the readings by a factor of 2. The correction factor was determined by comparing the results to other comparable instruments. All readings are gross exposure, no background subtraction, and are measured at contact. The background for the area was determined to be 6 micro-R/hr for naturally occurring radiation. The micro-R meter reading of the northwest corner office was as high as 95 micro-R/hr and 110 in a studio area near the west side of the building (See Figure 3 for third floor results). During the surveying of the third floor, The main party split up into two groups. OSC Simon, ERT Ball, IDNS Muzzalupo, and TAT Bugg (group 1) prepared for surveying the fourth floor. The remaining individuals (group 2) continued to survey the third floor.

At 1830 hours, group 1 began surveying the fourth floor. Group 1 could only perform a partial survey on the fourth floor due to the recording session in the booth located on the east section of the floor. The area where work was performed by the building owners contractor in 1987 to remove an area of contaminated material, had a reading of 350 micro-R/hr at floor contact and 200 microR/hr waist high (See Figure 4 for fourth floor results).

At 1900 hours, Group 2 conducted the survey on the second floor. The northwest corner office had high readings of up to 300 micro-R/hr. A window of the east adjacent room from the corner office had readings of 80 micro-R/hr (See Figure 2 for second floor results).

At 1920 hours, group 1 began to survey the first floor. Ron Steele requested the survey be performed away from the northeast section of the floor due to a client presentation that was taking place in that area. Group 1 began to survey the front lobby and the

Reading: micro-R/hr



Readings include correction factor
The instrument reads higher by a factor of 2

N

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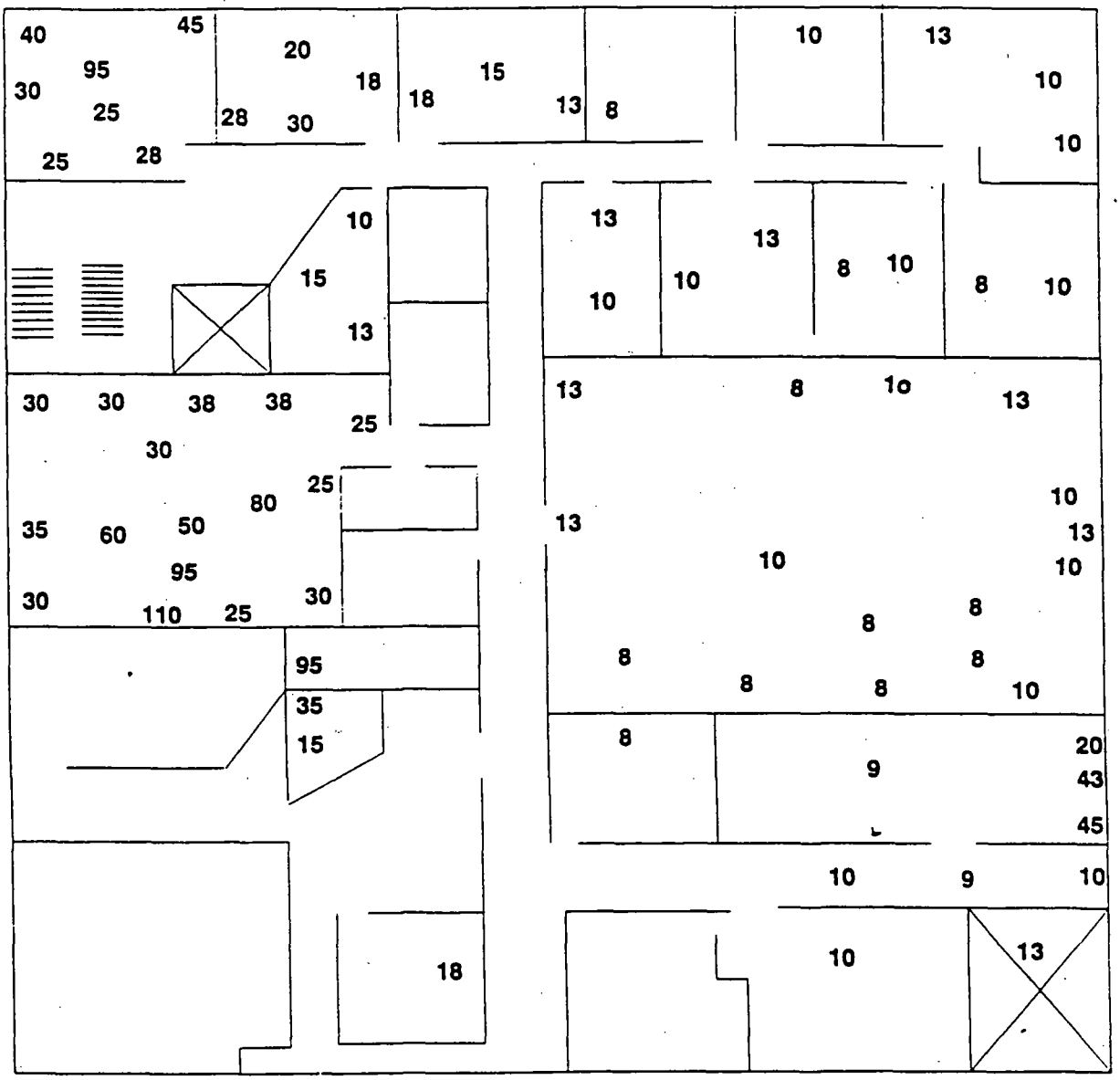
Region V

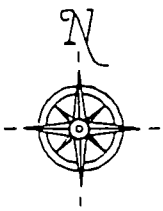
TITLE 161 E. Grand Ave. 2nd Floor (Optumus)	FIGURE # Figure 2
SITE Lindsay Light Company	TDO# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993 REVISED

Readings: Micro-R/hr



Floor Contact Readings
Readings include the correction factor
The instrument reads higher by a factor of 2

LEGEND



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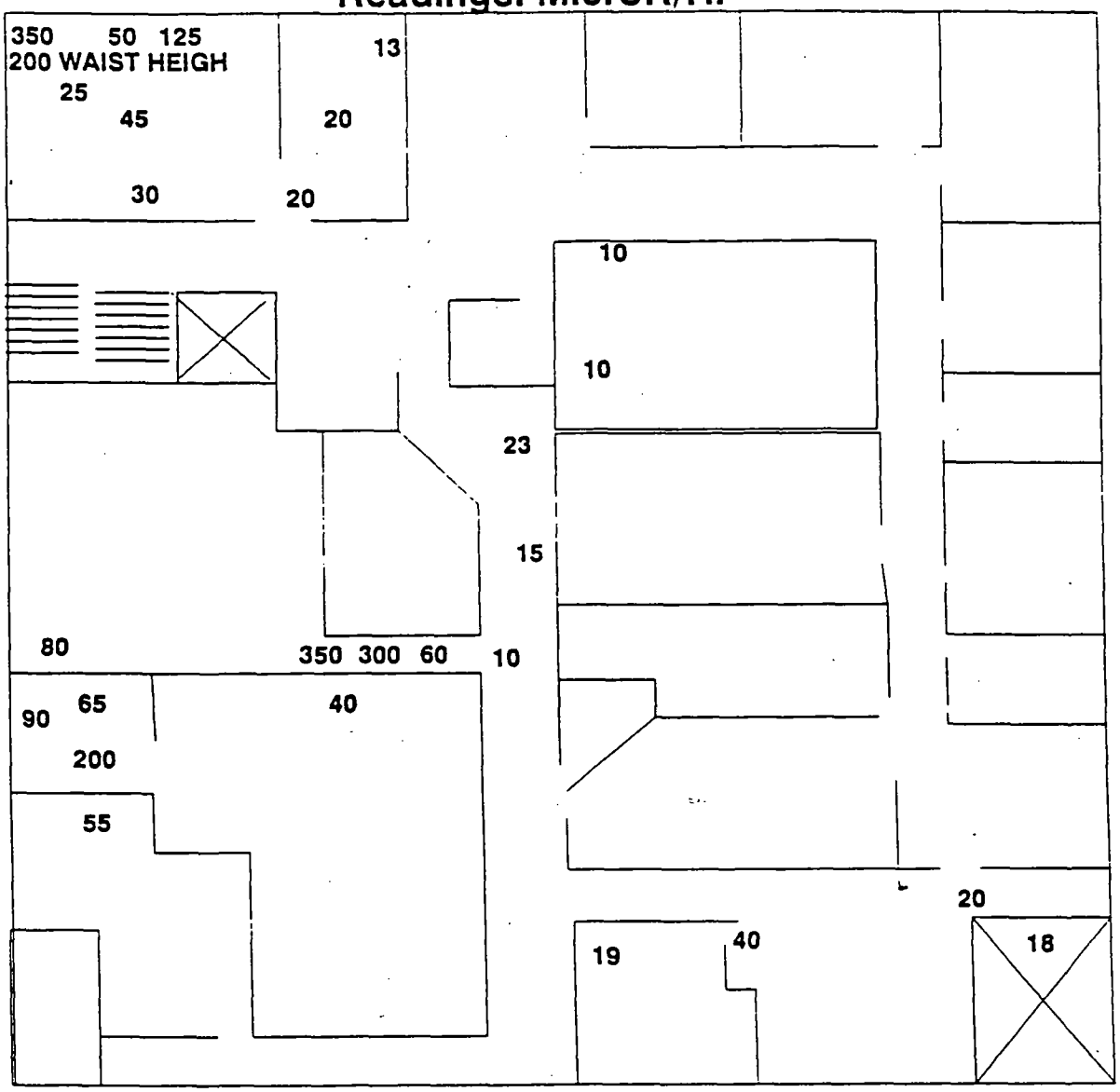
TITLE 161 E. Grand 3rd Floor (Optumus)	FIGURE # Figure 3
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993
	REVISED

Readings: MicroR/Hr

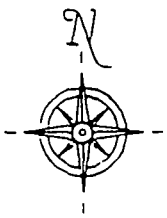


Floor Contact readings (unless indicated differently)

Readings include the correction factor

The instrument reads higher by a factor of 2.

LEGEND



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Region V

TITLE 161 E. Grand Ave. 4th Floor (Streeterville)	FIGURE # Figure 4
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 15, 1993 REVISED

secretary area in the northwest corner of the floor. The reading near the secretary was 100 micro-R/hr. The lobby area ranged from 30 to 75 micro/hr (See Figure 5 for first floor results).

At 2000 hours, group 1 began to survey the basement area. The area of concern in the basement with the highest gross exposure rate was measured on contact with a concrete plug in the chimney. The micro-R survey indicated level of 2,250 micro-R/hr at contact of the chimney and 250 micro-R/hr at one meter away from the chimney (See Figure 6 for basement results).

At 2015 hours, group 2 completed the second floor survey and assisted group 1's survey of the basement. Near the central area of the basement where records were kept in storage, the micro-R read 20 to 100 uR/hr. Readings of 18 to 20 micro-R/hr were found near the freight elevator. Group 1 also surveyed the stairs leading into the building area (See Figure 5 for result).

At 2040 hours, the OSC, ERT member, ARD representatives, IDNS representatives, and TAT went over the results with the building spokesman Ron Steele. It was suggested that due to the high readings from the chimney, the janitor's supplies near the chimney should be immediately relocated. After the meeting the groups left the site at 2100 hours.

On June 30, 1993, 12 thermoluminescent dosimeter (TLD) badges were placed near occuppied work areas throughout the four story building for one month.

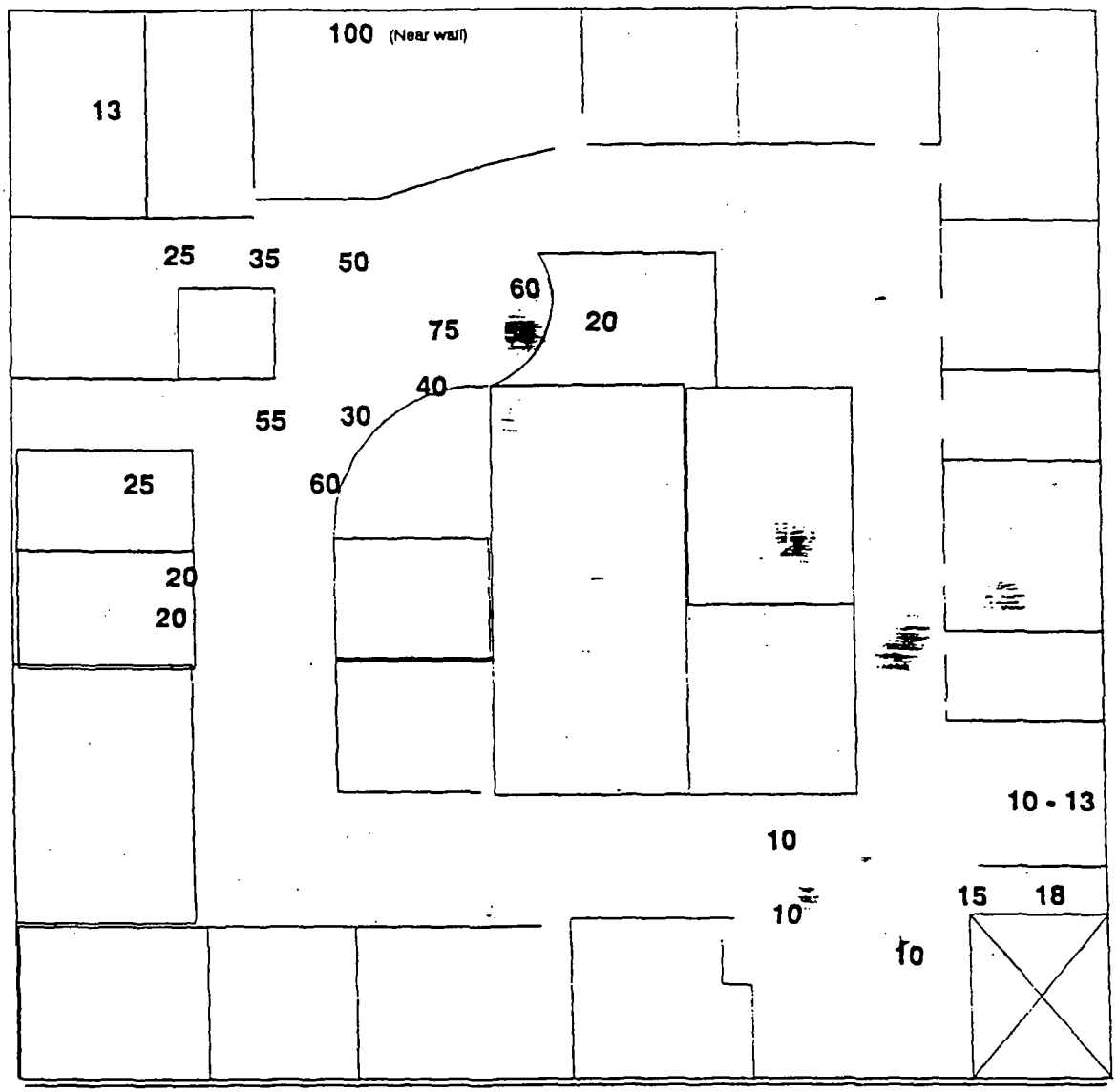
4.0 ANALYTICAL RESULTS

The results of the survey revealed the presence of radioactive material in flooring and chimney which potentially contains contaminated waste ash. Earlier work performed by the building owner's contractor determined that the thorium materials appeared to have been absorbed into porous flooring material and possibly spread due to flood caused by a leaking roof. The analytical results were not available for the wipe sample and the TLD badges.

5.0 DISCUSSION OF POTENTIAL THREATS

The conditions at the former Lindsay Light site at 161 E. Grand, Chicago, Illinois that may warrant a removal action, as set forth in paragraph (b) (2) of Section 300.415 of the National Contingency Plan (NCP), included:

<u>Actual or potential exposure to nearby populations, animals, or the food chain from hazardous substances or pollutants or contaminants:</u> The site investigation with micro-R meter indicated substantially elevated levels of radioactivity in several areas throughout the



Readings include correction factor of 2
The instrument reads higher by a factor of 2

LEGEND

N

Readings: MicroR/Hr

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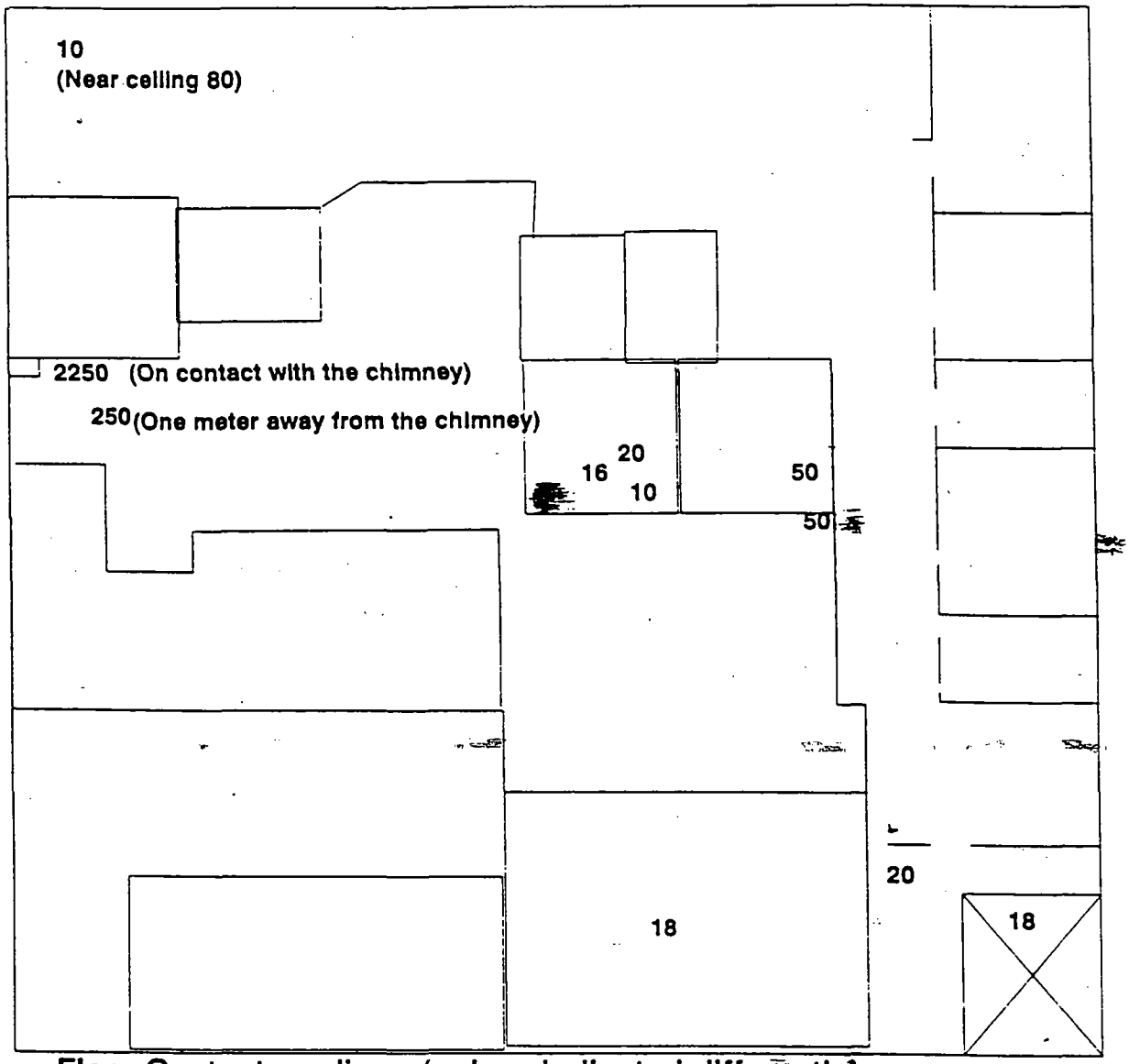
Region V
111 W. Jackson Blvd., Chicago, Illinois 60604

TITLE: 161 E. Grand Ave. 1st Floor Readings Optumus	FIGURE #: Figure 5
SITE: Lindsay Light Co.	SCALE: T05-9305-014
CITY: Chicago STATE: IL	PAN: Not to Scale
SOURCE: Instrument: Ludlum Model 19	DATE / REVISED

Readings: Micro-R/hr



Floor Contact readings (unless indicated differently)

Readings include the correction factor

The instrument reads higher by a factor of 2

LEGEND

N

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Region V

TITLE 161 E. Grand Ave. Basement (Optumus)	FIGURE # Figure 6
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993 REVISED

building. Gamma-ray emissions from the radioactive thorium decay series producing potential human exposures will continue as long as contaminants remain in the building. Continual gamma-ray exposure increases the risk for cancer due to ionizing radiation. Thorium dust may cause an increase chance of developing cancer of the lung decades after being exposed. Ingestion of thorium can increase the risk of liver cancer. Thorium radiactively decays to radon-220 and then to its decay products. Radon-220 decay products con increase thr risk of lung cancer.

Other situations or factors that may pose threats to public health or welfare or the environment.

Due to the contaminant of concern, one may be exposed to radioactive isotopes and the effects may occur many years after exposure. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium-232 has a half-life of 14 billion years. Several daughter products of concern are Radon-220 and Radon-222 (See Table 1 for Thorium Decay Series).

6.0 CONCLUSION

After conducting the survey at 161 E. Grand Street, formerly Lindsay Light Company site, had readings 400 times greater than background. High exposure rates were found in work areas and near the chimney in the basement. The latter indicated radioactive material inside the chimney. The isotope of concern is believed to be thorium. To determine the level of radiation, TLD badges were placed near the work areas that had high micro-R meter readings.

APPENDIX A

SITE PHOTOGRAPHS

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

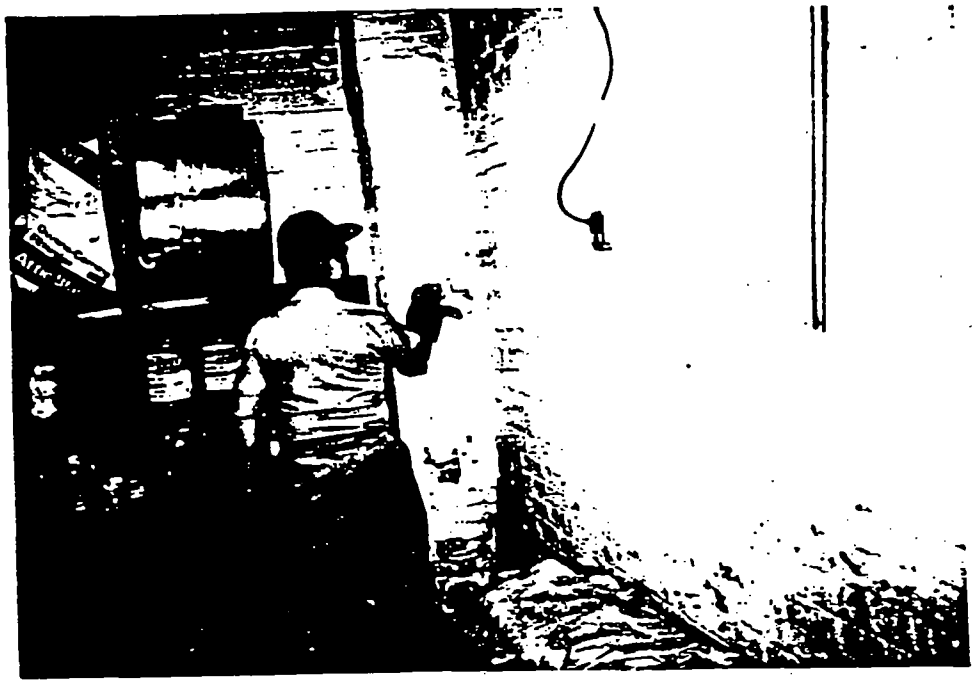
TIME: 2030

DIRECTION OF PHOTOGRAPH: West

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact of the chimney (2250 uR/hr). The chimney is located near the northwest section of the basement.

DATE: 6/2/93

TIME: 2030

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The janitors area located near the chimney. One meter away from the chimney the readings were reduced by a factor of 10.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID:

TDD: T05-9305-014

PAN:EIL0794SAA

DATE: 6/2/93

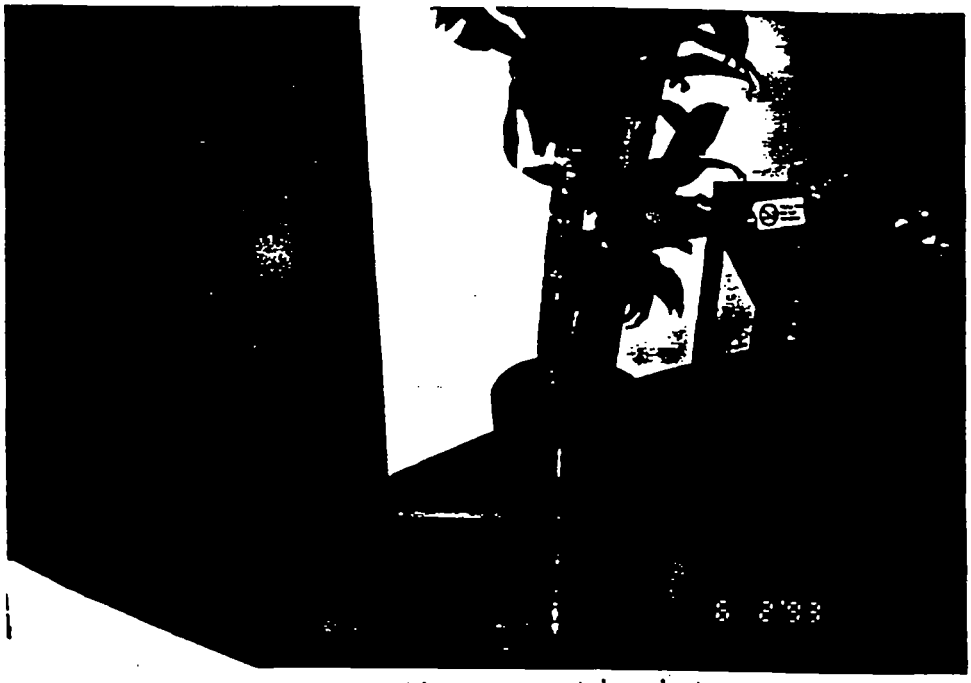
TIME: 1930

DIRECTION OF PHOTOGRAPH: East

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the receptionist area (receptionist is to the north (left of the photo).

DATE: 6/2/93

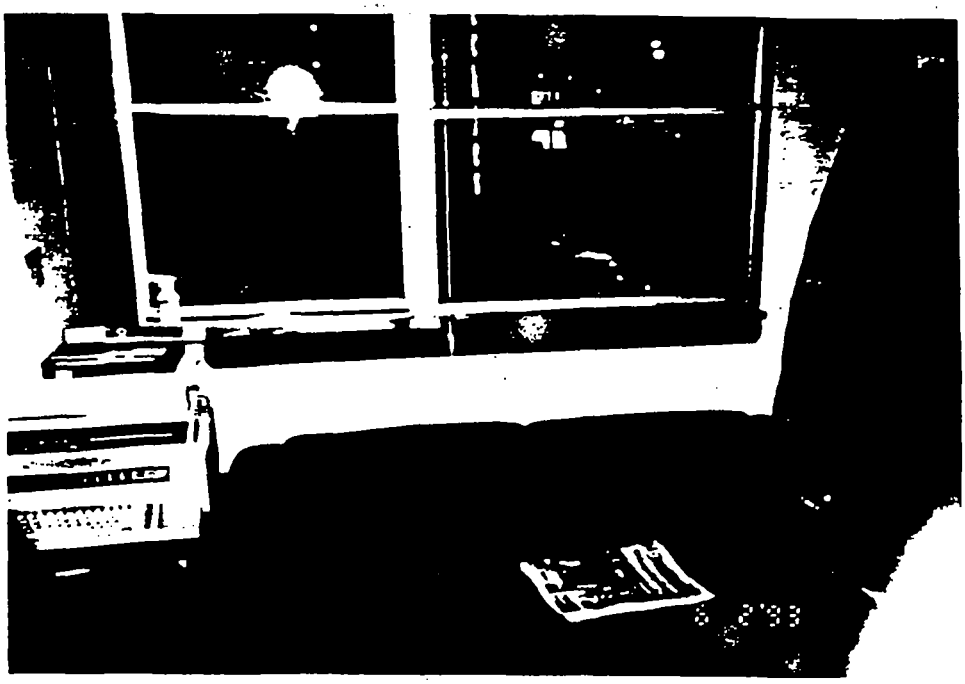
TIME: 2000

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: The Second floor photo of the area where the window area had a reading of 80 uR/hr.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID:

TDD: T05-9305-014

PAN:EIL0794SAA

DATE: 6/2/93

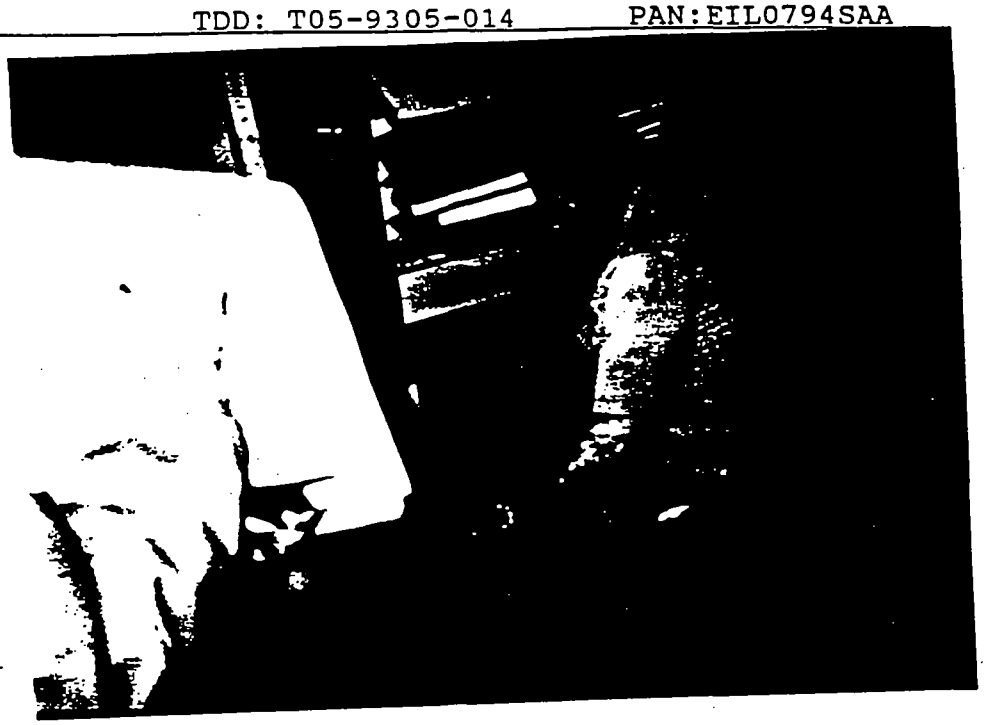
TIME: 1745

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the northeast corner of the third floor.

DATE: 6/2/93

TIME: 1830

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The third floor sound booth that had readings of 95 uR/hr on contact with the floor. The sound booth is located near the southwest side of the third floor.

FIELD PHOTOGRAPHY LOG SHEET

ITE NAME: Lindsay Light Company PAGE 4 OF 5

J.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

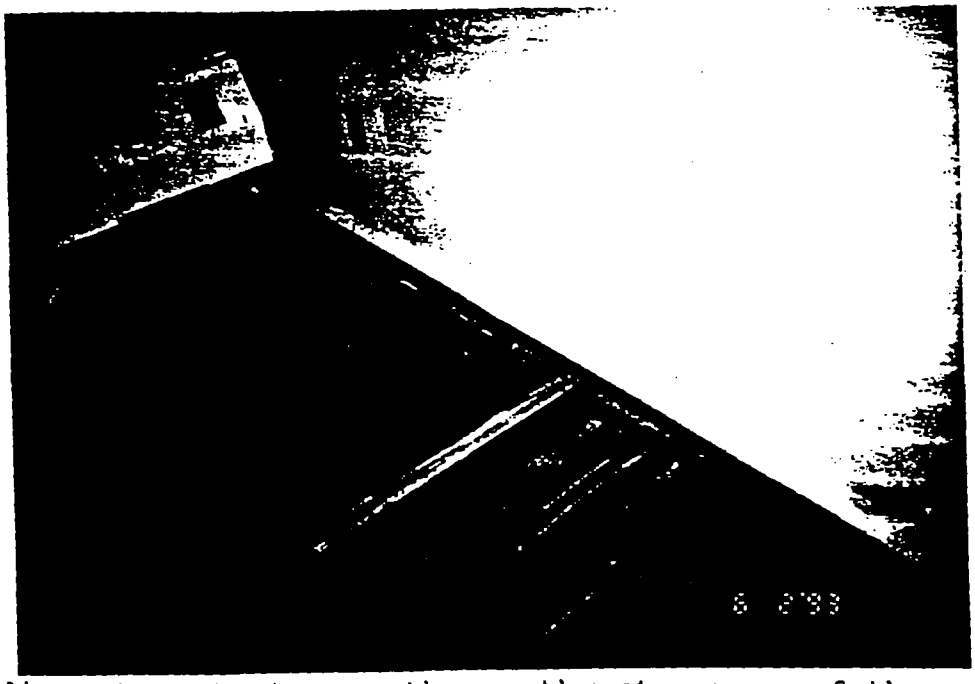
TIME: 1745

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the northwest corner of the second floor at the east wall of the office. Readings were 250 uR/hr.

DATE: 6/2/93

TIME: 1830

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The third floor northeast office on contact with the east wall. Readings were 10 uR/hr.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

TIME: 1845

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The reading was collected inside a sound booth located on the fourth floor and is near the southwest section of the floor. The reading was 200 uR/hr.

DATE: 6/2/93

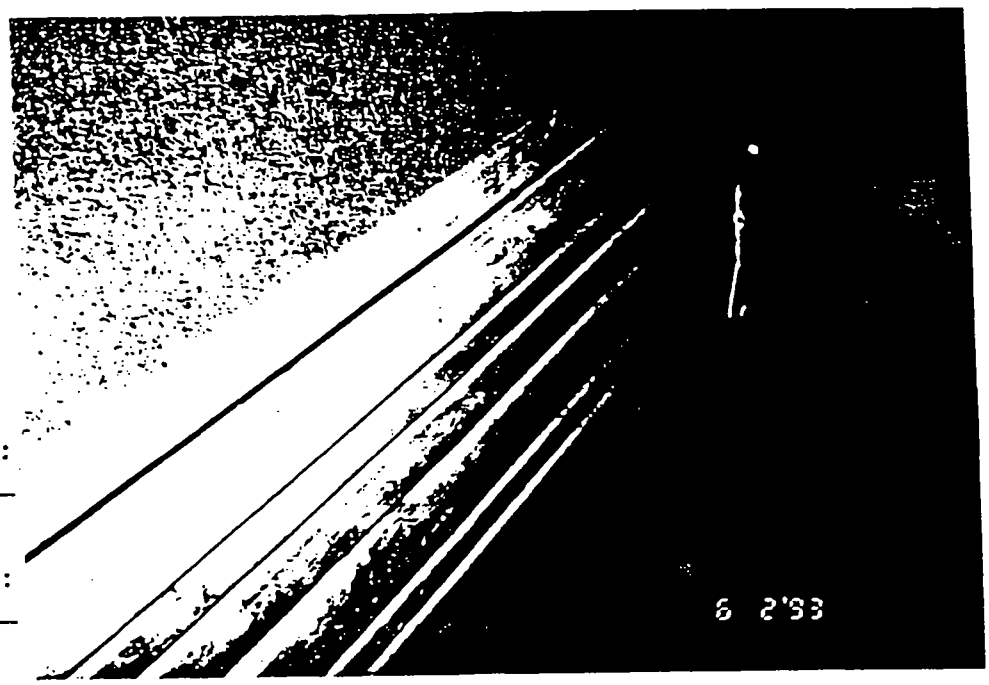
TIME: 1845

DIRECTION OF PHOTOGRAPH: West

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: A hallway leading into a sound booth located on the fourth floor. The reading at that point was 350 uR/hr.

APPENDIX B

THORIUM DECAY SERIES

Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10} y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (15%) 0.908 (25%) 0.96c (20%)
$^{228}_{90}Th$	Radiothorium	1.910y	5.34 (28%) 5.43 (71%)	---	0.084 (1.6%) 0.214 (0.3%)
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.7%)
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.07%)
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (47%) 0.300 (3.2%)
$^{212}_{83}Bi$	Thorium C	60.6m	6.05 (25%) 6.09 (10%)	1.55 (5%) 2.26 (55%)	0.040 (2%) 0.727 (7%) 1.620 (1.3%)
64.0% / 36.0%					
$^{212}_{84}Po$	Thorium C'	304ns	8.78 (100%)	---	---
$^{208}_{81}Tl$	Thorium C''	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 (23%) 0.583 (85%) 0.860 (12%) 2.614 (100%)
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{232}_{90}Th$ (4n).....n(58) = 232

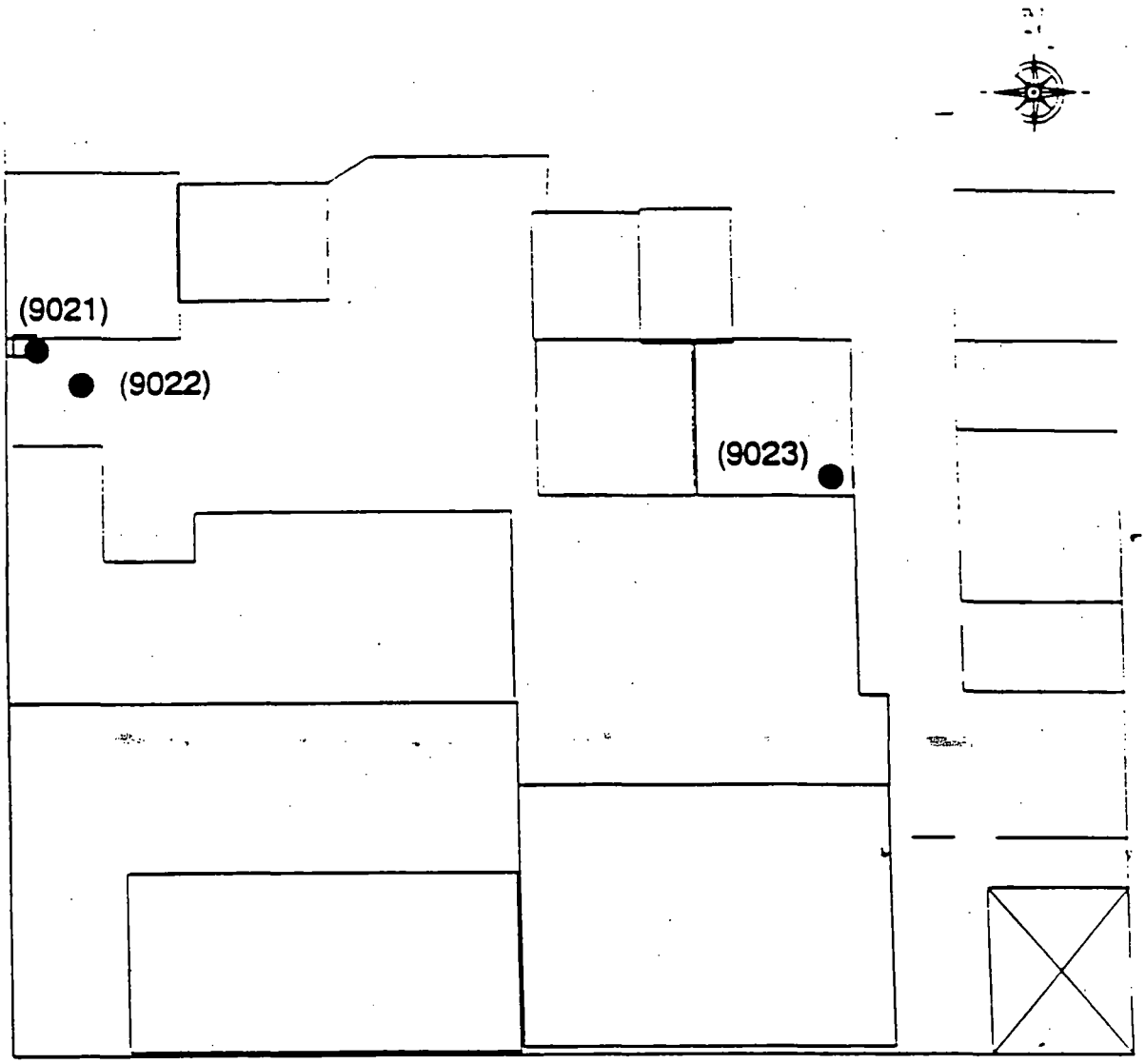
†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons, Inc., 1967) and Hogan, O. M., Zigman, P. E., and Machta, J. L., Beta Spectra (USNRDL-TR-802 (Washington, D.C. U.S. Atomic Energy Commission, 1964)).

FIGURE 1: Thorium Decay Series
(Source: Radiological Health Handbook, U.S. Department of Health, Educ and Welfare, Revised January 1970)

Readings: MILLIREM PER HOUR



TLD Badge (Badge #)

LEGEND

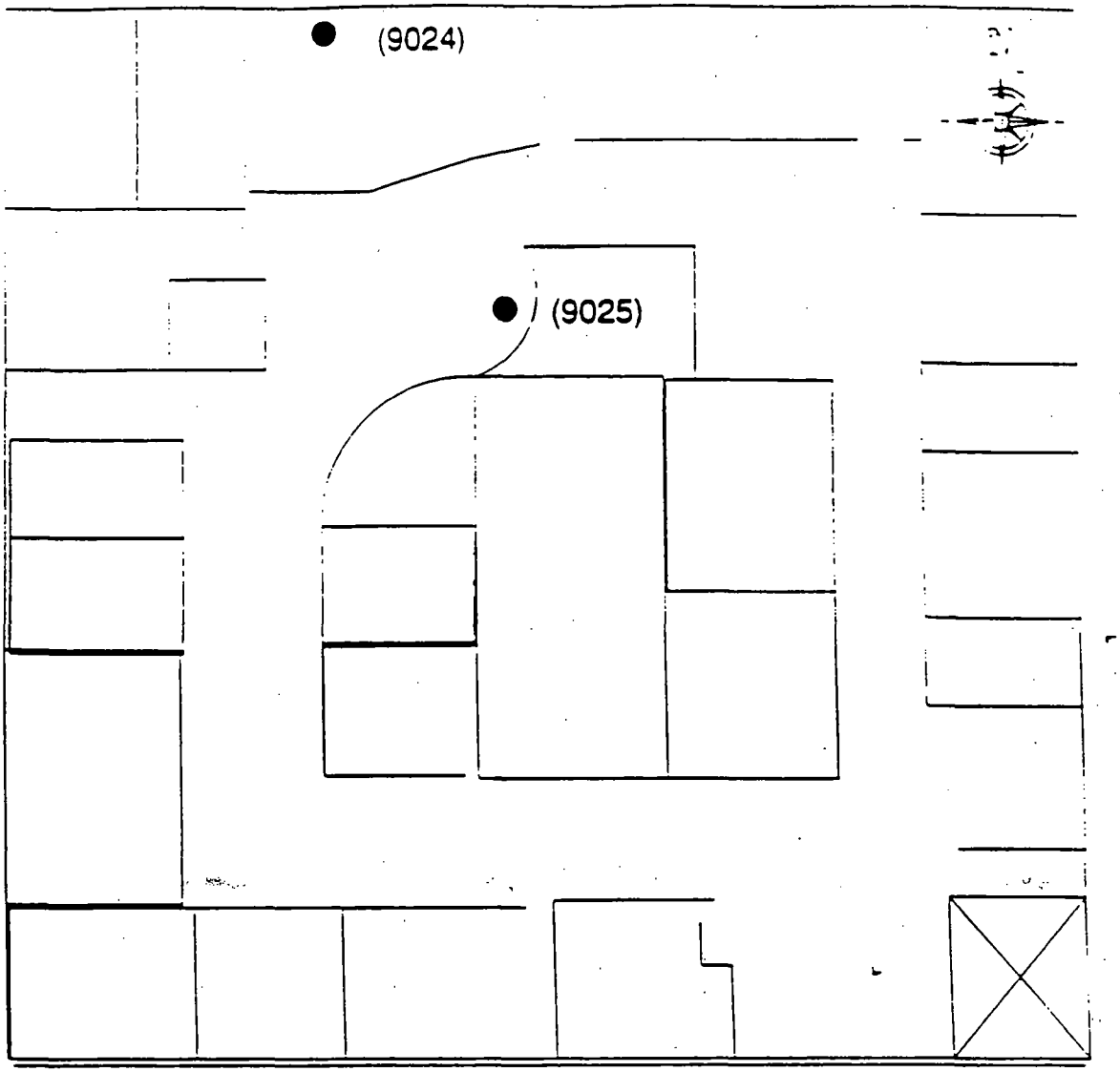
TLD EXPOSURE RESULTS

(9021)=4.28929 mrem/hr
(9022)=0.26751 mrem/hr
(9023)=0.02827 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE 161 E. Grand Ave. Basement (Optumus) Figure 1	FIGURE #
SITE Lindsay Light Company	TDD T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
DRAWING	DATE July 16, 1993
	REVISED



● TLD Badge (Badge #)

LEGEND

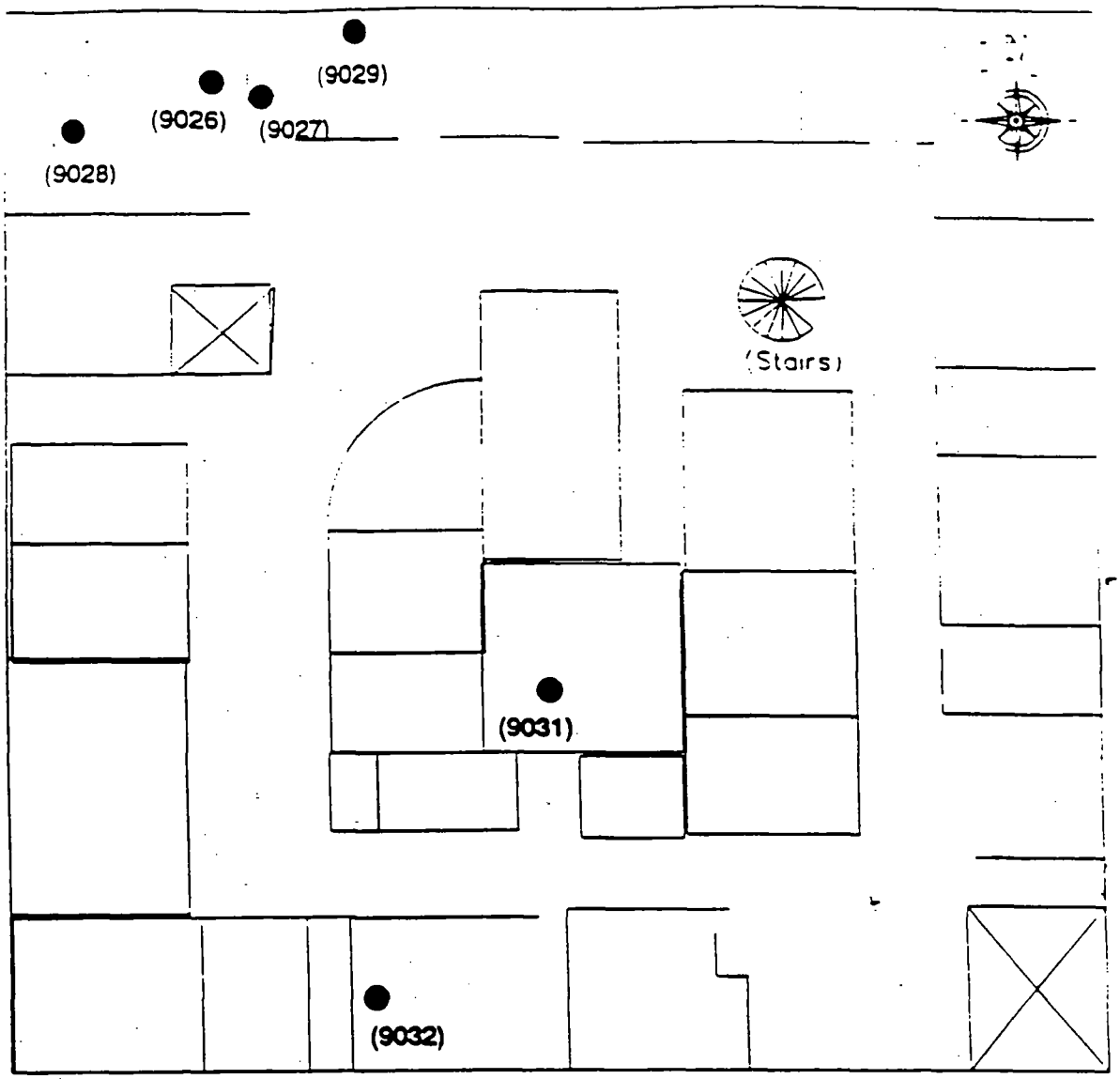
TLD Results

Reading: millirem per hour
(9024)=0.03364
(9025)=0.03768

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE: 161 E. Grand Ave. 1st Floor Readings Optumus	FIGURE #: Figure 2
SITE: Lindsey Light Co.	SCALE: T05-9305-014
CITY: Chicago STATE: IL	PAN: Not to Scale
SOURCE:	DATE:
	REVISED:



● TLD Badge (Badge #)

LEGEND

TLD Results

Reading: millirem per hour

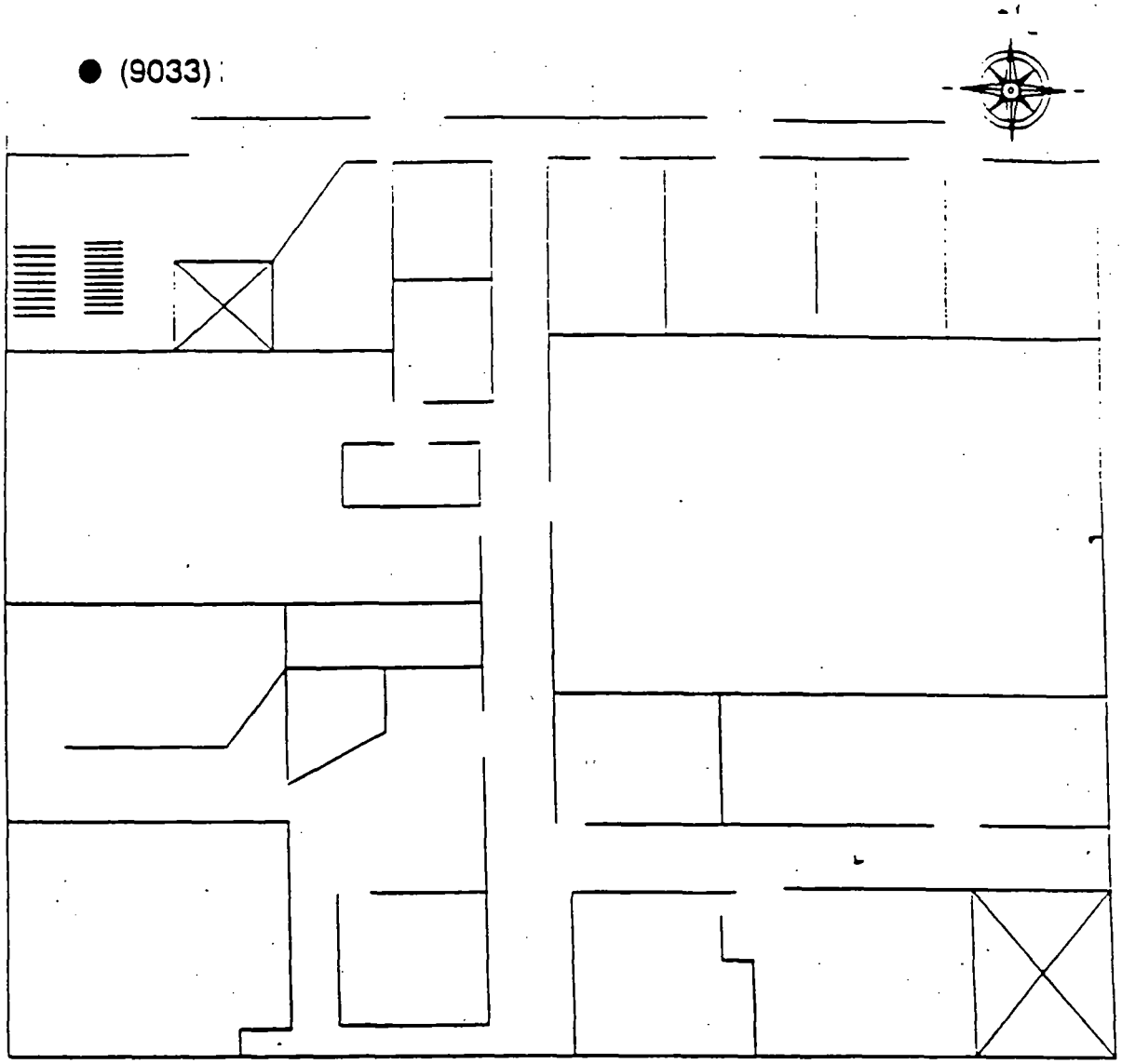
(9026)=0.25703 mrem/hr
(9027)=0.62827 mrem/hr
(9028)=0.05192 mrem/hr
(9029)=0.03875 mrem/hr
(9031)=0.00461 mrem/hr
(9032)=0.00622 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE 161 E. Grand Ave. 2nd Floor (Optumus)	FIGURE # Figure 3
SITE Lindsay Light Company	TDD 105-9305-0[illegible]4
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE	DATE July [illegible]
	REVISED

Readings: MILLIREM PER HOUR



TLD BADGE (Badge #)

LEGEND

TLD RESULTS

(9033)=0.03096 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

161 E. Grand 3rd Floor (Optumus)	Figure 4
Lindsay Light Company	T05-9305-01
Chicago IL	Not to Scale
	July 16, 1993

ID #: P A C 4 Date: 9/14/93 Time: 8:30 am

Site Name: Lindsey Ligh. City: Chicago ity: ____ State: IL

CERCLIS #: _____ Cost Recovery #: 60YL Region: V

Site Status (1) _ NPL _ Federal _ Non-NPL _ RCRA _ Non-Site specific
(2) _ Emergency Response _ Remedial _ Other

Activities

_ Incoming Call _ Public Meeting* _ Health Consult* _ Site Visit*
_X_ Outgoing Call _ Other Meeting _ Health Referral _ Info Provided
_ Conference Call _ Data Review _ Written Response _ Training
_ Incoming Mail _ Other

Requestor and Affiliation: (1) Vernita Simon, OSC
Phone: 312 886-3601 Address: _____
City: _____ State: ____ Zip Code: _____

Contacts and Affilation

( ) _____ ( ) _____
( ) _____ ( ) _____

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT
6-COUNTY HLTH	7-CITY HLTH	8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT
11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN	15-DOD
16-DOE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY
21-INTL	22-CITZ GROUP	23-ELECT. OFF.	24-PRIV. CO	25-NEWS MEDIA
26-ARMY	27-NAVY	28-AIR FORCE	29-DEF LOG AGCY	30-NRC
31-ATSDR				

_ Health Assessment _ Health Studies _ Tox Info-profile _ Worker Hlth
_ Petition Assessment _ Health Surveilnc _ Tox Info-Nonprofil _ Admin
_X_ Emergency Response _ Disease Regstry _ Subst-Spec Resch _ Other
_ Health Consultation _ Exposr Regstry _ Health Education

Narrative Summary: As a follow-up to the site visit to Lindsey Light, EPA has supplied the results of the TLD monitoring at several locations around the city of Chicago that may have radiological contamination. The TLD results were supplied as a function of exposure per week (24 hour exposure). To equate this to exposure of individuals who may receive excessive levels o exposure, the following procedure was used. I used 2000 hours per year for worker (50 weeks per year, 40 hours per week). The current exposure limit i 100 millirem per year or 0.05 mrem per hour. Since there are 168 hours in a week, any TLD with an exposure of 8.4 millirem per week was considered excessive (168 x 0.05). Using this procedure, 4 TLDs in the 161 E. Grand Avenue location were considered excessive. These were TLD numbers 9021, 9022, 9026, and 9027. 9021 and 9022 appear to be in the basement and it is unlikely that excessive exposures could occur. However, 9026 and 9027 appea to be within an office on the second floor. I would recommend that either that office be vacated and sealed or the office be remediated to a level tha is considered radiologically safe (<100 millirem per year).

Action Required/Recommendations/Info Provided: None at this time.

Signature: Robert Williams for Paul A. Charp, Ph.D. Date: September 14, 199

cc:
Robert L. Williams, Region V (via email)
RIMB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

HSE-5J

JUN 21 1993

Mr. Ron Steele
Building Manager
205 East Grand Avenue
Chicago, Illinois 60611

Dear Mr. Steele:

On June 2, 1993, USEPA and the Illinois Department of Nuclear Safety verified the presence of radioactivity at levels clearly above natural background at 161 East Grand, Chicago. The results are still being evaluated. We would like to collect additional data on dose levels in work spaces before making a determination about this building. We propose placing for one month, twenty-four radiation dosimeters called thermoluminescent dosimeter (TLD) badges in various rooms in your building. These dosimeters will be placed by USEPA staff at no cost to you. By the month's end, we should also have the results of the wipe samples collected on June 2, 1993. Tentatively, we plan to contact you sometime during the week of June 21, 1993, to arrange a mutually convenient time to place the TLD badges.

We also would like to remind you to move the janitor's supplies in the basement away from the chimney. If you need additional information or want to discuss this matter further, please contact me at (312) 886-3601.

Sincerely,

Verneta Simon

Verneta Simon
On-Scene Coordinator

cc: Tim Runyon, Illinois Department of Nuclear Safety

SITE ASSESSMENT REPORT
FOR
LINDSAY LIGHT COMPANY SITE
U.S. EPA ID: N/A
SSID#: N/A
TDD: T05-9305-014
PAN: EIL0794SAA

August 2, 1993

Prepared By: Ronald W Bugg Date: 8/5/93

Reviewed By: William Sass Date: 8/5/93

Approved By: [signature] Date: 8/5/93

ecology and environment, inc.
111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415
International Specialists in the Environment

recycled paper

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1.0 SITE DESCRIPTION

The Lindsay Light Company Building is a four story commercial building located at 161 E. Grand, at the corner of Grand Avenue and St. Clair Street, in Downtown Chicago, Illinois. Grand Avenue is about one-half mile north of the central Chicago "Loop" area. The geographical location is 41° 53' 30" north latitude and 88° 36' 30" west longitude (See Figure 1 for site location). The site is currently being occupied several companies including audio/video production companies called Optimus and Streeterville Studio, Inc..

2.0 SITE HISTORY

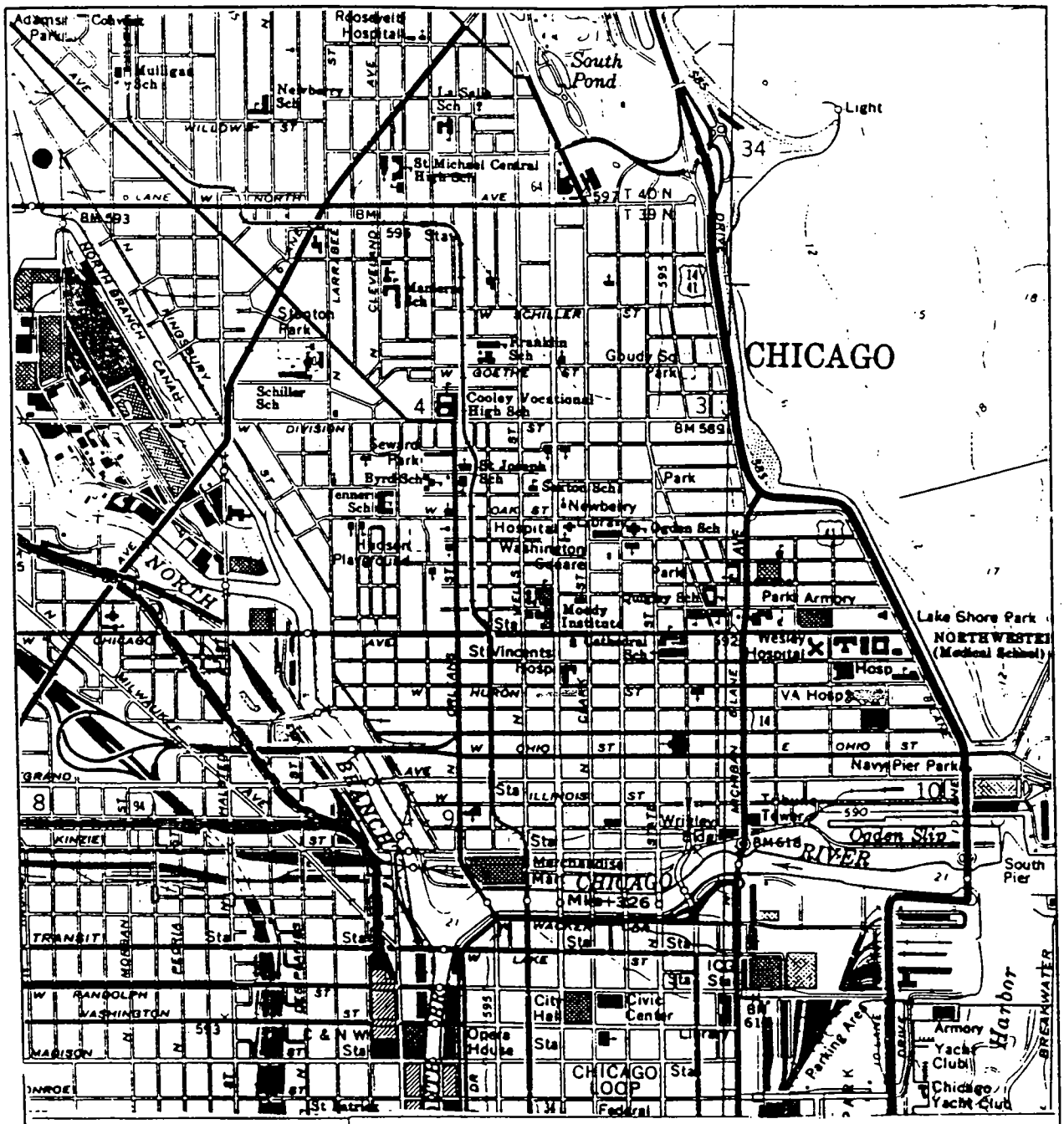
The Lindsay Light Company manufactured incandescent gas mantles for home and street lighting in this building from at least 1910 until 1936. Lindsay Light moved to West Chicago and was later purchased by American Potash, which was later purchased by Kerr McGee Chemical Company in 1967. The principal ingredient in gas mantle manufacture are the gauze mantle bags which were dipped into thorium nitrate solution. Small amounts of cerium, beryllium and magnesium nitrates were also used. The present owners of the building, Browne and Storch, a real estate firm, purchased the building in 1978.

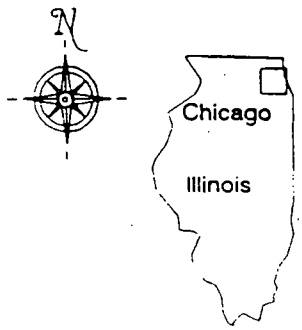
In August of 1981, The building owners attempted to decontaminate part of the second and fourth floor. The building owners hired Radiation Safety Services (RSSI) to determine the contaminated areas. RSSI identified areas of gamma dose rate at one meter above the floor in the building. Any readings above 100 micro-Roentgen per hour at one meter above the floor were candidates for decontamination. The building owners supplied the laborers and tools to assist RSSI in decontamining the second and fourth floor.

After the area of oak floor was determined to be contaminated, the floor was removed. All subflooring found to be contaminated was either removed or chiseled down a half inch. The decontamination was only performed on occupied work areas.

During June of 1983, as part of the U.S. EPA survey, 7 film badges were placed at specific locations of concern to collect dose measurements. The range of the 25 day gross dose equivalent ranged from minimal (5 badges) to 20 millirem (2 badges).

In February 1984, The building owners began reconstruction on the second floor. Prior to performing the reconstructioning project, RSSI conducted one hour training on radiation and collected wipe samples at the areas of concern. RSSI surveyed the area while the removal of the contaminated material was being conducted.





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Region V

TITLE: Site Location Map	FIGURE #: Figure 1
SITE: **Lindsay Light Co.**	SCALE: 1 : 24,000
CITY: Chicago IL	PAN: **EILO797SAA**

3.0 SITE ASSESSMENT

At 1700 hours, on June 2, 1993, U.S. EPA On-Scene Coordinator (OSC) Verneta Simon, U.S. EPA Emergency Response Team (ERT) Art Ball, U.S. EPA Air and Radiation Division (ARD) personnel Larry Jensen, Betsy Karr, and Michael Murphy, Illinois Department of Nuclear Safety (IDNS) representatives Tim Runyon and Vince Muzzalupo, and Technical Assistance Team (TAT) member Ron Bugg met with the building manager Ron Steele of 161 E. Grand Associates to perform a site assessment using gamma survey meters. The meters used were Micro-R meters, Ludlum Model 19 (measuring in micro-Roentgens per hour), radiation count rate meter with a sodium iodide (NaI) probe (measuring in counts per minute (cpm)) and a radiation count rate meter with an alpha probe (cpm). The four floor building, plus a basement was divided into floors to conduct a survey readings throughout each floor.

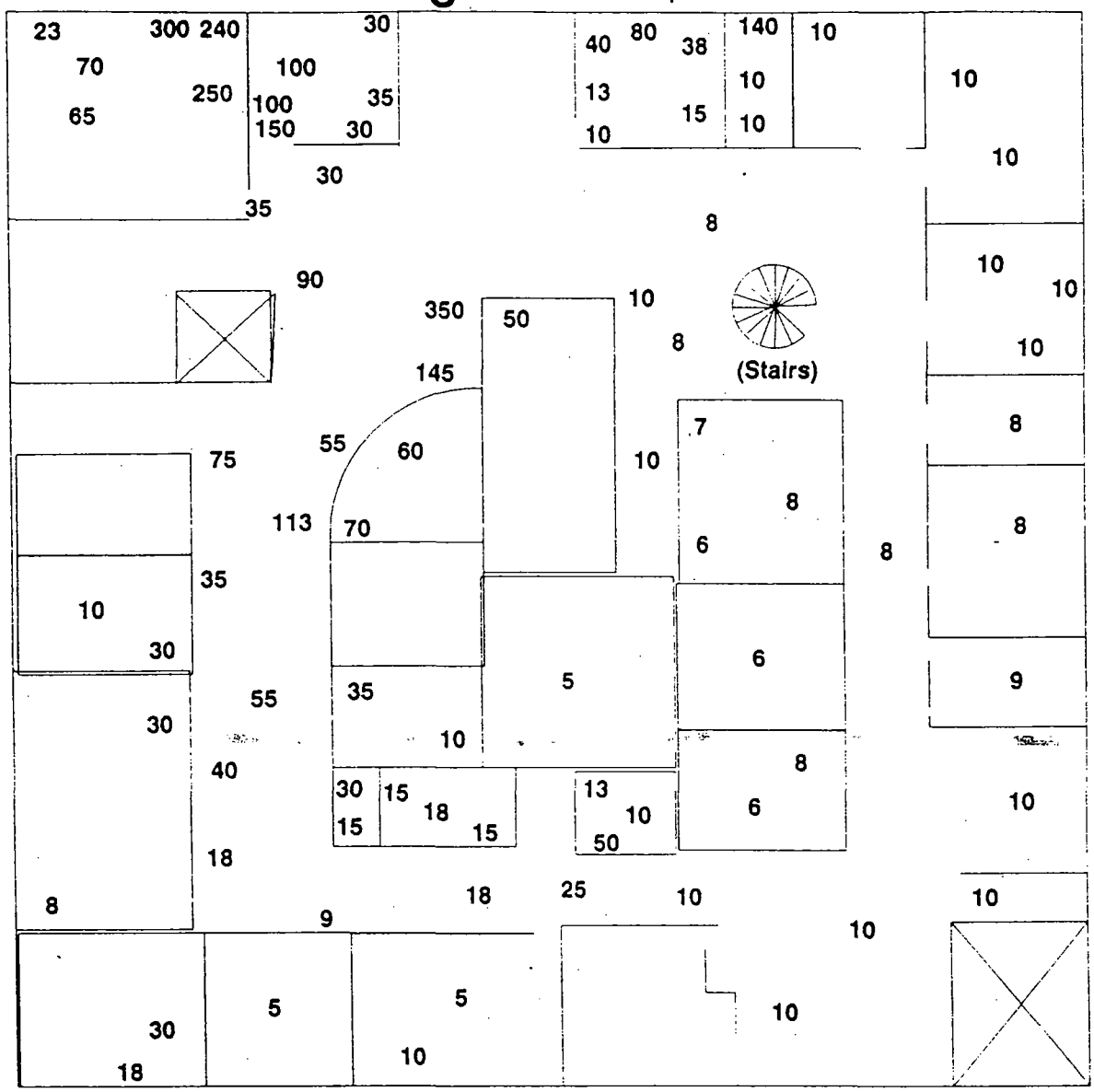
At 1745 hours, the group began to perform monitoring of the third floor with the micro-R meter and radiation monitors using a NaI probe. Due to the Ludlum Model 19 crystal over response to thorium, the levels were compensated by dividing the readings by a factor of 2. The correction factor was determined by comparing the results to other comparable instruments. All readings are gross exposure, no background subtraction, and are measured at contact. The background for the area was determined to be 6 micro-R/hr for naturally occurring radiation. The micro-R meter reading of the northwest corner office was as high as 95 micro-R/hr and 110 in a studio area near the west side of the building (See Figure 3 for third floor results). During the surveying of the third floor, The main party split up into two groups. OSC Simon, ERT Ball, IDNS Muzzalupo, and TAT Bugg (group 1) prepared for surveying the fourth floor. The remaining individuals (group 2) continued to survey the third floor.

At 1830 hours, group 1 began surveying the fourth floor. Group 1 could only perform a partial survey on the fourth floor due to the recording session in the booth located on the east section of the floor. The area where work was performed by the building owners contractor in 1987 to remove an area of contaminated material, had a reading of 350 micro-R/hr at floor contact and 200 microR/hr waist high (See Figure 4 for fourth floor results).

At 1900 hours, Group 2 conducted the survey on the second floor. The northwest corner office had high readings of up to 300 micro-R/hr. A window of the east adjacent room from the corner office had readings of 80 micro-R/hr (See Figure 2 for second floor results).

At 1920 hours, group 1 began to survey the first floor. Ron Steele requested the survey be performed away from the northeast section of the floor due to a client presentation that was taking place in that area. Group 1 began to survey the front lobby and the

Reading: micro-R/hr



Readings include correction factor
The instrument reads higher by a factor of 2

N

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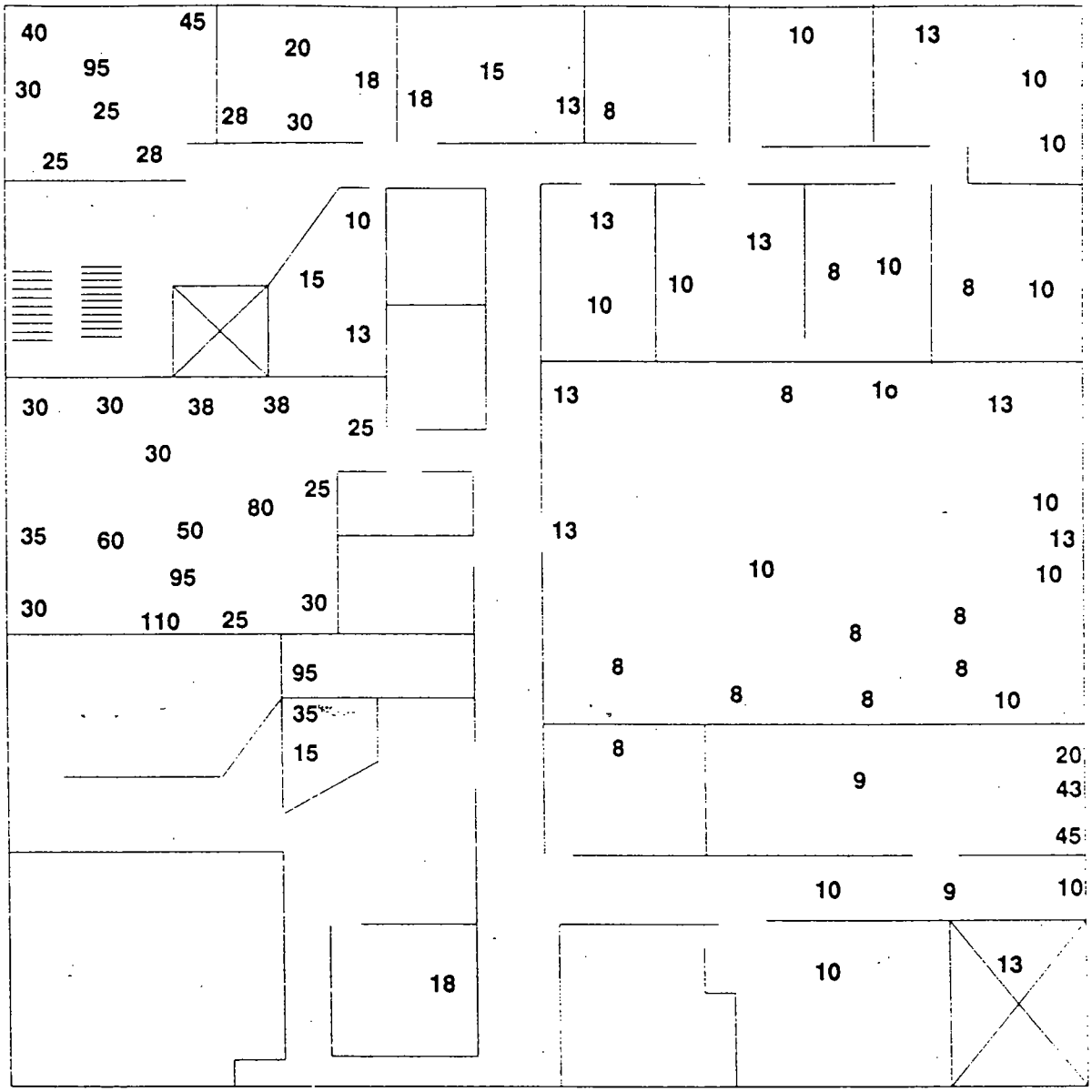
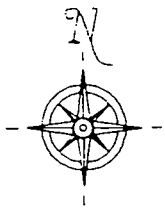
TITLE 161 E. Grand Ave. 2nd Floor (Optumus)	FIGURE # Figure 2
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993
	REVISED

Readings: Micro-R/hr



Floor Contact Readings
Readings include the correction factor
The instrument reads higher by a factor of 2

LEGEND



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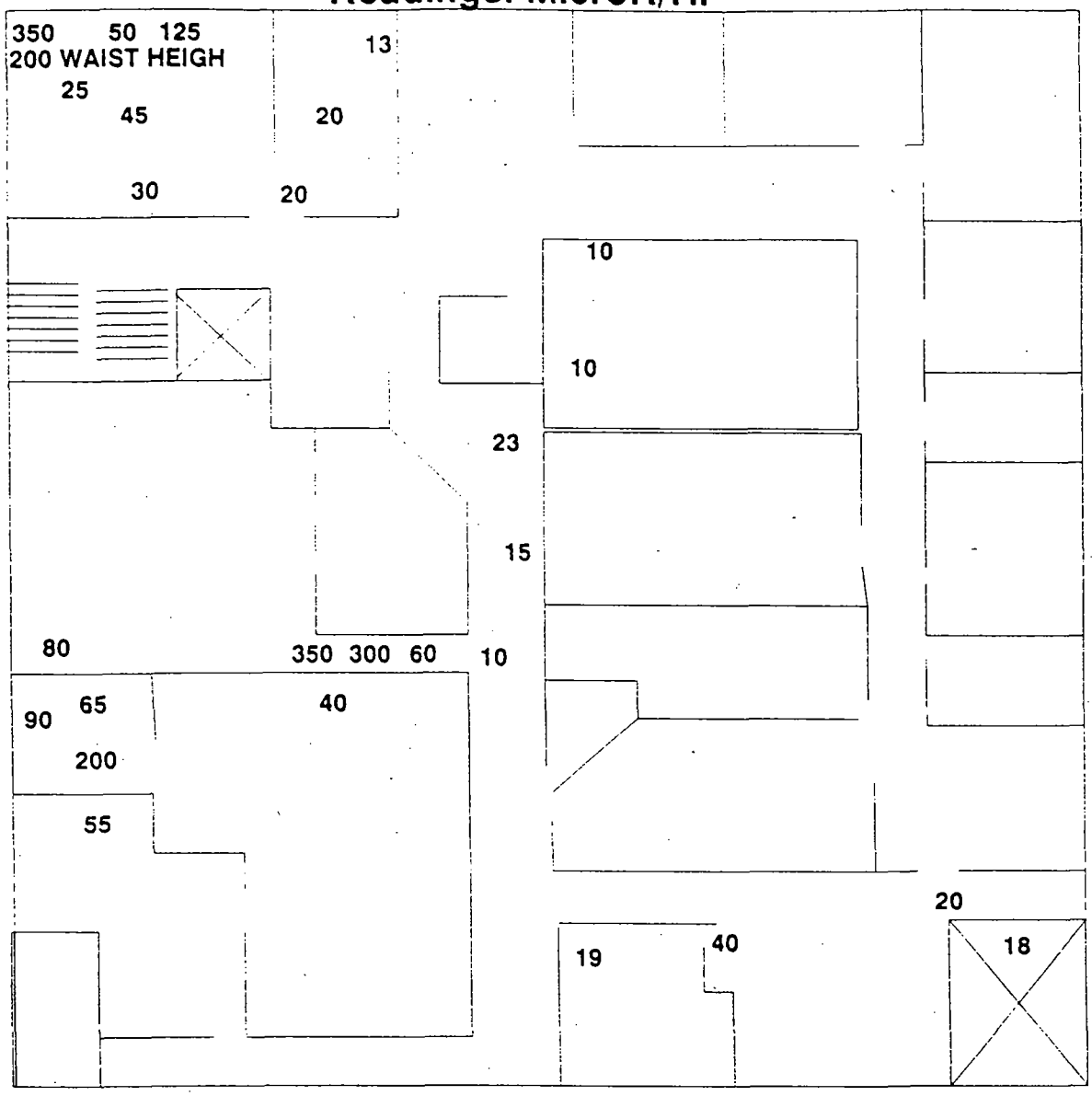
Region V

TITLE 161 E. Grand 3rd Floor (Optumus)	FIGURE # Figure 3
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993
	REVISED

Readings: MicroR/Hr

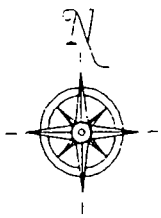


Floor Contact readings (unless indicated differently)

Readings include the correction factor

The instrument reads higher by a factor of 2.

LEGEND



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Region V

TITLE 161 E. Grand Ave. 4th Floor (Streeterville)	FIGURE # Figure 4
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 15, 1993
	REVISED

secretary area in the northwest corner of the floor. The reading near the secretary was 100 micro-R/hr. The lobby area ranged from 30 to 75 micro/hr (See Figure 5 for first floor results).

At 2000 hours, group 1 began to survey the basement area. The area of concern in the basement with the highest gross exposure rate was measured on contact with a concrete plug in the chimney. The micro-R survey indicated level of 2,250 micro-R/hr at contact of the chimney and 250 micro-R/hr at one meter away from the chimney (See Figure 6 for basement results).

At 2015 hours, group 2 completed the second floor survey and assisted group 1's survey of the basement. Near the central area of the basement where records were kept in storage, the micro-R read 20 to 100 uR/hr. Readings of 18 to 20 micro-R/hr were found near the freight elevator. Group 1 also surveyed the stairs leading into the building area (See Figure 5 for result).

At 2040 hours, the OSC, ERT member, ARD representatives, IDNS representatives, and TAT went over the results with the building spokesman Ron Steele. It was suggested that due to the high readings from the chimney, the janitor's supplies near the chimney should be immediately relocated. After the meeting the groups left the site at 2100 hours.

On June 30, 1993, 12 thermoluminescent dosimeter (TLD) badges were placed near occuppied work areas throughout the four story building for one month.

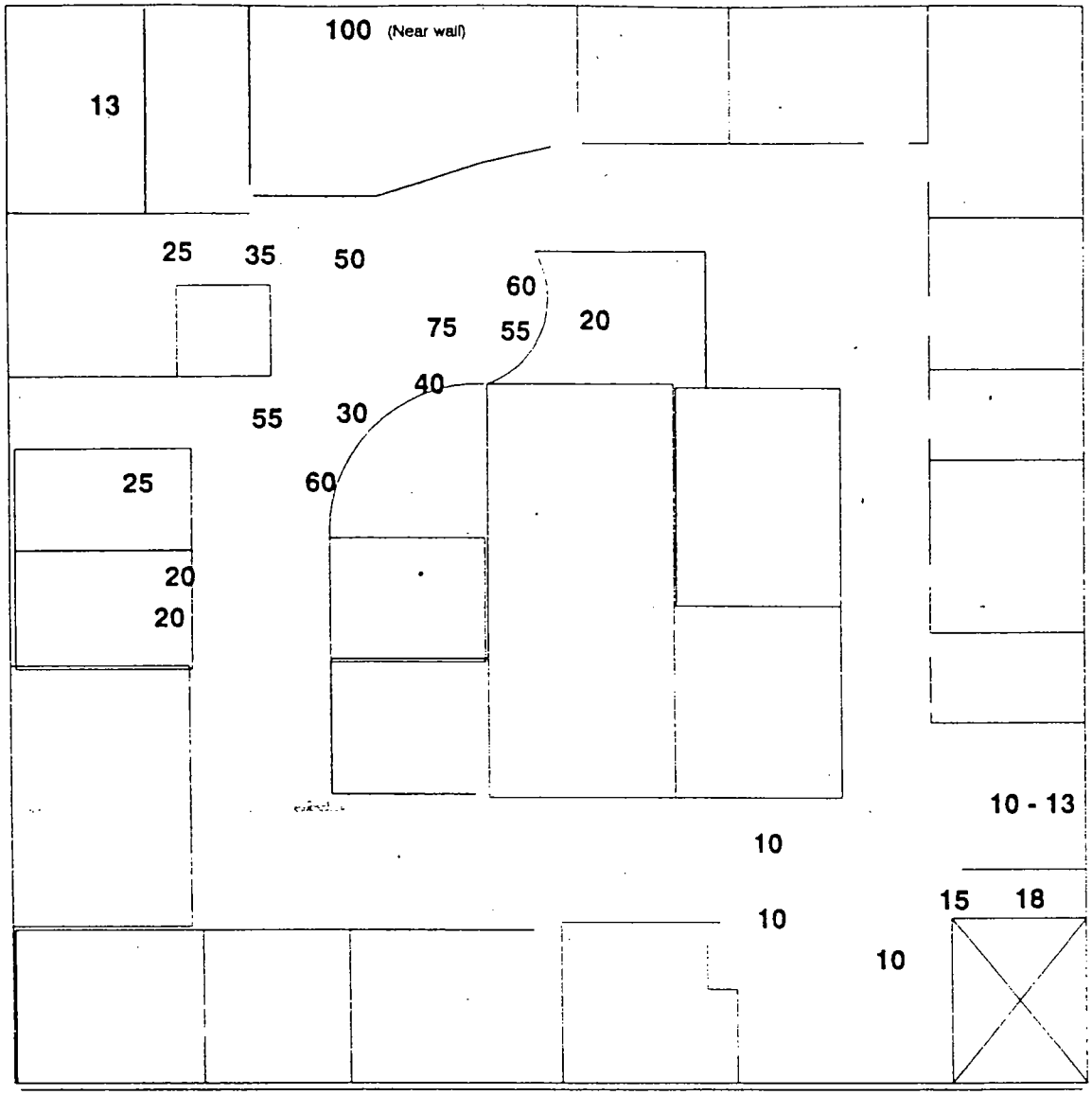
4.0 ANALYTICAL RESULTS

The results of the survey revealed the presence of radioactive material in flooring and chimney which potentially contains contaminated waste ash. Earlier work performed by the building owner's contractor determined that the thorium materials appeared to have been absorbed into porous flooring material and possibly spread due to flood caused by a leaking roof. The analytical results were not available for the wipe sample and the TLD badges.

5.0 DISCUSSION OF POTENTIAL THREATS

The conditions at the former Lindsay Light site at 161 E. Grand, Chicago, Illinois that may warrant a removal action, as set forth in paragraph (b) (2) of Section 300.415 of the National Contingency Plan (NCP), included:

<u>Actual or potential exposure to nearby populations, animals, or the food chain from hazardous substances or pollutants or contaminants:</u> The site investigation with micro-R meter indicated substantially elevated levels of radioactivity in several areas throughout the



Readings include correction factor of 2
The instrument reads higher by a factor of 2

LEGEND

N

Readings: MicroR/Hr

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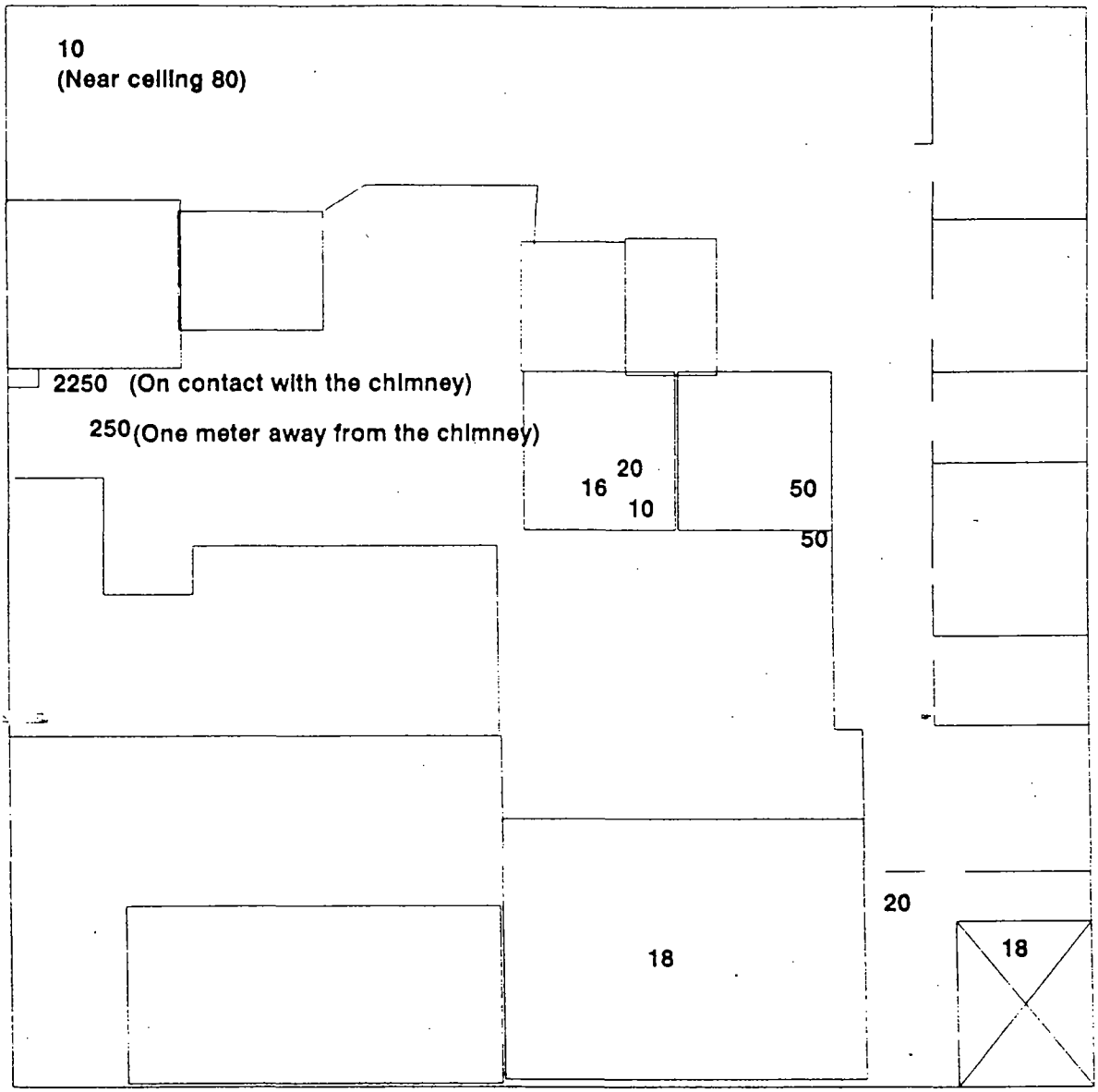
Region V
111 W. Jackson Blvd., Chicago, Illinois 60604

TITLE: 161 E. Grand Ave. 1st Floor Readings **Optumus**	FIGURE #: Figure 5
SITE: Lindsay Light Co.	SCALE: T05-9305-014
CITY: Chicago STATE: IL	PAN: Not to Scale
SOURCE: **Instrument: Ludlum Model 19**	DATE:
	REVISED:

Readings: Micro-R/hr



Floor Contact readings (unless indicated differently)

Readings include the correction factor
The instrument reads higher by a factor of 2

LEGEND

N

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Region V

TITLE 161 E. Grand Ave. Basement (Optumus)	FIGURE # Figure 6
SITE Lindsay Light Company	TDD# T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE Instrument: Ludlum Model 19	DATE July 16, 1993
	REVISED

building. Gamma-ray emissions from the radioactive thorium decay series producing potential human exposures will continue as long as contaminants remain in the building. Continual gamma-ray exposure increases the risk for cancer due to ionizing radiation. Thorium dust may cause an increase chance of developing cancer of the lung decades after being exposed. Ingestion of thorium can increase the risk of liver cancer. Thorium radiactively decays to radon-220 and then to its decay products. Radon-220 decay products con increase thr risk of lung cancer.

Other situations or factors that may pose threats to public health or welfare or the environment.

Due to the contaminant of concern, one may be exposed to radioactive isotopes and the effects may occur many years after exposure. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium-232 has a half-life of 14 billion years. Several daughter products of concern are Radon-220 and Radon-222 (See Table 1 for Thorium Decay Series).

6.0 CONCLUSION

After conducting the survey at 161 E. Grand Street, formerly Lindsay Light Company site, had readings 400 times greater than background. High exposure rates were found in work areas and near the chimney in the basement. The latter indicated radioactive material inside the chimney. The isotope of concern is believed to be thorium. To determine the level of radiation, TLD badges were placed near the work areas that had high micro-R meter readings.

APPENDIX A

SITE PHOTOGRAPHS

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

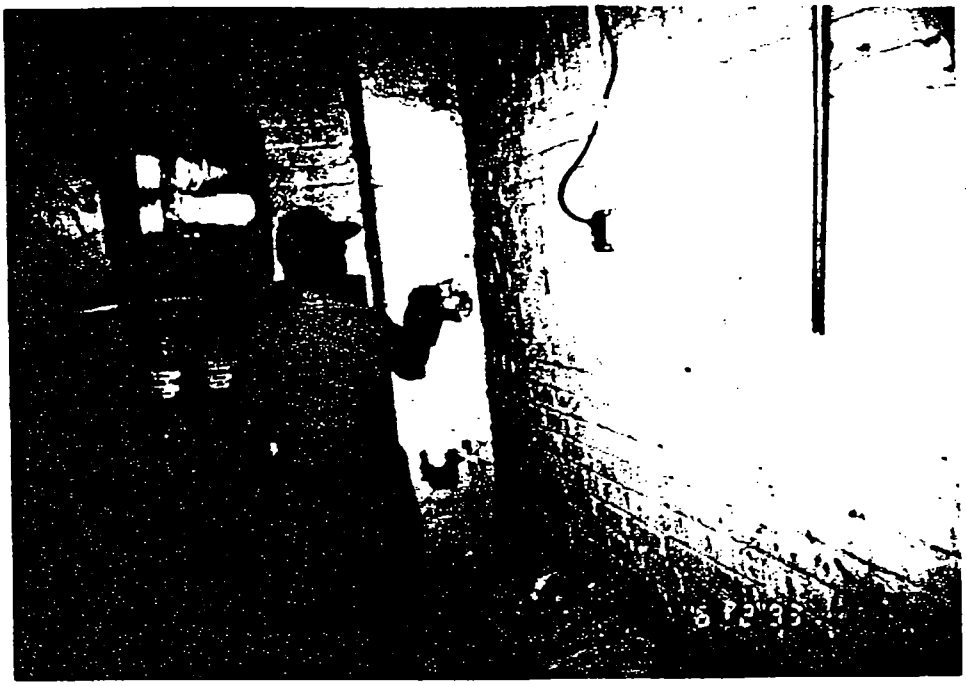
TIME: 2030

DIRECTION OF PHOTOGRAPH: West

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact of the chimney (2250 uR/hr). The chimney is located near the northwest section of the basement.

DATE: 6/2/93

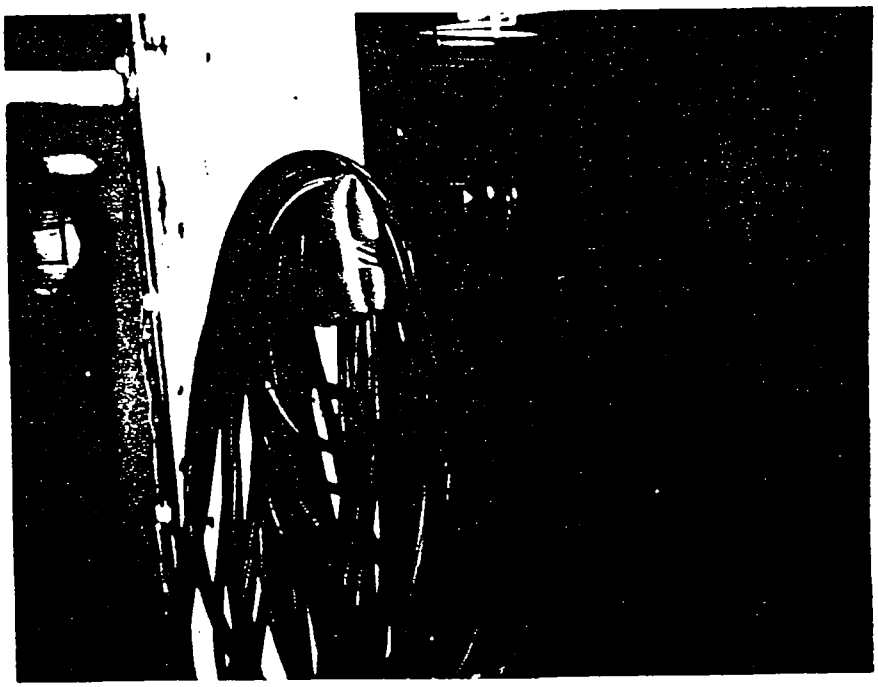
TIME: 2030

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: The janitors area located near the chimney. One meter away from the chimney the readings were reduced by a factor of 10.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

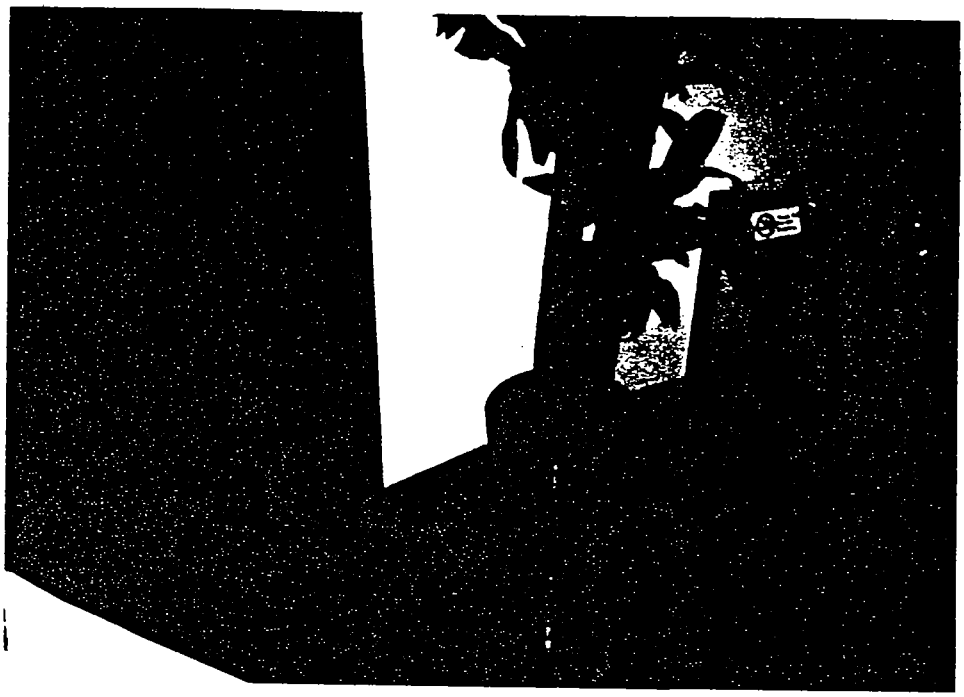
TIME: 1930

DIRECTION OF PHOTOGRAPH: East

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the receptionist area (receptionist is to the north (left of the photo).

DATE: 6/2/93

TIME: 2000

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The Second floor photo of the area where the window area had a reading of 80 uR/hr.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

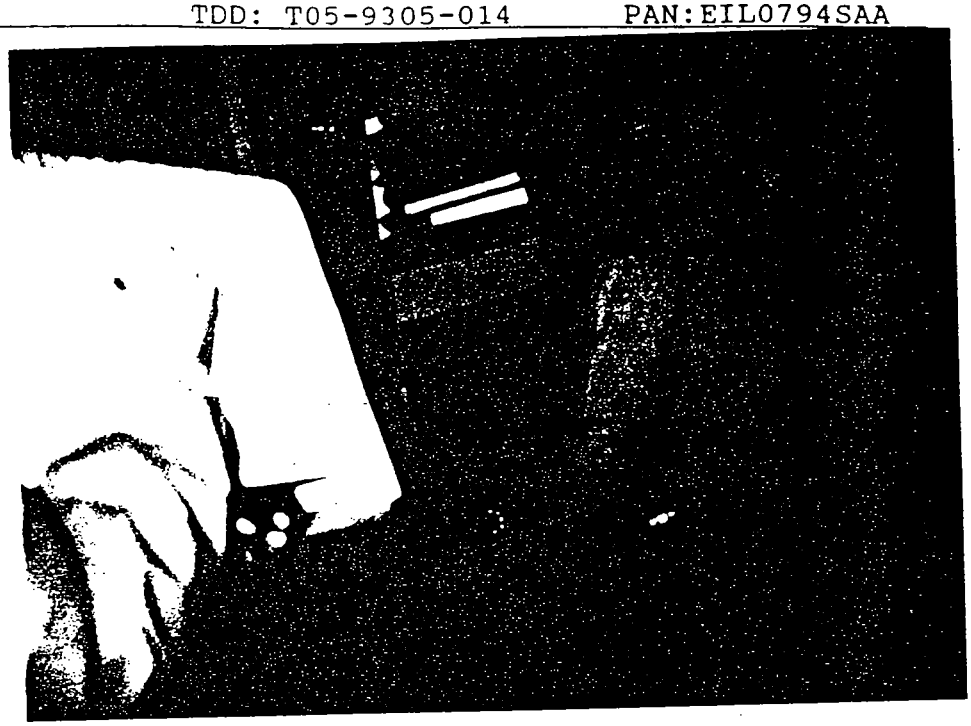
TIME: 1745

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the northeast corner of the third floor.

DATE: 6/2/93

TIME: 1830

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The third floor sound booth that had readings of 95 uR/hr on contact with the floor. The sound booth is located near the southwest side of the third floor.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

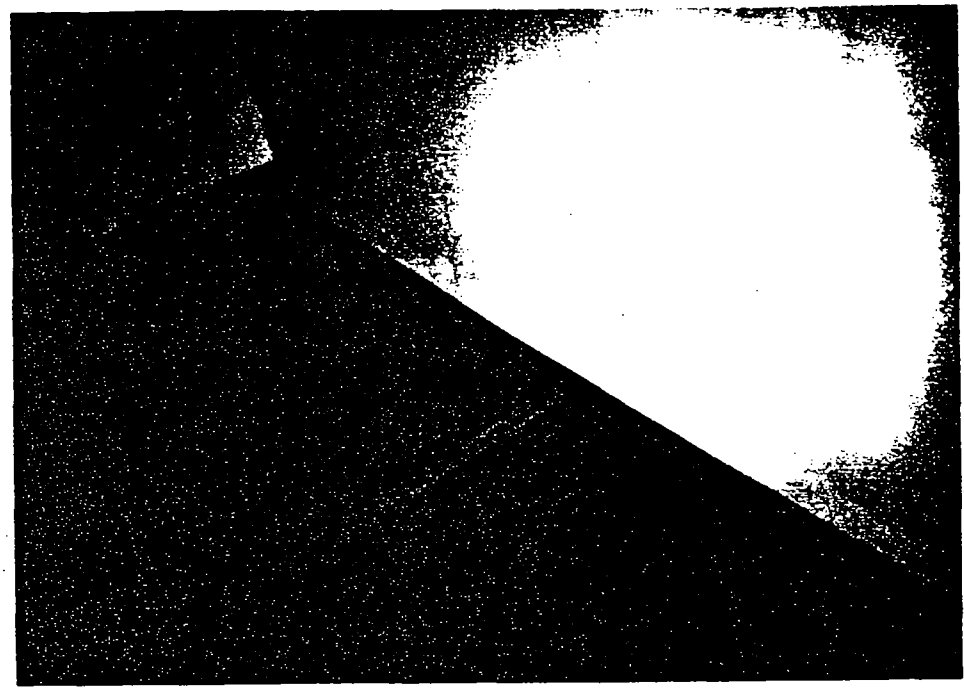
TIME: 1745

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: Reading at contact near the northwest corner of the second floor at the east wall of the office. Readings were 250 uR/hr.

DATE: 6/2/93

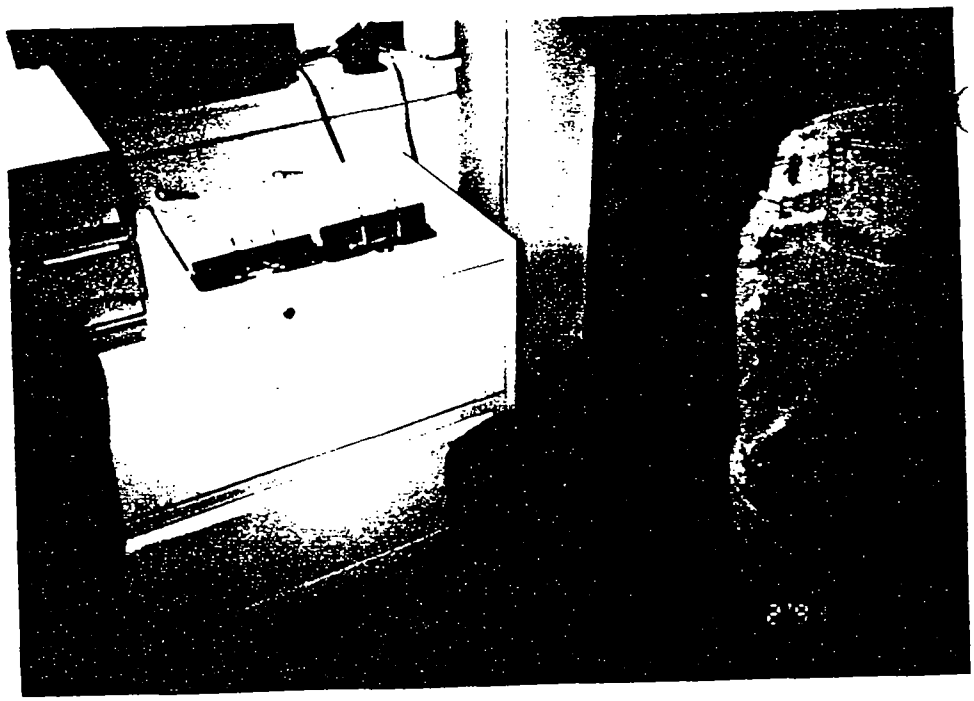
TIME: 1830

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: The third floor northeast office on contact with the east wall. Readings were 10 uR/hr.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Lindsay Light Company

U.S.EPA ID: TDD: T05-9305-014 PAN:EIL0794SAA

DATE: 6/2/93

TIME: 1845

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: N/A

PHOTGORAPHED BY: Ron Bugg

SAMPLE ID (if applicable):

DESCRIPTION: The reading was collected inside a sound booth located on the fourth floor and is near the southwest section of the floor. The reading was 200 uR/hr.

DATE: 6/2/93

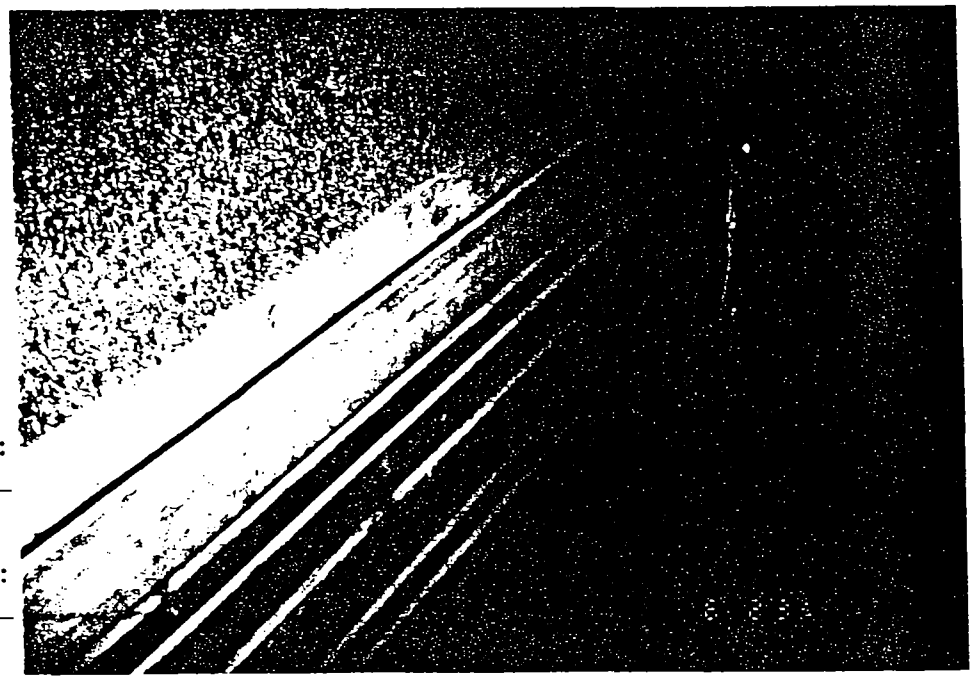
TIME: 1845

DIRECTION OF PHOTOGRAPH: West

WEATHER CONDITIONS: N/A

PHOTOGRAPHED BY: Ron Bugg

SAMPLE ID (if applicable):



DESCRIPTION: A hallway leading into a sound booth located on the fourth floor. The reading at that point was 350 uR/hr.

APPENDIX B

THORIUM DECAY SERIES

Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10}y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (1 0.908 (0.96c (3
$^{228}_{90}Th$	Radiothorium	1.910y	5.34 (28%) 5.43 (71%)	---	0.084 (1. 0.214 (0.
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.0
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (4 0.300 (3.
$^{212}_{83}Bi$	Thorium C	60.6m	6.05 (25%) 6.09 (10%)	1.55 (5%) 2.26 (55%)	0.040 0.727 1.620 (1.
$^{212}_{84}Po$	Thorium C'	304ns	8.78 (100%)	---	---
$^{208}_{81}Tl$	Thorium C"	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 0.583 0.860 2.614 (1
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

64.0% 36.0%

*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{232}_{90}Th$ (4n).....n(58) = 232

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incomplecely resolved by instruments of moderately low resolving power such as scintilla

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons Inc., 1967) and Hogan, O. M., Zigman, P. E., and Mackin, J. L., Beta Spectra (USNRDL-TR-802 [Washington, D. U.S. Atomic Energy Commission, 1964]).

FIGURE 1: Thorium Decay Series
(Source: Radiological Health Handbook, U.S. Department of Health, Ed and Welfare, Revised January 1970)

ATSDR Record of Activity

UID #: P A C 4 Date: 9/14/93 Time: 8:30 am

Site Name: Lindsey Light City: Chicago Cnty: ____ State: IL

CERCLIS #: _____ Cost Recovery #: 60YL Region: V

Site Status (1) _ NPL _ Federal _ Non-NPL _ RCRA _ Non-Site specific
(2) _ Emergency Response _ Remedial _ Other

Activities

_ Incoming Call _ Public Meeting* _ Health Consult* _ Site Visit*
X Outgoing Call _ Other Meeting _ Health Referral _ Info Provided
_ Conference Call _ Data Review _ Written Response _ Training
_ Incoming Mail _ Other

Requestor and Affiliation: (1) Vernita Simon, OSC
Phone: 312 886-3601 Address: _____
City: _____ State: ____ Zip Code: _____

Contacts and Affilation

( ) _____ ( ) _____
( ) _____ ( ) _____

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT
6-COUNTY HLTH	7-CITY HLTH	8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT
11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN	15-DOD
16-DOE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY
21-INTL	22-CITZ GROUP	23-ELECT. OFF	24-PRIV. CO	25-NEWS MEDIA
26-ARMY	27-NAVY	28-AIR FORCE	29-DEF LOG AGCY	30-NRC
31-ATSDR				

_ Health Assessment _ Health Studies _ Tox Info-profile _ Worker Hlth
_ Petition Assessment _ Health Surveilnc _ Tox Info-Nonprofil _ Admin
X Emergency Response _ Disease Regstry _ Subst-Spec Resch _ Other
_ Health Consultation _ Exposr Regstry _ Health Education

Narrative Summary: As a follow-up to the site visit to Lindsey Light, EPA has supplied the results of the TLD monitoring at several locations around the city of Chicago that may have radiological contamination. The TLD results were supplied as a function of exposure per week (24 hour exposure). To equate this to exposure of individuals who may receive excessive levels o exposure, the following procedure was used. I used 2000 hours per year for worker (50 weeks per year, 40 hours per week). The current exposure limit i 100 millirem per year or 0.05 mrem per hour. Since there are 168 hours in a week, any TLD with an exposure of 8.4 millirem per week was considered excessive (168 x 0.05). Using this procedure, 4 TLDs in the 161 E. Grand Avenue location were considered excessive. These were TLD numbers 9021, 9022, 9026, and 9027. 9021 and 9022 appear to be in the basement and it is unlikely that excessive exposures could occur. However, 9026 and 9027 appea to be within an office on the second floor. I would recommend that either that office be vacated and sealed or the office be remediated to a level tha is considered radiologically safe (<100 millirem per year).

Ac' 'n Required/Recommendations/Info Provided: None at this time.

Signature: Robert Williams for Paul A. Charp, Ph.D. Date: September 14, 1993

cc:
Robert L. Williams, Region V (via email)
RIMB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

HSE3-5J

2 2 1993

Mr. Ron Steele
Building Manger
205 East Grand Avenue
Chicago, Illinois 60611

RE: Lindsay Light Building
161 East Grand Avenue
Chicago, Illinois

Dear Mr. Steele:

As you may recall, the U.S. Environmental Protection Agency (U.S. EPA) placed twelve thermoluminescent dosimeter (TLD) badges in your building on June 30, 1993 to monitor radiation levels in work spaces and removed them after a month. TLD results for the locations shown on the enclosed figures were as follows:

	TLD #	millirem per hour	millirem per year
	9021	4.29	8,579
	9022	0.27	535
	9023	0.028	56
	9024	0.033	67
	9025	0.037	75
	9026	0.26	514
	9027	0.63	1257
	9028	0.052	104
	9029	0.039	78
Background	**9031**	**0.0046**	**9**
	9032	0.0062	12
	9033	0.031	62

These work space results were compared to background and to the Nuclear Regulatory Commission (NRC) regulations in the new Title 10, Part 20.1301, Code of Federal Regulations of 100 millirem per year and 2 millirem per hour for individual members of the general public. Your TLD results did exceed these relevant NRC levels in five locations.

In the opinion of U.S. EPA's Regional Radiation Expert and Superfund Toxicologist, these conditions present a threat to persons working in the contaminated areas. Since this contamination is limited to the indoors, it can not be remediated

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under U.S. EPA's Superfund program. The Superfund law usually applies to releases of hazardous substances into the outdoor environment. We do think it would be prudent to decontaminate and whenever possible reduce exposure by limiting exposure times, increasing the distance between work sites and exposure points, and using furniture or other items as absorbers. Also, the Agency for Toxic Substances and Disease Registry (ATSDR) recommended vacating and sealing the President's office on the second floor or remediating it to a radiologically safe level. A copy of ATSDR's recommendation is enclosed, which we understand you are already following. Furthermore, we would like to reiterate that the janitor's supplies should remain away from the chimney.

U.S. EPA would still be willing to advise, review any cleanup plans and survey remediated areas at no charge, if you decide it is prudent to take any action. If you need additional information or want to discuss this matter further, please contact Verneta Simon at (312) 886-3601.

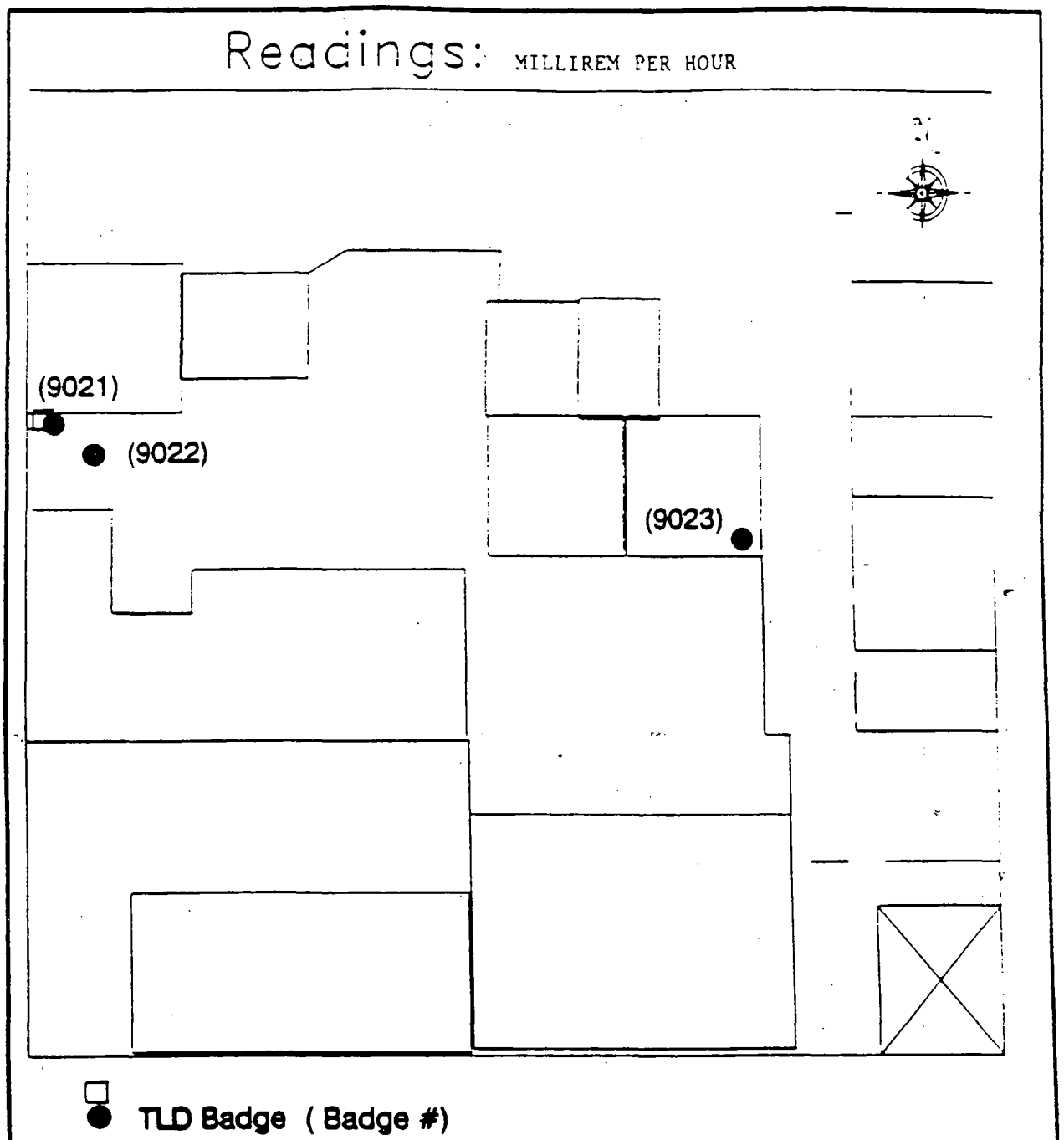
Sincerely,

Jodi Traub

Jodi Traub
Acting Associate Division Director

Enclosures

cc: Candy Morin, Illinois Environmental Protection Agency
Tim Runyon, Illinois Department of Nuclear Safety
Lafayette Robertson, City of Chicago



LEGEND

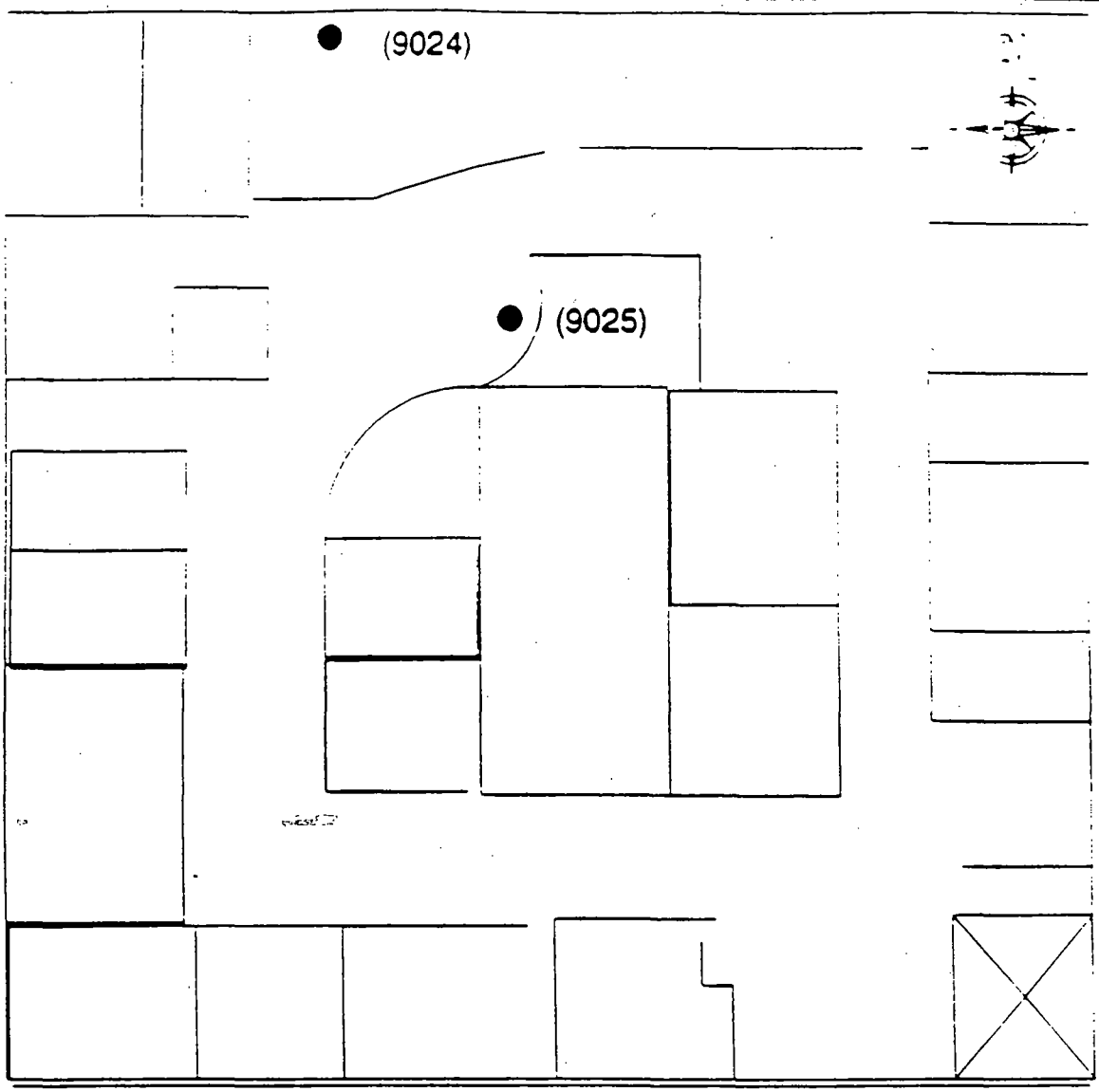
TLD EXPOSURE RESULTS

(9021)=4.28929 mrem/hr
(9022)=0.26751 mrem/hr
(9023)=0.02827 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE 161 E. Grand Ave. Basement (Optumus)	FIGURE # Figure 1
SITE Lindsay Light Company	TDD T05-9305-014
CITY Chicago STATE IL	SCALE Not to Scale
DRAWING	DATE July 16, 1993
	REVISED



● TLD Badge (Badge #)

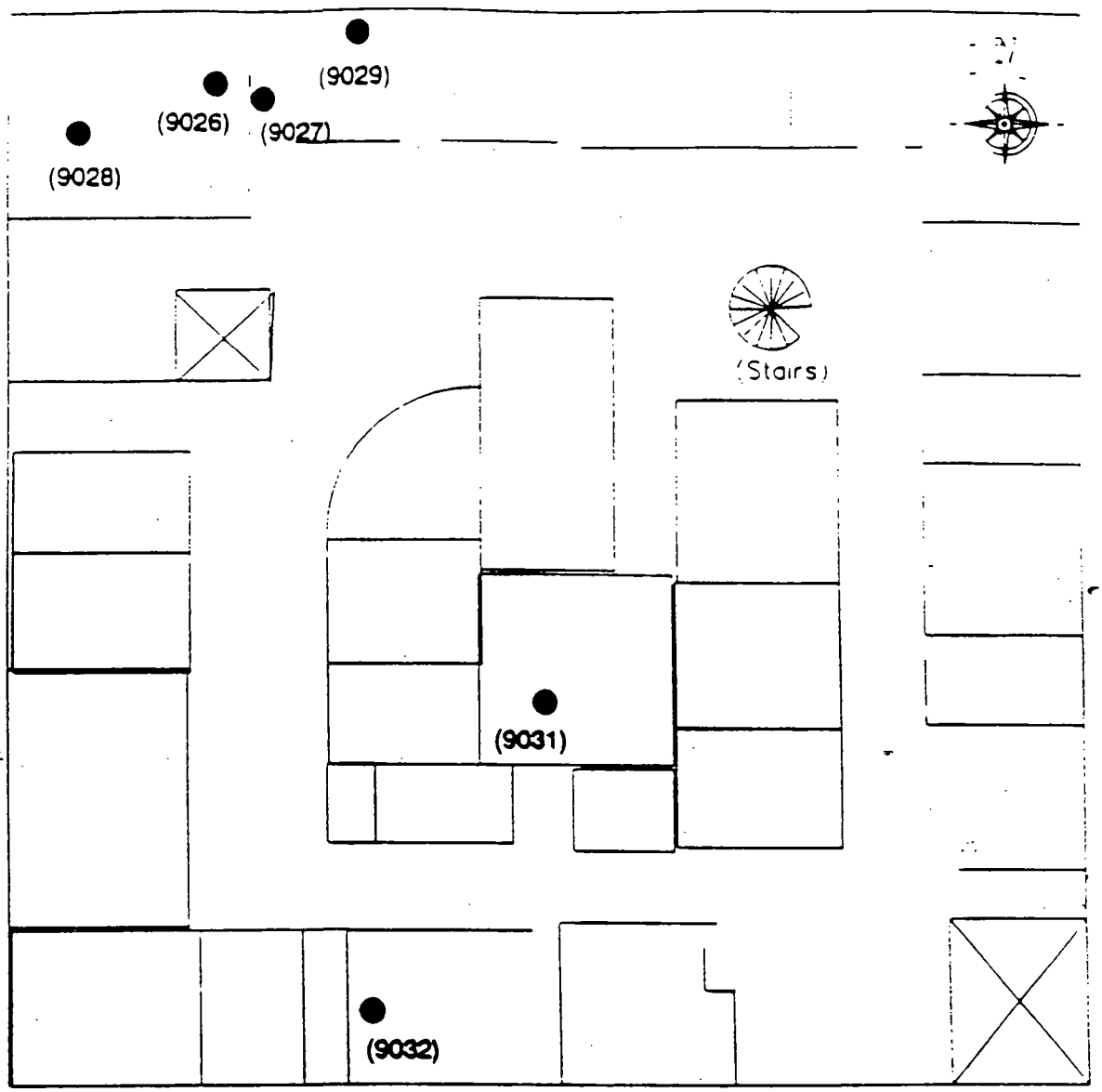
LEGEND

TLD Results

Reading: millirem per hour
(9024)=0.03364
(9025)=0.03768

EPA U.S. EPA REGION V
EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE: 161 E. Grand Ave. 1st Floor Readings Optumus	FIGURE #: Figure 2
SITE: Lindsey Light Co.	SCALE: T05-9305-014
CITY: Chicago STATE: IL	PAN: Not to Scale
SOURCE:	DATE:
	REVISED:



● TLD Badge (Badge #)

LEGEND

TLD Results

Reading: millirem per hour

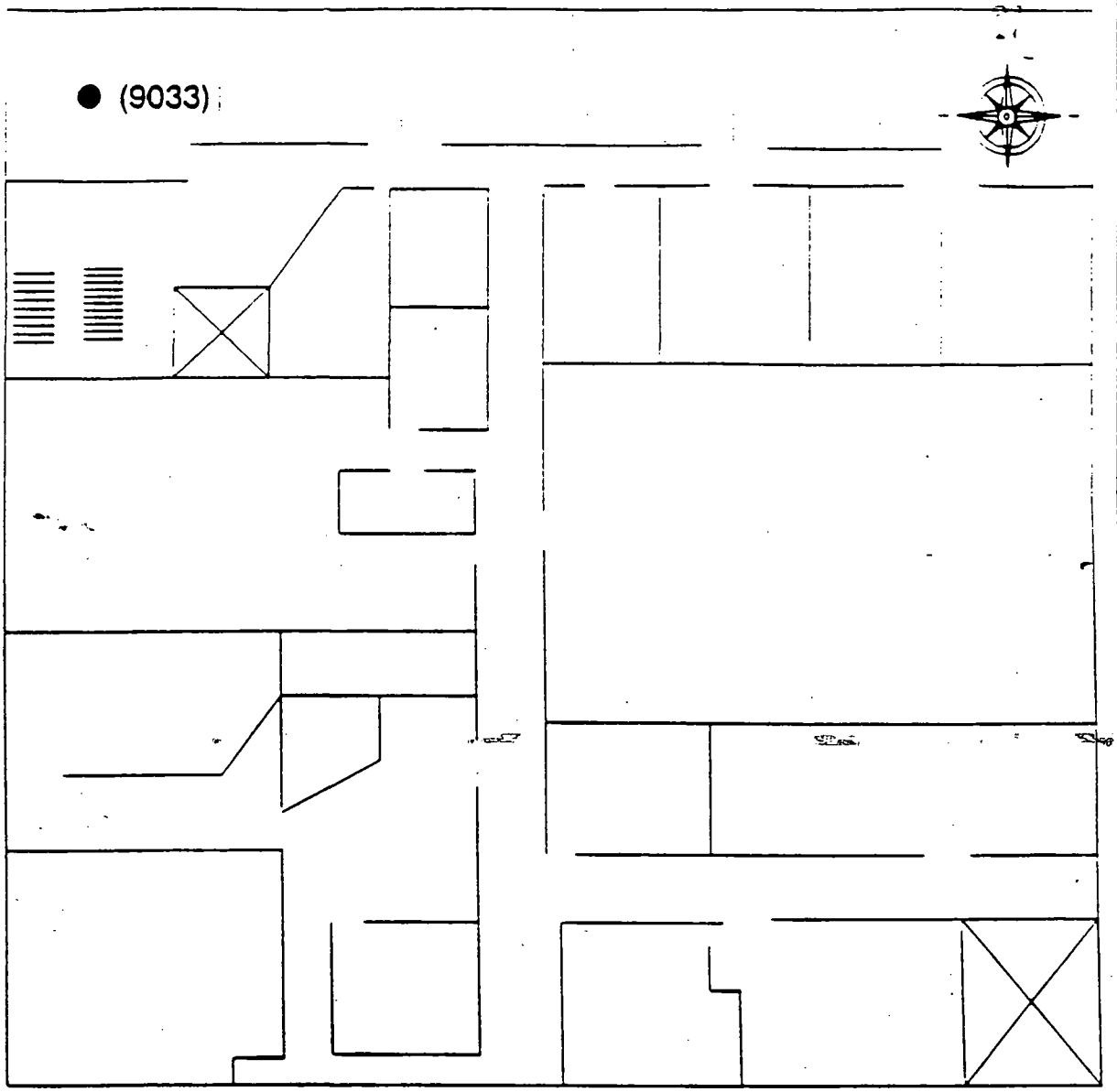
(9026)=0.25703 mrem/hr
(9027)=0.62827 mrem/hr
(9028)=0.05192 mrem/hr
(9029)=0.03875 mrem/hr
(9031)=0.00461 mrem/hr
(9032)=0.00622 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

TITLE 161 E. Grand Ave. 2nd Floor (Ootumus)	FIGURE # Figure 3
SITE Lindsay Light Company	TDD 105-9305-0[illegible]4
CITY Chicago STATE IL	SCALE Not to Scale
SOURCE	DATE July 16, [illegible]
	REVISED

Readings: MILLIREM PER HOUR



● TLD BADGE (Badge #)

LEGEND

TLD RESULTS

(9033)=0.03096 mrem/hr

EPA U.S. EPA REGION V

EMERGENCY AND ENFORCEMENT RESPONSE BRANCH

161 E. Grand 3rd Floor (Optumus)	Figure 4
Lindsay Light Company	T05-9305-014
Chicago IL	Not to Scale
	July 16, 1993

ID #: P A C 4 Date: 9/14/93 Time: 8:30 am

Site Name: Lindsey Light City: Chicago Cnty: ____ State: IL

CERCLIS #: _____ Cost Recovery #: 60YL Region: V

Site Status (1) _ NPL _ Federal _ Non-NPL _ RCRA _ Non-Site specific
(2) _ Emergency Response _ Remedial _ Other

Activities

_ Incoming Call _ Public Meeting* _ Health Consult* _ Site Visit*
X Outgoing Call _ Other Meeting _ Health Referral _ Info Provided
_ Conference Call _ Data Review _ Written Response _ Training
_ Incoming Mail _ Other

Requestor and Affiliation: (1) Vernita Simon, OSC
Phone: 312 886-3601 Address: _____
City: _____ State: ____ Zip Code: _____

Contacts and Affiliation

( ) _____ ( ) _____
( ) _____ ( ) _____

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT
6-COUNTY HLTH	7-CITY HLTH	8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT
11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN	15-DOD
16-DOE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY
21-INTL	22-CITZ GROUP	23-ELECT. OFF.	24-PRIV. CO	25-NEWS MEDIA
26-ARMY	27-NAVY	28-AIR FORCE	29-DEF LOG AGCY	30-NRC
31-ATSDR				

_ Health Assessment _ Health Studies _ Tox Info-profile _ Worker Hlth
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X Emergency Response _ Disease Regstry _ Subst-Spec Resch _ Other
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Narrative Summary: As a follow-up to the site visit to Lindsey Light, EPA has supplied the results of the TLD monitoring at several locations around the city of Chicago that may have radiological contamination. The TLD results were supplied as a function of exposure per week (24 hour exposure). To equate this to exposure of individuals who may receive excessive levels of exposure, the following procedure was used. I used 2000 hours per year for a worker (50 weeks per year, 40 hours per week). The current exposure limit is 100 millirem per year or 0.05 mrem per hour. Since there are 168 hours in a week, any TLD with an exposure of 8.4 millirem per week was considered excessive (168 x 0.05). Using this procedure, 4 TLDs in the 161 E. Grand Avenue location were considered excessive. These were TLD numbers 9021, 9022, 9026, and 9027. 9021 and 9022 appear to be in the basement and it is unlikely that excessive exposures could occur. However, 9026 and 9027 appear to be within an office on the second floor. I would recommend that either that office be vacated and sealed or the office be remediated to a level that is considered radiologically safe (<100 millirem per year).

Action Required/Recommendations/Info Provided: None at this time.

Signature: Robert Williams for Paul A. Charp, Ph.D. Date: September 14, 1993

cc:
Robert L. Williams, Region V (via email)
RIMB

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Centers for Disease Control

Memorandum

Date January 22, 1985

From Chief, Superfund Implementation Group

Subject Lindsay Light Company Building
Chicago, Illinois

To Louise A. Fabinski
Public Health Advisor
EPA Region V

The material you submitted on the subject site has been reviewed by the National Institute for Occupational Safety and Health, and the Chronic Disease Division, Center for Environmental Health, Centers for Disease Control. I hope that you find the comments useful.

RECOMMENDATIONS

In view of the calculated risk estimates and dose calculations, the radioactive contamination in the Lindsay Light Company Building does not appear to pose a significant threat to members of the public who visit the building.

The principal hazard that has been identified in the Lindsay Light Company Building is the inhalation of thoron (Rn-220) daughters. The concentration of thoron daughters to which occupants of the building are exposed is approximately a factor of 4 times greater than the equivalent concentration of radon (Rn-222) daughters in the typical U.S. home. From a health viewpoint, therefore, additional plans for cleanup of the building should be aimed at reducing the indoor thoron daughter concentration by at least a factor of 4. (This is based upon the reported EPA measurements and the EPA Technical Note of Thoron Risk, which is part of the review package.)

COMMENTS

The Endangerment Assessment for the Lindsay Light Company has been reviewed to determine if the contamination within the building poses a threat both to members of the public who visit the building, and to employees.

General Public

The excess lifetime cancer mortality risks for an individual member of the public who spends one hour per month inside the building for one year and for a lifetime of seventy years are 1.1 per 100,000 and 80 per 100,000 respectively. These values were calculated using the lifetime cancer mortality risk estimates provided for occupational exposure in the report and include the risk for gamma and radon exposure. For comparison, the average lifetime cancer mortality risk is 17,000 per 100,000 for an American. Since the building houses a variety of businesses, the average time an individual visitor might spend inside the building is difficult to estimate. On the average, one hour a month seems reasonable.

An individual spending one hour per month inside the building could be exposed to the equivalent of total of 0.02 working level months (WLM) per year, which is one tenth of the average background exposure to the public from radon in the home. The dose to the lungs would be approximately 63 mrad per year from both radon 220 and 222. Using the data in the report, an average gamma exposure rate of 0.116 milliRoentgen (mR) per hour was calculated for the building. For one year the exposure to a member of the public would be 1.39 mR. This exposure is only one percent of natural background exposure and 0.3 percent of the dose limit for members of the public.

Employees

The gamma-ray exposure risk is at least one order of magnitude less than the thoron (radon-220) exposure risk. Therefore the principal concern expressed in the reviewed document is with the exposure of workers who occupy this building to the radioactive thoron gas which emanates from the soluble form of thorium that has been found as a contaminant throughout the building.

The short-term air samples taken within the building showed a range of 0.028-0.211 thoron daughter working levels [WL(Th)]. Although calculations of lifetime fatal cancer risks are used in the reviewed report and do serve an important purpose, we have chosen to ask the question: How do the levels of thoron daughters reported in this building compare with those in other commercial buildings or homes?

Generally thoron daughter concentrations in the environment are significantly less than that of radon daughter concentrations. For that reason there is an abundance of scientific literature on radon measurements, compared with those of thoron. The "Informal Technical Note on Thoron Risk" that accompanied the package briefly explained that the bronchial dose per WLM is approximately 2.5 times greater for radon daughters than for thoron daughters. Using this assumption, we can compare the thoron daughter levels measured by EPA in the Lindsay Light Company Building with those measurements of radon daughter levels taken within homes. The latter would represent, as a first approximation, a reasonable reference frame for those who occupy the Lindsay Light Company Building.

The literature on indoor radon daughter exposures has been reviewed by the National Council on Radiation Protection and Measurements (NCRP) in Report No. 77, "Exposures from the Uranium Series with Emphasis on Radon and Its Daughters." Those concentrations in the U.S. are in the range of 0.003 to 0.02 WL(Rn). [Relevant to the present case, reported concentrations in homes within the Chicago area are 0.0025-0.0035 WL(Rn)].

Assuming a 2.5 times greater risk per unit bronchial dose for radon daughters, we would expect the risk of lung cancer from exposure for a given time period from 0.003-0.02 WL(Rn) to be equivalent to the risk of exposure during the same time period to 0.0075-0.05 WL(Th). This is to be compared to the measurements taken by EPA in the Lindsay Light Company Building which are 0.028-0.211 WL(Th). The latter concentration is approximately a factor of 4 times greater than equivalent thoron daughter exposure in the typical U. S. home.

Although a factor of 4 is significant, it should not be viewed with alarm for two reasons:

1. The ratio of radon daughter to thoron daughter risk is assumed to be 2.5. This is a calculated number with a wide range of uncertainty as the EPA Technical Note discusses. A paper by Jacobi (Health Physics 23: 3-11, 1972) carefully analyzes the risk of lung cancer from exposure to radon and thoron daughters and reports a risk ratio of 10. Using that ratio, it could be said that 8 hours of thoron daughter exposure in the Lindsay Light Company Building is equivalent to 8 hours of radon daughter exposure in the typical U.S. home [i.e., the 0.003-0.02 WL(Rn) in the home is equivalent to an exposure during the same time period to 0.03-0.2 WL(Th)].

2. Although U.S. homes are generally in the range of 0.003-0.02 WL(Rn), measurements have been made in homes with concentrations up to 0.1 WL(Rn) (NCRP Report No. 77) which would be equivalent to 0.25 WL(Th) (using the EPA risk ration assumption of 2.5). The highest concentration reported in the Lindsay Light Company Building is 0.211 WL(Th).

Sampling methodology

With regard to the sampling methodology, a few points need to be made. While the two methods used are very good for conditions found in mines, they do have limitations which should be acknowledged in the report. The method used by the Mine Safety and Health Administration assumes 100 percent equilibrium between polonium-218, lead 214 and bismuth-214 at the time of sampling. Complete equilibrium between radon-222 daughters does not usually occur in an occupied building. Perhaps some estimate should be made of the degree of error that this assumption creates. The Ogden method assumes that the respirable particles and total dust sample will be comparable. While this may be an acceptable assumption in mines, the quantity and type of dust in a business structure will be quite different. Ogden recommends that in an environment where dust levels are low, a sample from an open filter holder be used. Was this done? If so it was not clear in the report. Overall, the methodology used appears to be adequate for evaluating gamma and radon levels inside the building.

Georgi A. Jones

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: FEB 19 1985

SUBJECT: Centers for Disease Control Review of the Lindsay Light Company Endangerment Assessment

FROM: Larry Jensen
Air and Radiation Branch

TO: Louise A. Fabinski
Public Health Advisor
USEPA - Region V

Review of the Endangerment Assessment (EA) by the Centers for Disease Control was much appreciated. There are, I feel, some specific replies that should be made.

1. The reviewer spent a great deal of space assessing the gamma-ray risks to infrequent visitors to the building but discounted the need to assess the gamma-ray risks to the working occupants in the building.

2. The reviewer judged thoron risks against radon risks in typical homes. Radon at normal inhome levels represents a major health problem in this county and, therefore, is not a good basis of comparison. Thoron risks should have been judged on their own merits.

Discussion for both points follows.

1. It was asserted by the reviewer that the gamma-ray exposure risks to workers in the building were at least an order of magnitude less than the thoron risks and, therefore, the principal concern should be with thoron. I would have appreciated a review of the discussion presented in the EA for exposure to workers. The data showed that some places, actual and potential work stations, received in excess of 100 mrem per year dose and resulted in lifetime risks as high as 10^{-3}. These are levels where prevention and mitigation should be considered. What were the reviewer's judgements on (1) the dose levels and (2) the risk levels?

2. Radon at levels found in typical homes is known to cause a substantial number of lung cancer deaths annually. Nero (Health Physics Society Journal, August 1983, page 277) estimated that at 1 picocurie per liter radon-222, annual fatalities from lung cancer would range from 1,000-20,000. Radford, former chair of the BEIR III Committee of the National Academy of Sciences, recently estimated 1/3-1/2 of all lung cancer deaths* in the United States annually are attributable to normal inhome radon levels (New England Journal of Medicine, June 7, 1984, page 1485). Scherey (Proceedings of the Eighteenth Midyear Topical Symposium of the Health Phyics Society, January 1985) made measurements in homes of the thoron levels and found them to be about 55 percent of the radon levels (on a working level basis). Using the USEPA risk ratio for radon versus thoron of 2.5:1, then an additional 20 percent (1/2.5 x 55 percent) should be added to the radon risk in normal homes. Thus, the consequences of normal inhome radon/thoron levels are not trivial as might be inferred when the reviewer used this as a basis of comparison for the thoron levels in the Lindsay Light Company Building EA. Therefore, I strongly feel the thoron risks should be judged on their merits. Risks on the order of 10^{-2} are not small.

Finally, to answer questions posed by the reviewer under Sampling Methodology, normal inhome radon equilibrium factors are generally taken to be about 40 percent to 50 percent, but I've never seen any data on thoron equilibrium factors. When samples were collected for the Ogden Method calculations, the filter was open to the ambient air. It was not enclosed in a plastic cartridge.

* among nonsmokers

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date December 5, 1985

From Acting Director
Office of Health Assessment

Subject Health Assessment: Lindsay Light Company Building

To Ms. Louise A. Fabinski
Public Health Advisor
EPA Region V

EXECUTIVE SUMMARY

The Lindsay Light Company Building was contaminated with radiation by previous occupants a number of years ago. The initial review of this site, conducted by the Centers for Disease Control (CDC) and the National Institute for Occupational Safety and Health (NIOSH) was provided to the Environmental Protection Agency (EPA) Region V by a Superfund Implementation Group (SIG) memorandum dated January 22, 1985. Comments from the Region were submitted to NIOSH for answers which are provided in this document.

DOCUMENT REVIEWED

1. Memorandum from Larry Jensen, EPA Region V, to Louise Fabinski, ATSDR, "Centers for Disease Control Review of the Lindsay Light Company Endangerment Assessment," February 19, 1985.

DISCUSSION

In this memorandum, the two discussion points contained within the reviewed document are addressed.

Discussion Point 1. We can neither corroborate nor deny that 100 mrem per year dose should result in a lifetime risk as high as 10^{-3}. However, the EPA has established 25 mrem per year as the limiting dose allowed to any member of the general public from exposure to a specific source, e.g., exposure from land and buildings contaminated with residual radioactive materials, from inactive uranium processing sites (40CFR190), or exposure in the vicinity of Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) facilities (40 CFR61, parts H and I). This is prudent guidance to apply in the present case; one should not consider the office workers as "radiation

workers" but rather, as members of the general public. This would mean that cleanup operations at the Lindsay Light Company building should leave the building in such a state that the maximum external annual dose to any worker in the building is not more than 25 mrem. The level of exposure should be kept as low as reasonably achievable.

Discussion Point 2. "Radon at levels found in typical homes is known to cause a substantial number of lung cancer deaths annually . . . ." The lead sentence is not correct. One cannot state that these radon levels are known to cause lung cancer deaths. The number of fatalities quoted are estimated, based upon extrapolations and a number of assumptions. We simply do not know how many lung cancer deaths are caused annually by breathing radon/thoron progeny. This statement is not made in any way to downplay the significance of the health problem associated with indoor levels of radon/thoron, but rather to add a note of caution to the interpretation of any number of fatalities quoted in Mr. Jensen's memorandum.

Mr. Jensen states that the consequences of normal in-home radon/thoron levels are not trivial and that thoron risks should be judged on their own merit. We would not say that those risks are trivial, but would ask, "How small of a risk is small enough?" In the January 1985 CDC review, it was recommended that additional plans for cleanup of the contaminated levels with the Lindsay Light Company building should be aimed at reducing the indoor thoron daughter concentration by at least a factor of 4, although the concentration should be kept as low as reasonably achievable. Briefly stated, this factor was based upon reduction to equivalent indoor radon daughter levels found in average U.S. (and Chicago area) homes, i.e., 0.003 - 0.02 Working Levels (WL).

It is also relevant to this issue to consider what criteria/standards the EPA has issued with regard to remedial action for indoor radon daughter exposure in homes, keeping in mind that the National Council of Radiation Protection and Measurements has estimated that those concentrations in the U. S. are in the range of 0.003 to 0.02 WL.

The EPA guidance issued on July 2. 1979, to the State of Florida (with regard to homes constructed on Phosphate Lands) recommends remedial action on those homes with indoor average annual radon daughter levels equal to or

greater than 0.02 WL (Federal Register, Vol. 44, p. 38664; July 2, 1979). It also states that:

> "Development sites for new residences should be so selected and prepared and the residences so designed and sited that the annual average indoor gamma radiation exposure levels do not exceed average normal indoor background levels, within the uncertainties of normal background variation and measurement capability."

In the case of remedial action for homes and buildings constructed on tailings taken from inactive uranium mill sites, the EPA also recommended an action level of 2 Working Level Months (NCRP Report No. 77, 1984). This is approximately equivalent to an indoor concentration of 0.04 WL.

The 0.02 WL remedial action level for radon daughters is equivalent to a thoron daughter concentration of 0.05 WL(th), using the same assumptions as the previous memoranda. Since the measurements taken by EPA in the Lindsay Light Company building are 0.028 - 0.211 WL(th), a reduction in the indoor thoron daughter concentration by at least a factor of 4, as was recommended previously, is in concert with EPA's previously published guidance and based upon equivalent radon daughter levels in the average U.S. home.

We hope this information is useful to you.

Stephen Margolis

Stephen Margolis, Ph.D.

Real Estate
161 E. Grand Ave.
Chicago, IL

KERR-McGEE CHEMICAL CORPORATION
INTERNAL CORRESPONDENCE

TO DISTRIBUTION

DATE September 1, 1981

FROM I. L. Denny

SUBJECT Lindsey Light Company Bldg.
161 E. Grand Avenue
Chicago, IL

Attached for your information is a copy of a report that was apparently prepared by Larry Jensen, U.S.E.P.A. on the old Lindsey Light Company building in downtown Chicago.

I. L. Denny

I. L. Denny

ILD/ses

Attachment

DISTRIBUTION: J. L. Rainey
G. B. Rice
J. C. Berghoff

Final Report On a Survey of the

Former Lindsay Light Company Building

at

161 East Grand Avenue, Chicago, Illinois

May, 1981

INTRODUCTION

The building at 161 East Grand Avenue, Chicago, Illinois, was formerly utilized by the Lindsay Light Company between 1910 and 1936 to manufacture incandescent gas light mantles with radioactive thorium compounds. No regulations governed the possession and usage of radioactive source and byproduct materials at that time nor were radiation health effects well understood. Consequently, it was suspected the building might still contain residual radioactive contamination.

A series of data collections were performed by the U.S. Environmental Protection Agency, the Occupational Safety and Health Administration and the Illinois Department of Nuclear Safety between November 1980, and March 1981. Residual thorium contamination was found on every floor and in the basement, principally in the northwest and west-central portions of the floors. The contamination manifests itself by elevated gamma ray emissions and by elevated thoron gas working levels in the air. Limited sampling on exposed areas did not show removable alpha particle contamination. Dose measurements made in selected occupied areas were clearly elevated and unwarranted, but fortunately, not in excess of Title 10, Part 20.105 of the Code of Federal Regulations. Prompt cleanup of specific areas is strongly recommended to reduce personnel exposures to levels as low as reasonably achievable.

NOTE

In the interest of clarity, this report has been subdivided into a Main Report and a Technical Appendix. The Main Report is intended for the general public while the The Technical Appendix is, as the name implies, additional supportive technical material intended for persons acquainted with radiation health physics.

SURVEY PARTICIPANTS

Preliminary Survey

U.S. Environmental Protection Agency

Larry Jensen
Pete Tedeschi
Mike Madigan

Illinois Department of Nuclear Safety

Dave Derenzo

Comprehensive Survey

U.S. Environmental Protection Agency

Larry Jensen
Carl Onesti

Occupational Health and Safety Administration

Craig Henderson

MAIN REPORT

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I. SPECIFICATION OF THE SITE

Lindsay Light Company once manufactured incandescent gas mantles for home and street lighting in a building on the southwest corner of Indiana and St. Clair Streets from at least 1910 until 1936. During that time span (on April 14, 1913, to be exact) Indiana Street became Grand Avenue. Grand Avenue is half a mile north of the central Chicago "Loop" area and St. Clair Street is a quarter of a mile west of Lake Michigan. Today, at 161 East Grand Avenue, a greystone nameplate four stories up still reads Lindsay Light Company although the company moved to West Chicago, Illinois over the period 1931-36. The building is jointly owned by the 161 East Grand Co-op and managed by Browne and Storch, a real estate firm. Representative of the tenants in the building are film, video tape and sound production firms, an architect, an insurance investigator, and a locksmith.

II. RECOGNITION OF A POSSIBLE RADIATION PROBLEM

Interest in the Lindsay Light Company did not arise directly but grew through events 30 miles west of the "Loop" in suburban West Chicago, Illinois. A rare earths *extraction operation run by Kerr-McGee Chemical Corporation had terminated operations in 1973 and the company had asked to be released from its Nuclear Regulatory Commission (NRC) license. Subsequent surveys showed the factory buildings were extensively contaminated and several million pounds of radioactive materials, principally thorium with some uranium, were exposed in an open waste dump.

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*The rare earths are elements 58-71 in the Periodic Table of the Elements, from cerium to lutetium, and are used, to give two examples, for grinding compounds and high strength magnets. Ironically, they are quite abundant.

In writing a decommissioning plan for the NRC to deal with this situation, Kerr-McGee noted that they had purchased the facility from American Potash and Chemical Corporation in 1967, which, in turn, had purchased their operation from Lindsay Light and Chemical Company in 1958. Lindsay first occupied the West Chicago site in 1931 when they expanded their operations from downtown Chicago and changed their name to Lindsay Light and Chemical Company. Between 1931 and 1936, they fully translocated from Grand Avenue to West Chicago. Interest aroused by the West Chicago problem led to curiosity about the earlier Lindsay site. "Was it also radioactively contaminated?" The building was found to be located at Grand and St. Clair (By whom and how has not been determined). No records, however, have been identified showing any building surveys were made then. The Chicago Tribune newspaper apparently found out about the building through the West Chicago situation and referred to it in a series on radioactive waste in October 1978. The first indication that there might actually be residual materials left in the building came from Radiation Safety Services, Inc., a health physics consulting firm, that reported in the fall of 1980 that they had measured radioactivity in the halls while visiting their messenger service. At this point EPA arranged for a survey of the building. This was the subject of the "Preliminary Report on 161 East Grand Avenue Chicago, Illinois, November 17, and 24, 1980."

III. BACKGROUND INFORMATION ON GAS LIGHT MANTLE MANUFACTURE

The problems with Lindsay arose because thorium compounds used in the manufacture of gas mantles contain some atoms of the Thorium Decay Series, a naturally occurring sequence of radioactive elements starting with thorium-232 and radioactively decaying to lead-208 (see Fig. 1).

Figure 1

Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10}y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (15%) 0.908 (25%) 0.96c (20%)
$^{228}_{90}Th$	Radiothorium	1.910y	5.34 (28%) 5.43 (71%)	---	0.084 (1.6%) 0.214 (0.3%)
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.7%)
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.07%)
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (47%) 0.300 (3.2%)
$^{212}_{83}Bi$	Thorium C	60.6m	6.05 (25%) 6.09 (10%)	1.55 (5%) 2.26 (55%)	0.040 (2%) 0.727 (7%) 1.620 (1.8%)
$^{212}_{84}Po$	Thorium C'	304ns	8.78 (100%)	---	---
$^{208}_{81}Tl$	Thorium C''	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 (23%) 0.583 (86%) 0.860 (12%) 2.614 (100%)
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

64.0% 36.0%

*This expression describes the mass number of any member in this series, where *n* is an integer.
Example: $^{232}_{90}Th$ (4n).....4(58) = 232

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons, Inc., 1967) and Hogan, O. H., Zigman, P. E., and Mackin, J. L., Beta Spectra (USNRDL-TR-802 [Washington, D.C.: U.S. Atomic Energy Commission, 1964]).

Some uranium, more specifically the Uranium Decay Series, might have been present as a contaminant (see Fig. 2). It is probably safe to say that the thorium was not given special handling. Little was known of the health effects associated with radiation exposure at the time nor was there a regulatory system to provide an oversight function. As a result solutions and powders of thorium compounds were probably not treated with tidiness and caution. At this point a short diversion to explain the mantle making process may be helpful.

Mantles were generally woven from cotton, ramie, or artificial silk fibers in the form of a long tube. The tubes were treated with a solution containing 25-50% thorium and cerium nitrates (Cerium is one of the rare earths). In treating the tubes the solution was about 98-99 parts thorium to 1-2 parts cerium nitrate. Small quantities of beryllium and magnesium nitrates were also added for strength. Treated tubes were cut to the desired length and one end was closed with asbestos thread. The mantles were fixed with a thorium solution containing considerable alumina and alkaline earths. Once the fixed mantle was dried and shaped it was "burned off" whereby nitrates were converted to oxides by an intense flame. Mantles which survived the flame treatment were dipped in collodion for strength and then sold.*

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*From "Monazite, Thorium, and Cerium", Information Circular 6321, August 1930, Department of Commerce - Bureau of Mines.

Figure 2

Uranium Series (4n + 2)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{238}_{92}U$	Uranium I	4.51×10^9 y	4.15 (25%) 4.20 (75%)	---	---
$^{234}_{90}Th$	Uranium X_1	24.1d	---	0.103 (21%) 0.193 (79%)	0.063c‡ (3.5%) 0.093c (4%)
$^{234}_{91}Pa^m$	Uranium X_2	1.17m	---	2.29 (98%)	0.765 (0.30%) 1.001 (0.60%)
99.87% | 0.13% $^{234}_{91}Pa$	Uranium Z	6.75h	---	0.53 (66%) 1.13 (13%)	0.100 (50%) 0.70 (24%) 0.90 (70%)
$^{234}_{92}U$	Uranium II	2.47×10^5 y	4.72 (28%) 4.77 (72%)	---	0.053 (0.2%)
$^{230}_{90}Th$	Ionium	8.0×10^4 y	4.62 (24%) 4.68 (76%)	---	0.068 (0.6%) 0.142 (0.07%)
$^{226}_{88}Ra$	Radium	1602y	4.60 (6%) 4.78 (95%)	---	0.186 (4%)
$^{222}_{86}Rn$	Emanation Radon (Rn)	3.823d	5.49 (100%)	---	0.510 (0.07%)
$^{218}_{84}Po$	Radium A	3.05m	6.00 (~100%)	0.33 (~0.019%)	---
99.98% | 0.02% $^{214}_{82}Pb$	Radium B	26.8m	---	0.65 (50%) 0.71 (40%) 0.98 (6%)	0.295 (19%) 0.352 (36%)
$^{218}_{85}At$	Astatine	~2s	6.65 (6%) 6.70 (94%)	? (~0.1%)	---
$^{214}_{83}Bi$	Radium C	19.7m	5.45 (0.012%) 5.51 (0.008%)	1.0 (23%) 1.51 (40%) 3.26 (19%)	0.609 (47%) 1.120 (17%) 1.764 (17%)
99.98% | 0.02% $^{214}_{84}Po$	Radium C'	164μs	7.69 (100%)	---	0.799 (0.014%)
$^{210}_{81}Tl$	Radium C"	1.3m	---	1.3 (25%) 1.9 (56%) 2.3 (19%)	0.296 (80%) 0.795 (100%) 1.31 (21%)
$^{210}_{82}Pb$	Radium D	21y	3.72 (.000002%)	0.016 (85%) 0.061 (15%)	0.047 (4%)
$^{210}_{83}Bi$	Radium E	5.01d	4.65 (.00007%) 4.69 (.00005%)	1.161 (~100%)	---
~100% | .00013% $^{210}_{84}Po$	Radium F	138.4d	5.305 (100%)	---	0.803 (0.0011%)
$^{206}_{81}Tl$	Radium E"	4.19m	---	1.571 (100%)	---
$^{206}_{82}Pb$	Radium G	Stable	---	---	---

*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{206}_{82}Pb$ (4n + 2).....4(51) + 2 = 206

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Table of Isotopes and USNRDL-TR-802.

IV. SURVEYS

A. Preliminary Survey

The Preliminary Survey was conducted in tandem with the Illinois Department of Nuclear Safety (IDNS) in November, 1980. The report filed on this "Preliminary Report on 161 East Grand Avenue, Chicago, Illinois, November 17 and 24, 1980," concluded that some portions of the building were indeed contaminated with radioactive materials, that the material was thorium, that it did not appear to be removable and that excess alpha radiation appeared in the air in a room with elevated gamma radiation on the floors.

B. Comprehensive Survey

Subsequently, a thorough and more extensive survey was initiated between January and March 1981, this time in conjunction with the Occupational Health and Safety Administration. Each room in the building was surveyed for localized gamma radiation. Thermoluminescent dosimeters were placed in critical occupied locations. Air samples were collected in three rooms and determinations of radon-220 and radon-222* working levels were made.

V. GENERAL SURVEY RESULTS WITHOUT DISCUSSION

A. Building Surveys

a. Preliminary Survey

On November 17 an exploratory survey was performed in the Lindsay building to test the allegations of contamination. EPA requested the assistance of the Illinois Department of Nuclear Safety (IDNS) because of their possible jurisdiction in this matter.

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*Radon-220 and radon-222 are radioactive gases emitted from the Thorium and Uranium Decay Series, respectively (See Figs. 1,2).

EPA used a sodium iodide crystal to detect gamma rays emitted from any contaminated areas and a micro-roentgen (micro-R meter) to measure gamma ray exposure rates in micro-roentgen per hour (uR/hr)(Table TA1 in the Technical Appendix gives complete instrumentation data).

The surveys were performed on the evening of November 17 and 24, so as to minimize both the disruption to normal business operations of the tenants and to avoid generating unnecessary concerns before information was fully collected and analyzed. Surveying in the evening, however, had the drawback of not letting us gain access to each and every room. The basement, 1st floor, accessible portions of the 2nd and 3rd floors, and the 4th floor were surveyed. Resurvey data discussed later in this report should be considered to be better than preliminary survey data because specific information about the character, levels and distribution of contamination were known.

Roughly, the general background of the building was found to be 20-25 uR/hr as measured with the micro-R meter on contact with the surface. Scattered basement areas showed readings elevated over this running to 165 uR/hr on contact with the surface (including background). An area on the 1st floor restricted to the northwest corner of one office and an adjacent pipe showed a reading of 380 uR/hr on contact (including background). Over the 1st floor reception area exposure rate readings increased with height. The most extensive areas of contamination were located on the 2nd floor in Room 202 and the adjoining hallway. A contact reading of 1100 uR/hr (including background) was measured in a conference room. This room was over the 1st floor reception area and was thought to probably explain the increased readings with height measured there. Surveyed portions of the third and fourth floors did not show appreciably elevated readings.

It was concluded from the results of the Preliminary Survey that the allegations of contamination were valid. The material was localized and appeared to be spotty rather than spread over a large area. The latter conclusion was reached because of the rapid changes in surface readings with a small change in distance from the source. A comprehensive survey of the premises was deemed warranted.

b. Comprehensive Survey

On January 22, February 12, February 20 and March 2, 1981, the basement and all four floors were surveyed completely by EPA and the Occupational Health and Safety administration (OSHA). OSHA had, when informed of the preliminary survey results, elected to assist EPA in further surveys. IDNS felt they wished to review the final survey report but declined to spend additional personnel time on this matter. EPA collected air samples on February 24, 25, and 26, and took a gamma ray spectrum on February 24. TLDs were placed on January 22 and collected on March 2.

Each room was walked through with a sodium iodide crystal (See Table TA1 in the Technical Appendix for instrumentation details). Representative readings were taken in every room on contact with the surface and at one meter above the surface with a micro-R meter. Additional readings were taken at points identified by the sodium iodide survey meter to be appreciably elevated over background. Again, background was estimated from the lowest micro-R readings encountered. These ran about 20-25 uR/hr at both contact and one meter, although, 1st floor readings dropped below 20 uR/hr and in some cases were as low as 10 uR/hr.

Basement readings are shown in Figs. 3 and 4. Contact readings are highest in Rooms 1,2,8 and 12, in the hallway near Room 5, and in the room adjacent to the boiler. The highest reading in the building was measured in Room 8 where what appeared to be a chimney had been partially plugged with concrete. The chimney reading was 3200 uR/hr on contact with the micro-R meter (including background). The room is used for storage of recording tapes and commercials and is generally not occupied.

First floor background levels (See Fig. 5,6) were in general, the lowest in the building. Elevated gamma ray readings were restricted to two areas, the front reception area and one section of the northwest office. In the reception area it was reaffirmed that exposure readings increased with height indicating an overhead source. In the office area the contamination appeared over 10-15 feet of the wall in the northwest corner and also appeared to be associated with a large vertically standing pipe.

Resurveys of the second floor (See Fig. 7-15) showed almost all contamination to be limited to the northwest corner of the floor comprising Rooms 200, 201, 202, a corner of Room 214, and the adjacent hallway. Roughly the highest readings are on a northwest - southeast line. Two very restricted spots of contamination were found at a pipe hole in the southeast corner of the floor and on a section of floor in the south central hallway.

Figure 3 :Micro - Roentgen Meter Readings , Contact With Floor , in Basement

(All readings are in micro - roentgens per hour , uR/hr .)

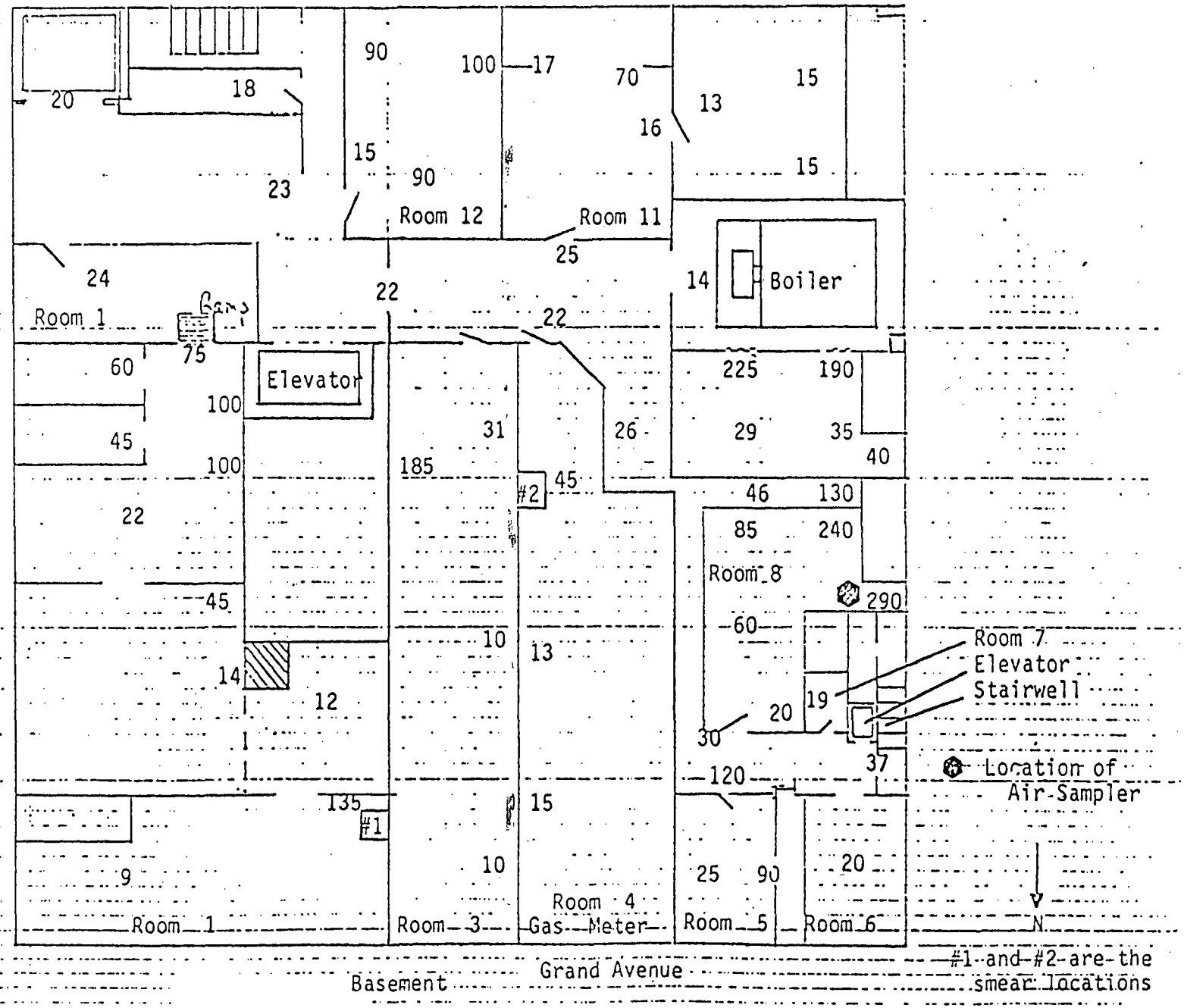


Figure 4: Micro - Roentgen Meter Readings at One Meter Above Floor in the Basement

(All readings are in micro - roentgens per hour , uR/hr .)

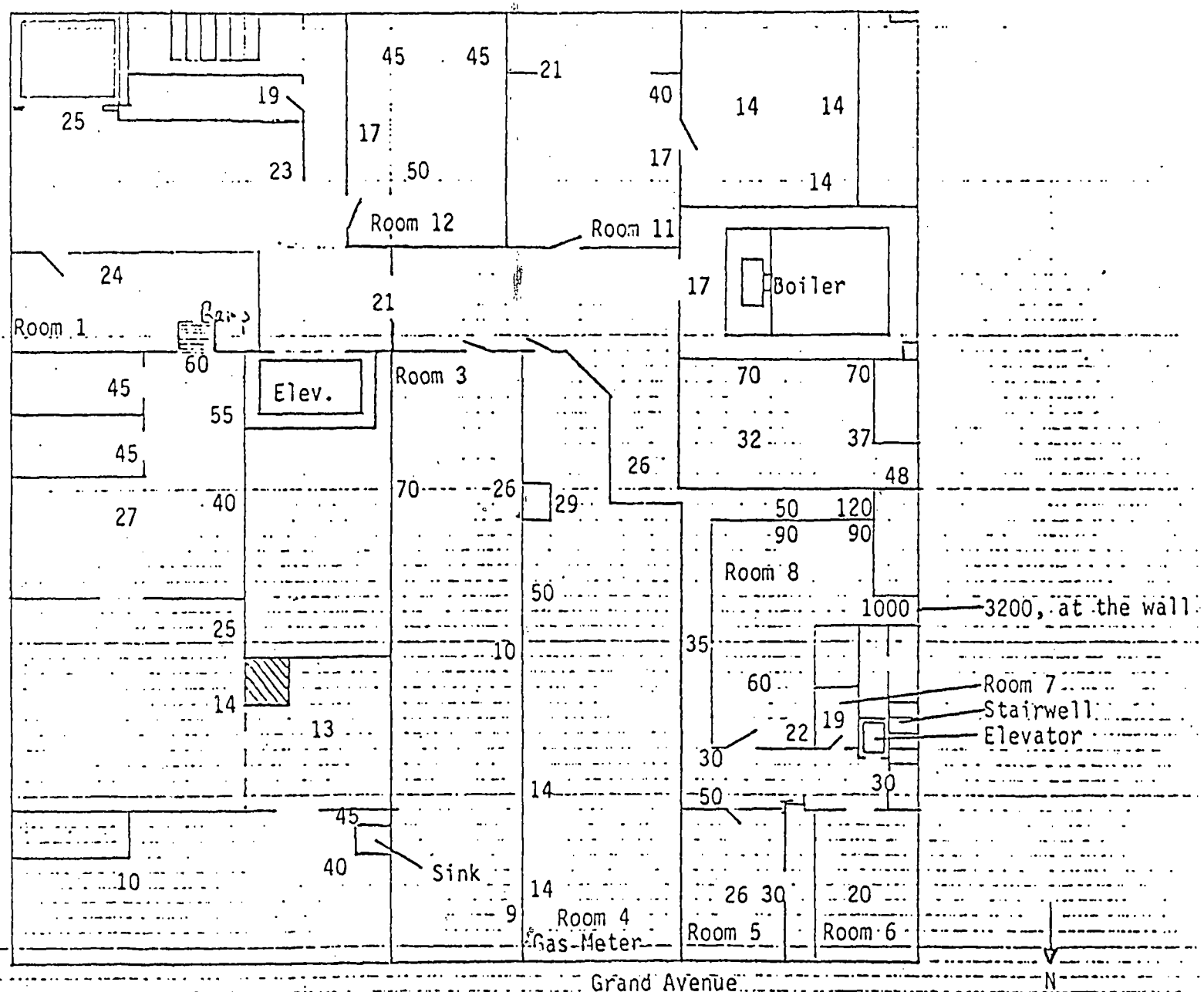


Figure 5 : Micro - Roentgen Meter Readings , Contact With Floor
(All readings are in micro - roentgens per hour , uR/hr.)

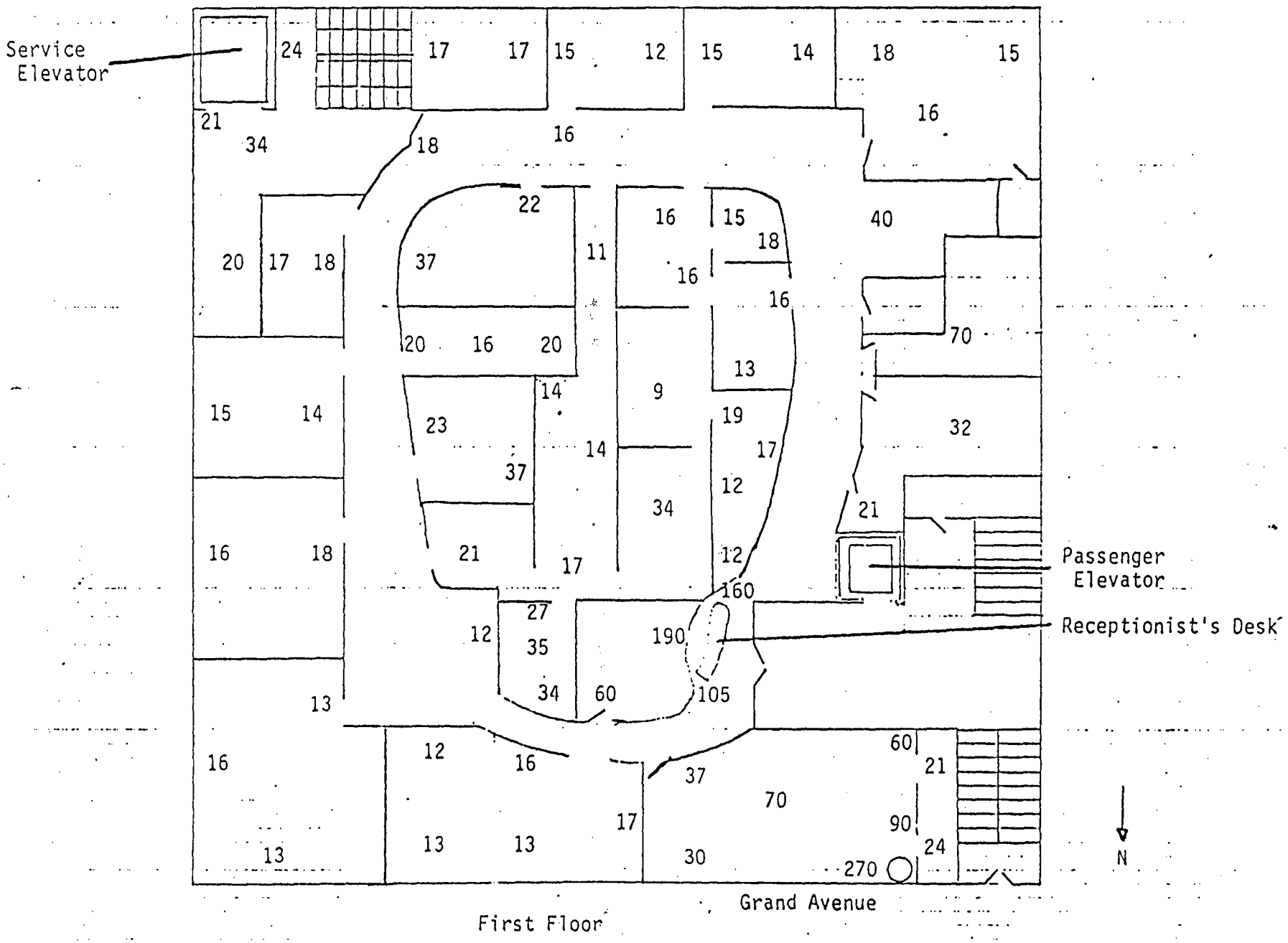
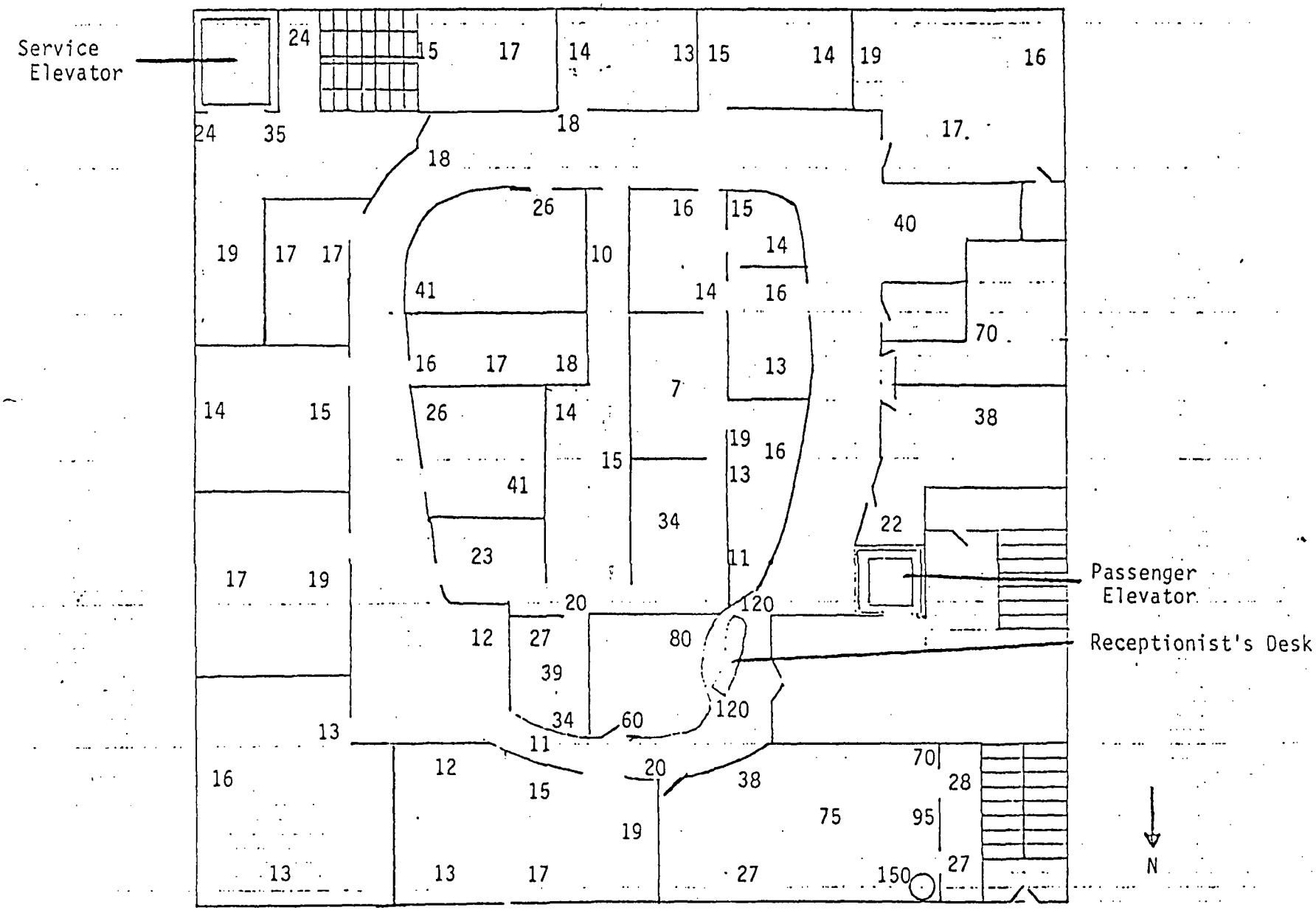


Figure 6 : Micro-Roentgen Meter Readings at One Meter Distance
(All readings are in micro-roentgens per hour , uR/hr .)



First Floor

Figure 7 : Micro - Roentgen Meter Readings , Contact With Floor
(All readings are in micro-roentgens per hour, uR/hr.)

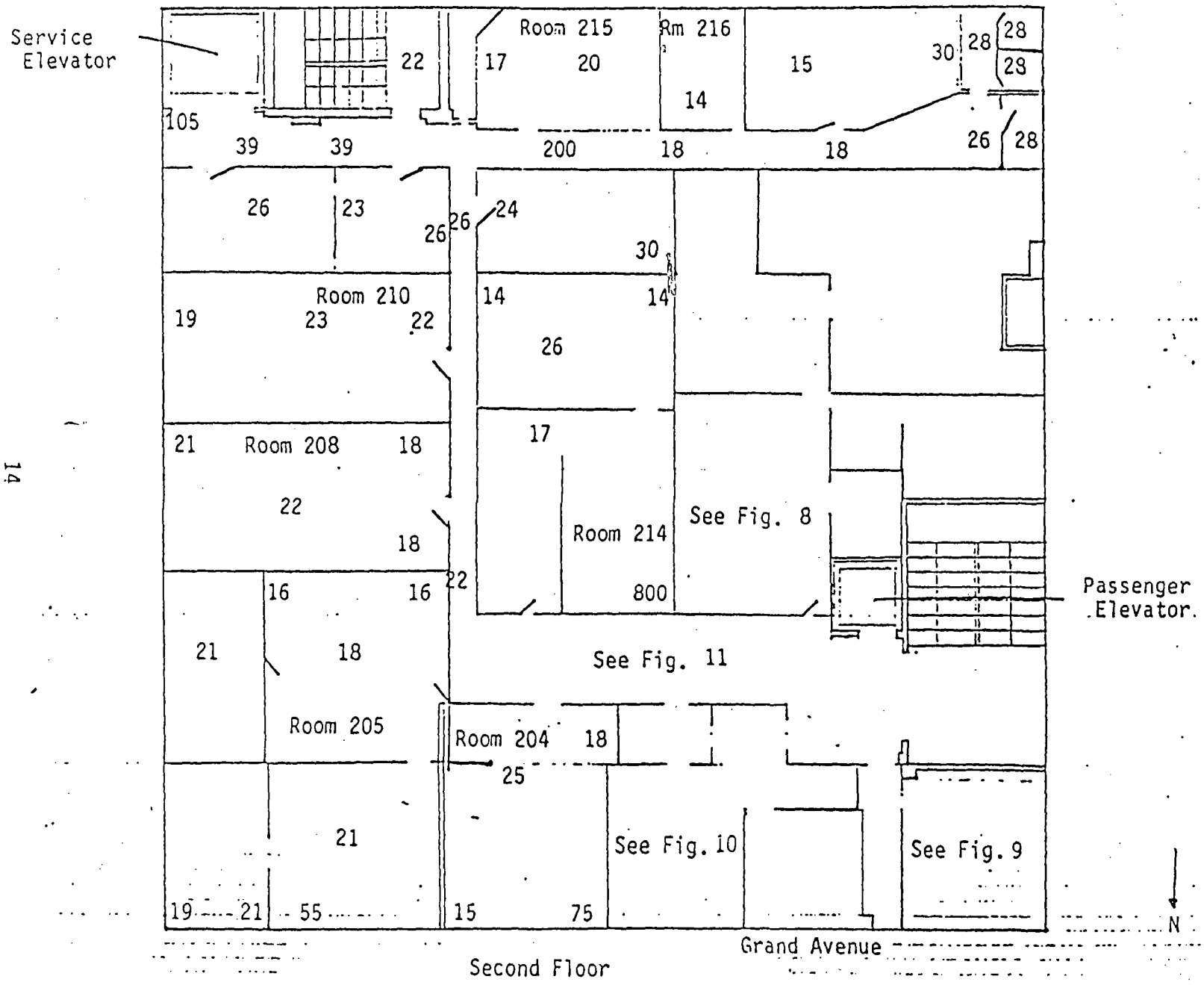
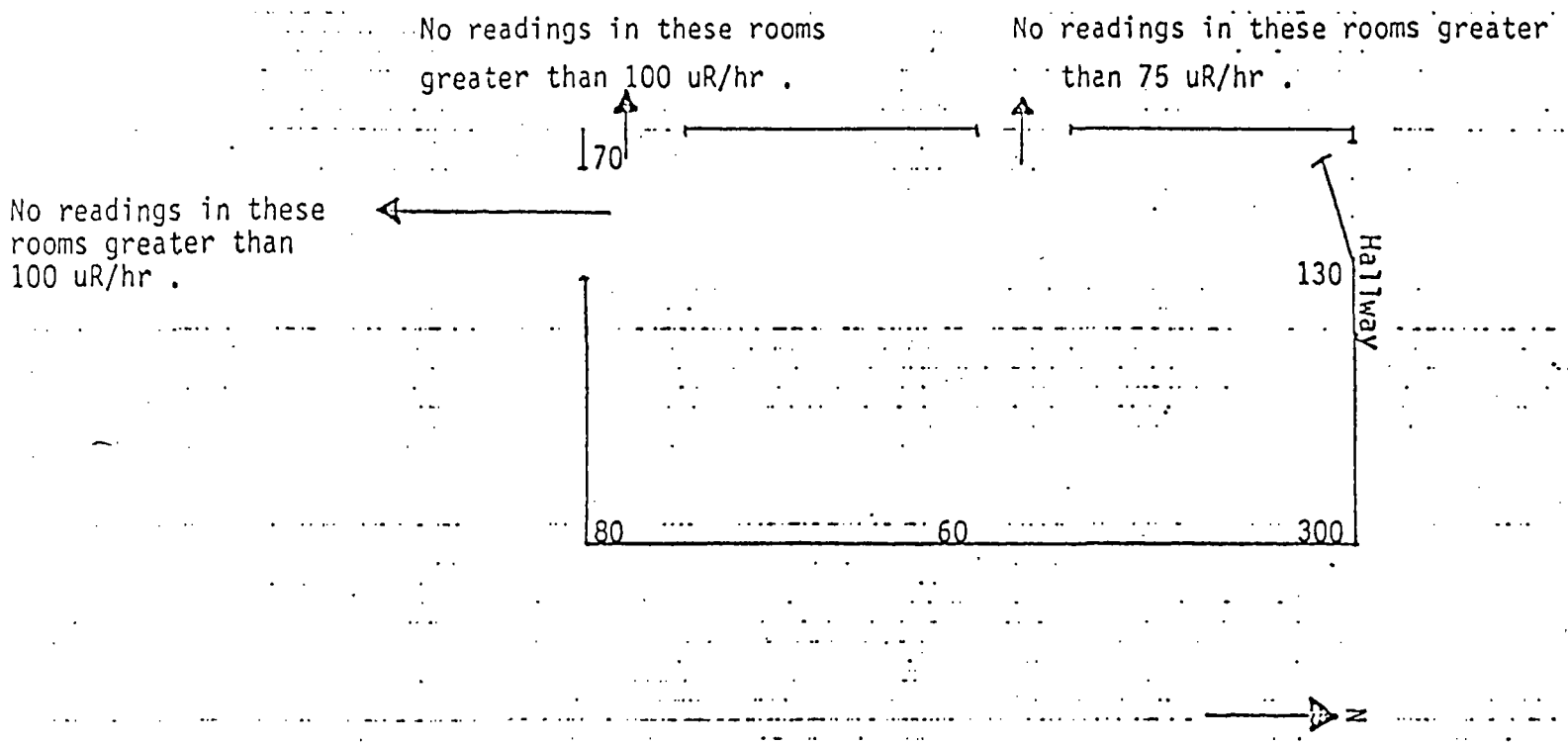


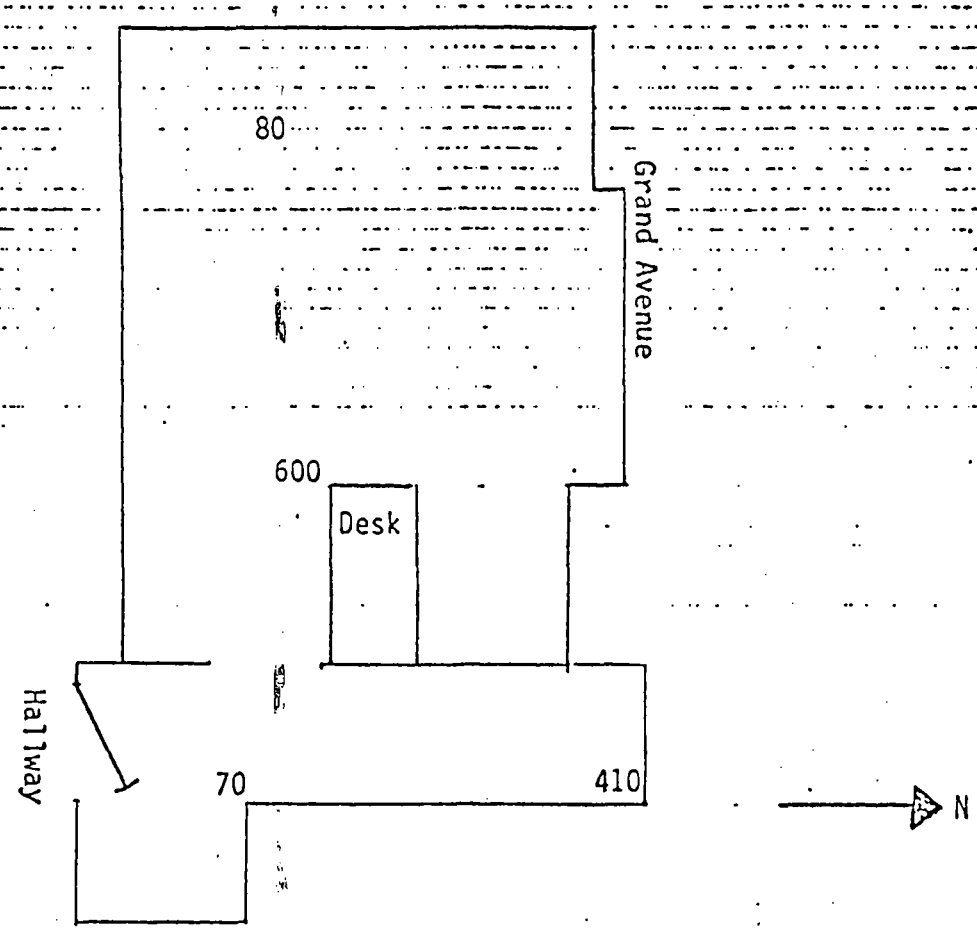
Figure 8 : Micro - Roentgen Meter Readings , Contact With Floor , in Room 200

(All readings are in micro - roentgens per hour , uR/hr)



Second Floor - Room 200 (Glen McGowean and Son)

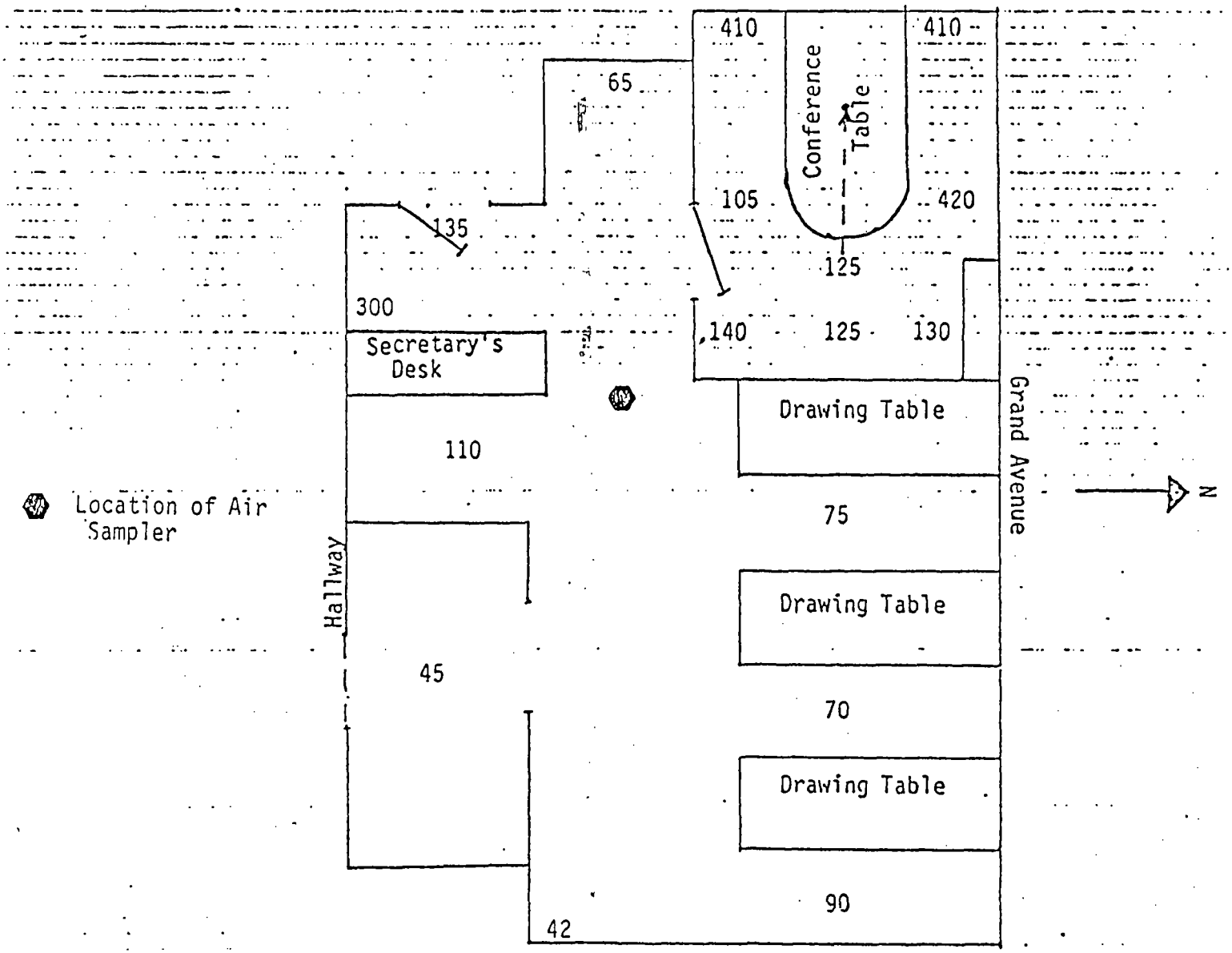
Figure 9: Micro - Roentgen Meter Readings, Contact With Floor, in Room 201
(All readings are in micro - roentgens per hour, uR/hr.)



Second Floor - Room 201 (Ascot Products)

Figure 10: Micro - Roentgen Meter Readings, Contact With Floor, in Room 202

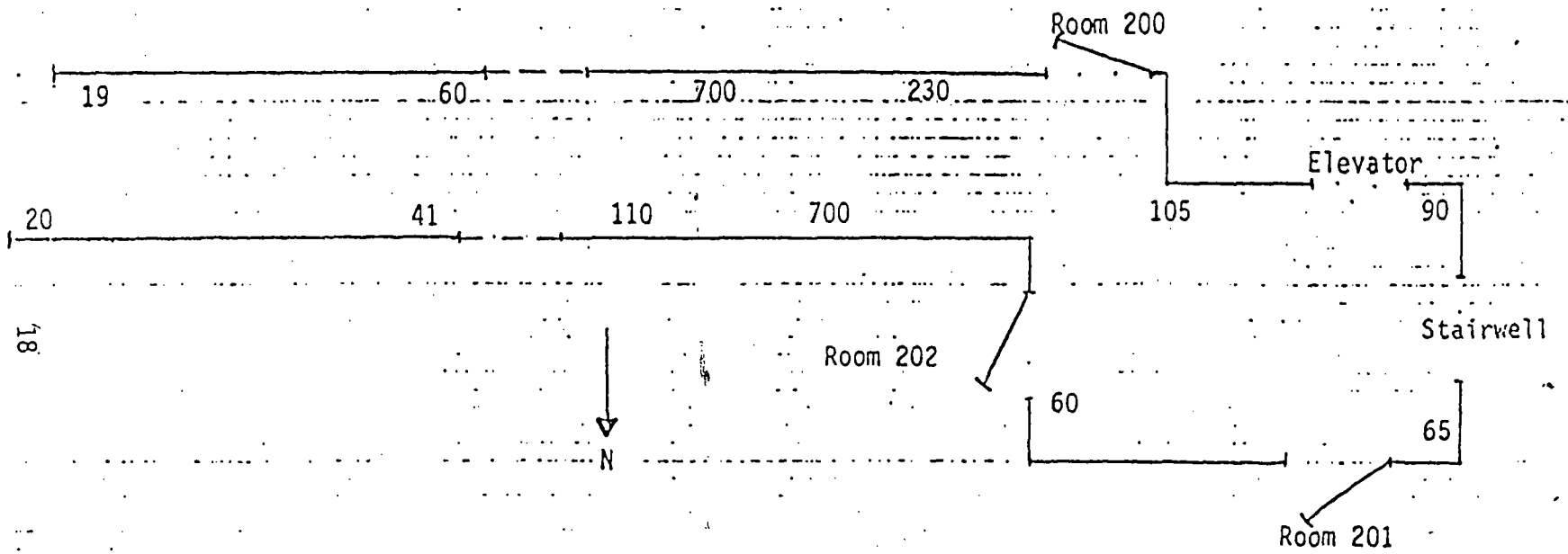
(All readings are in micro - roentgens per hour, uR/hr.)



Second Floor - Room 202 (Meisel Hunson LTD)

Figure 11: Micro - Roentgen Meter Readings ; Contact With Floor , in Hallway near Room 202

(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Hallway

Figure 12 : Micro - Roentgen Meter Readings at One Meter From Floor
(All readings are in micro - roentgens per hour, uR/hr.)

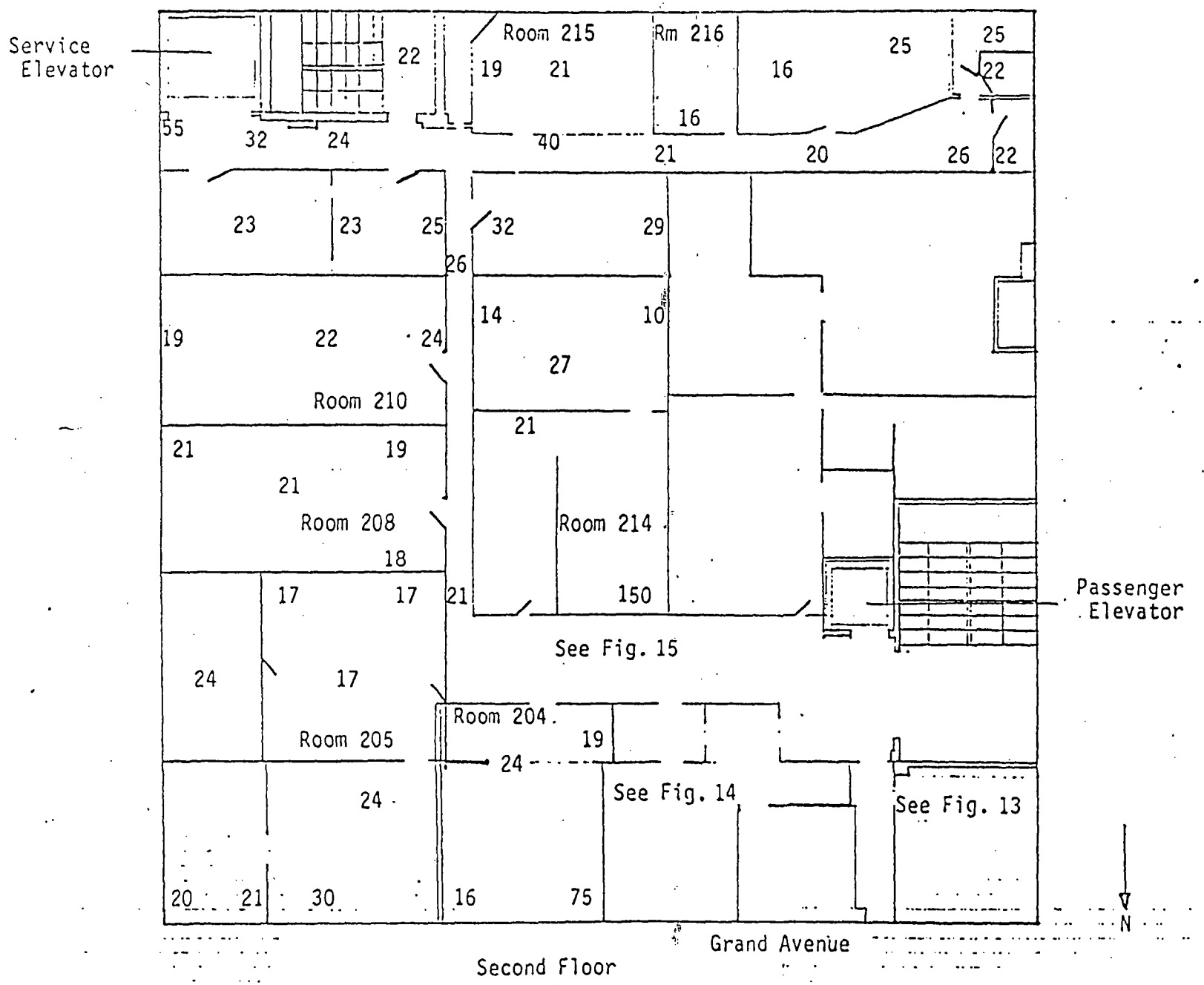
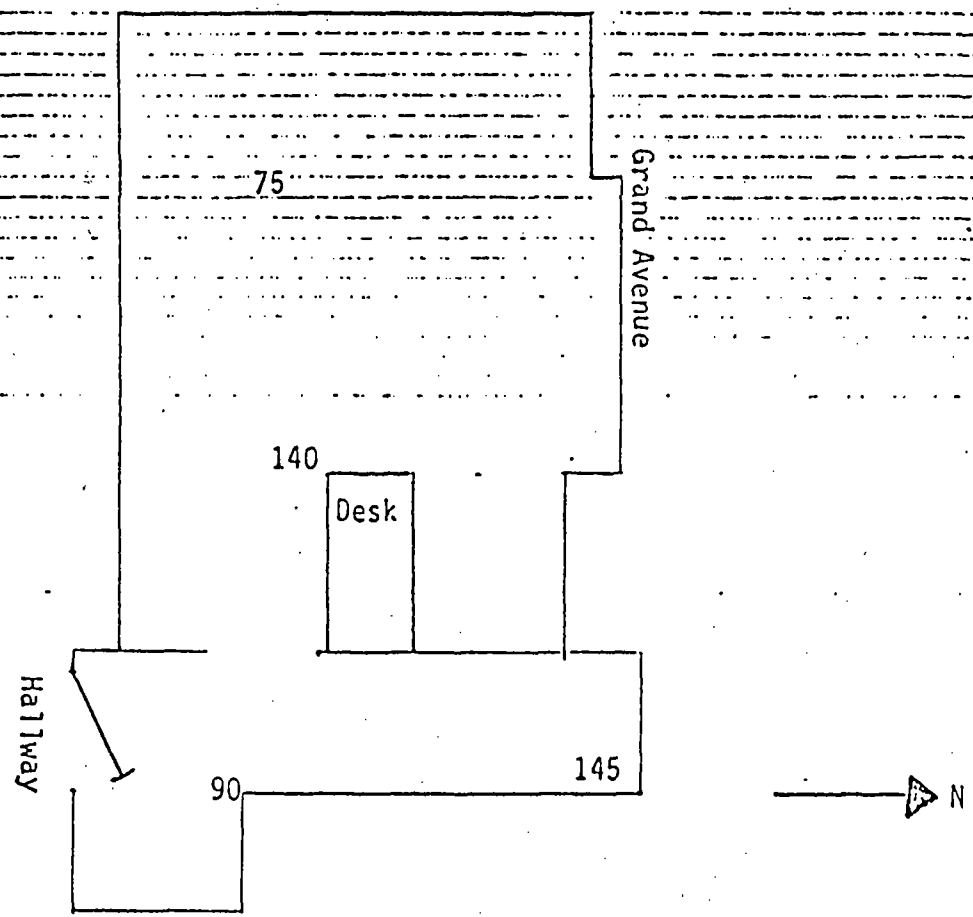


Figure 13 :

Micro - Roentgen Meter Readings at One Meter Above Floor in Room 201

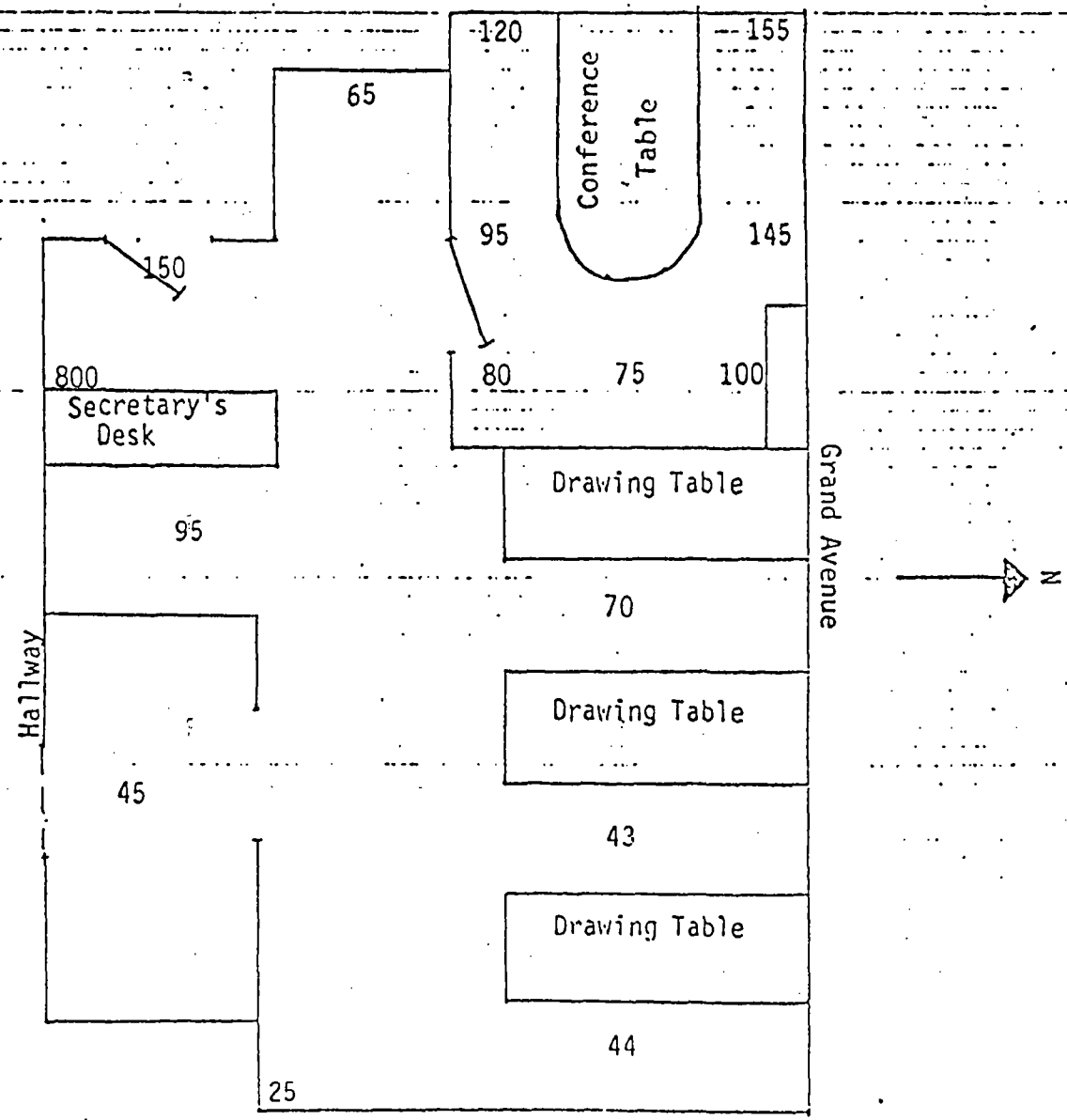
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Room 201 (Ascot Products)

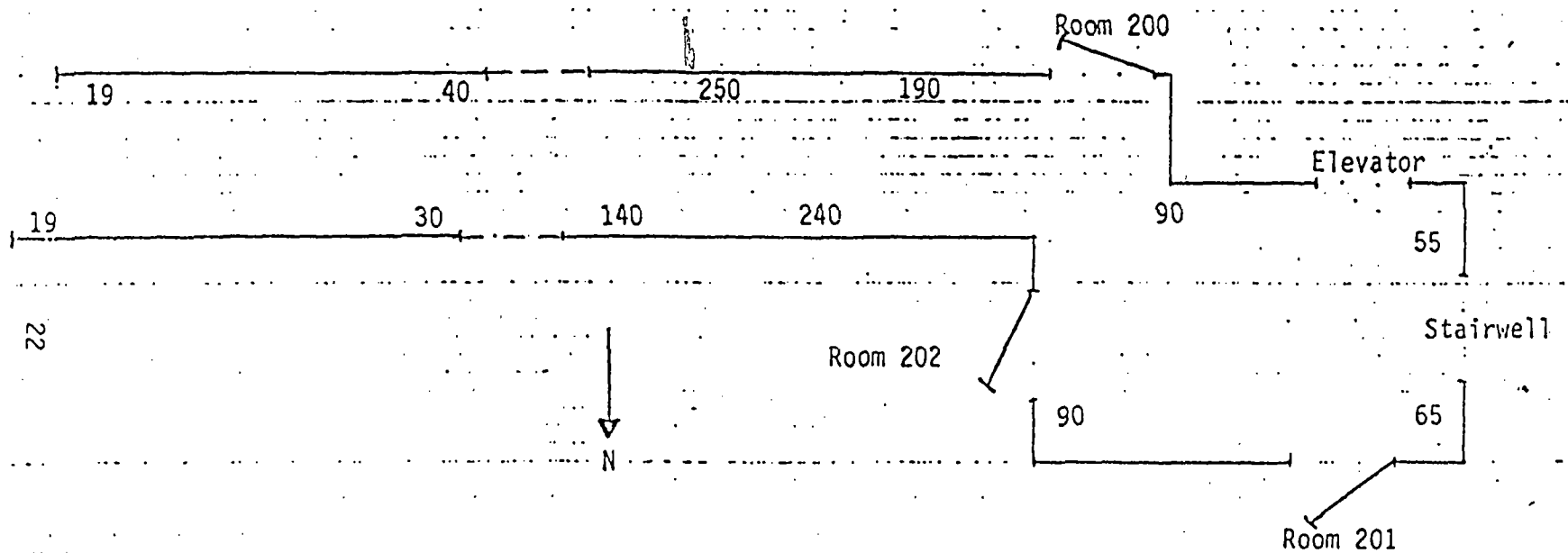
Figure 14 : Micro - Roentgen Meter Readings at One Meter Above Floor in Room 202

(All readings are in micro - roentgens per-hour , uR/hr.)



Second Floor - Room 202 (Meisel Munson LTD)

Figure 15 :- Micro - Roentgen Meter Readings at One Meter Above Floor in Hallway near Room 202
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Hallway

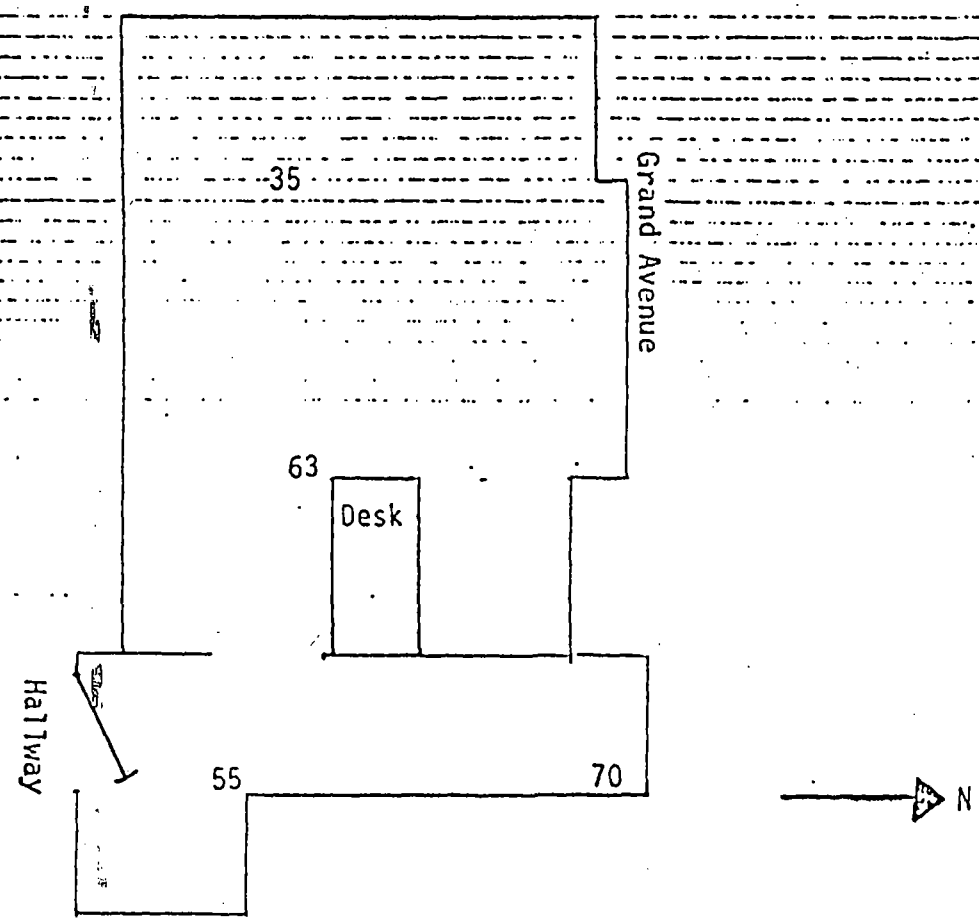
In Rooms 200, 201, and 202 along with the adjoining hallway, dual readings with the micro-R meter and a pressurized ion chamber (PIC) were made (See Figs. 16-18). The micro-R meter is handy for surveys because it is small, light and sensitive, but it can give exaggerated readings where low energy gamma rays are present. The PIC comprises two heavy, bulky and expensive pieces that give very reliable readings without the problem of over response to low energy gamma rays. Both instruments were used to obtain readings at the same location and at the same height, one meter off the floor. To the limits of the PIC (500 uR/hr) this allowed a working conversion from micro-R meter readings to equivalent PIC readings. PIC readings should be considered much closer to true. Within the range 0-300 uR/hr the micro-R meter was found to read approximately twice the PIC readings (See Table TA2 and Fig. TAA in the Technical Appendix). Consequently, micro-R meter readings can be compared to "true" by reducing them by half.

The third floor (See Figs. 19-20) showed the greatest contamination in an area in the west central portion of the building. Limited areas of contamination were found in the northwest corner - Room 300 and the adjacent hallway - and in the southeast corner near the service elevator.

As with the third floor the primary area of contamination on the fourth floor (See Figs. 21,22) was in the west central portion of the floor. One somewhat isolated, but considerably elevated spot was also identified in the northwest corner.

Figure 16 : Pressurized Ion Chamber Readings at One Meter Above Floor in Room 201

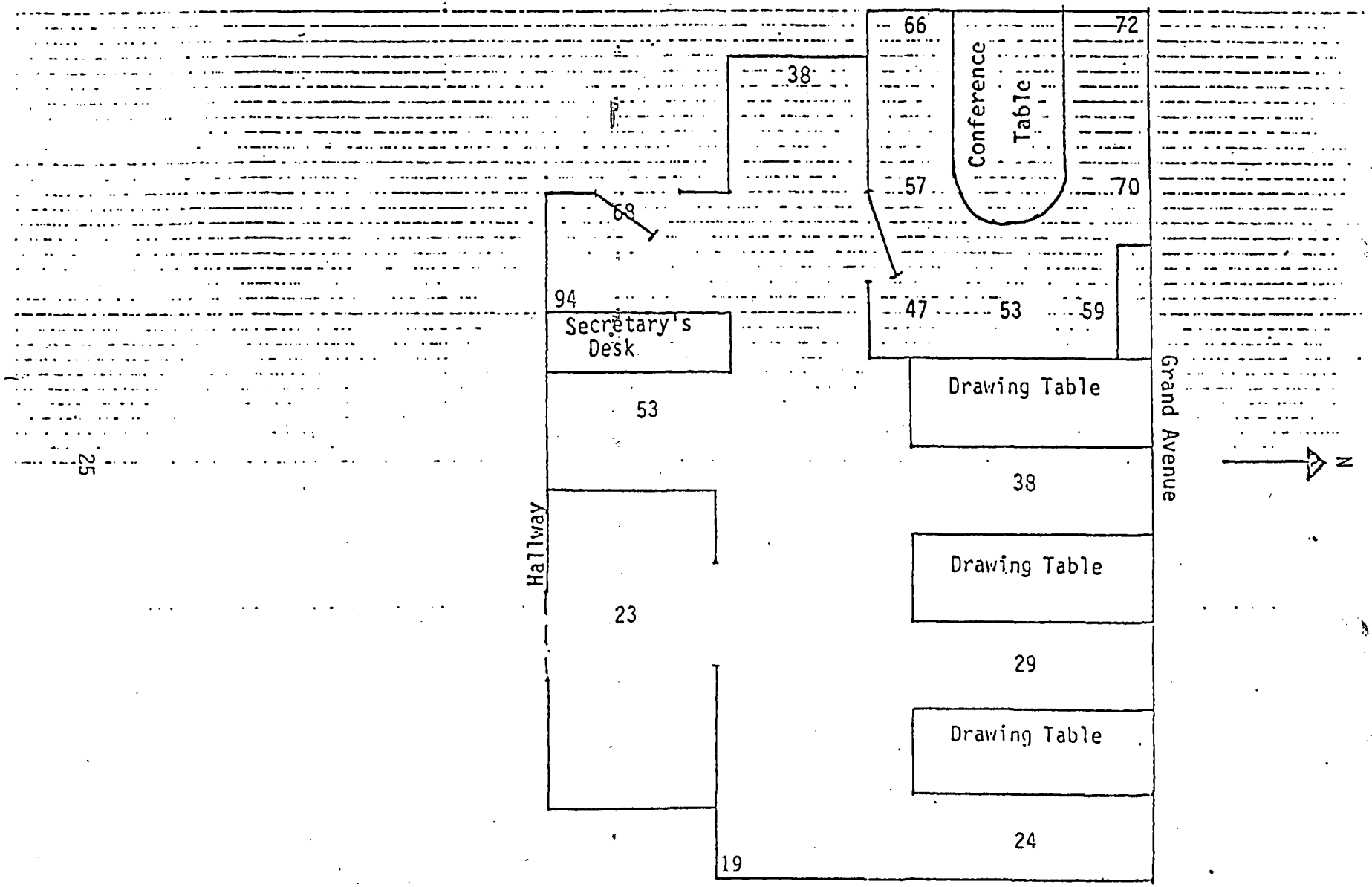
(All readings are in micro - roentgens per hour , uR/hr)



Second Floor - Room 201 (Ascot Products)

Figure 17 : Pressurized Ion Chamber Readings at One Meter Above Floor in Room 202

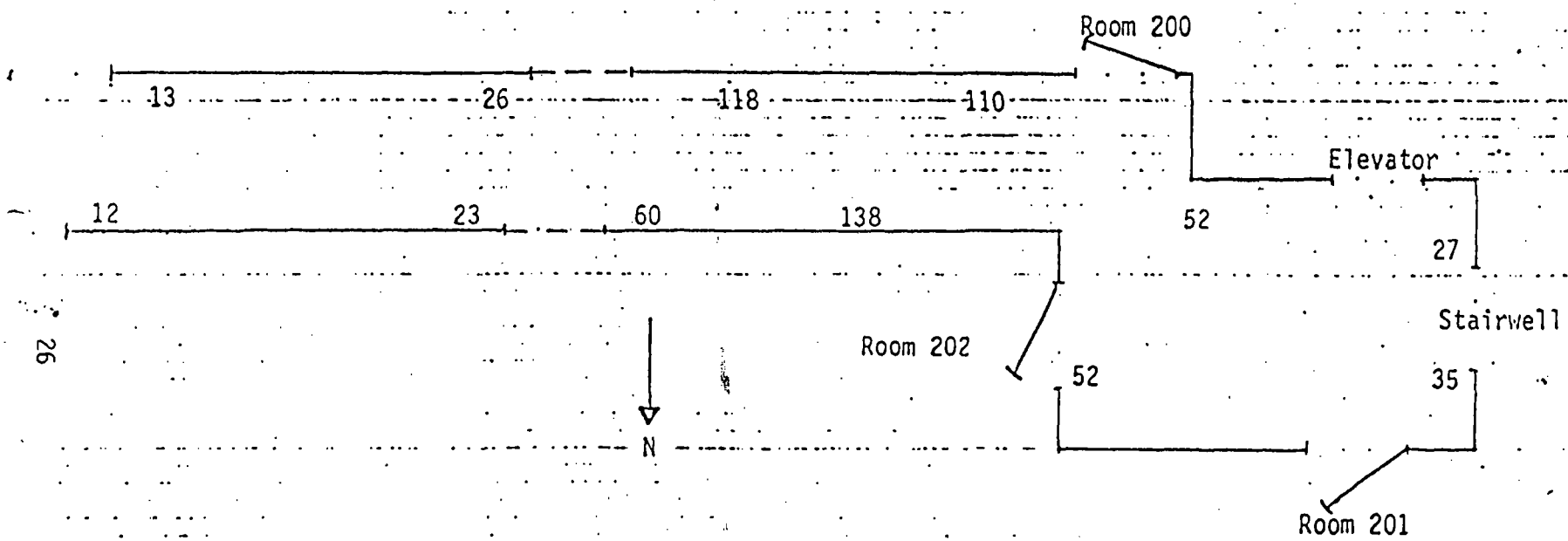
(-All readings are in micro - roentgens per hour , uR/hr-)



Second Floor - Room 202 (Meisel Munson LTD)

Figure 18 : Pressurized Ion Chamber Readings at One Meter Above Floor in Hallway Near Room 202

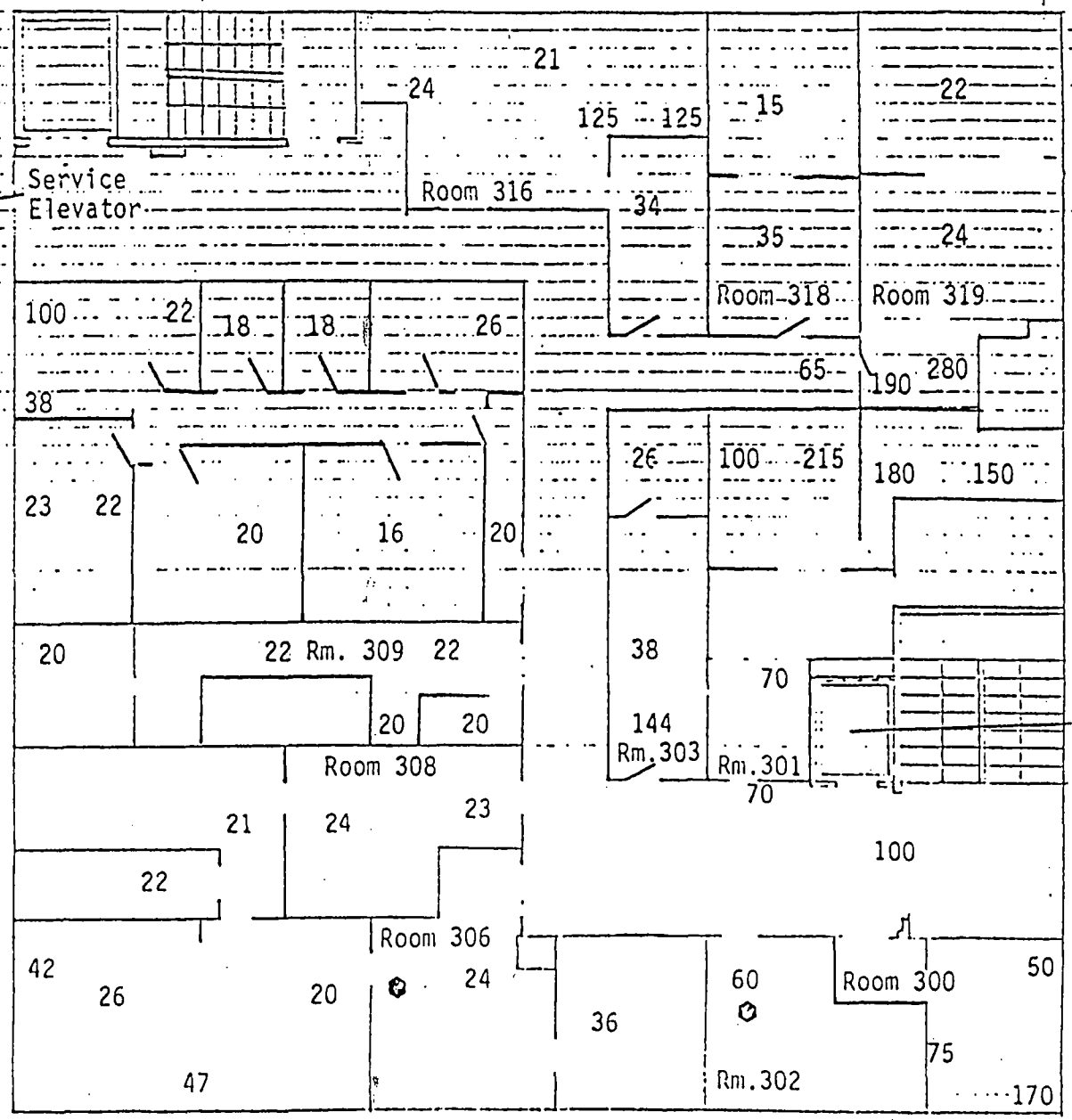
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Hallway

Figure 19 : Micro - Roentgen Meter Readings , Contact With Floor , on the Third Floor

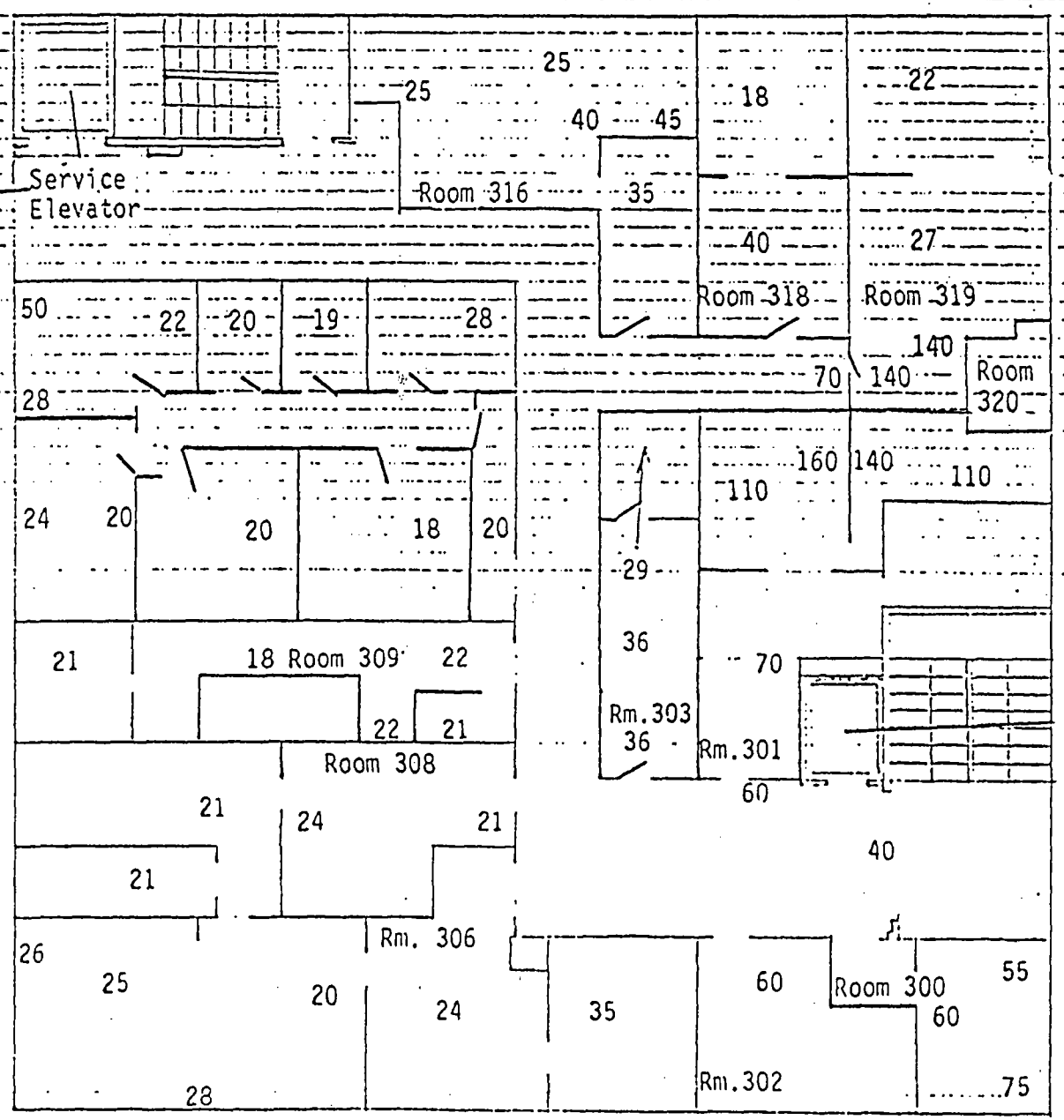
(All readings are in micro - roentgens per hour , uR/hr .)



3rd Floor

Figure 20 : Micro - Roentgen Meter Readings at One Meter Above Floor on Third Floor

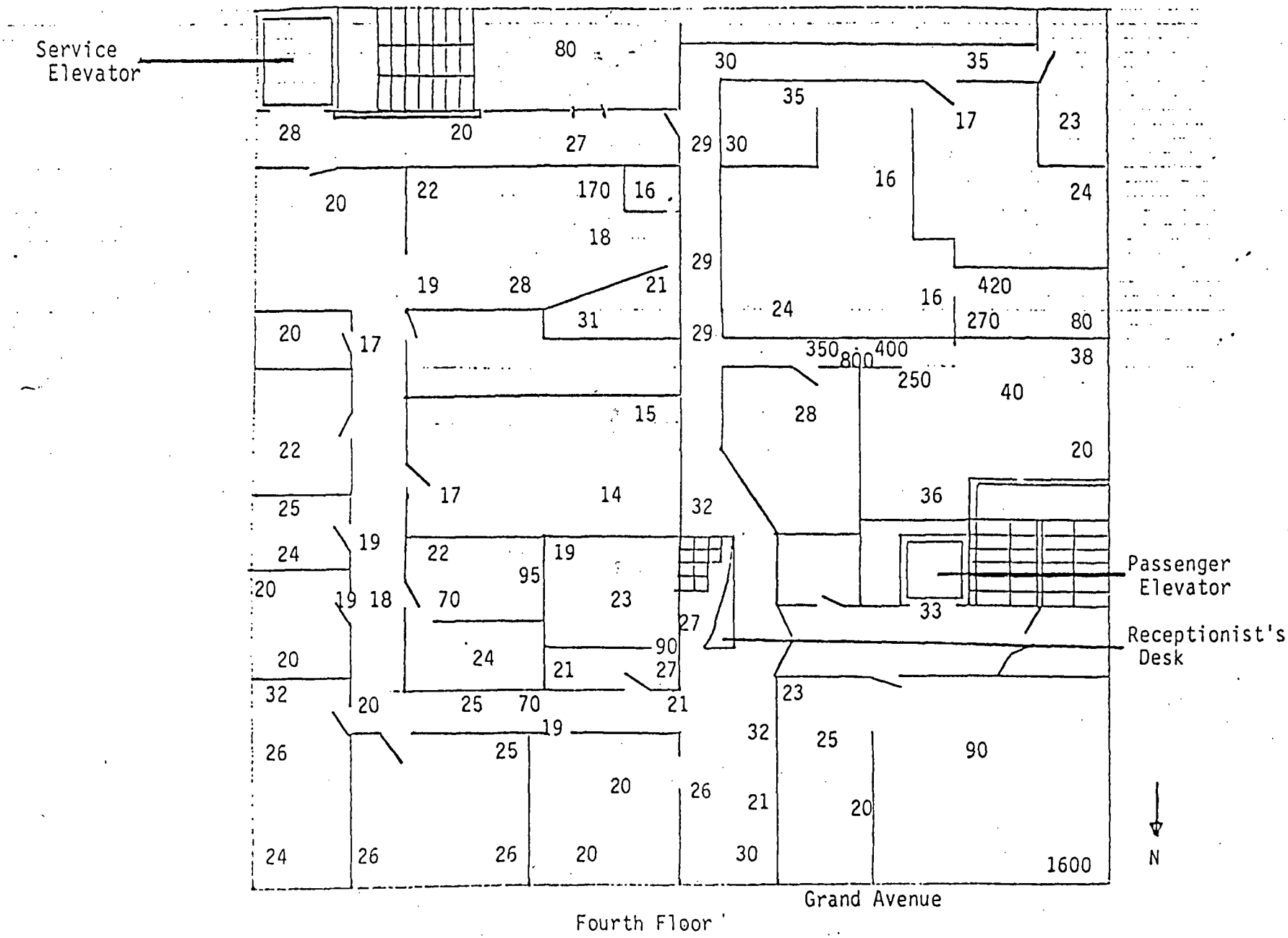
(All readings are in micro - roentgens per hour, uR/hr.)



3rd Floor

Figure 21 : Micro - Roentgen Meter Readings , Contact With Floor

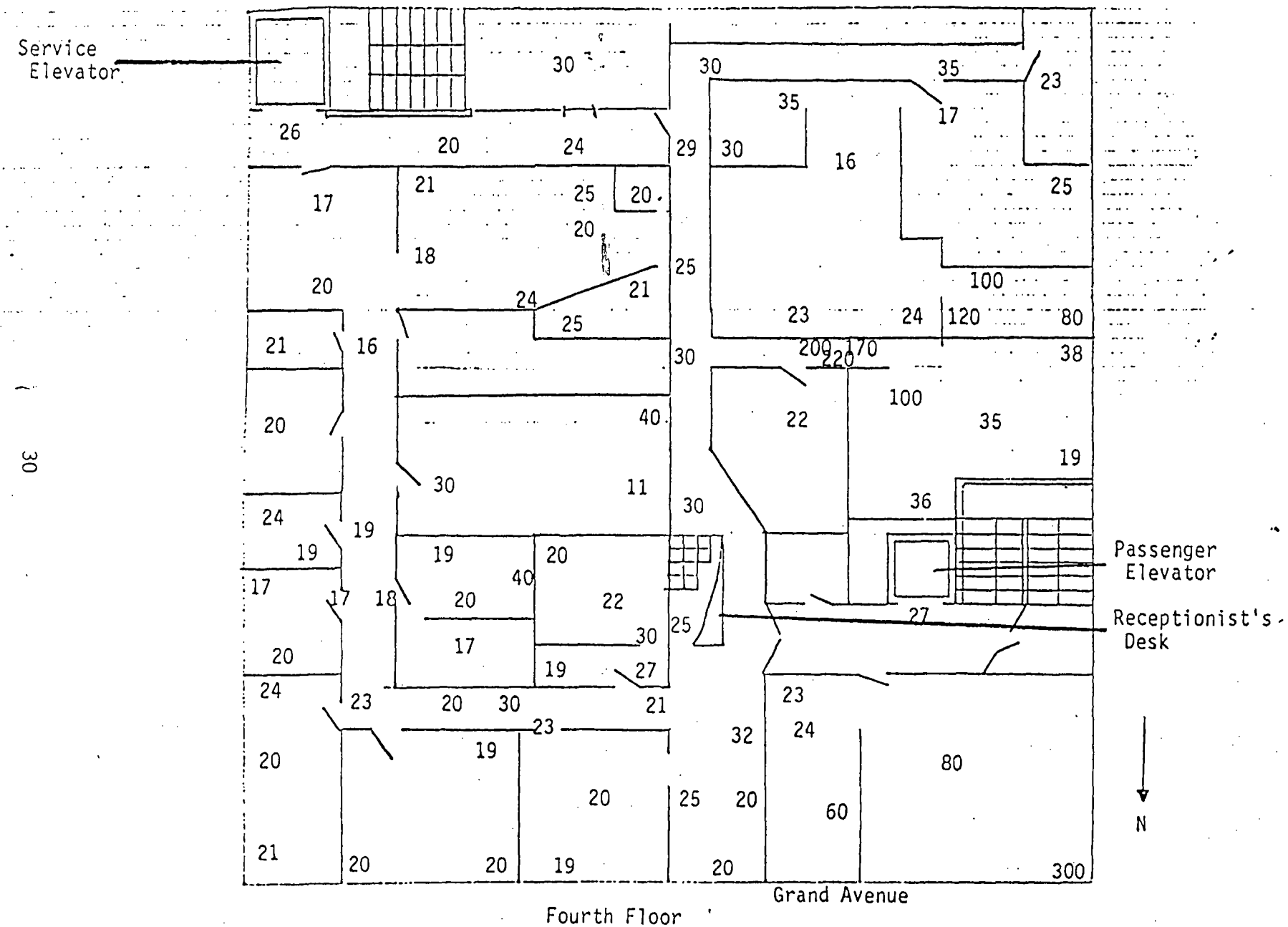
(All readings are in micro - roentgens per hour,uR/hr.)



Fourth Floor

Figure 22 : Micro - Roentgen Meter Readings at One Meter Distance

(All readings are in micro - roentgens per hour , uR/hr.)



B. Gamma Energy Spectrums

A portable multi-channel analyzer (MCA) was used to obtain the gamma energy spectrums of two contaminated spots within the buildings (See Figs. 23 and 24). Since the gamma rays emitted by various radionuclides have unique energies, the MCA can be used to identify these energies and thereby identify unknown radionuclides. One set of spectrum was obtained during the Preliminary Survey for the inside of the doorway in Room 202. The other was obtained during the Comprehensive Survey for the Basement in Room 8 where the highest gamma exposure rate reading in the building was measured. In the former spectrum a cesium-137 check source was used to calibrate the MCA and a modern Coleman brand gas light mantle was used for comparison. For the latter survey a small quantity of thorium dioxide was obtained and used for calibration and comparison. The cesium-137 peak was also used for an comparison. In both cases thorium was easily identified as the source of the contamination by matching the characteristic locations of the known peak positions with the unknown peak positions (See Figs. 23,24).

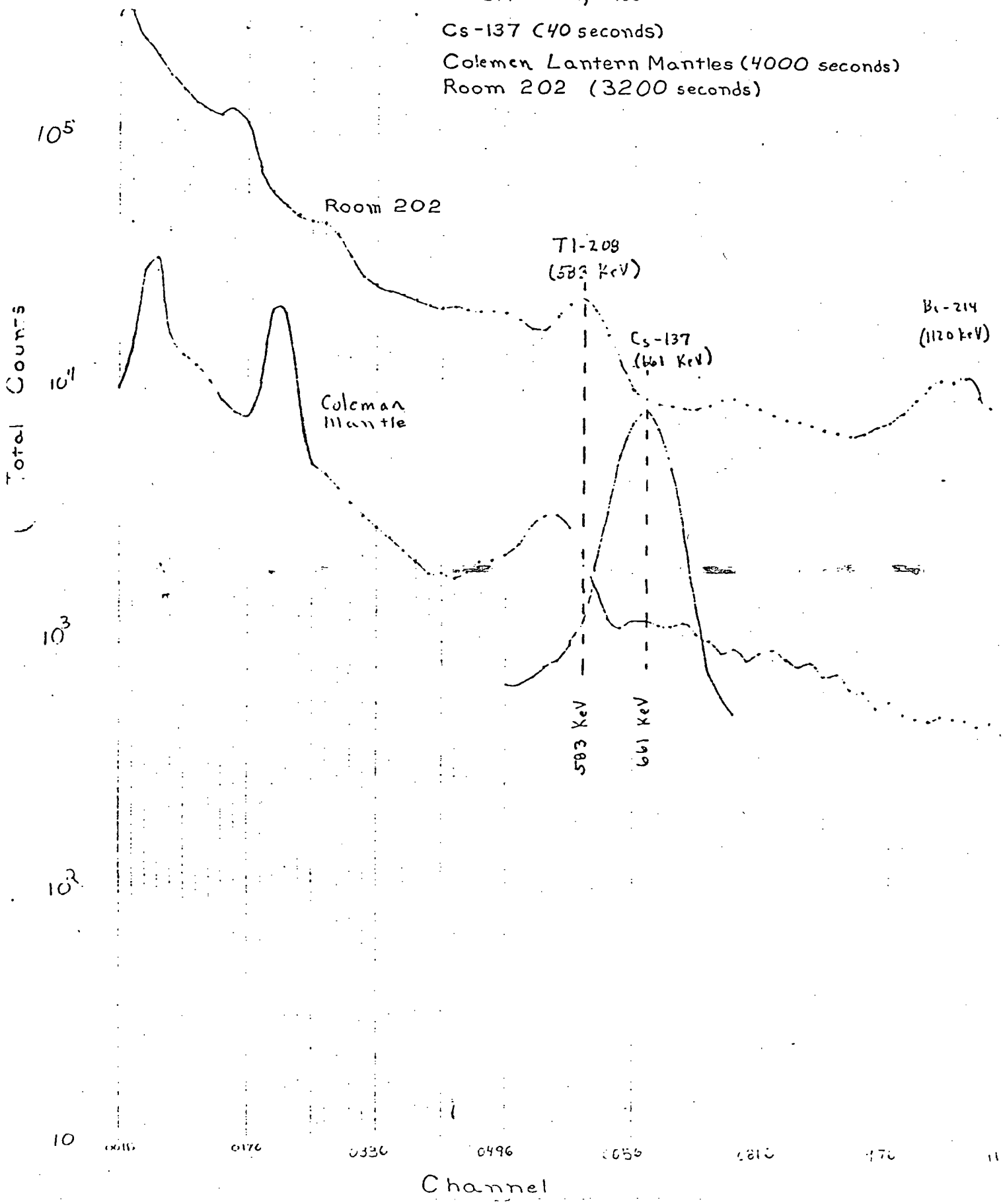
C. Thermoluminescent Dosimeter Data

Based upon the results of the Preliminary Survey thermoluminescent dosimeters* (TLDs) were placed in critical areas of major concern(See Fig. 25). Three TLDs were placed in a plastic amulet at each location to get an average exposure at that point.

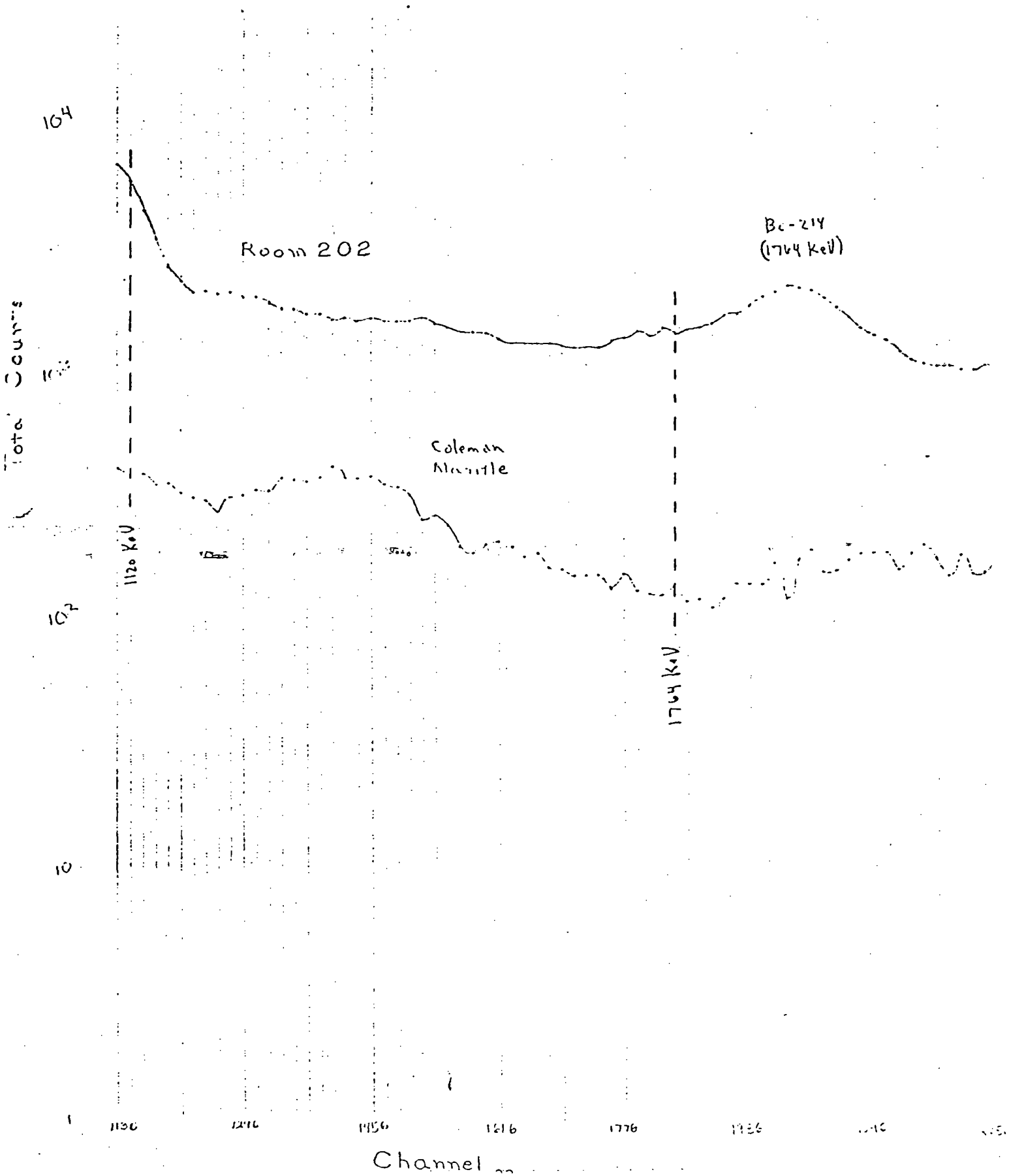
---

* TLDs are 1/8 inch square chips of lithium fluoride that are used like film badges to measure radiation exposure.

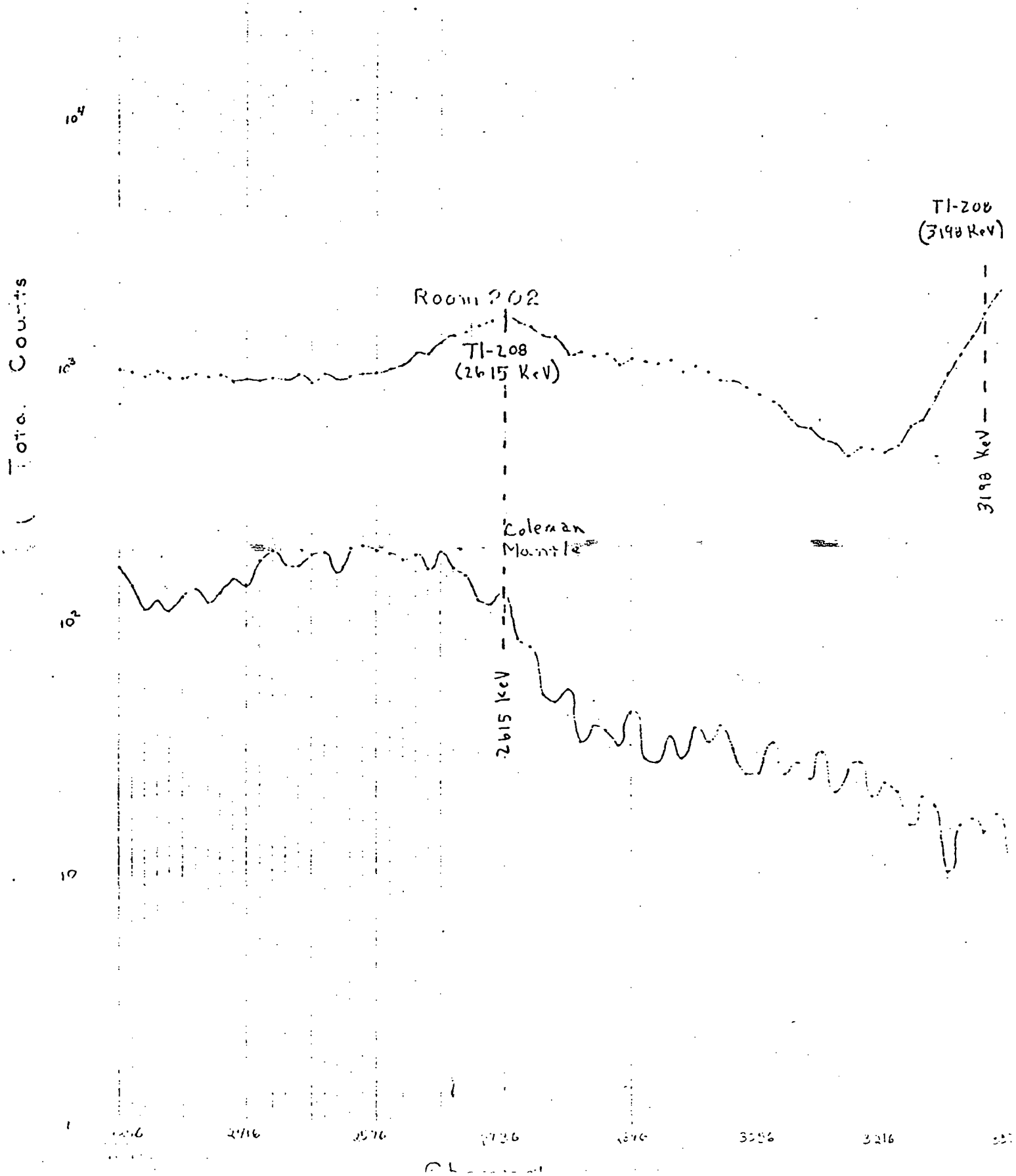
Figure 23 : Multi-Channel Gamma Ray Spectrum
161 East Grand - Chicago, Illinois
November 24, 1980
Cs-137 (40 seconds)
Coleman Lantern Mantles (4000 seconds)
Room 202 (3200 seconds)



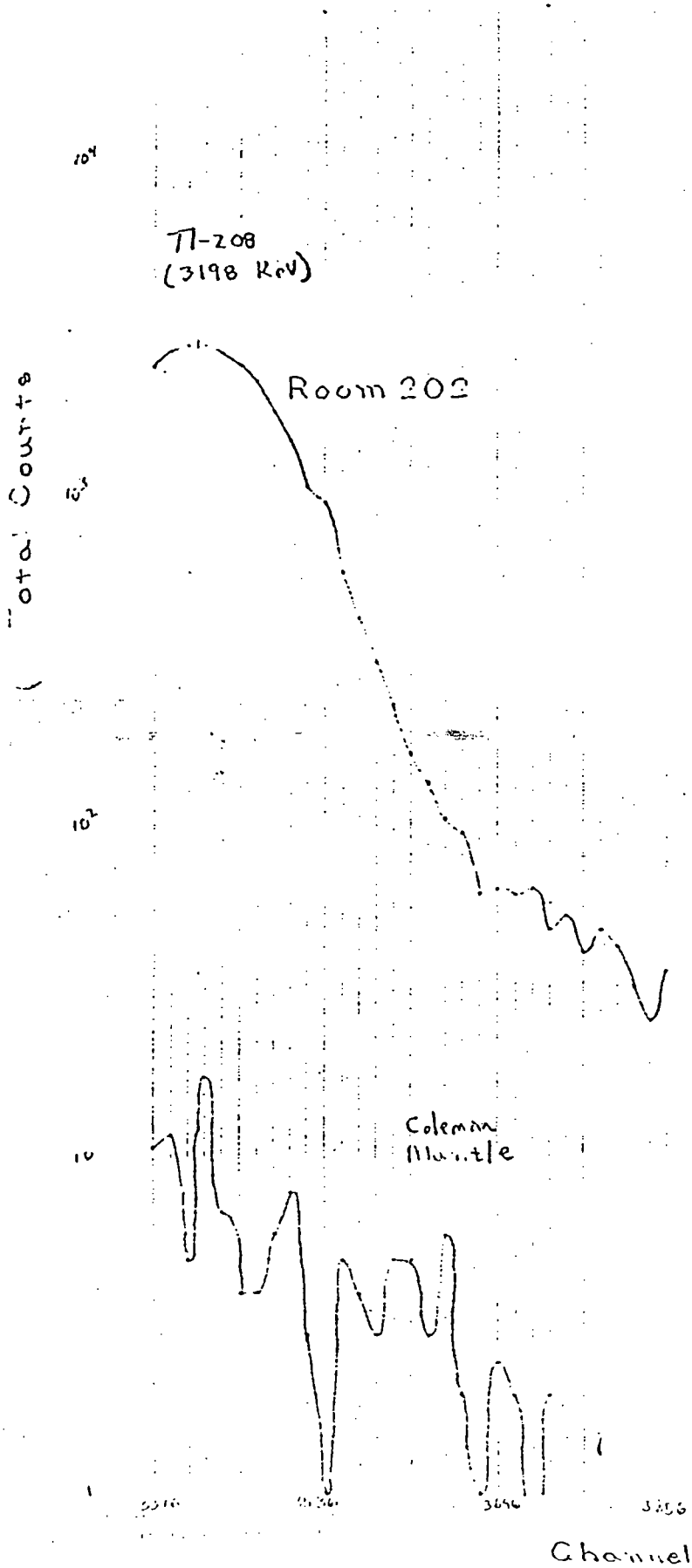
Multi-Channel Gamma Ray Spectrum
(Cont.)



Multi-Channel Gamma Ray Spectrum
(Cont.)



Multi-Channel Gamma Ray Spectrum
(Cont.)



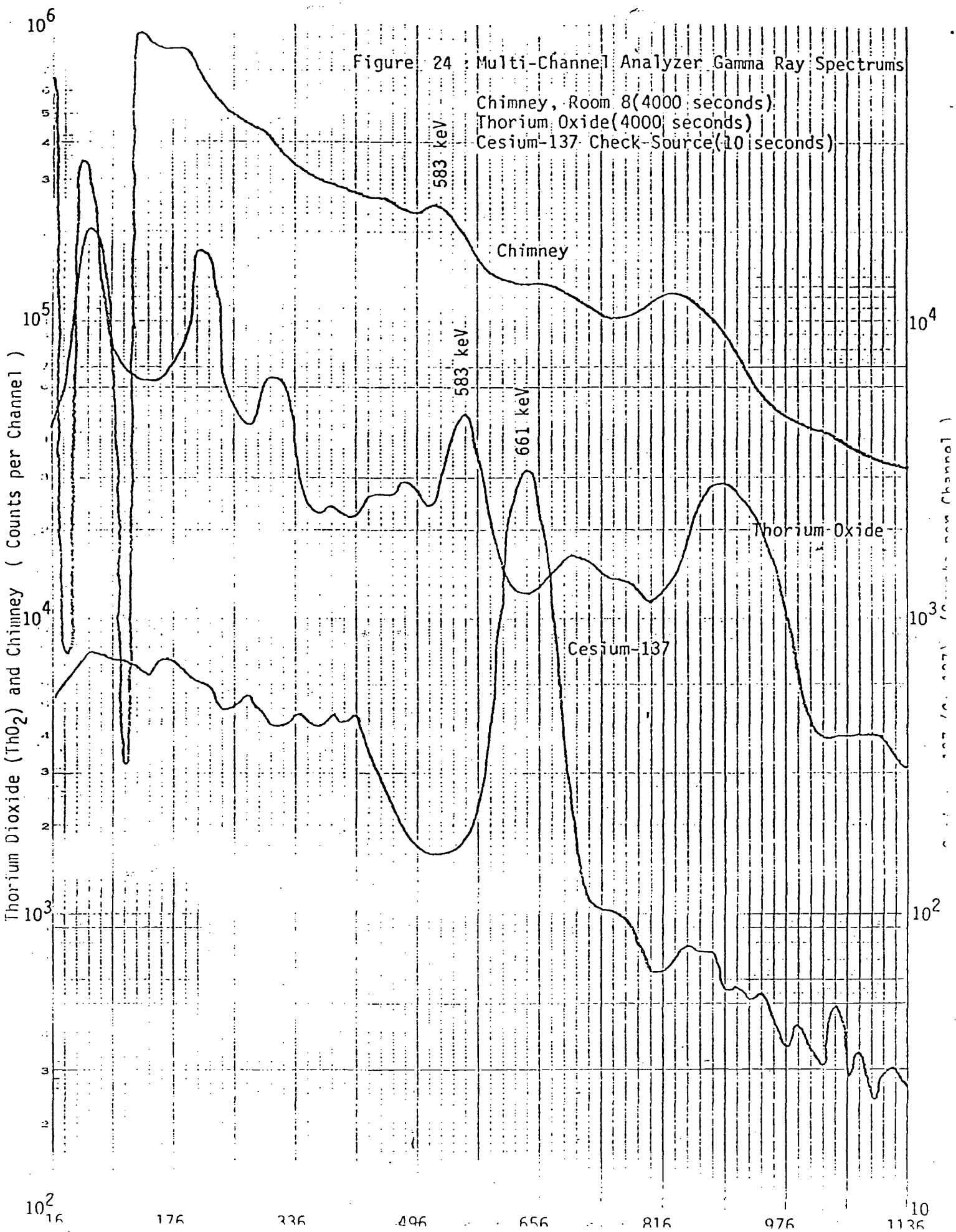
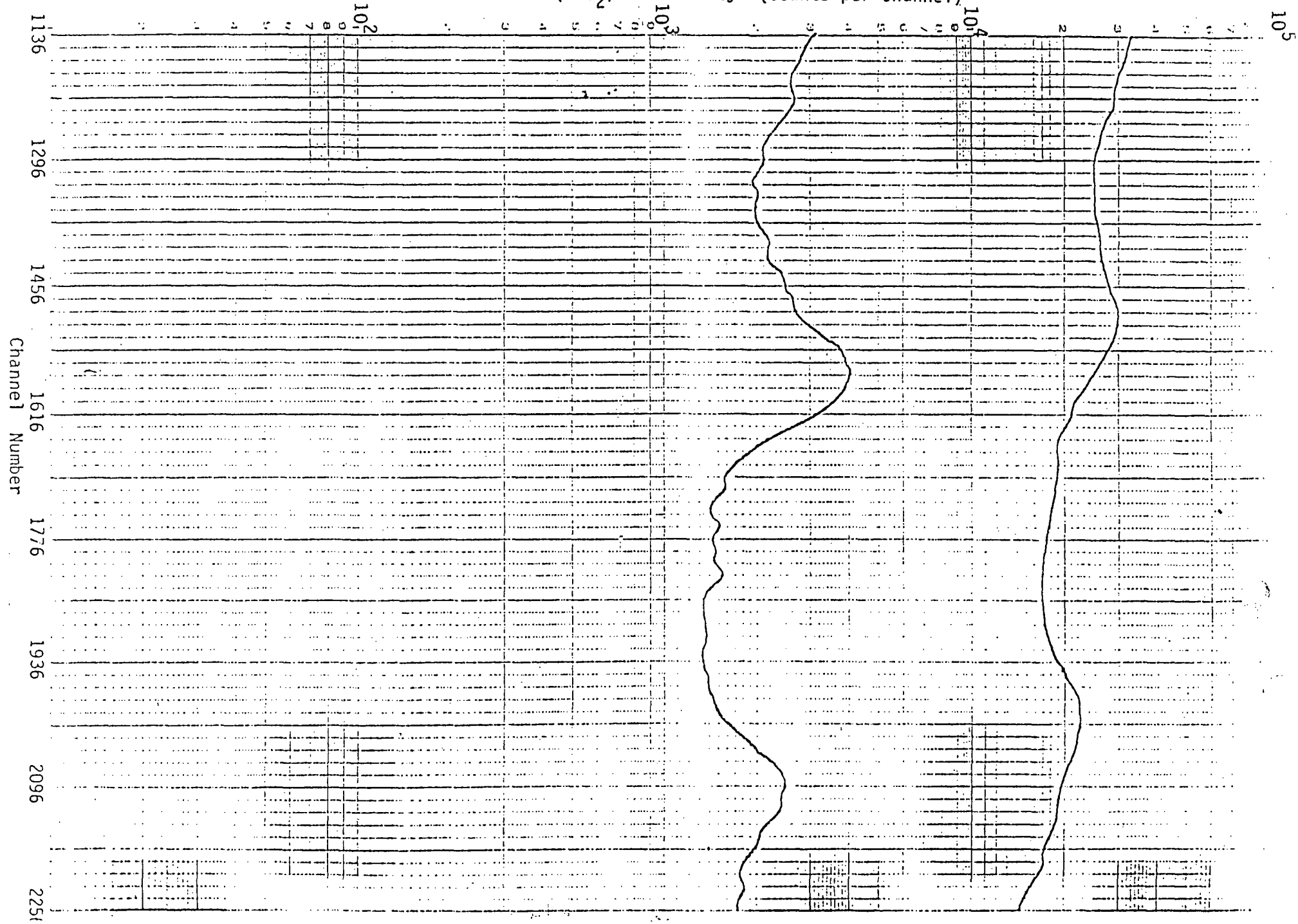


Figure 24 : Multi-Channel Analyzer Gamma Ray Spectrums

Thorium Dioxide (ThO_2) and Chimney (Counts per Channel)



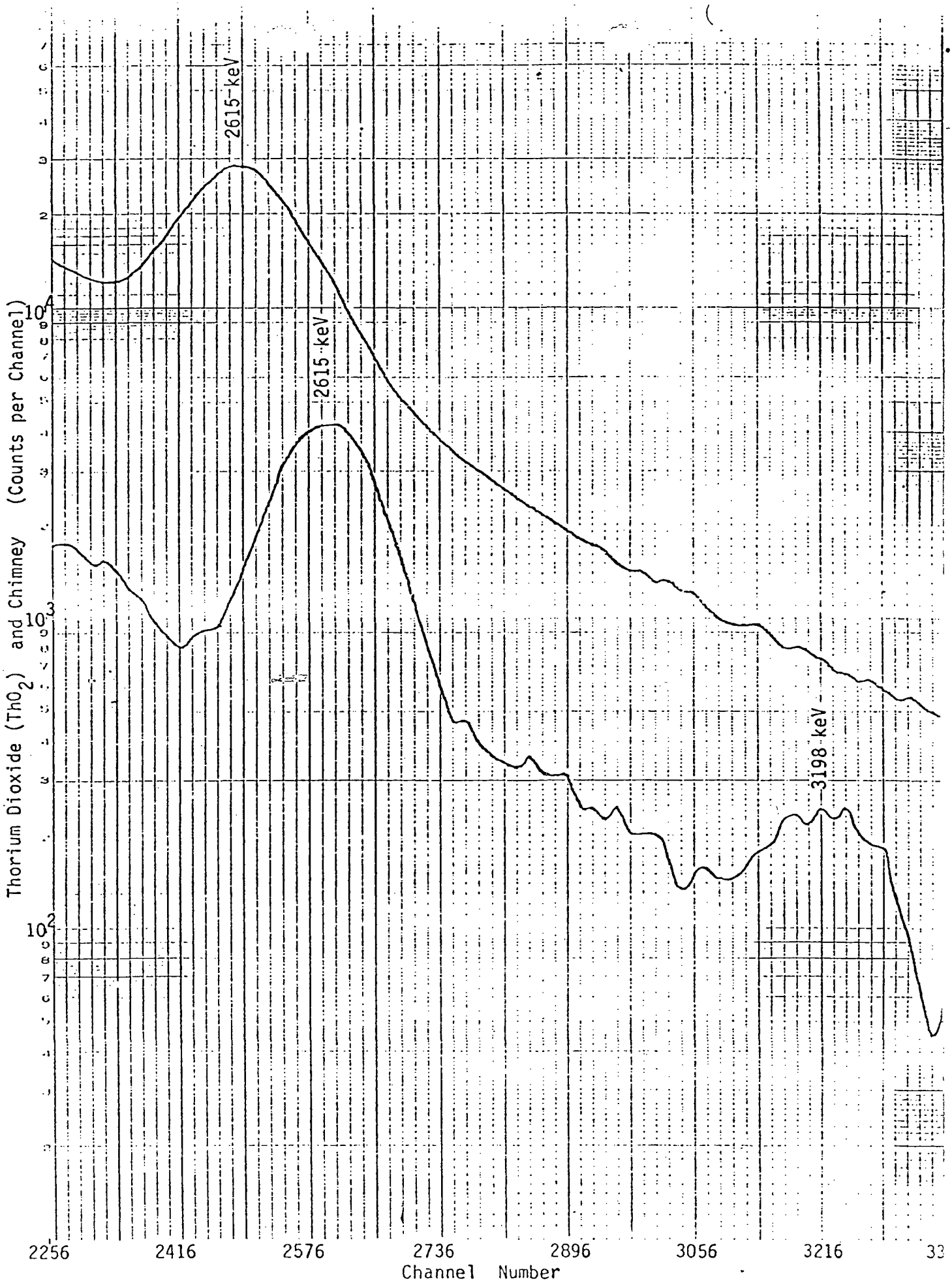
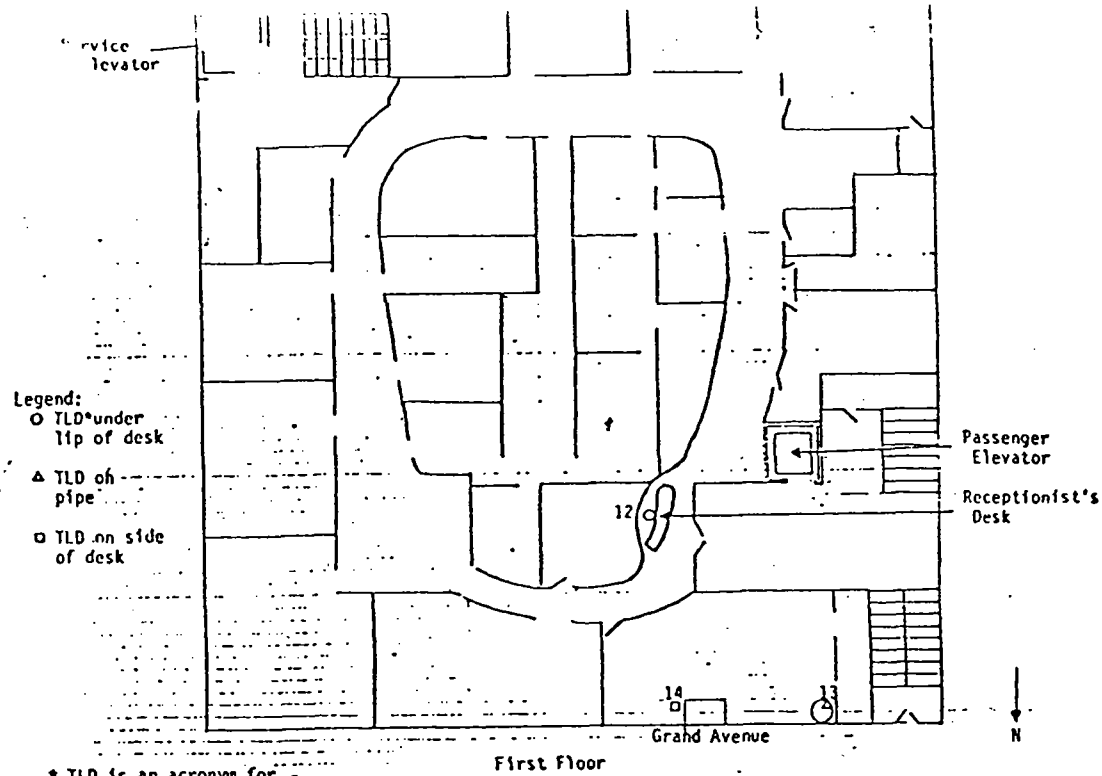

2615 keV
2615 keV
3198 keV
10^4
10^3
10^2
Thorium Dioxide (ThO_2) and Chimney (Counts per Channel)
2256
2416
2576
2736
2896
3056
3216
Channel Number

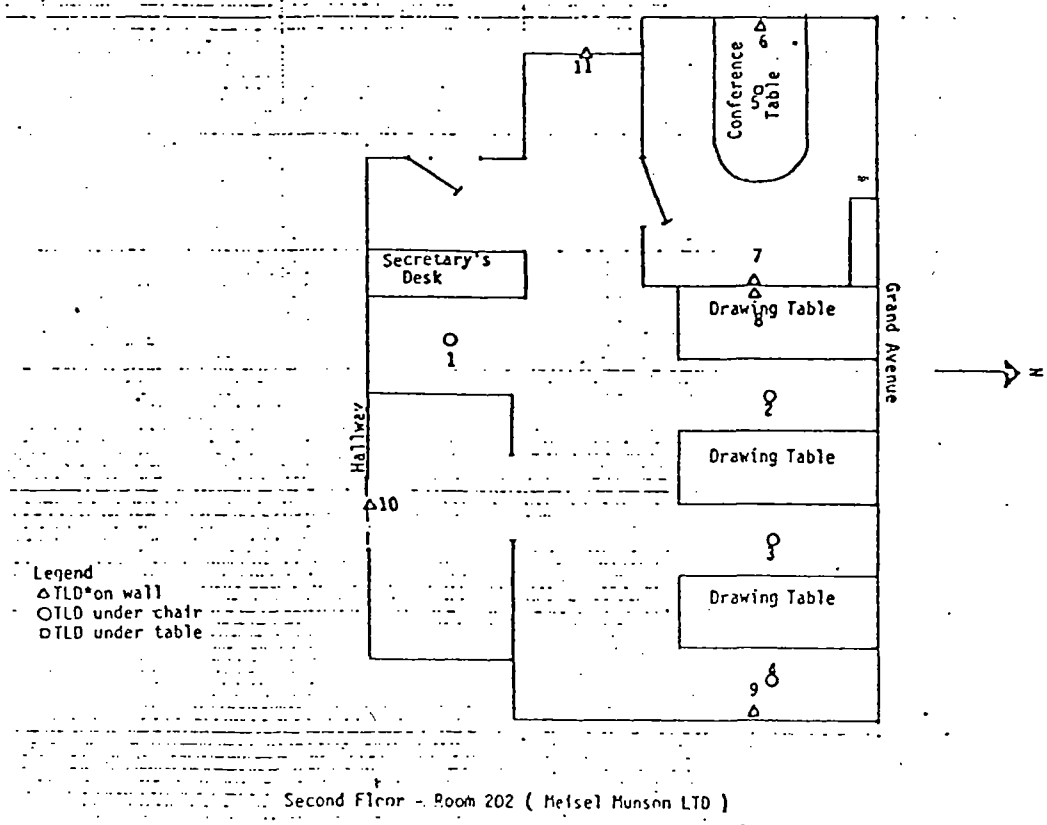
Figure 25



First Floor

* TLD is an acronym for thermoluminescent dosimeter

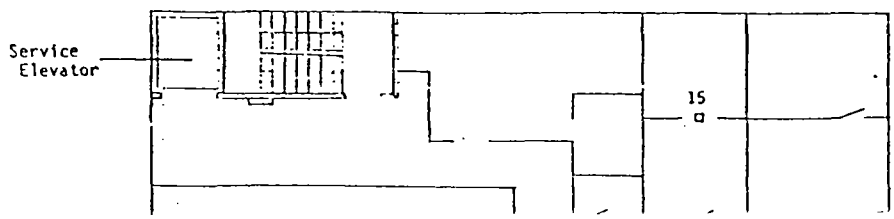
Location of Thermoluminescent Dosimeters in Room 202



Second Floor - Room 202 (Meisel Munson LTD)

* TLD = Thermoluminescent Dosimeter

Location of Thermoluminescent Dosimeter on Third Floor



Room 202 had shown predominantly higher gamma exposure readings and was fully occupied by an architectural firm. Eleven TLD amulets were placed there. On the first floor two TLD amulets were placed in the office area where higher exposure readings had been measured during the Preliminary Survey. One was placed on a pipe and the other was placed on the wall side of a desk. Part way through the exposure period the desk was shifted slightly, but probably not enough to alter the data substantially. A third TLD amulet was placed under the front edge of the receptionist desk because elevated readings from the floor above had been measured there and because it appeared to have a high occupancy. The fifteenth TLD amulet was placed over the arch in the middle of Room 318. This was for background to assess the normal radiation level of the building. Amulets were exposed from January 22 until March 2. Exposure results are shown in Table 1. Dose equivalent numbers in millirem (mrem) were divided by the hours in the exposure period to give hourly rates. The continuous exposure were taken to be 24x7 = 168 hours per week and 24x365 = 8760 hours per year. Workplace exposure was taken to be 40 hours per week and 40x50 = 2000 hours per year. Discussion of these results will be made later in this report.

D. Smears

During the preliminary survey, two smears* were taken at points in the basement that showed elevated micro-R meter readings. The basement floor, unlike most of the building, was readily accessible, not being covered with carpet or tile. Fig. 3 shows the points where smears were taken.

---

*Smears are small disks of paper rubbed across a potentially contaminated spot to assess the degree of removable contamination in a given area, usually 100 cm^2.

Immediate survey of the smears with an alpha scintillation dectector were negative. Smears were sent to the IDNS laboratory for gross alpha and gross beta measurements. The results were so low that it appears the radioactive material is not readily removable. However, if contaminated areas are uncovered in the future this conclusion should be rechecked.

E. Air Samples

During the Preliminary Survey an air sample was taken in Room 202 where elevated gamma readings were obtained and in Room 302 which was believed to be uncontaminated. Subsequent surveying showed the room to have a slightly elevated exposure level.

Air samples were taken because in both the Thorium Decay Series and the Uranium Decay Series (See Figs. 1,2) radioactive gases are formed at one stage in the decay process. For the Thorium Decay Series the gas is called radon - 220 or thoron for short. For the Uranium Decay Series the gas is called radon - 222 or radon for short. Spots of thorium or uranium contamination on the floor will emit thoron and radon, respectively, and this gas can then diffuse through overlying materials like carpets into the air. The risk would be exposing the lungs to the decay products of the radioactive gas.

Air samples taken in Rooms 202 and 302 showed that the gross airborne alpha radiation levels measured immediately after collection ceased were 3.5 times as great in Room 202 as in Room 302. This indicates only that one room has more alpha emitting materials in the air not that the air is hazardous. No absolute airborne alpha concentrations were calculated at that time because:

(1) filters had to be read immediatlely rather than waiting the necessary five hours for decay. This was due to time constraints on being in the building after normal working hours.

(2) glass fiber filters were all that were available at the time and these tend to trap particulates among the fibers where they are less likely to be detected by alpha radiation counting devices.

(3) and calibrations for the air sampler and the alpha scintillation filter reader were inadequate.

Subsequently, during the Comprehensive Survey air samples were collected in Room 8 (basement), Room 202 and Room 306 (See Figs. 3,10,19). These rooms were chosen because Room 8 had the high exposure chimney, Room 202 showed extensive contamination and was fully occupied, and Room 306 showed low background levels. It was decided to measure the thoron and radon levels directly, rather than measuring gross alpha levels. A surface filter was used to obtain an air sample in each room and the method of Ogden was used to calculate thoron and radon working levels* (See Technical Appendix for Ogden's paper).

The results are:

	Thoron (WL)	Radon (WL)
Room 8	0.229	0.0139
Room 202	0.162	0.0105
Room 306	0.0255	0.00215

*Working levels are energy units related to air concentrations of alpha emitting decay products of thoron and radon.

VI. RESULTS

A. Background Levels

Specification of a background radiation level for the Lindsay building is a necessary first step. Trace amounts of radioactive materials in building materials can elevate the natural background of a structure. The Lindsay building is brick and therefore would be expected to have a slightly higher radiation background. A quantification of this level can be estimated by looking for the lowest measured levels in the survey results shown in Figs. 3-22. In general, the lowest levels are in the range 15-25 uR/hr as measured by the micro-R meter at one meter. First floor levels tend to group more about 15 uR/hr,with several falling near 10 uR/hr. It was reported the First floor had been sandblasted at one time. If so, this may have removed surface contamination and, thus, lowered the background.

Overall, it appears that about 20 uR/hr is a reasonable level for background as measured with the micro-R meter. Recall that, as stated previously the micro-R meter over responds to low energy gamma rays. The PIC is much less susceptible to this drawback and more nearly registers the actual gamma exposure rate. However, it is cumbersome to use. Consequently, surveys were done with the portable micro-R meter, comparing some readings to equivalent ones made with a PIC, and then deriving a correspondence relationship. It was found that the micro-R meter tends to read about twice the PIC for this material. Consequently, the best estimate of the true gamma exposure rate is half the micro-R meter reading. Thus the following will be used as a criteria.

Background Gamma Ray Exposure Levels	
As measured with a micro-R meter	20 uR/hr
As measured with a pressurized ion chamber	10 uR/hr

B. Contaminated Areas

To designate a contaminated area, reference was made to EPA's proposed Remedial Action Standards for Inactive Uranium Processing Sites. Specific reference was made to the standard for gamma radiation indoors of 20 uR/hr over background. While not strictly applicable because this is based on radon from uranium and the problem on Grand Avenue is thorium, it will be taken as the best available designator of contamination levels. Therefore, in looking at Figs. 3-22, areas that have levels above 60 uR/hr at contact with the surface as measured with a micro-R meter should be considered suspect. If the higher reading is anomalous for the general environs then it should not be considered contamination. The criteria for contamination will be set by several readings in a general area exceeding 60 uR/hr. This leads to the designation of the following areas shown in Figs. 26-30 as contaminated.

Basement - area near Room 8 and boiler
- front section of Room 1
- section of Room 5
- Room 12

1st Floor - northwest corner of northwest office
- *reception area not designated contaminated because source is believed to be on 2nd Floor

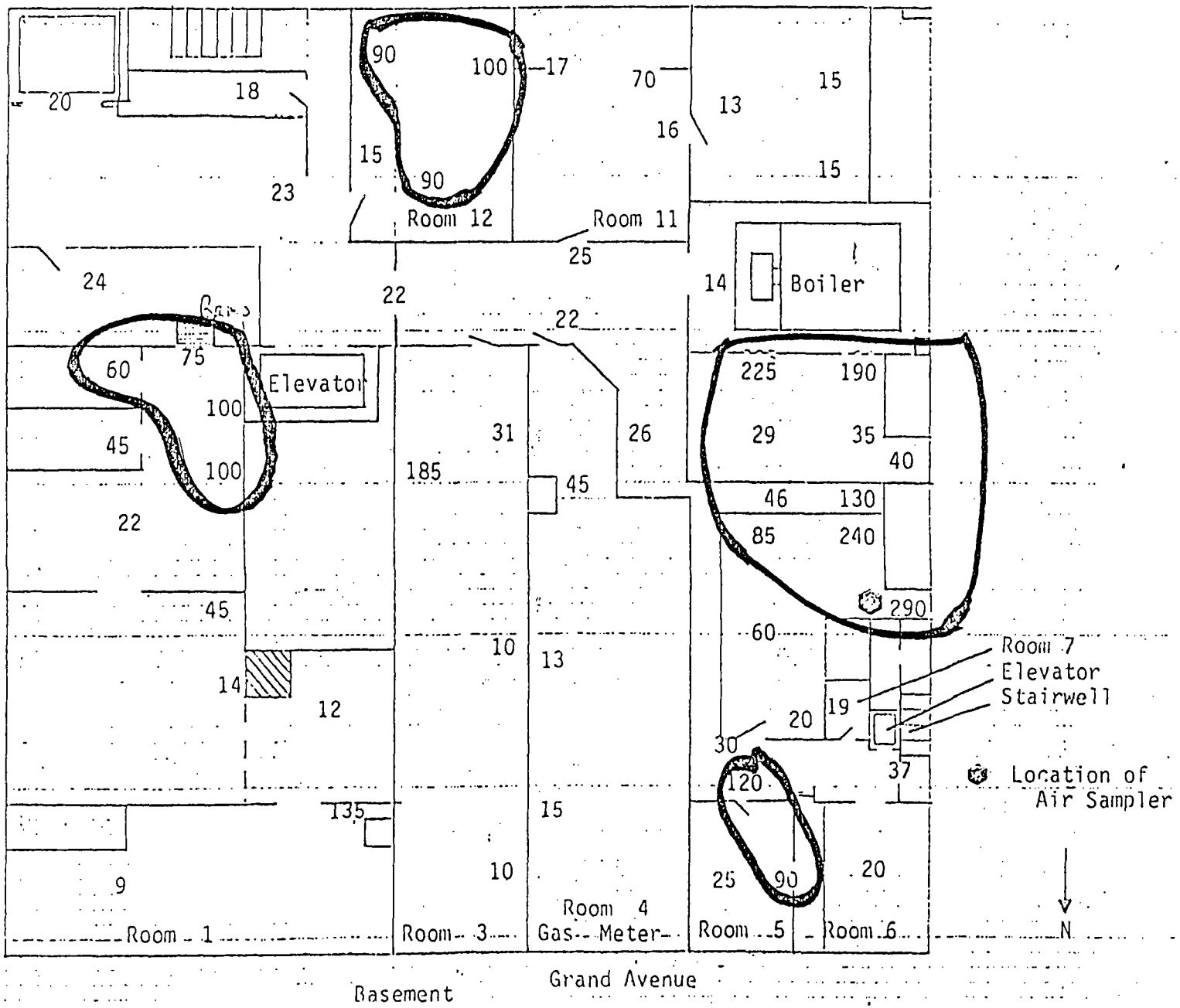
2nd Floor - portions of Rooms 200, 201, 202, 214 and adjacent hallway
- pipe area near service elevator

3rd Floor - portions of Rooms 300, 301, 302, and 303
- portions of Rooms 301 and 319
- section of Room 316
- pipe area near service elevator

4th Floor - west central area of floor
- area in northwest corner of floor

The original room layouts and operational setup in the Lindsay manufacturing process are unknown. However, contaminated areas show several patterns. The northwest corner of each floor generally shows contamination running along a northwest-southeast line. If piping or ductwork run under floorboards in these areas they should be surveyed.

Figure 26 : Basement Regions of Contamination



Basement

Figure 27 : First Floor Regions of Contamination

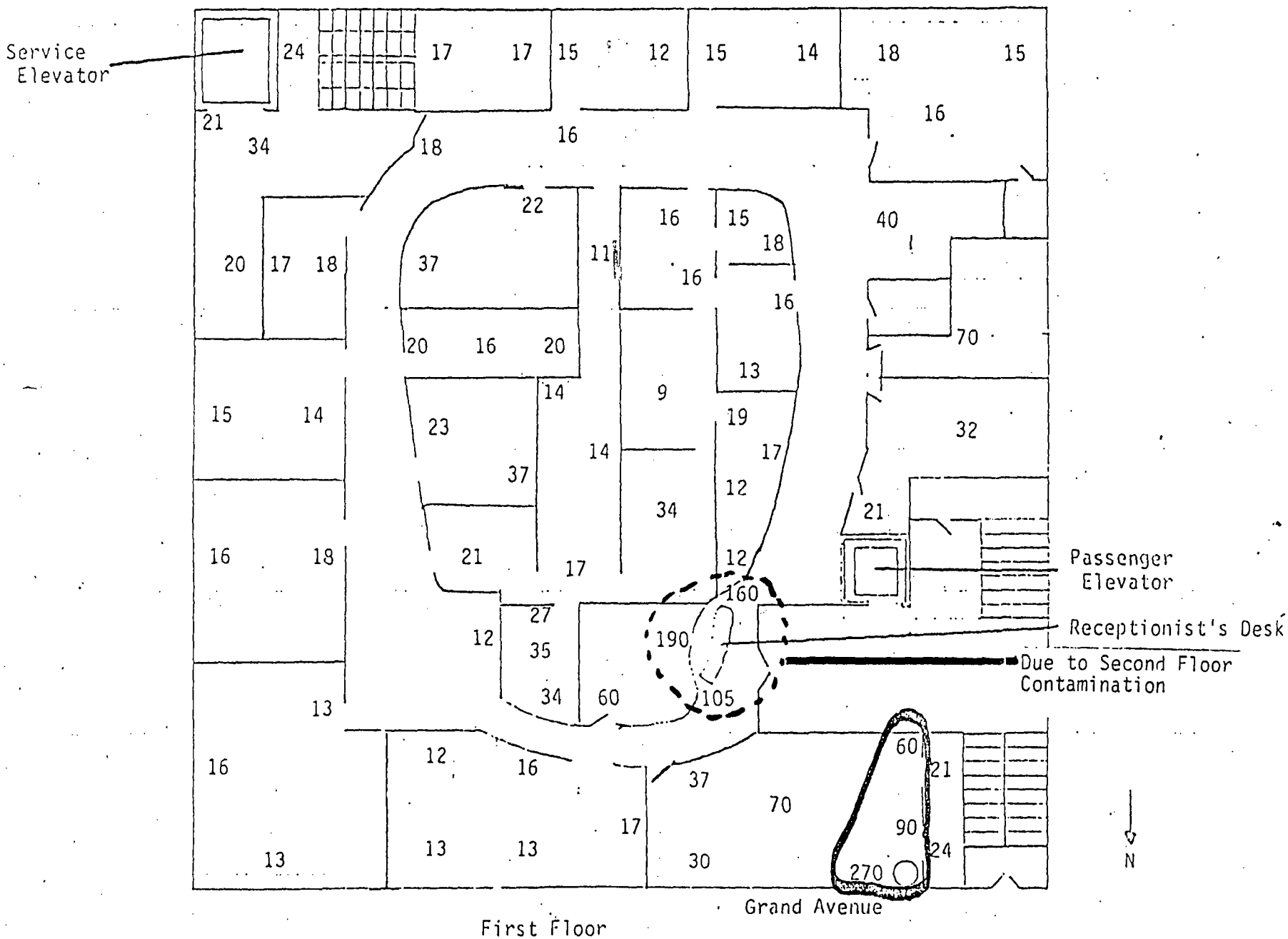


Figure 28 : Second Floor Regions of Contamination

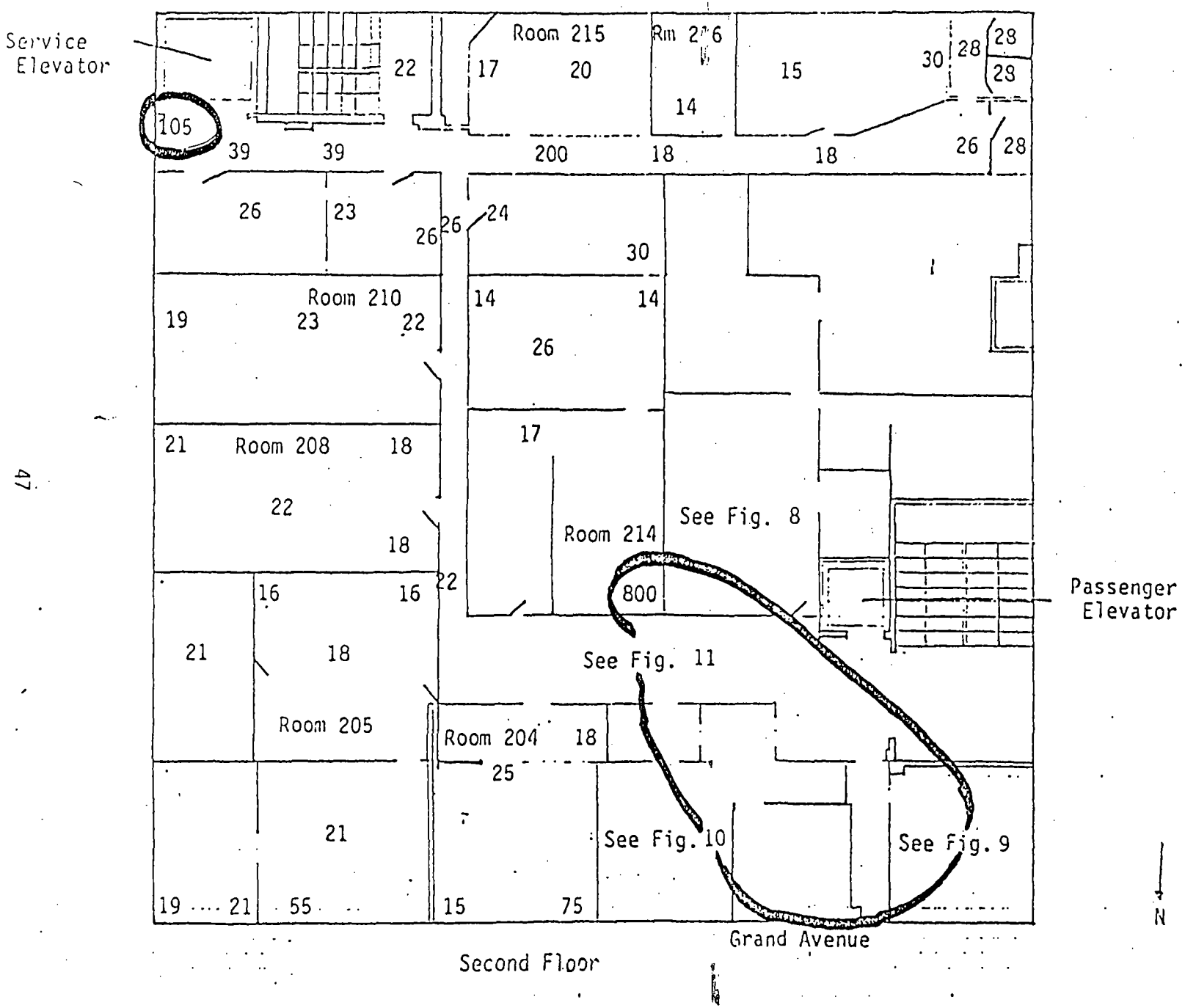
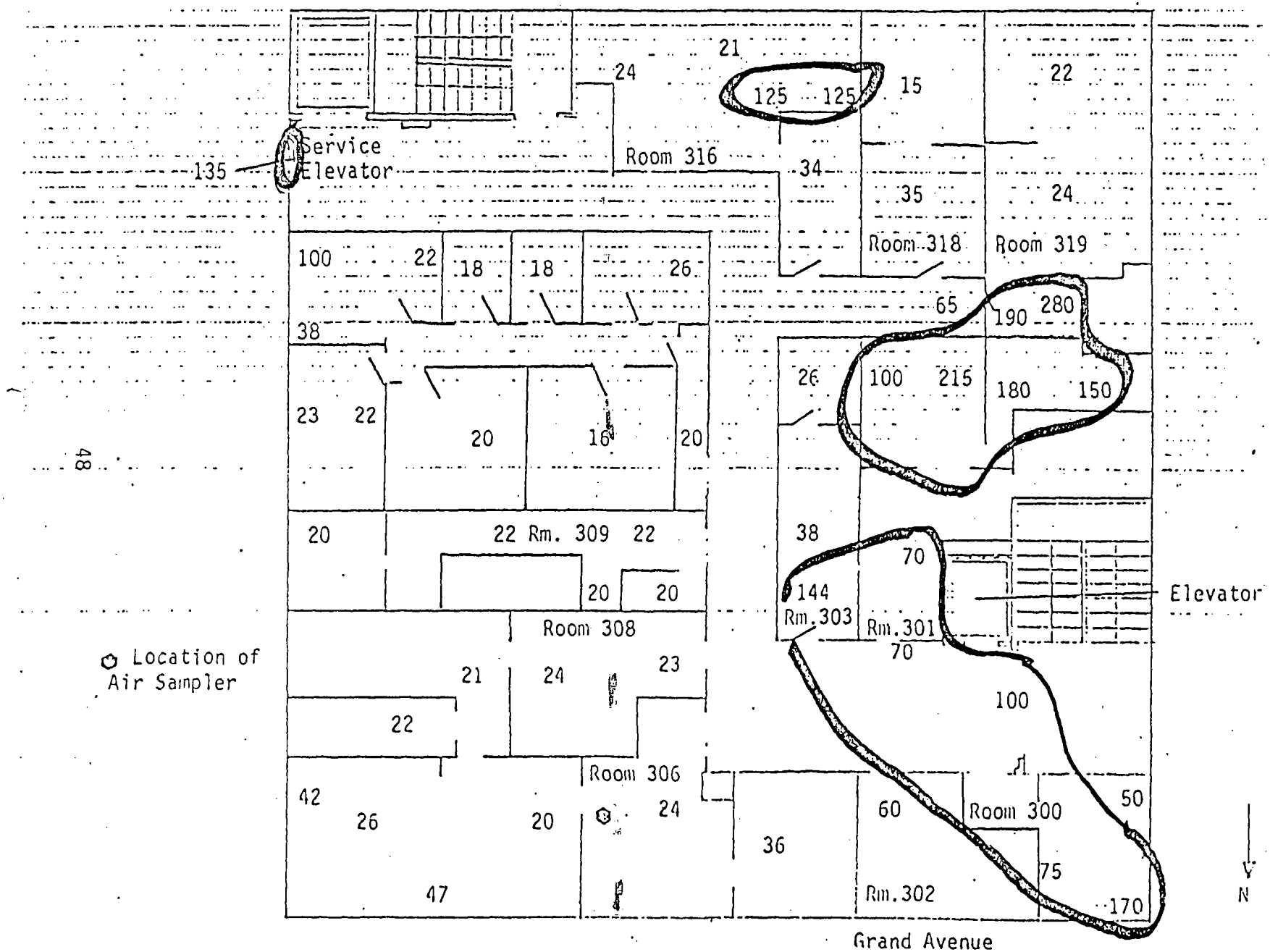
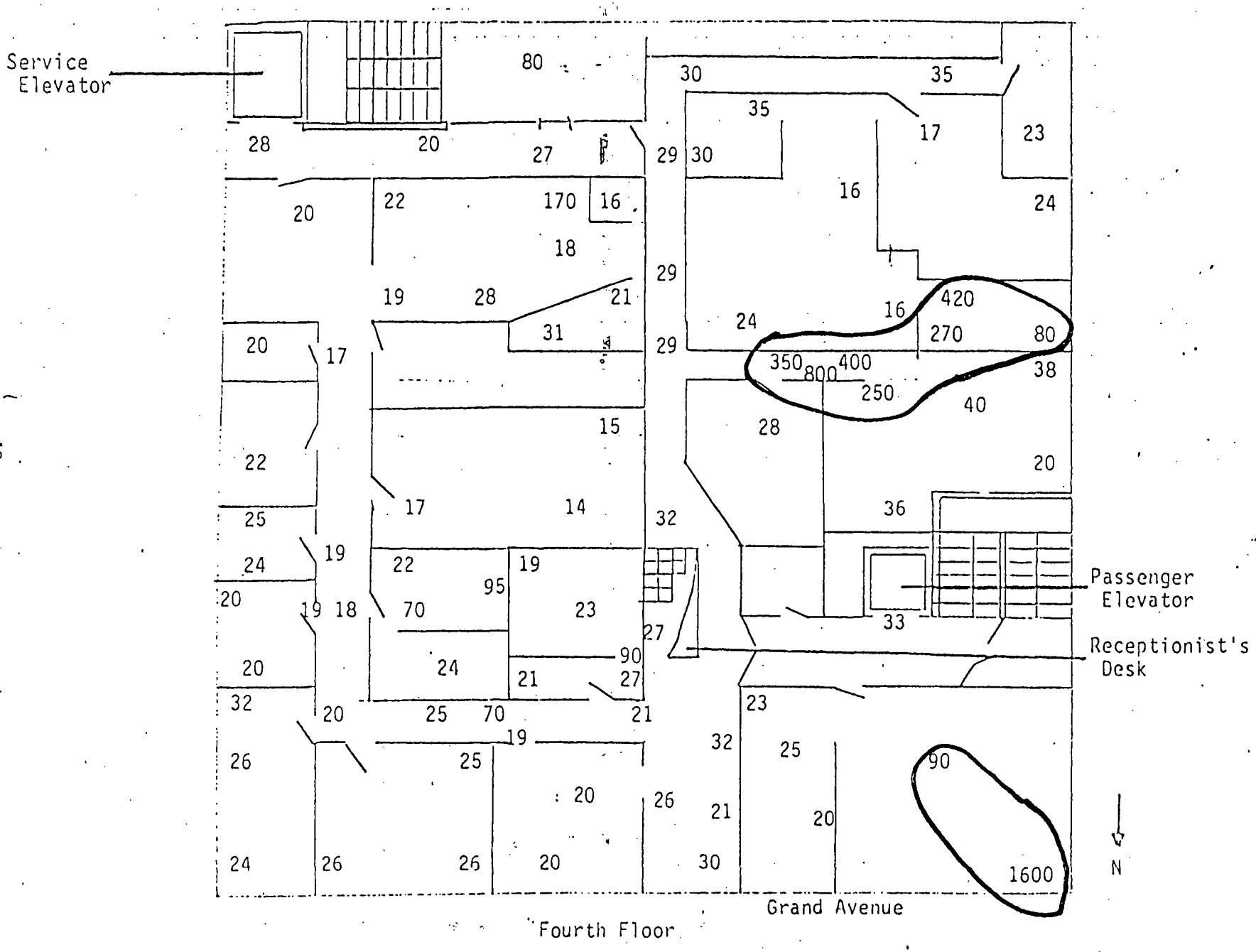


Figure 29 : Third Floor Regions of Contamination



3rd Floor

Figure 30 : Fourth Floor Regions of Contamination



The west central portions of the basement, 3rd and 4th floors also show contamination. No good reason for this could be found. Finally, the pipeholes near the service elevator on the 2nd and 3rd floors show elevated levels.

The chimney area found contaminated to high levels in the basement did not manifest itself on other floors but this may have been due to considerable absorption by the surrounding brickwork. This chimney definitely should be checked from basement to roof.

C. Identification of the Contamination

The contamination in question is, as suspected from the nature of Lindsay's operation, thorium. The MCA spectrums for Rooms 8 and 202 established this quite well (See Figs. 23 and 24). Thallium-208 gamma peaks at 583 keV, 2615 keV and 3198 keV are strong thorium indicators. Further, the very close correspondences between the spectrums of the Coleman mantle and the thorium dioxide sample with the spectrums for Room 202 and 8, respectively, are strong thorium indicators.

D. Smear Results

The contamination encountered is not removable by normal wiping techniques, at least where we were able to reach surfaces. On-the-spot surveys of two smears with a hand held alpha scintillation detector were negative. Laboratory analyses by the Illinois Department of Nuclear Safety (IDNS) showed the following results.

	Gross Alpha	Gross Beta
Smear #2	5.35 dpm/100 cm^2	2.35 dpm/100 cm^2

*dpm stands for disintegrations per minute. Each disintegration is one radioactive decay.

When compared to the Nuclear Regulatory Commission's "Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unresticted Use or Termination of Licenses For Byproduct, Source, or Special Nuclear Material" these levels are very low.

	NRC Guidelines
Removable Alpha	200 dpm/100 cm^2
Removable Beta	1000 dpm/100^2

E. Air Sample Results

As discussed with regard to the Preliminary Survey a relative comparison of the alpha radiation present in the air of Room 202 compared to Room 302 showed an enhancement of a factor of 3.5. This was not a firm indicator of alpha contamination in the air. Subsequently, air samples were made to assess the degree of alpha air contamination present due to diffusion of thoron and, possibly radon, through carpets and floor coverings from underlying spots of contamination. The results follow:

	Thoron	Radon
Room 306	0.0255 WL	0.00215 WL
Room 202	0.162	0.0105
Room 8	0.229	0.0139

The radon values can be compared to values measured in comparable buildings as reported in the United Nation's Scientific Committee On the Effects of Atomic Radiation, 1977 Report (UNSCEAR)*.

Brick Buildings	0.001 WL
Brick Home	0.0054
Apartment, Brick	0.007

The Lindsay building numbers are not at variance with this data. Radon in buildings is influenced considerably by the degree and rate of ventilation. If the building was tight or the ventilation rate low the radon levels would be expected to be higher. It can also be noted, however, that the radon levels do increase with the measured gamma exposure levels. Room 8 had the highest working levels, Room 202 intermediate and Room 306 low. This would be expected if uranium were present as contamination. From a legal standpoint the Title 10, Part 20 of the Code of Federal Regulations (10 CFR 20) limit for radon of 1/30 WL (.033 WL) is not exceeded in the Lindsay building.

Comparison values for thoron are much more difficult to come by. The same UNSCEAR document reported that indoor equilibrium equivalent concentrations can, for building materials containing thorium, range from 0.0001 WL to 0.008 WL**

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*Table 28, page 77-78, equilibrium equivalent concentrations in pCi/l were converted to WL by dividing by 100 pCi/l per WL.

**Table 30, page 80, equilibrium equivalent concentrations in pCi/l were converted to WL by dividing by 7.5 pCi/l per WL.

EPA's Office of Radiation Programs, Las Vegas Facility did a study in late 1980 on thoron and radon levels in outside air in Las Vegas. Two samples were also collected from inside homes. The thoron levels in homes were 0.00028 WL and 0.00036 WL.

Finally, if one working level of radon is assumed to be equivalent to one working level of thoron then these levels could be compared to standards for contaminated buildings in Grand Junction, Colorado, and in Florida. This is not strictly true. But, because of the limited amount of material available on thoron, it is the best available comparison we have.

Surgeon General's Guidelines for Remedial Action In Grand Junction, Colorado

Radon levels greater than 0.05 WL* - remedial action indicated

Radon levels from 0.01 to 0.05 WL* - remedial action may be suggested

EPA Recommendation For Residences on Florida Phosphate Lands

Annual average radon greater than 0.02 WL** - remedial action should be taken

Annual average radon less than 0.02 WL** - remedial action to reduce concentrations as low as reasonably achievable

*over a background of 0.004 WL

**including background

With these limited comparisons the thoron levels in the Lindsay building appear to be considerably higher than usual. Where higher gamma exposure levels were found the thoron and radon levels were elevated.

From a legal standpoint, the 10 CFR 20, Appendix B, Table II limit for thoron is 10 pCi/l per WL. When converted to working levels based upon UNSCEAR's conversion of 7.5 pCi/l per WL, the equivalent limit is 1.33 WL. The Lindsay building levels do not exceed this standard.

F. Thermoluminescent Dosimeter Results

TLDs were placed in areas deemed critical by the results of the Preliminary Survey. Results are shown in Table 1. Since Site 15 was used as a background location exposure values at the other 14 locations should be adjusted by subtracting off the Site 15 values, 1.56 mrem/week or 78 mrem/year. Background is a level considered normal in the absence of contamination. Site 6 has lower levels but is in the vicinity of a contaminated area and should not be considered as a background location.

The bases for comparison is 10 CFR 20 Section 20.105 where exposures in unrestricted areas are limited to

10 CFR 20 Limits
2 mrem/hour
100 mrem/week
500 mrem/year

Since the building is a workplace, most people would be expected to spend about 40 hours per week or 40 x 50 hours per year there. These should be considered workplace exposures and compared to the Workplace Exposure columns in Table 1. It can be seen that for measured areas of the building, people should not expect to exceed any of the 10 CFR 20 limits.

The Federal Radiation Council (FRC) in Staff Report No. 1 suggested for average population groups exposed to widespread radioactive contamination tht the yearly whole-body exposure not exceed 170 mrem. This criteria is most applicable here.

Thermoluminescent Dosi r Results For 161 East Grand nue, Chicago, Illinois

Table 1

TLD Chip No.	Location	Dose* (mrem)	Dose* Rate (mrem/hr)	Continuous (mrem/wk	Exposure**** (mrem/yr)	Workplace (mrem/wk)	Exposure* (mrem/yr)
1	Under Secretary's Chair	61	0.065	10.95	569	2.60	130.
2	Under Draftman's Chair	52	0.055	9.27	482	2.20	110
3	Under Draftman's Chair	45	0.048	8.08	421	1.92	96
4	Under Draftman's Chair	39	0.042	7.08	368	1.68	84
5	Under Conference Table	100	0.107	18.03	937	4.28	214
6	On West Wall Above Conference Table	23	0.025	4.2	219	1.00	50
7	On East Wall In Conference Room	61	0.065	10.95	569	2.60	130
8	On West Wall In Main Drawing Room	54	0.058	9.77	508	2.32	116
9	On East Wall In Main Drawing Room	39	0.042	7.08	368	1.68	84
10	On South Wall In Storage Room	40	0.043	7.24	377	1.72	86
11	On West Wall In Entrance Foyer	46	0.049	8.25	429	1.96	98
12	Under Lip Of Reception Desk	56	0.060	10.11	526	2.40	120
13	On Pipe Proximal to Grand Avenue	94	0.100	16.80	880	4.00	200
14	On Side of Desk Near Grand Avenue	65	0.069	11.62	604	2.76	138
15	Over Arch In Middle of Room	37	0.039	6.57	342	1.56	78

*Exposure period 1/22/81, 8:30 p.m. unti 3/2/81 a.m., Total hours 938.5

**Chips 1-11 were located in Room 202, chips 12-14 were located on the first floor, and chip 15 was located in Room 218.

***Continuous exposure is considered to be 168 hours for one week and 8760 hours for one year.

****Workplace exposure is considered to be 40 hours fdor one week and 2000 hours for one year.

However, Site 13 is located beside a desk and typewriter with possibly high occupancy. The net annual occupational exposure at this location would be about 122 mrem (200-78) or 71% the FRC recommendation. Such an exposure should be considered unwarranted. There is no reason to believe at this time that any unmeasured areas of the building are going to be dramatically different from measured areas.

VII. Conclusions

Several conclusions can be drawn from the surveys performed in the Lindsay Light Company Building at 161 East Grand Avenue.

(1) Several areas of the building are contaminated with radioactive materials believed to be residual from the gas light mantle manufacturing operations of the Lindsay Light Company between 1910 and 1936.

(2) The material is thorium.

(3) The distribution of thorium residuals was spotty over an area rather than being uniformly distributed and seemed to be, generally, in the same region of the floor on each floor.

(4) The maximum measured gamma ray exposure rate (one meter off the surface) in an occupied area was 15 times the apparent background and 50 times the apparent background in an unoccupied area. This is clearly excessive although not in violation of hourly or weekly rates in Title 10, Part 20.105 of the Code of Federal Regulations (10 CFR 20.105).

(5) Radon gas levels in contaminated areas increase with increasing gamma exposure levels but do not appear to be out of line with normal levels for similar structures.

(6) Radon gas levels do not exceed the legal limits of 10 CFR 20, Appendix B, Table II for radon-222.

(7) Thoron gas levels in contaminated areas increase with increasing gamma exposure levels. Based upon limited comparison data thoron levels appear much higher than expected.

(8) Thoron gas levels indicate considerable unwarranted lung exposure could arise to persons in the building for long periods of time even though the legal limits of 10 CFR 20, Appendix B, Table II, are not exceeded.

(9) Continued exposure of persons in this workplace to elevated gamma ray emissions and to elevated thoron gas concentrations is contrary to sound health physics practice of maintaining radiation exposures as low as reasonably achievable (ALARA).

VII. Recommendations

The overriding consideration upon which this report is based is well founded in health physics, that where unnecessary radiation exposures can be reduced to lower the possibilities of unwarranted health effects, then steps should be taken to do so, even when regulatory limits are not exceeded. We do not wish to convey the impression there is a substantial crisis or that people are in great peril. These recommendations are made primarily to initiated prudent actions.

It is strongly recommended that a cleanup program to remove residual radioactive materials in those areas shown in Figs. 26-30 be initiated as soon as possible. Cleanup should have the goal of restoring radiation levels in contaminated portions of the building to those comparable with uncontaminated portions of the building.

In no case should such work be performed by any but personnel trained and experienced in handling radioactive materials.

If at any time in the future modifications in this building are made, radiation surveys should be taken to protect personnel and to detect any further contamination. Such modifications could be replacement of carpets, sanding floors, sandblasting walls or altering or replacing piping or ductwork. If new areas of contamination are detected then further cleanup should be initiated before commencing work.

If at any time in the future the building is sold the new owners should be informed of cleanup done and forewarned of the necessity of checking radiation levels before doing work such as suggested above.

The U.S. Environmental Protection Agency and the Occupational Safety and Health Administration offer their assistance in making recommendations about cleanup. Both agencies would expect that they would be allowed to make radiation surveys after cleanup to assure that effective reduction of radiation levels have been achieved.

TECHNICAL APPENDIX

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I. Instrumentation

Table TA1

Manufacturer	Instrument	Serial Number	Attachment	Serial Number	Preliminary Survey	Comprehensive Survey
Eberline	PRM-5-3	EPA#127371	1"x1" NaI Scintillation Crystal	----------	X	X
Ludlum	Model 19 Micro-R Meter	EPA#164325			X	X
D.S. Davidson	Model 4106 Multi-Channel Analyzer	EPA#164321			X	X
Harshaw			3"x4" NaI Scintillation Crystal, Model 12A12/3A	EPA#101063	X	X
Ludlum	Model 2200 Scaler	EPA#164320	Model 43-10 Alpha Scintillation Counter	EPA#164355	X	X
Eberline	RAS-1 Air Sampler	EPA#164349			X	X
Gelman			47mm Glass Fiber Filters, Type A/E		X	
Gelman			47mm Metricel Filters GN-4, .8 um pore size			X
Rocky Mountain Glass Blowing			Lucas Cells	EPA#164333 164334 164335 164336 164337 164338		X
Harsaw	Model 2000A TLD Reader	EPA#164361	Model 2000B Picoammeter	EPA#164362		X
			TLD-100 Thermoluminescent Dosimeter			X
Reuter-Stokes	Pressurized Ion Chamber	Borrowed, Nuclear Regulatory Commission				X

II. Room Survey Data

All rooms in the basement and on each of the four floors were surveyed with a micro-roentgen (micro-R) meter at contact with the surface and at one meter above the surface. Rooms 201, 202, and the adjoining hallway area were also surveyed with a pressurized ion chamber (PIC) borrowed from the Nuclear Regulatory Commission's Region III office in Glen Ellyn, Illinois. Simultaneous readings with both the PIC and the micro-R meter were taken in this area of the building to develope a correspondence for the remaining readings using the micro-R meter. The rationale for this being that the PIC does not over respond to low energy gammas the way the micro-R meter does. With a correspondence relationship much of the over response could be allowed for. The average result over four scales of the micro-R meter (0-50, 0-250, 0-500, 0-5000 uR/hr) was a ratio of 0.56:1, PIC:micro-R meter. A reasonable relationship then is that micro-R readings should be reduced by half to more nearly represent the true exposure rate. Room survey results for both instruments were given in Figs. 13-18 in the Main Report. The cross calibration data follows.

Simultaneous Readings, Pressurized Ion Chamber and Micro-Roentgen Meter
(Both approximately one meter above surface)

Table TA2

Micro-R Meter Scale	Micro-R Meter Reading	Pressurized Ion Chamber Reading	Ratio PIC/Micro-R Meter
0-50	19	12	0.63
	19	13	0.68
	25	19	0.76
	30	23	0.77
	43	29	0.67
	44	24	0.55
0-250	40	26	0.65
	45	23	0.51
	55	27	0.49
	65	35	0.54
	65	38	0.58
	70	38	0.54
	75	35	0.47
	75	53	0.71
	80	47	0.59
	90	52	0.58
	90	52	0.58
	90	55	0.61
	95	53	0.56
	95	57	0.60
	100	59	0.59
	140	60	0.43
	140	63	0.45
	145	70	0.48
	145	70	0.48
	150	68	0.45
	155	72	0.46
0-500	120	66	0.55
	190	110	0.58
	240	138	0.58
	250	118	0.47
0-5000	300	94	0.31
		Mean	0.56

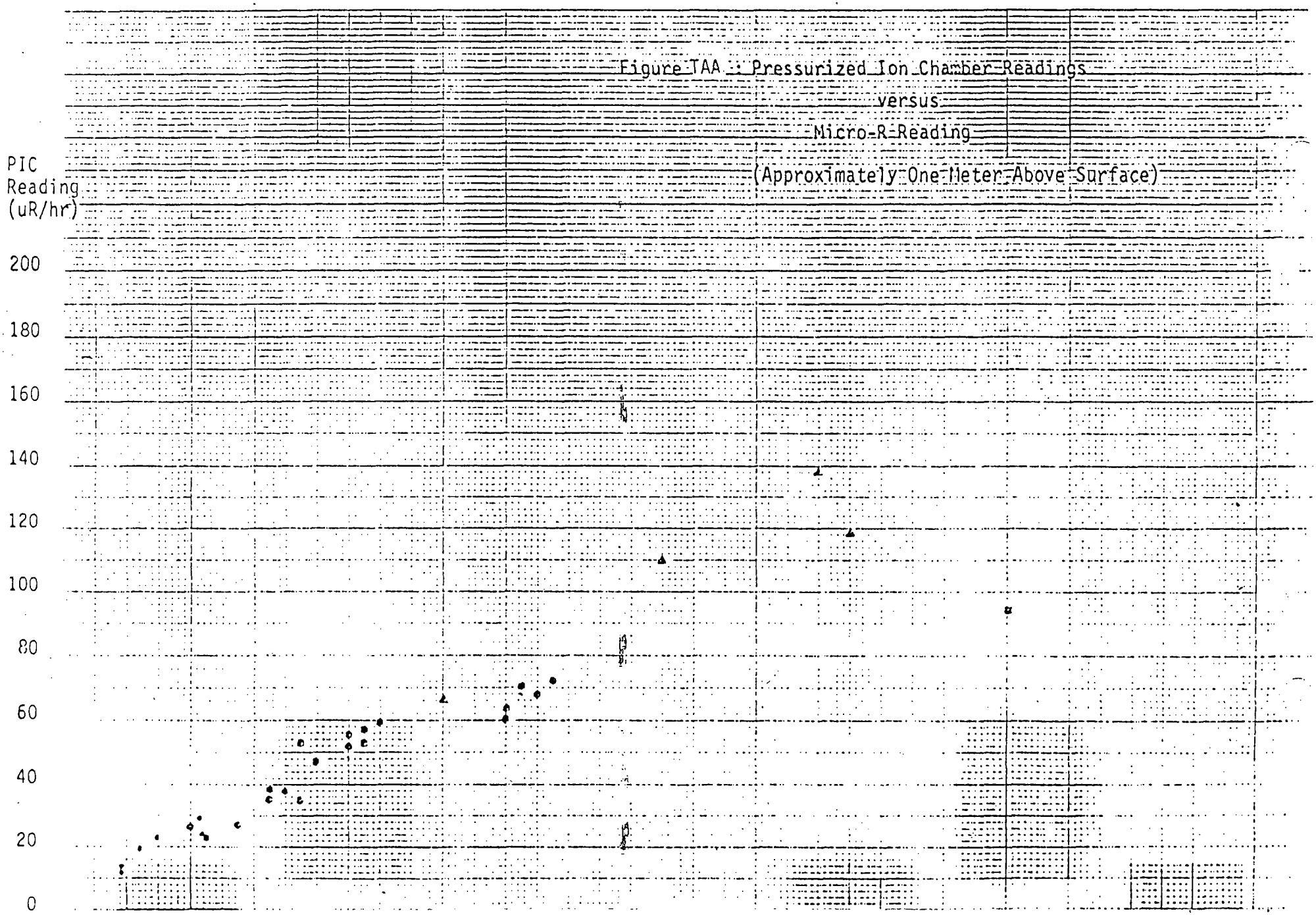

Figure TAA : Pressurized Ion Chamber Readings
versus
Micro-R-Reading
(Approximately One Meter Above Surface)

III. Multi-Channel Analyzer Spectrums

A. Room 202

The first attempt to identify the contamination found in Room 202 was made during the Preliminary Survey. A 3"x4" sodium iodide crystal was connected to a portable multi-channel analyzer (MCA). The MCA was calibrated to the 661 keV peak of a cesium-137 check source. Also, a Coleman brand gas lantern mantle purchased in a local hardware store and believed to be similar to those manufactured by Lindsay Light Company, was used to obtain a mantle spectrum. The spectrum from Room 202 was obtained by setting the crystal directly on the carpet over one of the highest reading spots in the room. No attempt was made to subtract background.

All three spectrums are plotted in Figs. 23 and 24 in the Main Report. It can be noted that the 583 keV thallium-208 peak corresponds well to a similar peak for the mantle and falls about where expected based on the cesium-137 peak at 661 keV. The distinctive thallium-208 peak at 2615 keV is well defined in the Room 202 spectrum, but much less well defined in the mantle spectrum. Also, probably due to the close proximity of the sodium iodide crystal to the floor source, there is a sum peak formed at 3198 keV (2615+583 keV). Because the MCA was only calibrated at a single point, the energy to channel relationship was not as good as at higher gamma energies. No attempt was made to quantify the floor source activity.

B. Room 8

The highest reading point in the building was located in Room 8 in the basement at what appeared to be an old chimney. A hole about a meter off of the floor was partially filled with concrete.

A spectrum was taken there by placing the sodium iodide crystal in contact with the chimney. See Fig. 24 in the Main Report. For comparison two other spectrums were taken. One again shows the 661 KeV peak for the cesium-137 check source. The other is the spectrum of a small quantity of thorium oxide. Before the Room 8 spectrum was taken the 2615 keV peak of the thorium oxide was used to calibrate the MCA. It appears there may have been some drift of the MCA during collection of the spectrums. No attempt was made to quantify the activity of the chimney source.

IV. Smear Data

Two smears were taken during the Preliminary Survey in the basement at the points shown in Fig. 3 in the Main Report. The Illinois Department of Nuclear Safety Laboratory performed gross alpha, gross beta tests on the smears. The results follow on the computer printout sheet (Table TA3). When converted to disintegrations per minute (dpm) per 100 cm^2 wipe the results are as follows:

Smear #1	Gross Alpha	$2.28 \times 10^{-7} - 1.93 \times 10^{-7}$ uCi/wipe
		0.506 - 0.428 dpm/100 cm^2
	Gross Beta	$<4.91 \times 10^{-7}$ uCi/wipe
		<1.09 dpm/100cm^2
Smear #2	Gross Alpha	$2.41 \times 10^{-6} - 5.00 \times 10^{-7}$ uCi/wipe
		5.35 ± 1.11 dpm/100cm^2
	Gross Beta	$1.06 \times 10^{-6} \pm 6.66 \times 10^{-7}$ uCi/wipe
		2.35 ± 1.48 dpm/100 cm^2

Table TA3

DATE 1/21/81 MICROFILM ----

CCCCF017 LABORATORY INPUT SHEET FOR RADIOLOGICAL SAMPLES PAGE 4

TRAN CODE 45
SAMPLE KEY 80355845059 SAMPLE DATES 11/24/80
PROGRAM CODE FLM 11/24/80
FACILITY ID LINDSAY LIGHT BLDG 161 E GRAND CHICAGO WIPE #1
REGION 2B SAMPLE TYPE WIPE
COLLECTOR ID 646 ANALYSIS DATES 1/ 5/81
1/ 7/81

PARAMETER	ID	R E S U L T			
GROSS ALPHA	4110	.22826881E -6	+-	.192533326E -6	UCI/W (.506 dpm/100 cm^2)
GROSS BETA	4120	LESS THAN		.491253403E -6	UCI/W (1.09 dpm/100 cm^2)

DATE 1/21/81 MICROFILM ----

CDGCF017 LABORATORY INPUT SHEET FOR RADIOLOGICAL SAMPLES PAGE 5

TRAN CODE 45
SAMPLE KEY 8035845067 SAMPLE DATES 11/24/80
PROGRAM CODE FLM 11/24/80
FACILITY ID LINDSAY LIGHT BLDG 161 E GRAND CHICAGO WIPE #2
REGION 2B SAMPLE TYPE WIPE
COLLECTOR ID 646 ANALYSIS DATES 1/ 5/81
1/ 7/81

	PARAMETER ID	RESULT			
GROSS ALPHA	4110	.24095041E -5	+-	.49959815E -6	UCI/W (5.35 dpm/100 cm^2)
GROSS BETA	4120	.10596226E -5	+-	.66358740E -6	UCI/W (2.35 dpm/100 cm^2)

TA9

The bases of comparison for the smears is the Nuclear Regulatory Commission's "Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestrected Use or Termination of Licenses For Byproduct, Source, or Special Nuclear Material". Excerpted Table I is copied here and shows that the natural thorium limits for removable gross alpha are 200 dpm/100 cm^2 and for removable gross beta are 1000 dpm/100 cm^2. All measured values listed above are well below the natural thorium limits.

V. Thermoluminescent Dosimeter Data

A. Calibration Data

Thermoluminescent dosimeters (TLD-100) were first sorted. One hundred TLD's were annealed by the common procedure of 400°C for one hour,one minute cooling at room temperature, 2 hours at 100°C. Annealed chips were all irradiated to 500 mR with a radium source at Argonne National Laboratory (ANL). TLD's were read once and all chips that fell outside 5% of the mean were culled out.

A calibration curve was obtained by irradiating sorted chips with ANL's radium source to levels from 10-100 mR. Each chip was read by the process suggested by the Harshaw Chemical Company, manufacturer of both our TLD's and our reader. The process is to read a chip, turn it over and read it twice (identified as A, B, C, readings, respectively). Annealed but unexposed chips are also read (identified as D reading). The net reading value is obtained by the relationship (A-C) + (B-C) -D. This process gave us the calibration curve in Fig. TAB.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDE[a]	AVERAGE[b c]	MAXIMUM[b d]	REMOVABLE[b e]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm β-γ/100 cm^2	15,000 dpm β-γ/100 cm^2	1000 dpm β-γ/100 cm^2

[a]Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b]As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c]Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d]The maximum contamination level applies to an area of not more than 100 cm^2.

[e]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f]The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

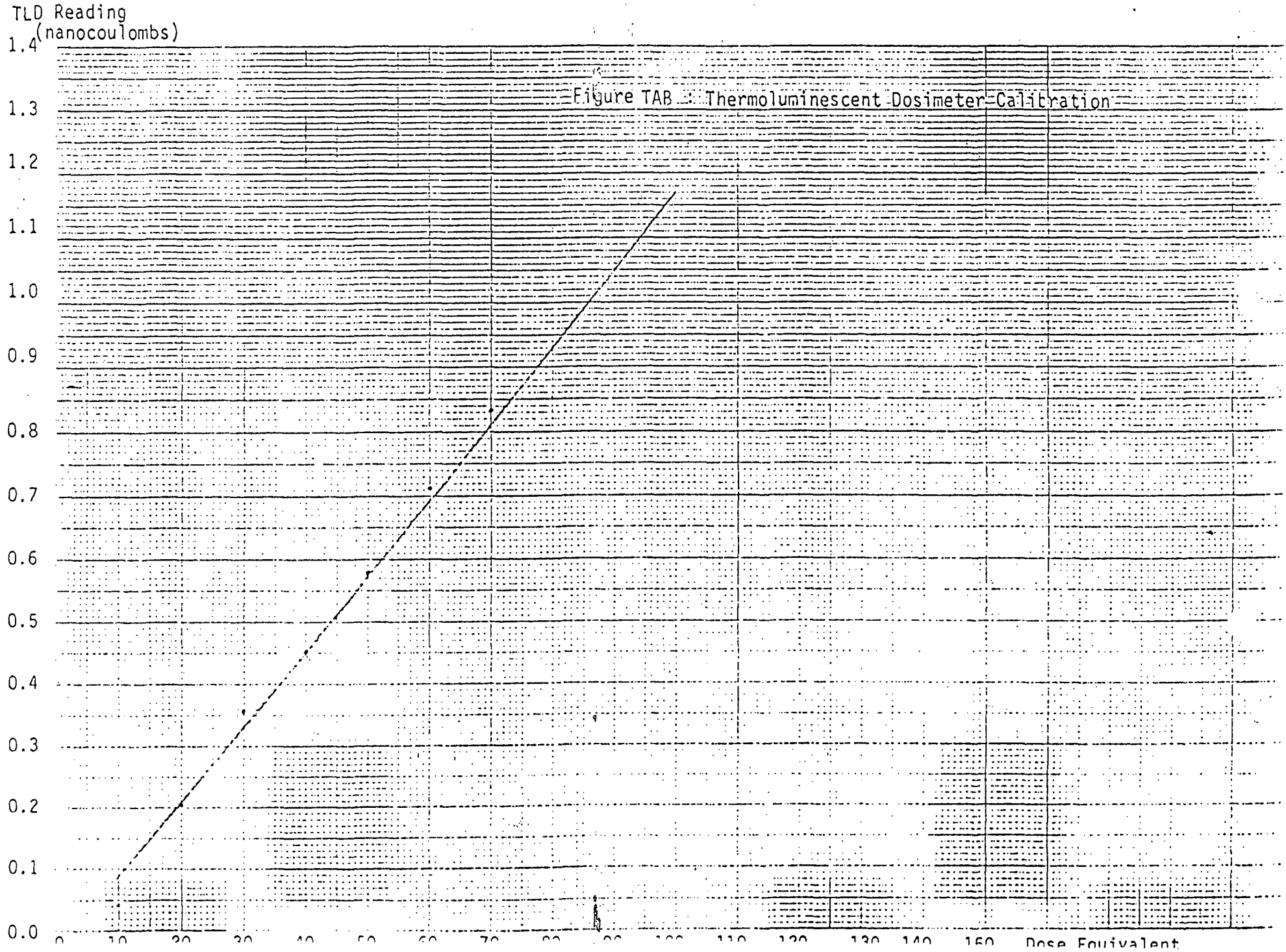

Figure TAB : Thermoluminescent Dosimeter Calibration

Once the calibration was obtained, sorted chips were annealed and placed in amulets obtained from the Illinois Department of Nuclear Safety. Three chips went in each amulet. Fifteen amulets were hung in areas in the Lindsay building deemed critical by the Preliminary Survey. See Fig. 25 in the Main Report. After a 39 day exposure the amulets were collected and read immediately. The process for reading was as described above except that in place of a reading for an annealed but unexposed chip, the dark current was substituted. Results are given in Table TA4. The period exposure numbers were reduced to hourly exposure rates and then converted to weekly and annual exposures based upon continuous occupancy (168 hours/week, 8760 hours/year) and workplace occupancy (40 hours/week, 2000 hours/year). The latter exposure is most relevant in this situation.

B. Exposure Sites

Exposure sites were chosen based upon the Preliminary Survey results. Namely, Room 202 showed considerable, spotty contamination and the first floor showed elevated gamma readings over the receptionist desk and a wall-pipe area in a front office. A third floor office, Room 318 was selected for background. Based upon the results of the Comprehensive Survey additional TLD's could have been placed in Room 8 in the basement, in the entrance way to Room 319, in the backrooms of Room 301 and in the short 4th floor hallway east of center on the floor. From the TLD results obtained it did not appear further TLD studies were warranted.

Thermoluminescent Dosimeter Results For 161 East Grand Avenue, Chicago, Illinois

Table TA4

TLD Chip No.	Location	Dose* (mrem)	Dose* Rate (mrem/hr)	Continuous (mrem/wk	Exposure**** (mrem/yr)	Workplace (mrem/wk)	Exposure*** (mrem/yr)
1	Under Secretary's Chair	61	0.065	10.95	569	2.60	130
2	Under Draftman's Chair	52	0.055	9.27	482	2.20	110
3	Under Draftman's Chair	45	0.048	8.08	421	1.92	96
4	Under Draftman's Chair	39	0.042	7.08	368	1.68	84
5	Under Conference Table	100	0.107	18.03	937	4.28	214
6	On West Wall Above Conference Table	23	0.025	4.2	219	1.00	50
7	On East Wall In Conference Room	61	0.065	10.95	569	2.60	130
8	On West Wall In Main Drawing Room	54	0.058	9.77	508	2.32	116
9	On East Wall In Main Drawing Room	39	0.042	7.08	368	1.68	84
10	On South Wall In Storage Room	40	0.043	7.24	377	1.72	86
11	On West Wall In Entrance Foyer	46	0.049	8.25	429	1.96	98
12	Under Lip Of Reception Desk	56	0.060	10.11	526	2.40	120
13	On Pipe Proximal to Grand Avenue	94	0.100	16.80	880	4.00	200
14	On Side of Desk Near Grand Avenue	65	0.069	11.62	604	2.76	138
15	Over Arch In Middle of Room	37	0.039	6.57	342	1.56	78

* Exposure period 1/22/81, 8:30 p.m. until 3/2/81 a.m., Total hours 938.5

** Chips 1-11 were located in Room 202, chips 12-14 were located on the first floor, and chip 15 was located in Room 318.

*** Continous exposure is considered to be 168 hours for one week and 8760 hours for one year.

**** Workplace exposure is considered to be 40 hours for one week and 2000 hours for for one year.

VI. Air Sample Data

A. Air Sample Sites

During the Preliminary Survey an air sample was taken in Room 202 where elevated gamma readings were obtained and in Room 302 which was believed to be uncontaminated. Subsequent surveys showed the room to have a slightly elevated exposure level.

During the Comprehensive Survey air samples were collectd in Room 8 (basement) near the highly contaminated chimney, in Room 202 which showed extensive contamination and was fully occupied, and in Room 306 which showed background levels.

B. Air Sample Results

During the Preliminary Survey two air samples were collected in Rooms 202 and 302 to get a rough estimate of the relative alpha radiation air concentrations between a known area of contamination and an area believed to be low or free from contamination. An air sample at 50 liters/minute was used with glass fiber filters. Since then a recalibration has been performed and the actual flow was 41.8 liters/minute. The alpha scintillation detector was also recalibrated and found to have an efficiency of 25%. Although glass fiber filters are not preferable for alpha collections because of deep trapping and self-absorption by the filter, these were all that were available for use at the time. Because of time constraints on overtime personnel in the building we were not able to stay long enough to allow for the normal 5 hour radon decay. Due to all of these drawbacks only a relative concentration is computed here and this is just for the record. Later collections with surface filters are considered superior. (See Table TA5)

Table TA5 Preliminary Survey Air Sample Data and Calculations

Room 202			
Time	Counts/minute*	Time	Counts/minute*
6:52 PM	1710	7:09 PM	1819
6:53	1664	7:10	1829
6:54	1659	7:11	1811
6:56	1685	7:13	1834
6:57	1703	7:14	1752
6:58	1683	7:15	1777
7:02	1777	7:16	1883
7:03	1798	7:17	1824
7:04	1802	7:18	1899
7:05	1735	7:19	1857
7:07	1773	7:21	1841
7:08	1847	Average	1781
		Sampling Time 64 minutes	

* Counting time 1 minute

Room 302	
Time	Counts/minute*
7:35 PM	310
7:38	309
7:39	331
7:40	316
7:41	315
7:42	316
Average	316
Sampling Time 39 minutes	

Blank Filter	
Time	Counts/minute*
7:24 PM	4
7:25	0
7:27	3
Average	2

B. Ogden Method

The method of T.L. Ogden (paper attached) was used in determining the working level* concentrations for radon-220 and radon-222 in Rooms 8,202 and 306.

The method requires at least a 2.5 hour collection, followed by a 20 minute wait and then counting of the filter for 85 and 105 minutes. In this survey collections ranged from 13:26 hours to 18:55 hours. Thoron and radon working levels were computed from:

$$W_T = 6.068 \times 10^{-10} c\ (d \cdot A_2 - A_1)/V$$

$$W_R = 4.736 \times 10^{-9}\ a\ (b \cdot A_1 - A_2)/V$$

where

a, b, c, d = Constants based upon wait times and sampling times, these are obtained from tables or from equations generated by Ogden

A_1, A_2 = counts in 85 and 105 minute periods, respectively, corrected for counter efficiency and blank filter counts

V = collection rate in liters per second

---

*Technically the definition for the radon-220 working level is the quantity of lead-212 per liter of air which in decaying through bismuth-212, polonium-212 and thallium-208 to lead-208 will yield 1.3×10^5 MeV of alpha energy. The definition for radon-222 is any combination of polonium-218, lead-214 and bismuth-214 per liter of air which will yield 1.3×10^5 MeV of alpha energy in decaying completely through polomium-214 to lead 210. (From R.L. Rock, "Sampling Mine Atmospheres for Potential Alpha Energy due to the Presence of Radon-220 (Thoron) Daughters", Mining Enforcement and Safety Administration, Informational Report 1015).

AIR SAMPLES

I. Room 202, Average 1781 counts/minute

Background 2 cpm

Net, Room 202 1779 cpm

Air Sampling Rate 41.8 liters/minute

Air Sampling Time 64 minutes

Air Sampling Volume 2675 liters = 2.675×10^6 milliliters

Concentration

$$\frac{1779 \text{ cpm}}{2.675 \times 10^6 \text{ ml}} = 6.65 \times 10^{-4} \text{ cpm/ml}$$

II. Room 302, Average 316 cpm

Background 2 cpm

Net, Room 302 314 cpm

Air Sampling Rate 41.8 liters/minute

Air Sampling Time 39 minutes

Air Sampling Volume 1630 liters = 1.63×10^6 ml

Concentration

$$\frac{314 \text{ cpm}}{1.63 \times 10^6 \text{ ml}} = 1.93 \times 10^{-4} \text{ cpm/ml}$$

III. Relative Concentration

$$\frac{\text{Room 202}}{\text{Room 302}} = \frac{6.65 \times 10^{-4} \text{ cpm/ml}}{1.93 \times 10^{-4} \text{ cpm/ml}} = 3.45$$

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Route

RADON AND THORON WORKING LEVELS FROM ORDINARY INDUSTRIAL-HYGIENE DUST SAMPLES

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Abstract—The method is an improvement of that of OGDEN (1974), and has the following advantages over other methods: the measurements do not require special samples, but can be made on ordinary airborne dust samples; the long sampling time (> 2½ h) is more suitable for estimating average exposure than the conventional short sample; radon and thoron working levels are both obtained; and the method is very sensitive (0.001 WL is easily measured). Side-by-side comparisons show good agreement with other methods.

INTRODUCTION

WORKERS in many types of mine are exposed to relatively high concentrations of radon and thoron, and it has been proposed that miners exposed to an average radon daughter concentration exceeding 0.1 WL should be subject to medical and environmental surveillance (STRONG *et al.*, 1975). This note describes how average working levels can be determined from dust samples of the type already commonly taken in mines and other industries. The method is an improvement of that described by OGDEN (1974). The earlier method was restricted to dust samples taken at 2.5 l./min (0.0417 l./s) for at least 5.7 h, and required a 50 min wait between the end of sampling and the start of counting. The new version is much more flexible.

METHOD

An airborne dust sample is collected on filter paper at a sampling rate V (l./s) for a period T of at least 2½ h. After a wait t_Q of at least 20 min from the end of sampling the dust-covered filter is exposed to an alpha detector, and the alpha particles given off are counted for two successive periods, the first lasting 85 min and the second 105 min. The counts are corrected for counter efficiency (and the background count in the absence of dust) to give the number of disintegrations A_1 and A_2 in these two periods. The radon working-level value w_R and the thoron value w_T are given by

2½ h so

Following 1 after the other in sequence; i.e. 20–105 and 105 to 210.

$$w_R = 4.736 \times 10^{-9}\, a(bA_1 - A_2)/V$$
$$w_T = 6.068 \times 10^{-10}\, c(dA_2 - A_1)/V \qquad (1)$$

lps

where a, b, c and d are given in Table 1 in terms of sampling time T and wait time t_Q (see Appendix for theory).

Although standards are in terms of radon working levels, the thoron contribution is often appreciable when radon levels are low, for example in coal mines or on the surface, and the total working-level value $(w_R + w_T)$ is then perhaps a better measure of the hazard. Some uncertainly is introduced by γ, the activity concentration ratio of thorium-C to thorium-B (see OGDEN, 1974). Usually, $\gamma \ll 1$ (DUGGAN, 1973), and the

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THE FOLLOWING DOCUMENTS ARE OF POOR QUALITY

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TABLE I. VALUES OF a, b, c, AND d FOR SUBSTITUTIONS IN EQUATION (I)

Sampling time T (min)		Wait time t_0 (min) 20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
150	a	5.81	6.51	7.20	8.20	9.21	10.36	11.65	13.12	14.79	16.67	18.01	21.23	23.97	27.08	30.61
	b	1.39	1.37	1.35	1.34	1.32	1.31	1.30	1.28	1.27	1.26	1.26	1.25	1.24	1.23	1.22
	c	22.74	22.27	21.86	21.43	21.16	20.87	20.61	20.37	20.16	19.98	19.81	19.66	19.53	19.41	19.31
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
160	a	5.18	6.50	7.37	8.27	9.28	10.43	11.74	13.21	14.88	16.77	18.91	21.34	24.09	27.20	30.73
	b	1.37	1.36	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22
	c	21.37	20.93	20.54	20.20	19.89	19.62	19.38	19.16	18.96	18.79	18.64	18.50	18.37	18.27	18.17
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
170	a	5.94	6.64	7.43	8.33	9.35	10.51	11.81	13.29	14.96	16.86	19.00	21.43	24.19	27.31	30.85
	b	1.36	1.35	1.33	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22
	c	20.16	19.75	19.39	19.06	18.78	18.52	18.29	18.09	17.91	17.75	17.60	17.47	17.36	17.26	17.17
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
180	a	5.99	6.70	7.49	8.40	9.42	10.57	11.88	13.35	15.04	16.94	19.09	21.53	24.29	27.41	30.96
	b	1.35	1.34	1.32	1.31	1.30	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.22	1.21
	c	19.09	18.70	18.36	18.06	17.79	17.55	17.33	17.14	16.97	16.82	16.68	16.56	16.46	16.35	16.28
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
190	a	6.04	6.75	7.55	8.45	9.40	10.64	11.95	13.43	15.12	17.02	19.18	21.61	24.38	27.51	31.07
	b	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21
	c	18.13	17.77	17.45	17.16	16.90	16.68	16.48	16.29	16.14	15.99	15.86	15.75	15.65	15.56	15.48
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
200	a	6.09	6.80	7.60	8.51	9.54	10.70	12.01	13.50	15.19	17.09	19.25	21.70	24.47	27.60	31.16
	b	1.33	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.21
	c	17.27	16.93	16.63	16.35	16.11	15.90	15.71	15.54	15.38	15.25	15.13	15.02	14.93	14.83	14.77
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
210	a	6.14	6.85	7.65	8.56	9.59	10.75	12.07	13.56	15.25	17.16	19.33	21.77	24.55	27.69	31.26
	b	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20
	c	16.50	16.17	15.88	15.63	15.40	15.19	15.01	14.85	14.71	14.58	14.46	14.36	14.27	14.19	14.12
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
220	a	6.18	6.89	7.70	8.61	9.64	10.81	12.13	13.62	15.31	17.23	19.39	21.85	24.63	27.77	31.38
	b	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.20	1.20
	c	15.80	15.49	15.21	14.97	14.75	14.56	14.39	14.23	14.09	13.97	13.86	13.75	13.68	13.60	13.54
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
230	a	6.22	6.93	7.74	8.65	9.69	10.86	12.18	13.68	15.37	17.29	19.46	21.92	24.70	27.85	31.42
	b	1.31	1.30	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.21	1.21	1.21	1.20	1.20
	c	15.15	14.86	14.60	14.37	14.16	13.97	13.81	13.66	13.53	13.41	13.31	13.22	13.14	13.07	13.00
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
240	a	6.26	6.97	7.78	8.70	9.73	10.90	12.23	13.73	15.43	17.35	19.52	21.95	24.77	27.92	31.50
	b	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19
	c	14.58	14.29	14.04	13.82	13.62	13.44	13.28	13.14	13.02	12.91	12.81	12.72	12.64	12.57	12.52
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
260	a	6.33	7.05	7.86	8.78	9.81	10.99	12.32	13.82	15.53	17.45	19.63	22.10	24.89	28.06	31.64
	b	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19
	c	13.95	13.29	13.06	12.85	12.67	12.50	12.36	12.23	12.11	12.01	11.92	11.84	11.77	11.71	11.65
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
280	a	6.39	7.11	7.93	8.85	9.89	11.07	12.40	13.91	15.62	17.55	19.73	22.20	25.01	28.18	31.77
	b	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18
	c	12.68	12.43	12.22	12.02	11.85	11.70	11.57	11.45	11.34	11.25	11.16	11.09	11.02	10.97	10.92
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
300	a	6.45	7.17	7.99	8.91	9.95	11.14	12.47	13.98	15.70	17.63	19.82	22.30	25.11	28.28	31.88
	b	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18
	c	11.92	11.69	11.49	11.31	11.15	11.01	10.89	10.77	10.68	10.59	10.51	10.44	10.38	10.33	10.28
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
340	a	6.54	7.27	8.09	9.02	10.07	11.26	12.60	14.12	15.83	17.78	19.99	22.46	25.28	28.47	32.08
	b	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.19	1.19	1.18	1.18	1.17
	c	10.69	10.48	10.30	10.14	10.00	9.88	9.77	9.67	9.58	9.51	9.44	9.38	9.32	9.28	9.24
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
380	a	6.62	7.35	8.17	9.11	10.16	11.35	12.70	14.22	15.95	17.90	20.10	22.60	25.42	28.62	32.24
	b	1.24	1.23	1.22	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17
	c	9.72	9.54	9.38	9.23	9.11	8.99	8.89	8.80	8.73	8.66	8.60	8.54	8.49	8.45	8.42
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
420	a	6.69	7.42	8.24	9.18	10.24	11.43	12.78	14.31	16.04	18.00	20.21	22.71	25.54	28.74	32.37
	b	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.19	1.19	1.18	1.18	1.17	1.17	1.17	1.17
	c	8.94	8.78	8.63	8.50	8.38	8.28	8.19	8.11	8.04	7.98	7.92	7.87	7.83	7.79	7.76
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
460	a	6.74	7.47	8.30	9.24	10.30	11.50	12.86	14.39	16.12	18.08	20.30	22.80	25.64	28.85	32.48
	b	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.17	1.16	1.16
	c	8.31	8.15	8.02	7.90	7.79	7.70	7.61	7.54	7.47	7.42	7.37	7.32	7.28	7.25	7.22
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
500	a	6.78	7.52	8.35	9.29	10.35	11.56	12.92	14.45	16.19	18.15	20.37	22.88	25.72	28.94	32.58
	b	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.16	1.16	1.16	1.16
	c	7.78	7.64	7.51	7.40	7.30	7.21	7.13	7.06	7.00	6.95	6.90	6.86	6.82	6.79	6.76
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
540	a	6.82	7.56	8.39	9.34	10.40	11.60	12.97	14.50	16.24	18.21	20.43	22.95	25.79	29.01	32.66
	b	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.17	1.16	1.16	1.16	1.16
	c	7.33	7.20	7.08	6.97	6.88	6.80	6.73	6.66	6.60	6.55	6.51	6.47	6.44	6.41	6.38
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50

entries in Table 1 assume $\gamma = 0$, but levels for other values of γ can be calculated from the equations in the Appendix. The changes produced by assuming other values of γ are usually <0.001 WL.

The daughter atoms whose activity is measured usually attach to fine dust, and in coal mines the same w values are obtained from respirable and total dust samples. Where dust levels are low, however, a sample from an open filter holder may be preferable. Any size of filter can be used. It may be best to use a membrane filter, where the dust sits on the surface of the filter, but glass fibre filters appear to be satisfactory. For samples of a few milligrams, absorption in the dust should not be a problem. Where concentrations vary with time, the method gives greater weight to the end of the sampling period, but errors in exposure estimate due to this will not usually exceed 20% (OGDEN, 1974). For measuring average exposure to the worker, this method, with its relatively long sampling time, should give a better estimate than a method requiring a very short sample.

Sensitivity is greatest for high values of V and low values of t_Q, but there is no difficulty in measuring a normal surface value of 0.001 WL. The theory assumes $t_Q \gg \tau_{RA}$ (4.5 min), which is why the recommended minimum t_Q is 20 min.

VERIFICATION

As opportunity has arisen, side-by-side comparison has been made with methods used by other workers. The results are given in Table 2.

TABLE 2. RESULTS OF SIDE-BY-SIDE COMPARISONS WITH OTHER METHODS

Comparison method	Duration of test sample (h)	Number and duration of comparison samples	Mean comparison value (WL) (range)	Equation (1) results w_R (WL)	Equation (1) results w_T (WL)
JAMES and STRONG (1974)	5.7	8 of 5 min	0.0009* (0.0005–0.0012)	0.0010	0.0004
JAMES and STRONG (1974)	2.7	2 of 5 min	0.0041† (0.0037–0.0045)	0.0033	0.0020
JAMES and STRONG (1974)	3.8	3 of 5 min	0.0054† (0.0046–0.0062)	0.0033	0.0025
Modified Kusnetz‡	2.5	9 of 10 min	0.040† (0.034–0.051)	0.047	0.002
Modified Kusnetz‡	2.5	10 of 10 min	0.134† (0.110–0.147)	0.149	0.006
Modified Kusnetz‡	2.5	10 of 10 min	0.154† (0.127–0.179)	0.177	0.004
Modified Kusnetz‡	2.5	10 of 10 min	0.181† (0.151–0.211)	0.201	0.004

* Corrected for thoron daughters.
† Assuming thoron daughters negligible.
‡ See STRONG *et al.* (1975).

It can be seen that in five of the seven comparisons equation (1) gave radon levels 10–20% higher than the comparison method, a difference well within the expected possible errors. In the other two cases, the comparison method assumed thoron

daughters to be negligible, and our results show this to be unjustified. The comparison method would then be expected to give a result between our w_R and our $w_R + w_T$, as observed. The first three comparisons in Table 2 were carried out in surface buildings, and the other four in an iron-ore mine.

As a check on Table 1, the same sample was evaluated for four different values of t_Q, *viz.* 10, 30, 50 and 70 min. The answers were within a few per cent of each other.

The decay of activity of a coal mine dust sample was followed in detail by taking counts every five minutes for four hours. The decay curve predicted by the calculated values of w_R and w_T fitted the results exactly, confirming that the theory accounted for all the observed activity.

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APPENDIX—THEORY

THE theory given by OGDEN (1974) was aimed at coal-mine sampling, and covered samples taken for about a shift at 2½ l./min, with a wait time t_Q of 50 min. The theory can be extended as follows (using the symbols of OGDEN, 1974).

Different sampling rates can be accommodated by putting the sampling rate V (l./s) in equations (7) and (14) of OGDEN (1974) instead of the specific value 0.0417 l./s, and carrying V through to equations (16) and (17).

Shorter sampling times than about 5.7 h invalidate the assumption $\exp(-T/\tau_{TC}) \ll 1$, made in equation (12). However, the departure from a shift length of 7 h (2.52×10^4 s) can be allowed for by factors

$$k_{TB} = \{1 - \exp(-T/\tau_{TB})\}/\{1 - \exp(-2.52 \times 10^4/\tau_{TB})\}$$
$$k_{TC} = \{1 - \exp(-T/\tau_{TC})\}/\{1 - \exp(-2.52 \times 10^4/\tau_{TC})\}$$

Equation (12) of OGDEN (1974) then becomes (taking $\tau_{TB} = 5.527 \times 10^4$ s and $\tau_{TC} = 5247$ s; T in seconds)

$$A_T = n_{TB}\{0.4047\, k_{TB} \exp(-1.809 \times 10^{-5}\, t) - 0.09415\,(1.105 - \gamma)\, k_{TC} \exp(-1.906 \times 10^{-4}\, t)\}$$

k_{TB} is the same as k in OGDEN (1974) (k is incorrectly defined in the list of symbols there as the reciprocal of its true value). T must still exceed 2½ h, unless similar corrections are made to the radon daughter terms.

Counting begins at a time t_Q after the end of sampling. A_1 alpha particles are emitted in the next 85 min and A_2 in the following 105 min. The count-rate equation (14) of OGDEN (1974) can be integrated between these limits to give

$$w_R = 4.736 \times 10^{-9}\, a(bA_1 - A_2)/V$$
$$w_T = 6.068 \times 10^{-10}\, c(dA_2 - A_1)/V$$

where

$$a = 10^5 K/(JM - LK)$$
$$b = M/K$$
$$c = 10^5 L\,(1 + 0.0949\gamma)/(JM - LK)$$

$$d = J/L$$
$$J = 3.859\times10^{4}\exp(-4.310\times10^{-4}\,t_Q) - 1.821\times10^{4}\exp(-5.862\times10^{-4}\,t_Q)$$
$$K = 1.972\times10^{3}\,k_{Ra}\exp(-1.809\times10^{-3}\,t_Q) - 309.6\,(1.105-\gamma)k_{Tc}\exp(-1.906\times10^{-4}\,t_Q)$$
$$L = 4.499\times10^{3}\exp(-4.310\times10^{-4}\,t_Q) - 940.6\exp(-5.862\times10^{-4}\,t_Q)$$
$$M = 2.197\times10^{3}\,k_{Ra}\exp(-1.809\times10^{-3}\,t_Q) - 131.7\,(1.105-\gamma)k_{Tc}\exp(-1.906\times10^{-4}\,t_Q)$$
(t_Q in seconds).

The overnight collections which we used foreclosed use of Ogden's tables so that constants a,b,c,d, were derived from the equations and then cross-checked by plotting each constant from the table (See Fig. TAC) and extrapolating to the desired sampling time. Both methods agreed.

In the counting process for the sample filter, total counts during the 85+105 minute periods were recorded every 5 minutes. For each room total counts versus time were plotted in Fig. TAD. No attempt was made to subtract background since this would be a minor correction. No attempt was made to correct for counter efficiency, although multiplying counts by 4 or 1/25% would do this. Two points can be made with this graph. First, all rooms show similar decay rates, only the level is different. Second the flatness of the decay curve is indicative of predominantly thoron decay product content on the filter. As shown by Rock in "Sampling Mine Atmospheres for Potential Alpha Energy due to the Presence of Radon-220 (Thoron) Daughters," Informational Report 1015, Mining Enforcement and Safety Administration, a mixed radon-thoron sample would show a rapid decrease in count rate with a half life on the order of 26.8 minutes followed by a long half-life decay on the order of 10.64 hours. The first is due to the radon (lead-214) the second is due to the thoron (lead-212). Here no rapid decay is evident indicating little radon. The half life is about 14 hours supporting a largely thoron atmosphere.

C. Air Sample Results

Table TA6 gives collection data on air samples taken during the Comprehensive Survey. These collections were aimed at measuring thoron and radon working levels. Data and results using the Ogden Method are given in Table TA7.

Figure TAC : Constants' Values versus Sampling Time (minutes)
(Used in Ogden Method for Determination of Radon and Thoron Working Levels)

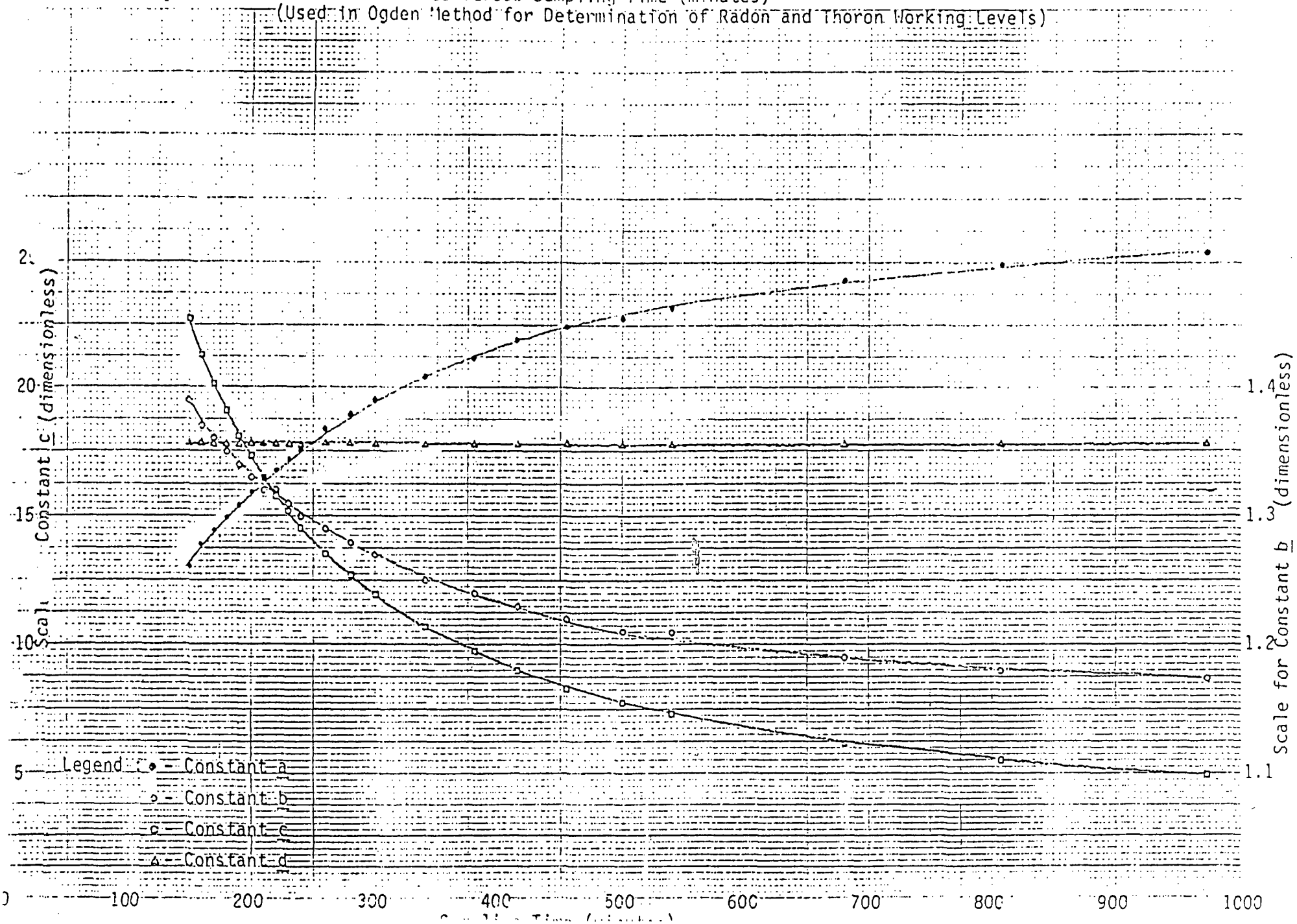

Table TA6: Air Sample (Filter) Collection and Background Counting Periods

Collection Site	Collection Period	Time (min)	Background* Period	Background Time (min)	Flow Rate (l/min)
Room 8	Start 2/25/81, 1:40 P.M. Stop 2/26/81, 8:35 A.M.	1135	2/26/81, 12:10 P.M. 2/25/81, 1:35 P.M.	85	18.42
Room 202	Start 2/24/81, 4:20 P.M. Stop 2/25/81, 8:33 A.M.	973	2/25/81, 12:05 P.M. 2/25/81, 1:30 P.M.	85	18.42
Room 306	Start 2/26/81, 7:10 P.M. Stop 2/27/81, 8:36 A.M	806	2/27/81, 12:10 P.M. 2/27/81, 1:35 P.M.	85	18.42

*Sample (Filter) counting times were between the end of collection and the beginning of the background count.

Working Level Results Using Ogden's Method

Table TA7

		Room 8	Room 202	Room 306
Calibrated (1/min)		18.42	18.42	18.42
		0.307	0.307	0.307
Alpha Detector Efficiency		25%	25%	25%
Counting Periods	85 Minutes (counts	1,033,280	670,340	95,320
	105 Minutes		762.722	107,587
Ogden Contants	a	7.071	7.04	6.99
	b	1.169	1.174	1.181
	c	4.533	4.94	5.533
	d	6.315	6.315	6.315
Background Collection Time (min)		85	85	85
Counts		134	132	74
Count Rate counts/min		1.58	1.55	0.87
Working Levels	W_T(WL)	0.229	0.162	0.0255
	W_R(WL)	0.0139	0.0105	0.00215

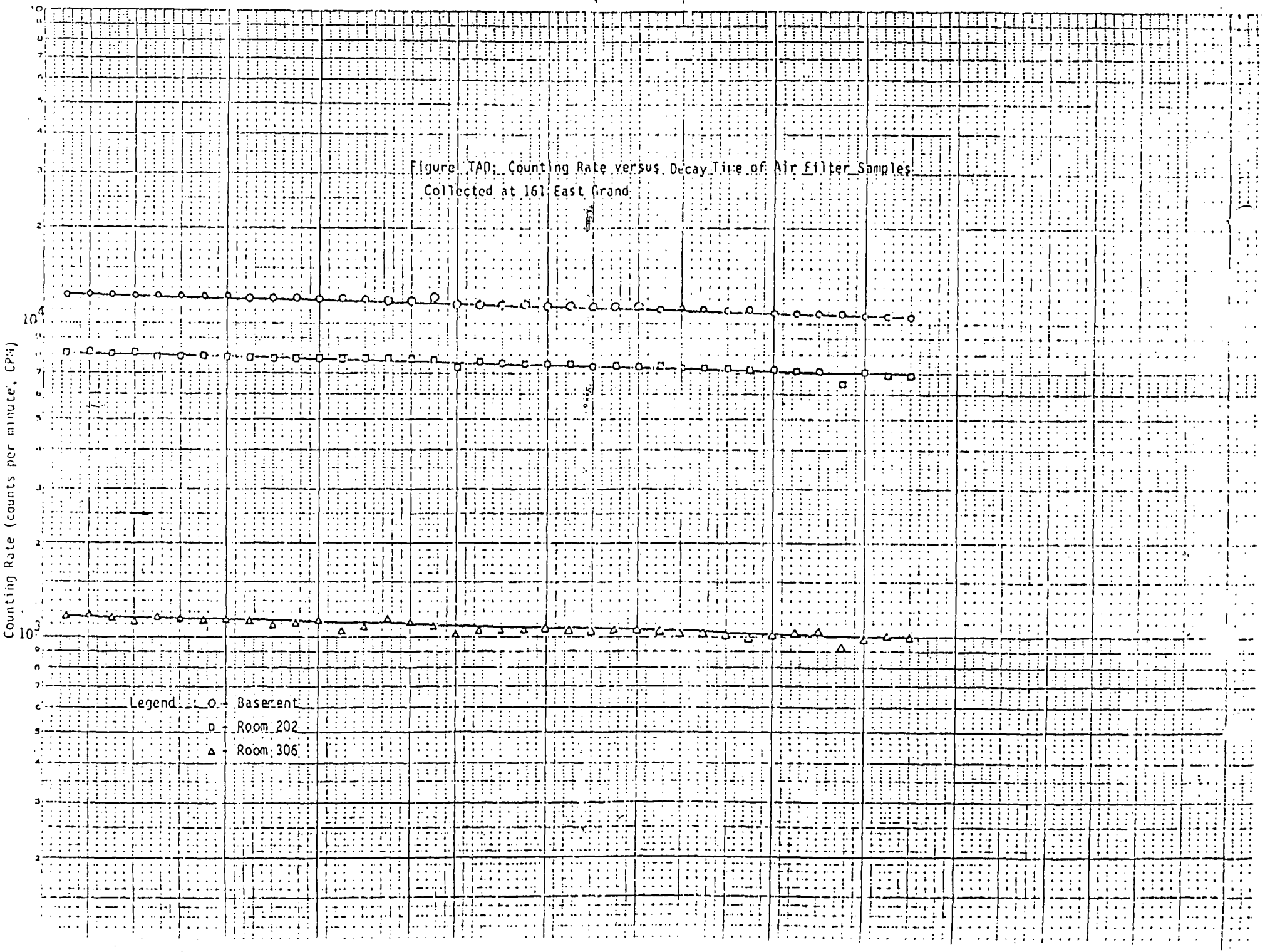

Figure TAD: Counting Rate versus Decay Time of Air Filter Samples Collected at 161 East Grand

KERR-McGEE CORPORATION
INTERNAL CORRESPONDENCE

TO Distribution

DATE September 28, 1981

FROM J. C. Stauter

SUBJECT Lindsey Light Company Bldg. - 161 E. Grand, Chicago, IL

Attached are comments by G. J. Sinke concerning the USEPA draft report on the contamination found at the old Lindsey Light Company building at 161 E. Grand, Chicago.

Concerning Comment 4, we have Robley Evans reviewing the Mausner paper referenced in the memo.

Your assessment of potential action and direction of any further follow-up would be appreciated.

John

J. C. Stauter
Nuclear Regulation & Control

JCS/eh

Distribution

I. C. Denny
J. C. Berghoff, Jr.
J. B. Rhinelander

Attachments

John Strom
Please be sure
Ivan, Berghoff and
Rhinelander get copies
Also, please decide if
we should do anything
else.
George
9/25

KERR-McGEE CORPORATION
INTERNAL CORRESPONDENCE

TO Distribution

DATE September 25, 1981

FROM G. J. Sinke

SUBJECT Comments on the USEPA Report Titled "Final Report on a Survey of the former Lindsay Light Company Building at 161 East Grand Avenue, Chicago, Illinois", dated May 1981.

COMMENTS:

1. The introduction states that residual thorium contamination was found on every floor and the basement of the building.

2. The contamination is not removable by the normal wipe test. The contamination manifests itself by gamma emission and by thoron daughters (working levels) in the air.

3. Gamma exposure rates via TLD's located in the work areas of the building ranged from 25 μrem/hr. to 107 μrem/hr., averaging 58 μrem/hr. For continuous occupancy 57 μrem/hr. is the limit for non-occupatonal radiation exposure to an individual. Since occupancy is not continuous, the EPA concludes that gamma exposures to individuals do not exceed 10 CFR 20 limits.

4. Where gamma levels were elevated, thoron daughter concentrations were greater also. In Room No. 8, the thoron daughter working level is 0.229. Since 10 CFR 20 does not regulate thoron (Rn 220) in terms of working levels, the EPA convert to pCi/l of Rn 220 by using the UNSCEAR's factor of 7.5 pCi/l per WL. Here they are assuming that equilibrium exists between the Rn 220 daughters and their parent. This assumption may have been acceptable 15+ years ago but today it is "unjustified" according to Mausner (Ma 81) ** who complains that similar assumptions were made in the 1960's at the West Chicago Rare Earth Plant.

   The EPA states, on p 54 of their report, that the non-occupational thoron limit (MPC) is 10 pCi/l. Using the 7.5 pCi/l-WL conversion, they derive a limit of 1.33 WL as the non-occupational limit for Rn 220. If Mausner is correct, the 0.229 WL in Room 8 could actually represent 20 times more Rn 220 than assumed at equilibrium. This means Room 8 could actually have 34.4 pCi/l of Rn 220; 3.4 times the limit!

** Robley Evans has been asked to review Mausner's ~~wor~~ paper.

G. B. Rice
CORPORATE
SEP 25 1981

KM-814-1-A

5. Another item of interest is the comparisons of the pressurized ion chamber (PIC) results with micro-R instrument readings for gamma survey work. It is known that the micro-R sodium iodide crystal over-responds to low energy gamma. For thorium surveys, the EPA's experience is that the micro-R readings divided by 2 more nearly represent the true exposure rate.

6. Although the EPA concludes that legal limits for radioactivity are not exceeded, they strongly urge that a cleanup program be initiated to accomplish exposure reduction ALARA.

G. J. Sinke

G. J. Sinke

dc
Distribution
E. Goltra
G. Rice
W. Shelley
S. Munson
J. Stauter

REFERENCES

(Ma 81) L. F. Mausner, 1981 (to be published in Health Physics), "Inhalation Exposures at a Thorium Refinery".

KERR-McGEE CORPORATION
INTERNAL CORRESPONDENCE

TO Distribution

DATE September 25, 1981

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G. J. Sinke

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Distribution
E. Goltra
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W. Shelley
S. Munson
J. Stauter

REFERENCES

(Ma 81) L. F. Mausner, 1981 (to be published in Health Physics), "Inhalation Exposures at a Thorium Refinery".

→ Bill Shelley & I think John and ~~Henry~~ should look at this and report on the technical aspects. George 9/2

KERR-McGEE CHEMICAL CORPORATION
INTERNAL CORRESPONDENCE

TO DISTRIBUTION

DATE September 1, 1981

FROM I. L. Denny

SUBJECT Lindsey Light Company Bldg.
161 E. Grand Avenue
Chicago, IL

Attached for your information is a copy of a report that was apparently prepared by Larry Jensen, U.S.E.P.A. on the old Lindsey Light Company building in downtown Chicago.

P.S.: This is a "bootleg" copy. Do Not Call EPA!

I. L. Denny

I. L. Denny

ILD/ses

Attachment

DISTRIBUTION: J. L. Rainey
~~G. B. Rice~~
J. C. Berghoff

See my Sept 25 1981 memo - comments on this report. S.J.

J. Rice

Final Report On a Survey of the

Former Lindsay Light Company Building

at

161 East Grand Avenue, Chicago, Illinois

May, 1981

INTRODUCTION

The building at 161 East Grand Avenue, Chicago, Illinois, was formerly utilized by the Lindsay Light Company between 1910 and 1936 to manufacture incandescent gas light mantles with radioactive thorium compounds. No regulations governed the possession and usage of radioactive source and byproduct materials at that time nor were radiation health effects well understood. Consequently, it was suspected the building might still contain residual radioactive contamination.

A series of data collections were performed by the U.S. Environmental Protection Agency, the Occupational Safety and Health Administration and the Illinois Department of Nuclear Safety between November 1980, and March 1981. Residual thorium contamination was found on every floor and in the basement, principally in the northwest and west-central portions of the floors. The contamination manifests itself by elevated gamma ray emissions and by elevated thoron gas working levels in the air. Limited sampling on exposed areas did not show removable alpha particle contamination. Dose measurements made in selected occupied areas were clearly elevated and unwarranted, but fortunately, not in excess of Title 10, Part 20.105 of the Code of Federal Regulations. Prompt cleanup of specific areas is strongly recommended to reduce personnel exposures to levels as low as reasonably achievable.

NOTE

In the interest of clarity, this report has been subdivided into a Main Report and a Technical Appendix. The Main Report is intended for the general public while the The Technical Appendix is, as the name implies, additional supportive technical material intended for persons acquainted with radiation health physics.

SURVEY PARTICIPANTS

Preliminary Survey

U.S. Environmental Protection Agency

Larry Jensen
Pete Tedeschi
Mike Madigan

Illinois Department of Nuclear Safety

Dave Derenzo

Comprehensive Survey

U.S. Environmental Protection Agency

Larry Jensen
Carl Onesti

Occupational Health and Safety Administration

Craig Henderson

MAIN REPORT

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I. SPECIFICATION OF THE SITE

Lindsay Light Company once manufactured incandescent gas mantles for home and street lighting in a building on the southwest corner of Indiana and St. Clair Streets from at least 1910 until 1936. During that time span (on April 14, 1913, to be exact) Indiana Street became Grand Avenue. Grand Avenue is half a mile north of the central Chicago "Loop" area and St. Clair Street is a quarter of a mile west of Lake Michigan. Today, at 161 East Grand Avenue, a greystone nameplate four stories up still reads Lindsay Light Company although the company moved to West Chicago, Illinois over the period 1931-36. The building is jointly owned by the 161 East Grand Co-op and managed by Browne and Storch, a real estate firm. Representative of the tenants in the building are film, video tape and sound production firms, an architect, an insurance investigator, and a locksmith.

II. RECOGNITION OF A POSSIBLE RADIATION PROBLEM

Interest in the Lindsay Light Company did not arise directly but grew through events 30 miles west of the "Loop" in suburban West Chicago, Illinois. A rare earths *extraction operation run by Kerr-McGee Chemical Corporation had terminated operations in 1973 and the company had asked to be released from its Nuclear Regulatory Commission (NRC) license. Subsequent surveys showed the factory buildings were extensively contaminated and several million pounds of radioactive materials, principally thorium with some uranium, were exposed in an open waste dump.

---

*The rare earths are elements 58-71 in the Periodic Table of the Elements, from cerium to lutetium, and are used, to give two examples, for grinding compounds and high strength magnets. Ironically, they are quite abundant.

In writing a decommissioning plan for the NRC to deal with this situation, Kerr-McGee noted that they had purchased the facility from American Potash and Chemical Corporation in 1967, which, in turn, had purchased their operation from Lindsay Light and Chemical Company in 1958. Lindsay first occupied the West Chicago site in 1931 when they expanded their operations from downtown Chicago and changed their name to Lindsay Light and Chemical Company. Between 1931 and 1936, they fully translocated from Grand Avenue to West Chicago. Interest aroused by the West Chicago problem led to curiosity about the earlier Lindsay site. "Was it also radioactively contaminated?" The building was found to be located at Grand and St. Clair (By whom and how has not been determined). No records, however, have been identified showing any building surveys were made then. The Chicago Tribune newspaper apparently found out about the building through the West Chicago situation and referred to it in a series on radioactive waste in October 1978. The first indication that there might actually be residual materials left in the building came from Radiation Safety Services, Inc., a health physics consulting firm, that reported in the fall of 1980 that they had measured radioactivity in the halls while visiting their messenger service. At this point EPA arranged for a survey of the building. This was the subject of the "Preliminary Report on 161 East Grand Avenue Chicago, Illinois, November 17, and 24, 1980."

III. BACKGROUND INFORMATION ON GAS LIGHT MANTLE MANUFACTURE

The problems with Lindsay arose because thorium compounds used in the manufacture of gas mantles contain some atoms of the Thorium Decay Series, a naturally occurring sequence of radioactive elements starting with thorium-232 and radioactively decaying to lead-208 (see Fig. 1).

Figure 1

Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10}y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (15%) 0.908 (25%) 0.96c (20%)
$^{228}_{90}Th$	Radiothorium	1.910y	5.34 (28%) 5.43 (71%)	---	0.084 (1.6%) 0.214 (0.3%)
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.7%)
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.07%)
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (47%) 0.300 (3.2%)
$^{212}_{83}Bi$	Thorium C	60.6m	6.05 (25%) 6.09 (10%) 35%	1.55 (5%) 2.26 (55%)	0.040 (2%) 0.727 (7%) 1.620 (1.8%)
$^{212}_{84}Po$	Thorium C' ^{212}Po	304ns	8.78 (100%) 65% (100%) = 65%	---	---
$^{208}_{81}Tl$	Thorium C'' ^{208}Tl	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 (23%) 0.583 (86%) 0.860 (12%) 2.614 (100%)
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

64.0% 36.0%

*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{232}_{90}Th$ (4n).....4(58) = 232

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons, Inc., 1967) and Hogan, O. H., Zigman, P. E., and Mackin, J. L., Beta Spectra (USNRDL-TR-802 [Washington, D.C.: U.S. Atomic Energy Commission, 1964]).

Some uranium, more specifically the Uranium Decay Series, might have been present as a contaminant (see Fig. 2). It is probably safe to say that the thorium was not given special handling. Little was known of the health effects associated with radiation exposure at the time nor was there a regulatory system to provide an oversight function. As a result solutions and powders of thorium compounds were probably not treated with tidiness and caution. At this point a short diversion to explain the mantle making process may be helpful.

Mantles were generally woven from cotton, ramie, or artificial silk fibers in the form of a long tube. The tubes were treated with a solution containing 25-50% thorium and cerium nitrates (Cerium is one of the rare earths). In treating the tubes the solution was about 98-99 parts thorium to 1-2 parts cerium nitrate. Small quantities of beryllium and magnesium nitrates were also added for strength. Treated tubes were cut to the desired length and one end was closed with asbestos thread. The mantles were fixed with a thorium solution containing considerable alumina and alkaline earths. Once the fixed mantle was dried and shaped it was "burned off" whereby nitrates were converted to oxides by an intense flame. Mantles which survived the flame treatment were dipped in collodion for strength and then sold.*

---

*From "Monazite, Thorium, and Cerium", Information Circular 6321, August 1930, Department of Commerce - Bureau of Mines.

Figure 2

Uranium Series (4n + 2)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{238}_{92}U$	Uranium I	4.51×10^{9}y	4.15 (25%) 4.20 (75%)	---	---
$^{234}_{90}Th$	Uranium X_1	24.1d	---	0.103 (21%) 0.193 (79%)	0.063c‡ (3.5%) 0.093c (4%)
$^{234}_{91}Pa^{m}$	Uranium X_2	1.17m	---	2.29 (98%)	0.765 (0.30%) 1.001 (0.60%)
99.87% 0.13% $^{234}_{91}Pa$	Uranium Z	6.75h	---	0.53 (66%) 1.13 (13%)	0.100 (50%) 0.70 (24%) 0.90 (70%)
$^{234}_{92}U$	Uranium II	2.47×10^{5}y	4.72 (28%) 4.77 (72%)	---	0.053 (0.2%)
$^{230}_{90}Th$	Ionium	8.0×10^{4}y	4.62 (24%) 4.68 (76%)	---	0.068 (0.6%) 0.142 (0.07%)
$^{226}_{88}Ra$	Radium	1602y	4.60 (6%) 4.78 (95%)	---	0.186 (4%)
$^{222}_{86}Rn$	Emanation Radon (Rn)	3.823d	5.49 (100%)	---	0.510 (0.07%)
$^{218}_{84}Po$	Radium A	3.05m	6.00 (~100%)	0.33 (~0.019%)	---
99.98% 0.02% $^{214}_{82}Pb$	Radium B	26.8m	---	0.65 (50%) 0.71 (40%) 0.98 (6%)	0.295 (19%) 0.352 (36%)
$^{218}_{85}At$	Astatine	~2s	6.65 (6%) 6.70 (94%)	? (~0.1%)	---
$^{214}_{83}Bi$	Radium C	19.7m	5.45 (0.012%) 5.51 (0.008%)	1.0 (23%) 1.51 (40%) 3.26 (19%)	0.609 (47%) 1.120 (17%) 1.764 (17%)
99.98% 0.02% $^{214}_{84}Po$	Radium C'	164μs	7.69 (100%)	---	0.799 (0.014%)
$^{210}_{81}Tl$	Radium C"	1.3m	---	1.3 (25%) 1.9 (56%) 2.3 (19%)	0.296 (80%) 0.795 (100%) 1.31 (21%)
$^{210}_{82}Pb$	Radium D	21y	3.72 (.000002%)	0.016 (85%) 0.061 (15%)	0.047 (4%)
$^{210}_{83}Bi$	Radium E	5.01d	4.65 (.00007%) 4.69 (.00005%)	1.161 (~100%)	---
~100% .00013% $^{210}_{84}Po$	Radium F	138.4d	5.305 (100%)	---	0.803 (0.0011%)
$^{206}_{81}Tl$	Radium E"	4.19m	---	1.571 (100%)	---
$^{206}_{82}Pb$	Radium G	Stable	---	---	---

*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{206}_{82}Pb$ (4n + 2).....4(51) + 2 = 206
†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.
‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Table of Isotopes and USNRDL-TR-802.

IV. SURVEYS

A. Preliminary Survey

The Preliminary Survey was conducted in tandem with the Illinois Department of Nuclear Safety (IDNS) in November, 1980. The report filed on this "Preliminary Report on 161 East Grand Avenue, Chicago, Illinois, November 17 and 24, 1980," concluded that some portions of the building were indeed contaminated with radioactive materials, that the material was thorium, that it did not appear to be removable and that excess alpha radiation appeared in the air in a room with elevated gamma radiation on the floors.

B. Comprehensive Survey

Subsequently, a thorough and more extensive survey was initiated between January and March 1981, this time in conjunction with the Occupational Health and Safety Administration. Each room in the building was surveyed for localized gamma radiation. Thermoluminescent dosimeters were placed in critical occupied locations. Air samples were collected in three rooms and determinations of radon-220 and radon-222* working levels were made.

V. GENERAL SURVEY RESULTS WITHOUT DISCUSSION

A. Building Surveys

a. Preliminary Survey

On November 17 an exploratory survey was performed in the Lindsay building to test the allegations of contamination. EPA requested the assistance of the Illinois Department of Nuclear Safety (IDNS) because of their possible jurisdiction in this matter.

---

*Radon-220 and radon-222 are radioactive gases emitted from the Thorium and Uranium Decay Series, respectively (See Figs. 1,2).

EPA used a sodium iodide crystal to detect gamma rays emitted from any contaminated areas and a micro-roentgen (micro-R meter) to measure gamma ray exposure rates in micro-roentgen per hour (uR/hr)(Table TA1 in the Technical Appendix gives complete instrumentation data).

The surveys were performed on the evening of November 17 and 24, so as to minimize both the disruption to normal business operations of the tenants and to avoid generating unnecessary concerns before information was fully collected and analyzed. Surveying in the evening, however, had the drawback of not letting us gain access to each and every room. The basement, 1st floor, accessible portions of the 2nd and 3rd floors, and the 4th floor were surveyed. Resurvey data discussed later in this report should be considered to be better than preliminary survey data because specific information about the character, levels and distribution of contamination were known.

Roughly, the general background of the building was found to be 20-25 uR/hr as measured with the micro-R meter on contact with the surface. Scattered basement areas showed readings elevated over this running to 165 uR/hr on contact with the surface (including background). An area on the 1st floor restricted to the northwest corner of one office and an adjacent pipe showed a reading of 380 uR/hr on contact (including background). Over the 1st floor reception area exposure rate readings increased with height. The most extensive areas of contamination were located on the 2nd floor in Room 202 and the adjoining hallway. A contact reading of 1100 uR/hr (including background) was measured in a conference room. This room was over the 1st floor reception area and was thought to probably explain the increased readings with height measured there. Surveyed portions of the third and fourth floors did not show appreciably elevated readings.

It was concluded from the results of the Preliminary Survey that the allegations of contamination were valid. The material was localized and appeared to be spotty rather than spread over a large area. The latter conclusion was reached because of the rapid changes in surface readings with a small change in distance from the source. A comprehensive survey of the premises was deemed warranted.

b. Comprehensive Survey

On January 22, February 12, February 20 and March 2, 1981, the basement and all four floors were surveyed completely by EPA and the Occupational Health and Safety administration (OSHA). OSHA had, when informed of the preliminary survey results, elected to assist EPA in further surveys. IDNS felt they wished to review the final survey report but declined to spend additional personnel time on this matter. EPA collected air samples on February 24, 25, and 26, and took a gamma ray spectrum on February 24. TLDs were placed on January 22 and collected on March 2.

Each room was walked through with a sodium iodide crystal (See Table TA1 in the Technical Appendix for instrumentation details). Representative readings were taken in every room on contact with the surface and at one meter above the surface with a micro-R meter. Additional readings were taken at points identified by the sodium iodide survey meter to be appreciably elevated over background. Again, background was estimated from the lowest micro-R readings encountered. These ran about 20-25 uR/hr at both contact and one meter, although, 1st floor readings dropped below 20 uR/hr and in some cases were as low as 10 uR/hr.

Basement readings are shown in Figs. 3 and 4. Contact readings are highest in Rooms 1,2,8 and 12, in the hallway near Room 5, and in the room adjacent to the boiler. The highest reading in the building was measured in Room 8 where what appeared to be a chimney had been partially plugged with concrete. The chimney reading was 3200 uR/hr on contact with the micro-R meter (including background). The room is used for storage of recording tapes and commercials and is generally not occupied.

First floor background levels (See Fig. 5,6) were in general, the lowest in the building. Elevated gamma ray readings were restricted to two areas, the front reception area and one section of the northwest office. In the reception area it was reaffirmed that exposure readings increased with height indicating an overhead source. In the office area the contamination appeared over 10-15 feet of the wall in the northwest corner and also appeared to be associated with a large vertically standing pipe.

Resurveys of the second floor (See Fig. 7-15) showed almost all contamination to be limited to the northwest corner of the floor comprising Rooms 200, 201, 202, a corner of Room 214, and the adjacent hallway. Roughly the highest readings are on a northwest - southeast line. Two very restricted spots of contamination were found at a pipe hole in the southeast corner of the floor and on a section of floor in the south central hallway.

Figure 3 :Micro - Roentgen Meter Readings , Contact With Floor , in Basement

(All readings are in micro - roentgens per hour , uR/hr .)

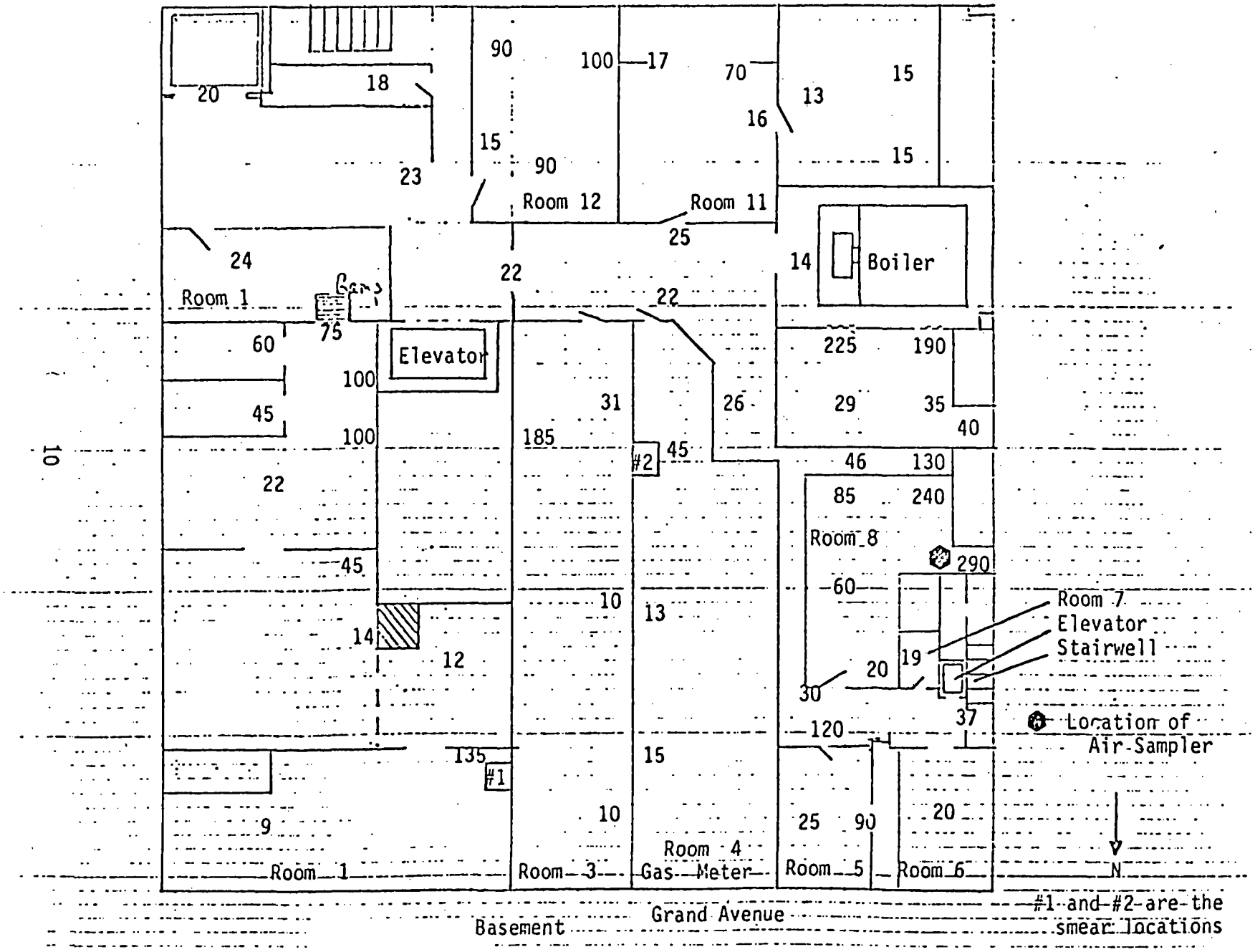


Figure 4: Micro - Roentgen Meter Readings at One Meter Above Floor in the Basement

(All readings are in micro - roentgens per hour , uR/hr .)

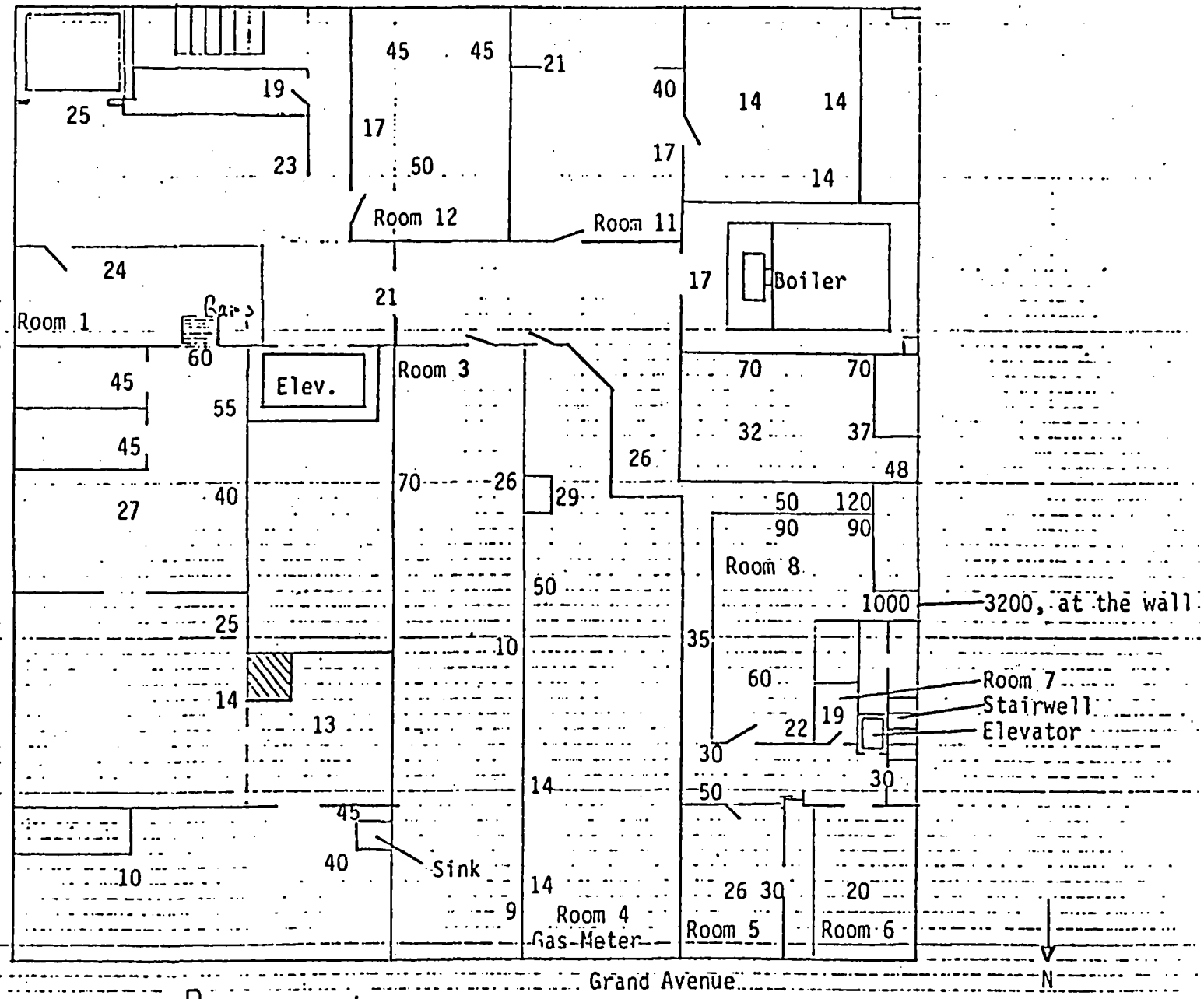


Figure 5 : Micro - Roentgen Meter Readings , Contact With Floor
(All readings are in micro - roentgens per hour , uR/hr.)

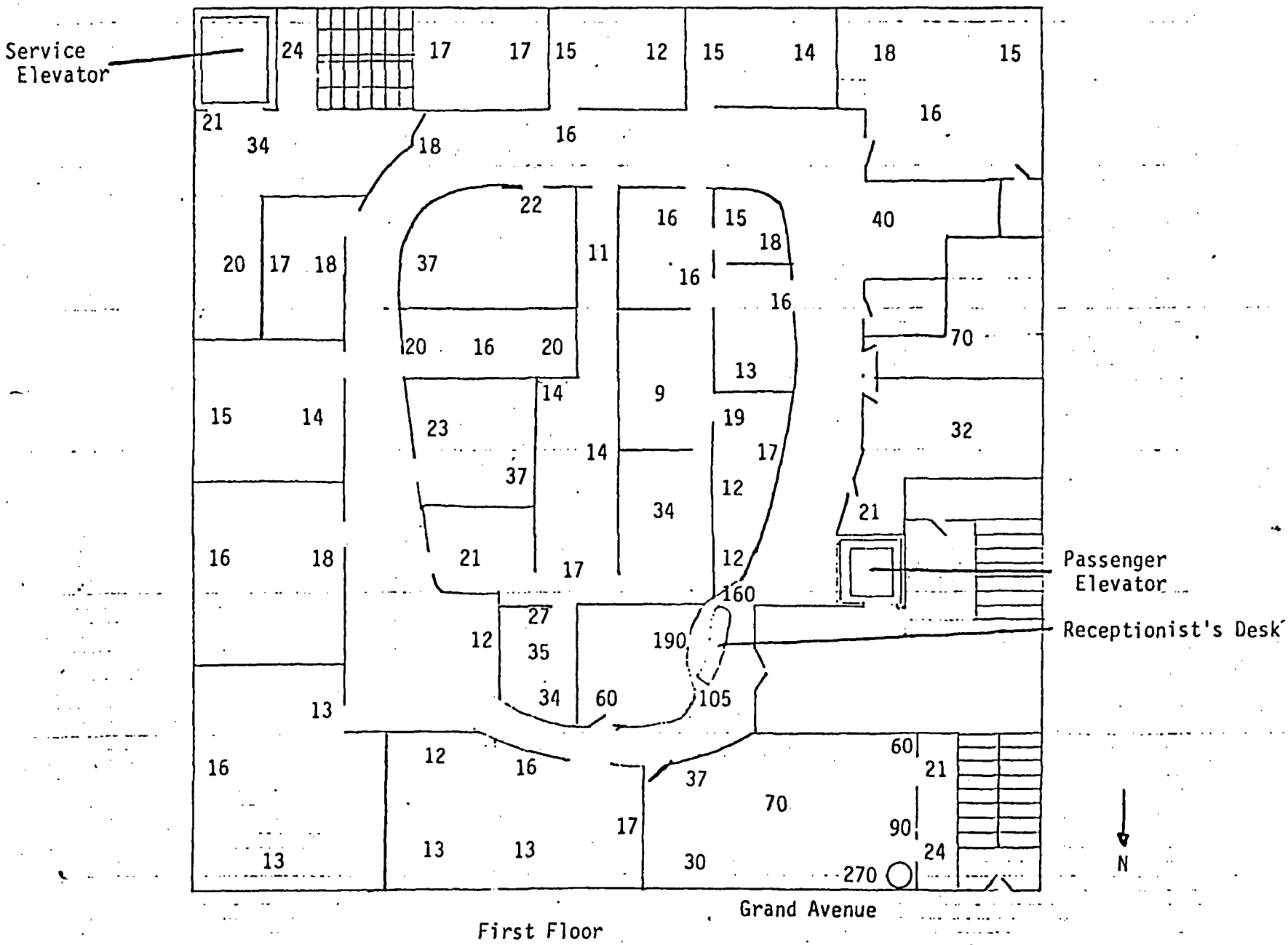


Figure 6 : Micro-Roentgen Meter Readings at One Meter Distance
(All readings are in micro-roentgens per hour , uR/hr .)

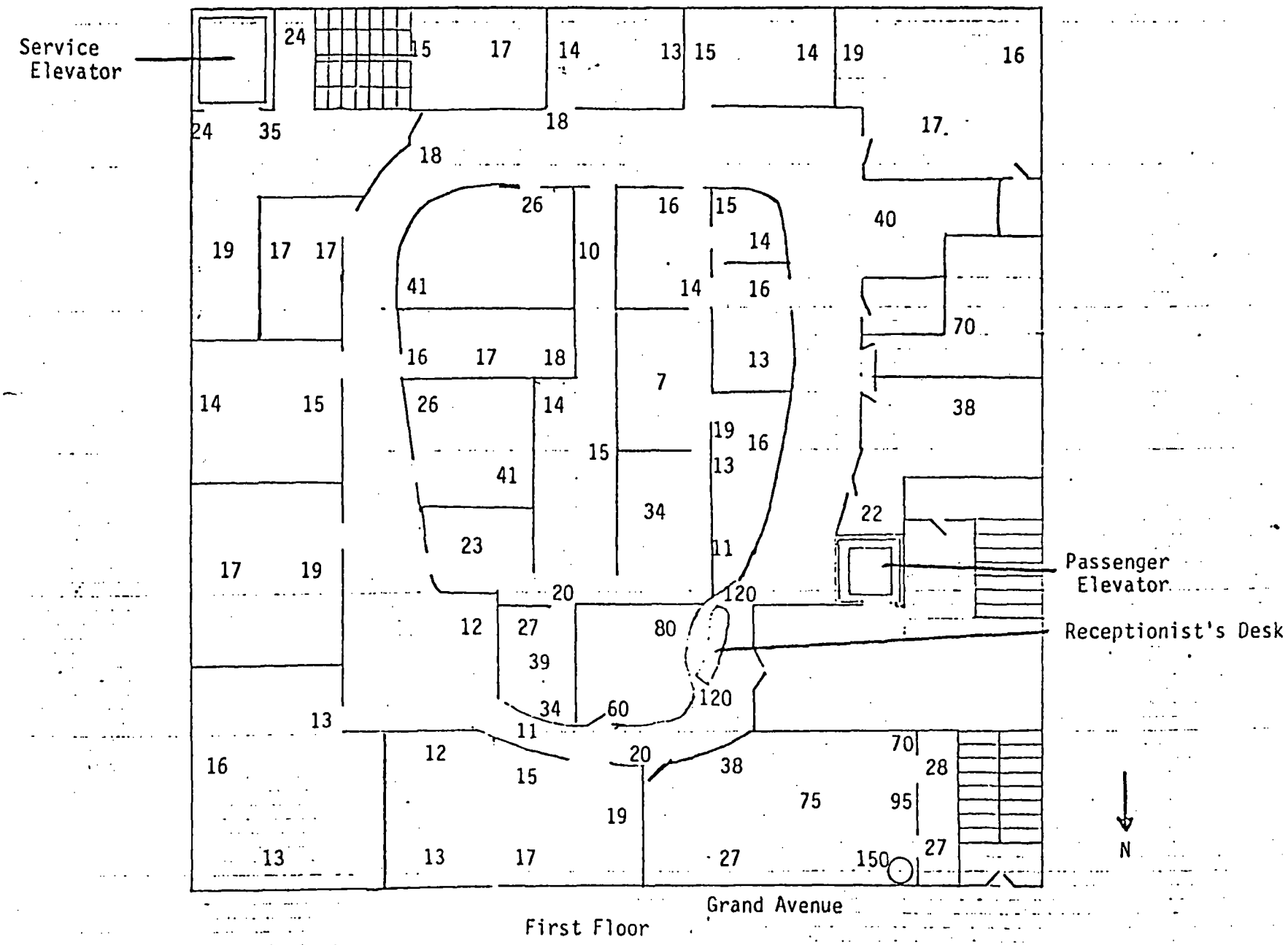


Figure 7 : Micro - Roentgen Meter Readings , Contact With Floor
(All readings are in micro-roentgens per hour, uR/hr.)

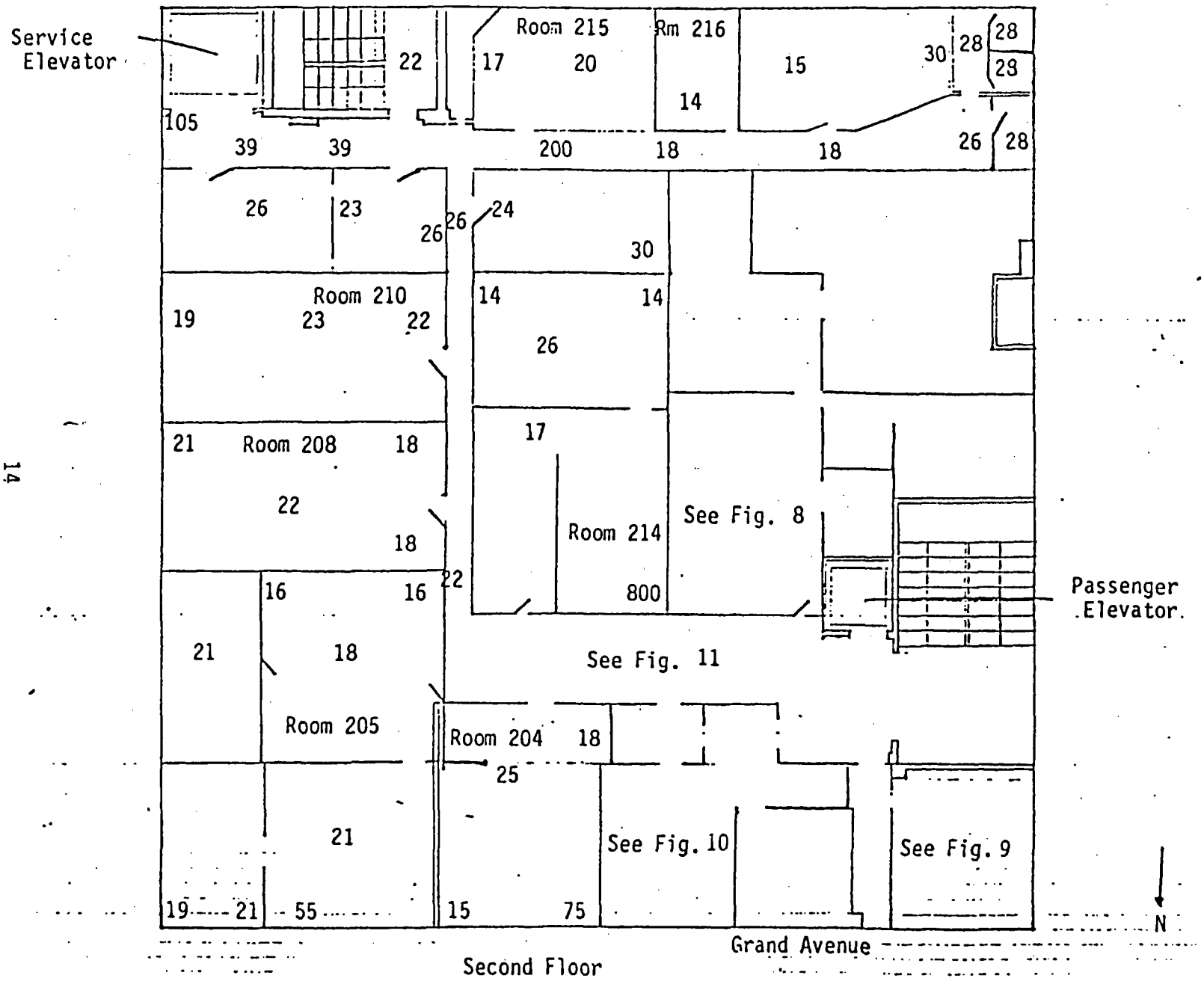
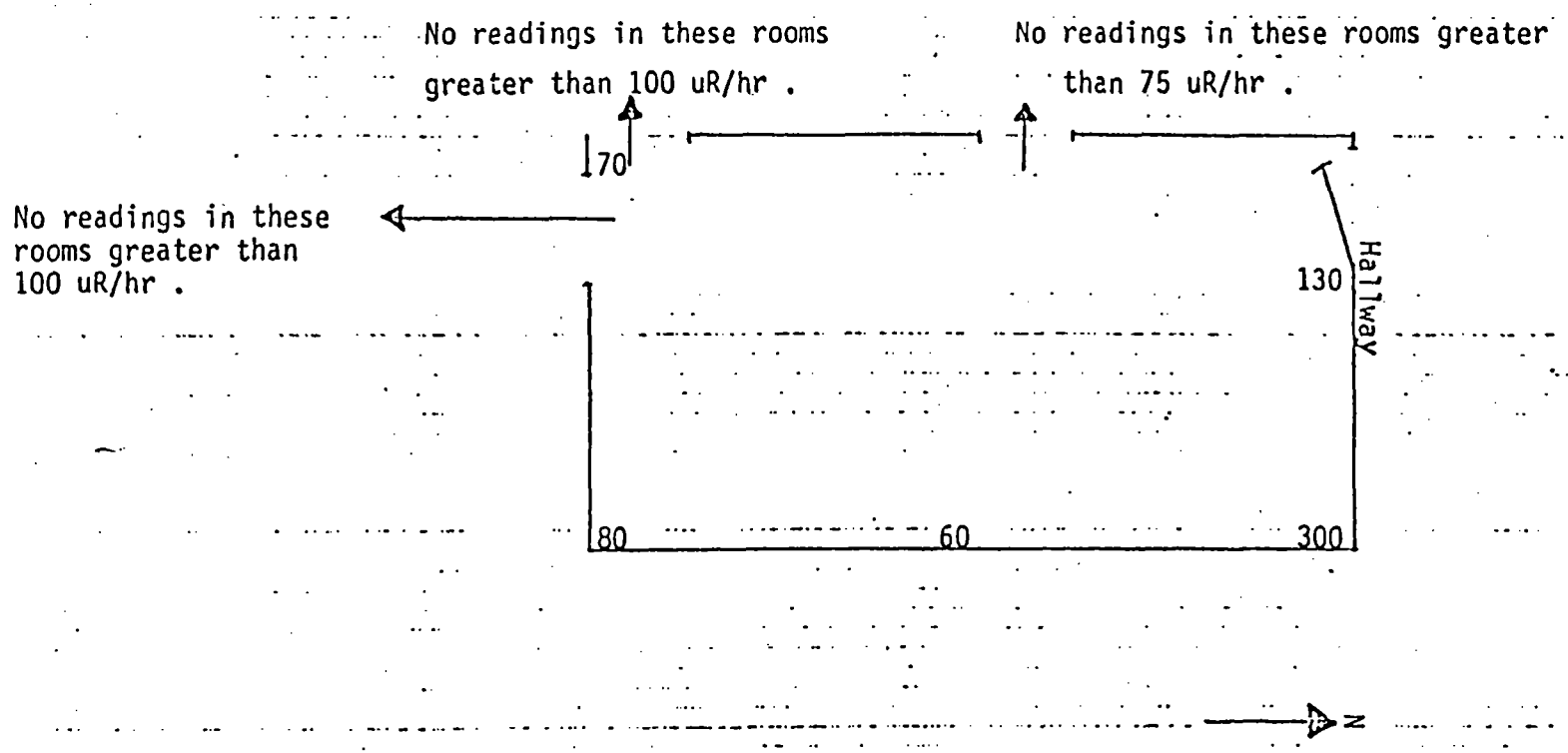


Figure 8 : Micro - Roentgen Meter Readings , Contact With Floor , in Room 200

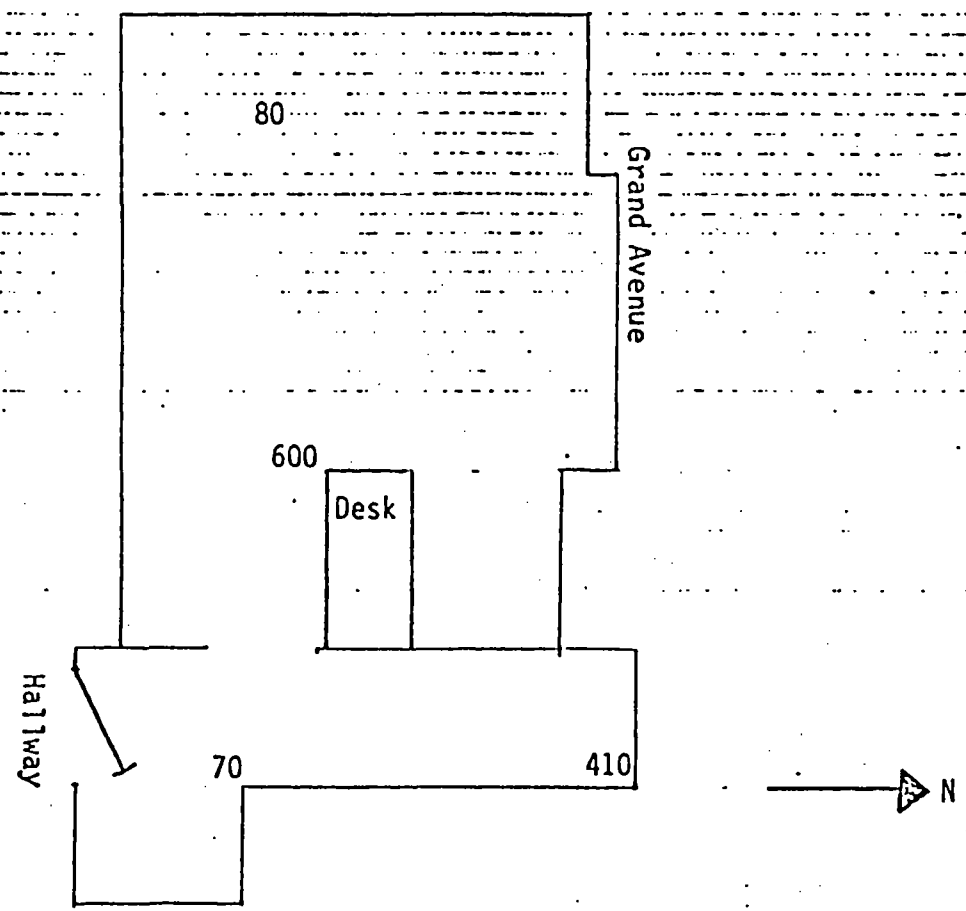
(All readings are in micro - roentgens per hour , uR/hr)



Second Floor - Room 200 (Glen McGowean and Son)

Figure 9: Micro - Roentgen Meter Readings, Contact With Floor, in Room 201

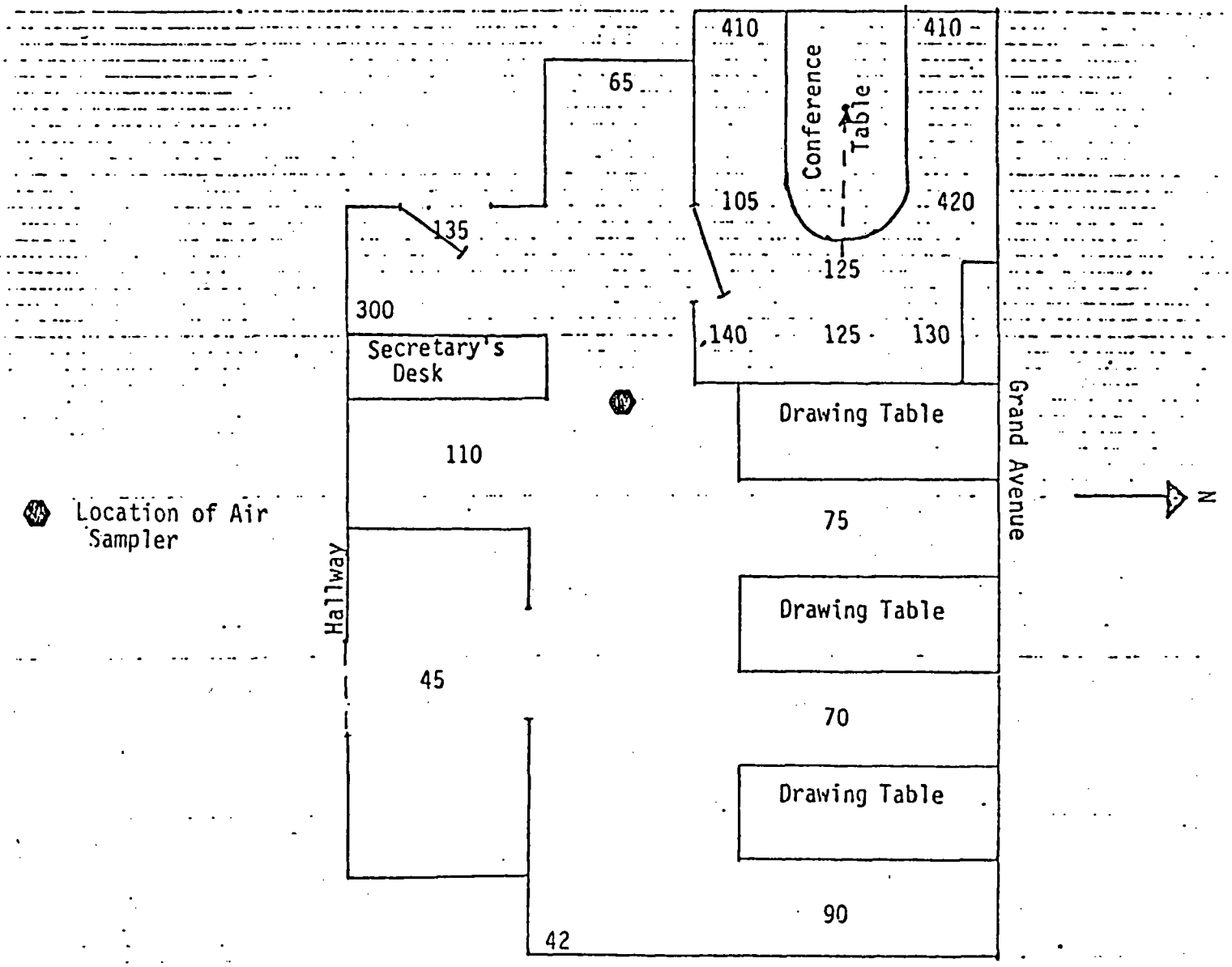
(All readings are in micro - roentgens per hour, uR/hr.)



Second Floor - Room 201 (Ascot Products)

Figure 10 : Micro - Roentgen Meter Readings , Contact With Floor , in Room 202

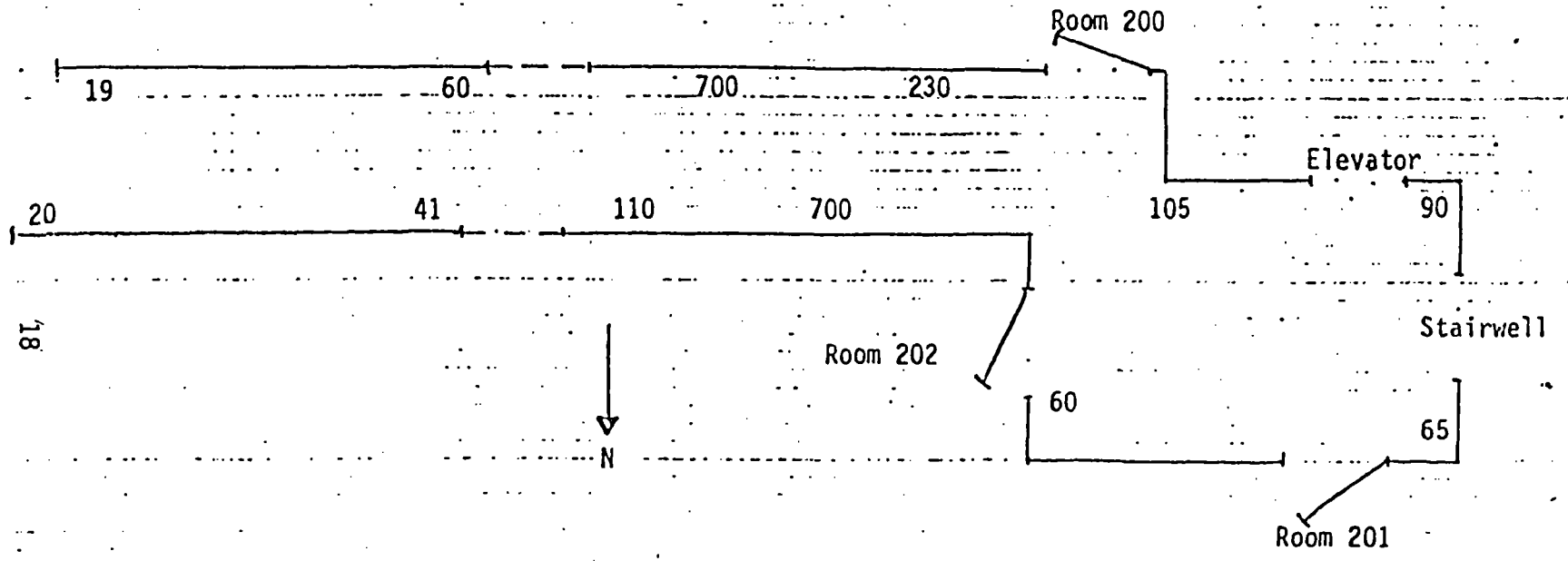
(All readings are in micro - roentgens per hour , uR/hr)



Second Floor - Room 202 (Meisel Hunson LTD)

Figure 11: Micro - Roentgen Meter Readings , Contact With Floor , in Hallway near Room 202

(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Hallway

Figure 12 : Micro - Roentgen Meter Readings at One Meter From Floor
(All readings are in micro - roentgens per hour, uR/hr.)

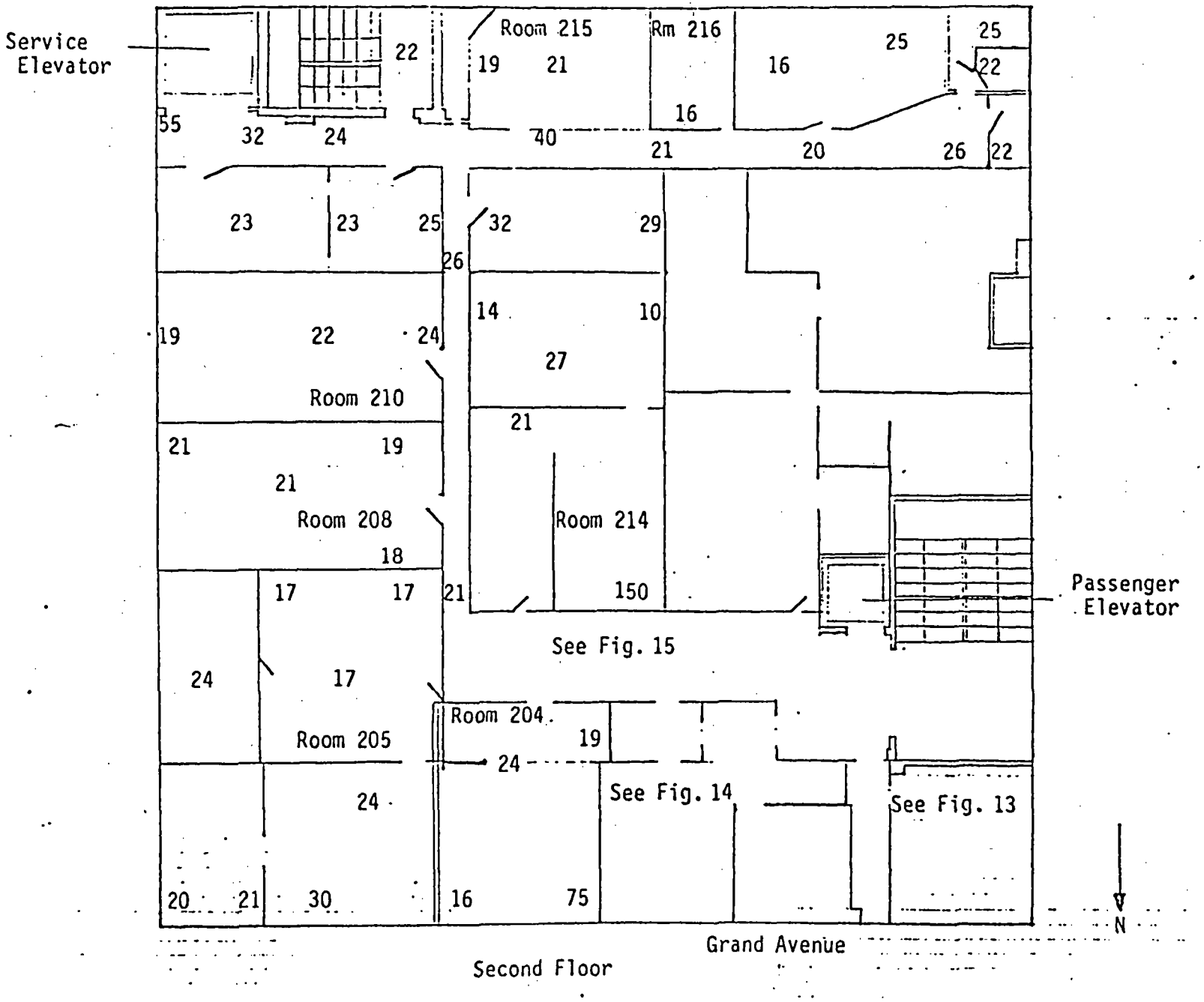
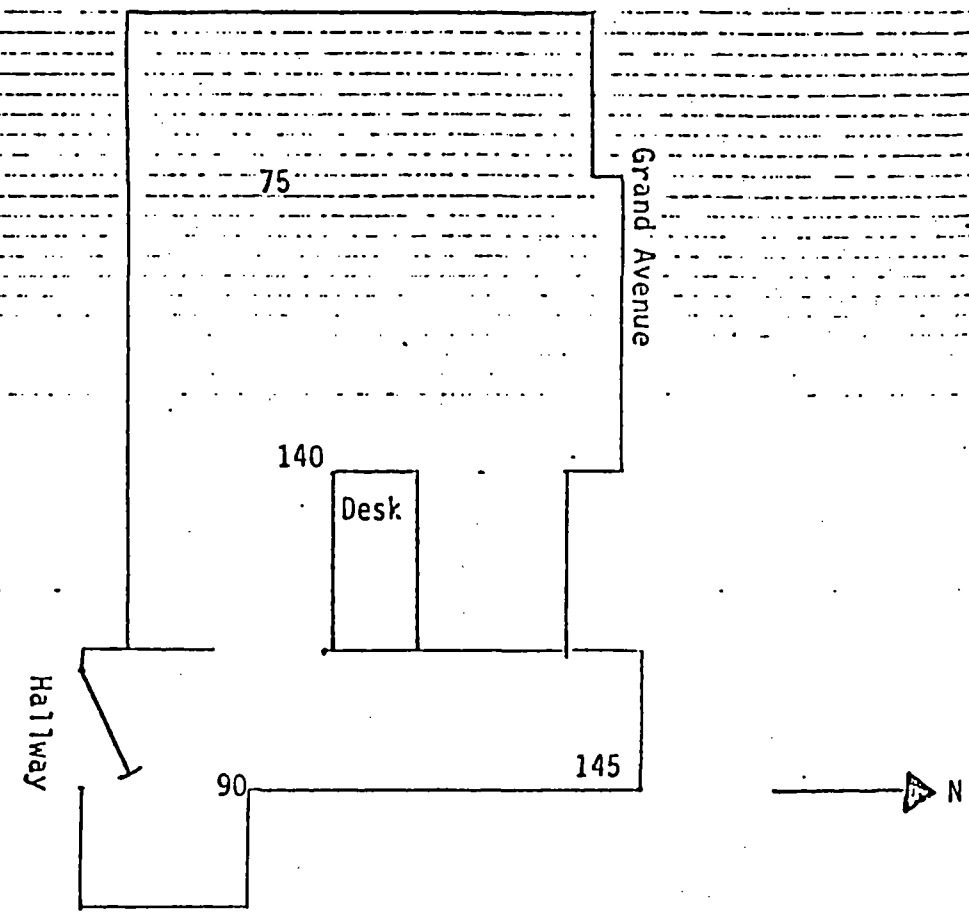


Figure 13 :

Micro - Roentgen Meter Readings at One Meter Above Floor in Room 201

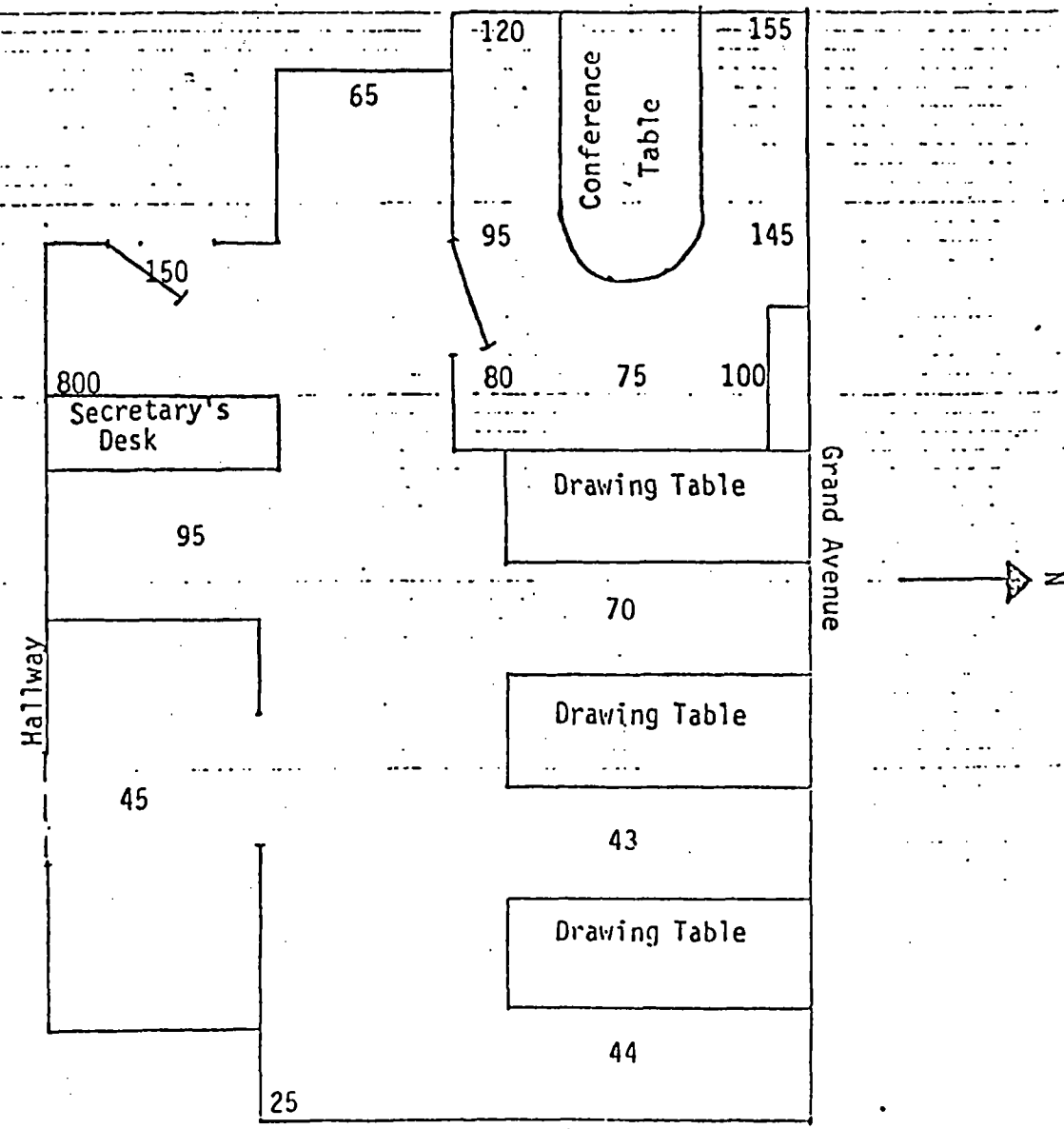
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Room 201 (Ascot Products)

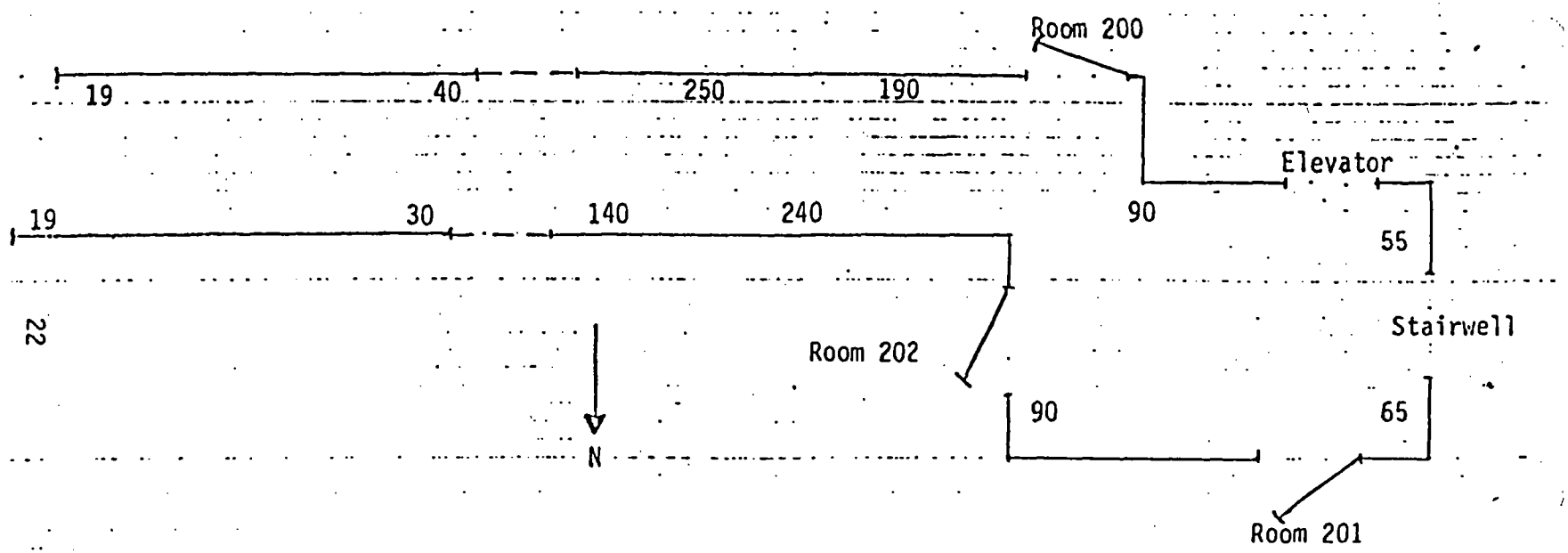
Figure 14 : Micro - Roentgen Meter Readings at One Meter Above Floor in Room 202

(All readings are in micro - roentgens per-hour , uR/hr.)



Second Floor - Room 202 (Meisel Munson LTD)

Figure 15 :- Micro - Roentgen Meter Readings at One Meter Above Floor in Hallway near Room 202
(All readings are in micro - roentgens per hour , uR/hr .)



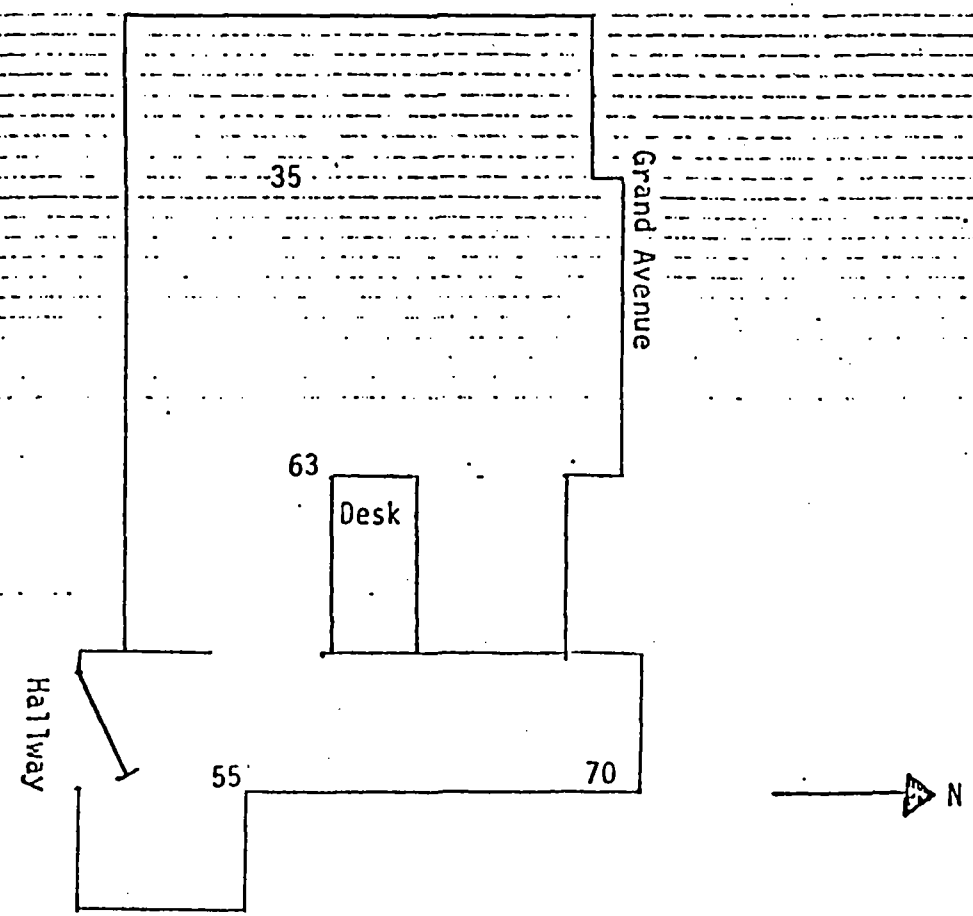
Second Floor - Hallway

In Rooms 200, 201, and 202 along with the adjoining hallway, dual readings with the micro-R meter and a pressurized ion chamber (PIC) were made (See Figs. 16-18). The micro-R meter is handy for surveys because it is small, light and sensitive, but it can give exaggerated readings where low energy gamma rays are present. The PIC comprises two heavy, bulky and expensive pieces that give very reliable readings without the problem of over response to low energy gamma rays. Both instruments were used to obtain readings at the same location and at the same height, one meter off the floor. To the limits of the PIC (500 uR/hr) this allowed a working conversion from micro-R meter readings to equivalent PIC readings. PIC readings should be considered much closer to true. Within the range 0-300 uR/hr the micro-R meter was found to read approximately twice the PIC readings (See Table TA2 and Fig. TAA in the Technical Appendix). Consequently, micro-R meter readings can be compared to "true" by reducing them by half.

The third floor (See Figs. 19-20) showed the greatest contamination in an area in the west central portion of the building. Limited areas of contamination were found in the northwest corner - Room 300 and the adjacent hallway - and in the southeast corner near the service elevator.

As with the third floor the primary area of contamination on the fourth floor (See Figs. 21,22) was in the west central portion of the floor. One somewhat isolated, but considerably elevated spot was also identified in the northwest corner.

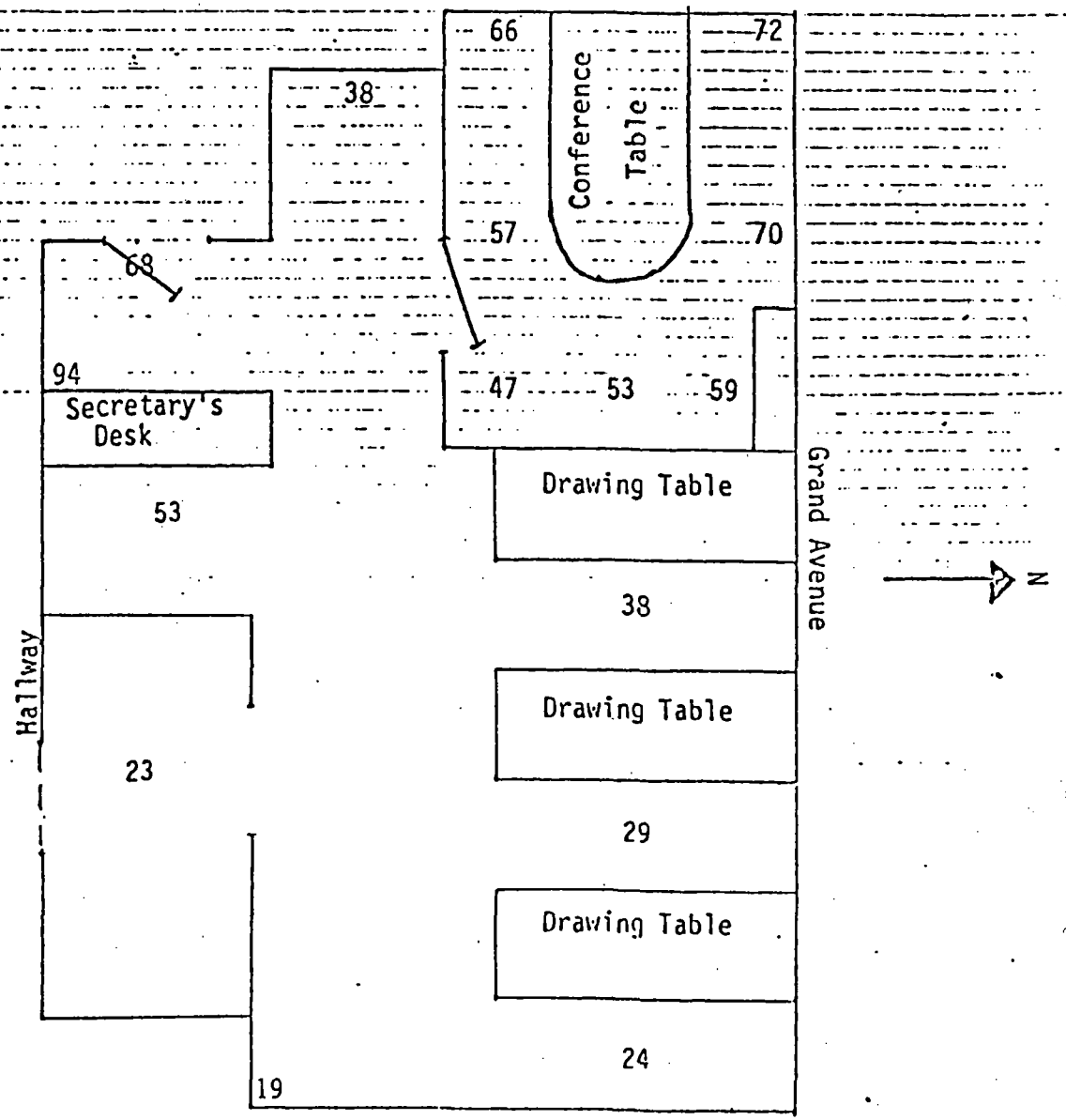
Figure 16 : Pressurized Ion Chamber Readings at One Meter Above Floor in Room 201
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Room 201 (Ascot Products)

Figure 17 : Pressurized Ion Chamber Readings at One Meter Above Floor in Room 202

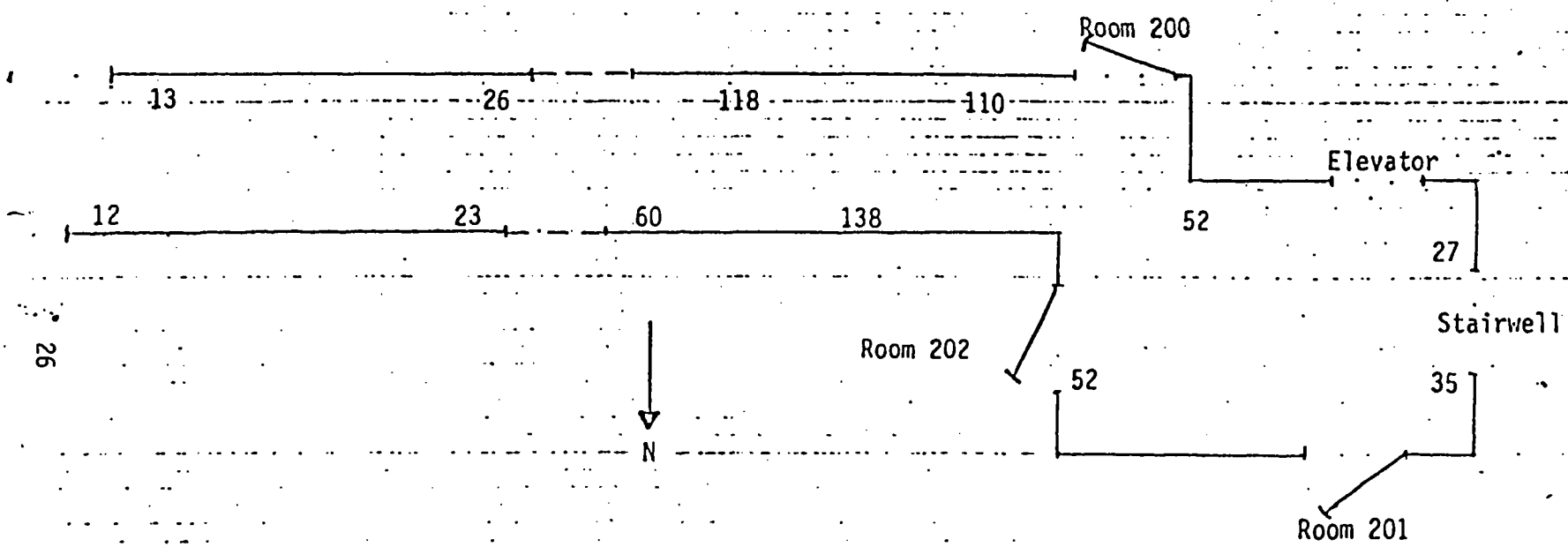
(-All readings are in micro - roentgens per hour , uR/hr-)



Second Floor - Room 202 (Meisel Hunson LTD)

Figure 18 : Pressurized Ion Chamber Readings at One Meter Above Floor in Hallway Near Room 202

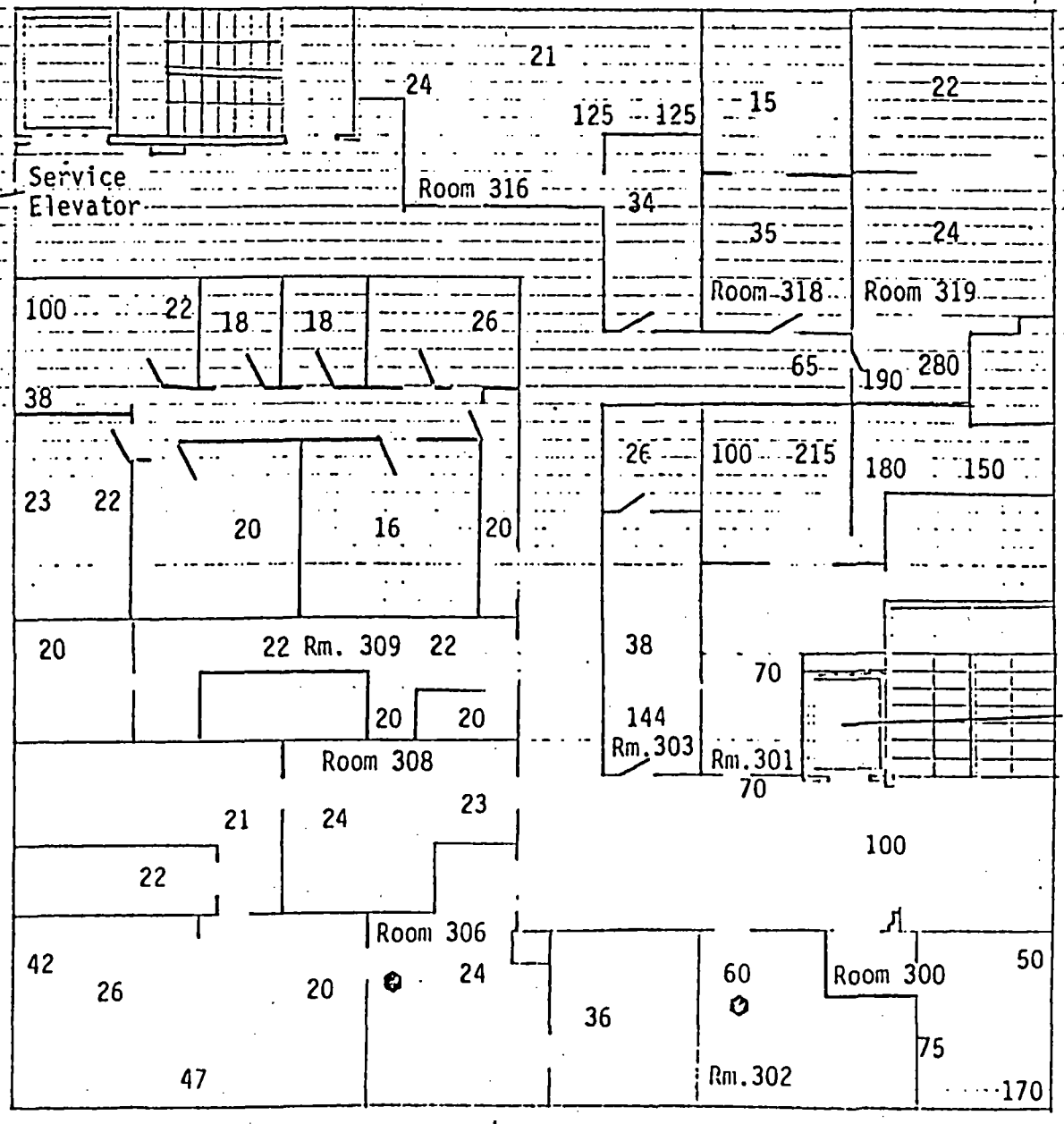
(All readings are in micro - roentgens per hour , uR/hr .)



Second Floor - Hallway

Figure 19 : Micro - Roentgen Meter Readings, Contact With Floor, on the Third Floor

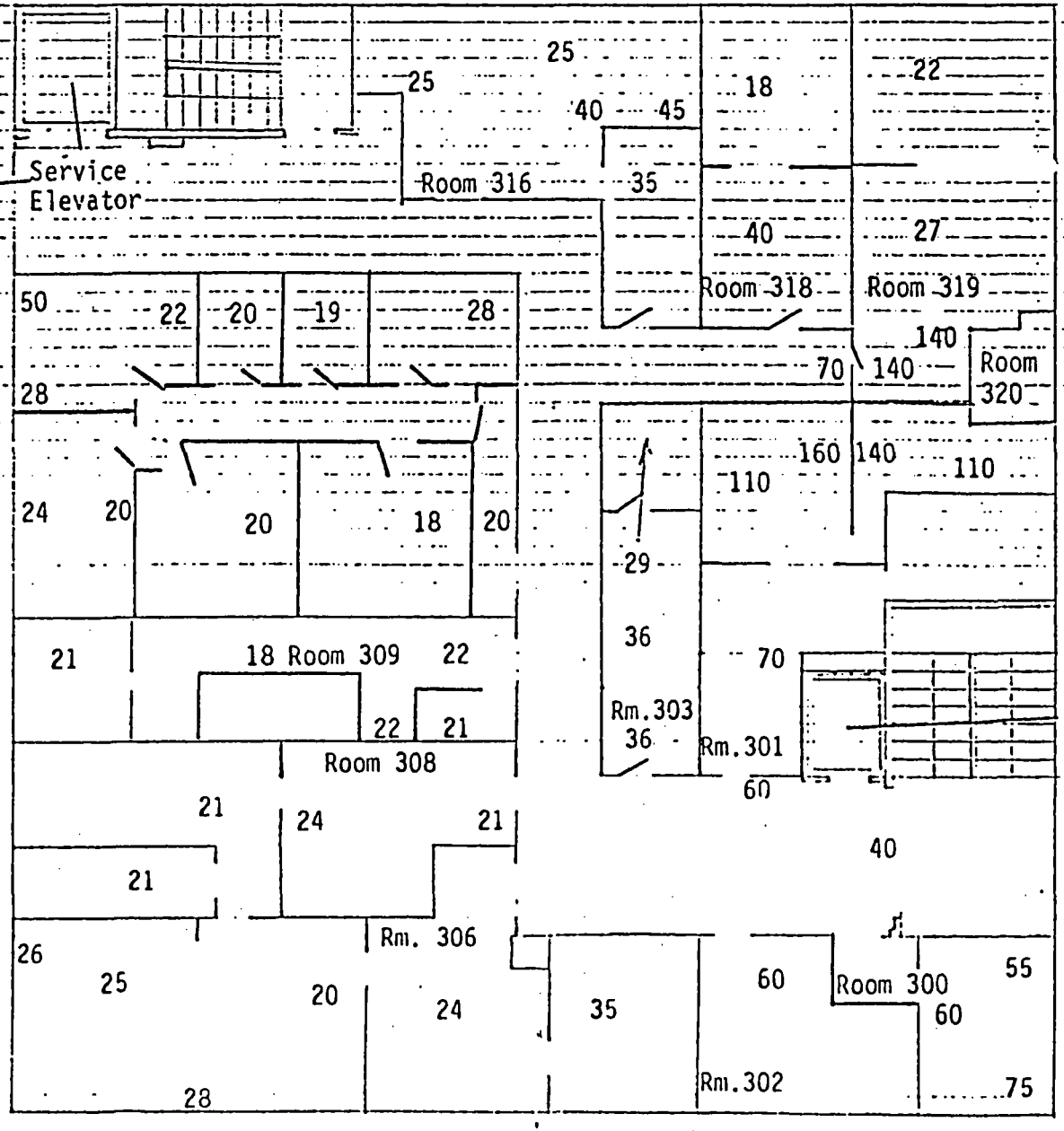
(All readings are in micro - roentgens per hour, uR/hr.)



3rd Floor

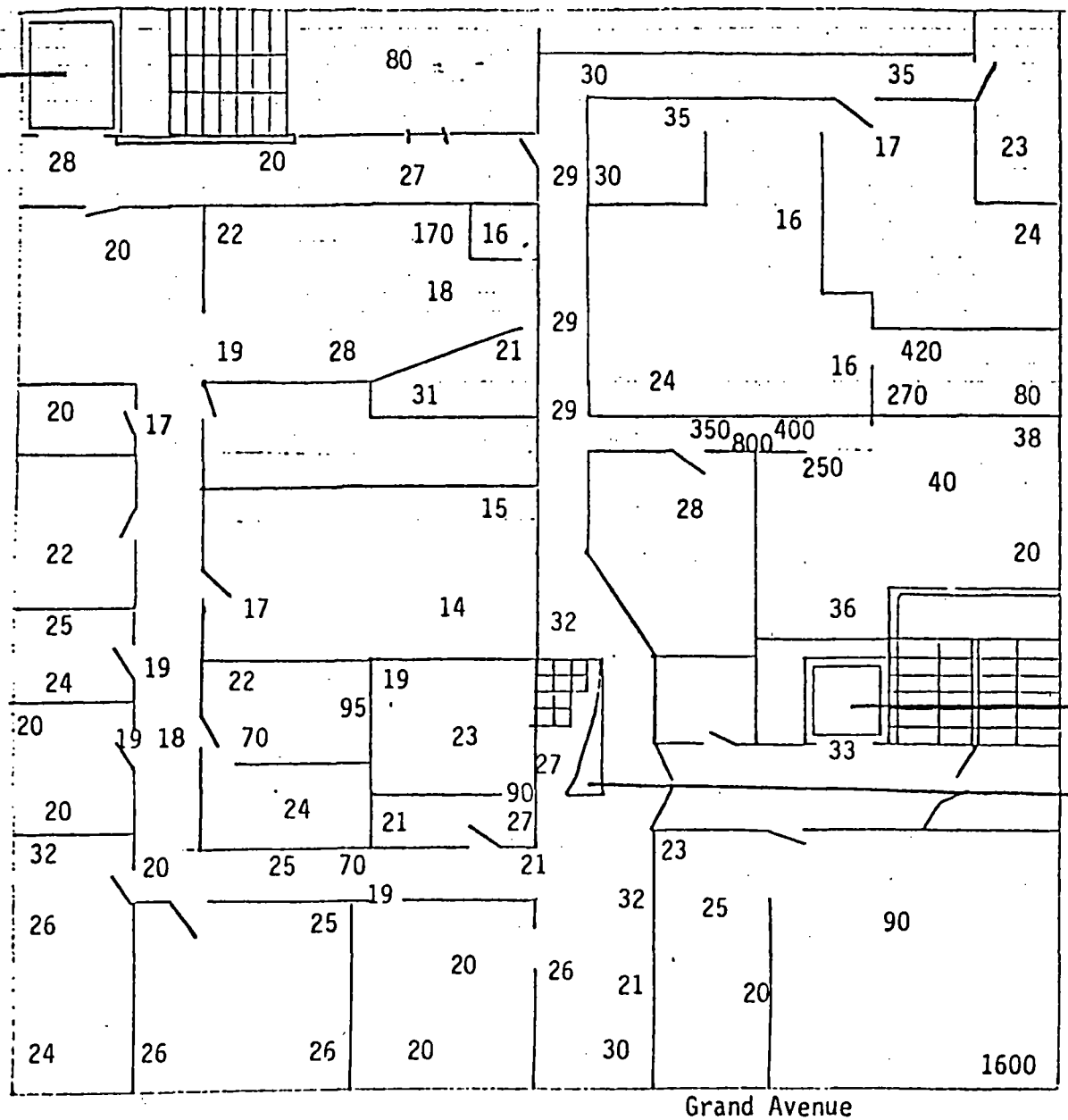
Figure 20 : Micro - Roentgen Meter Readings at One Meter Above Floor on Third Floor

(All readings are in micro - roentgens per hour , uR/hr .)



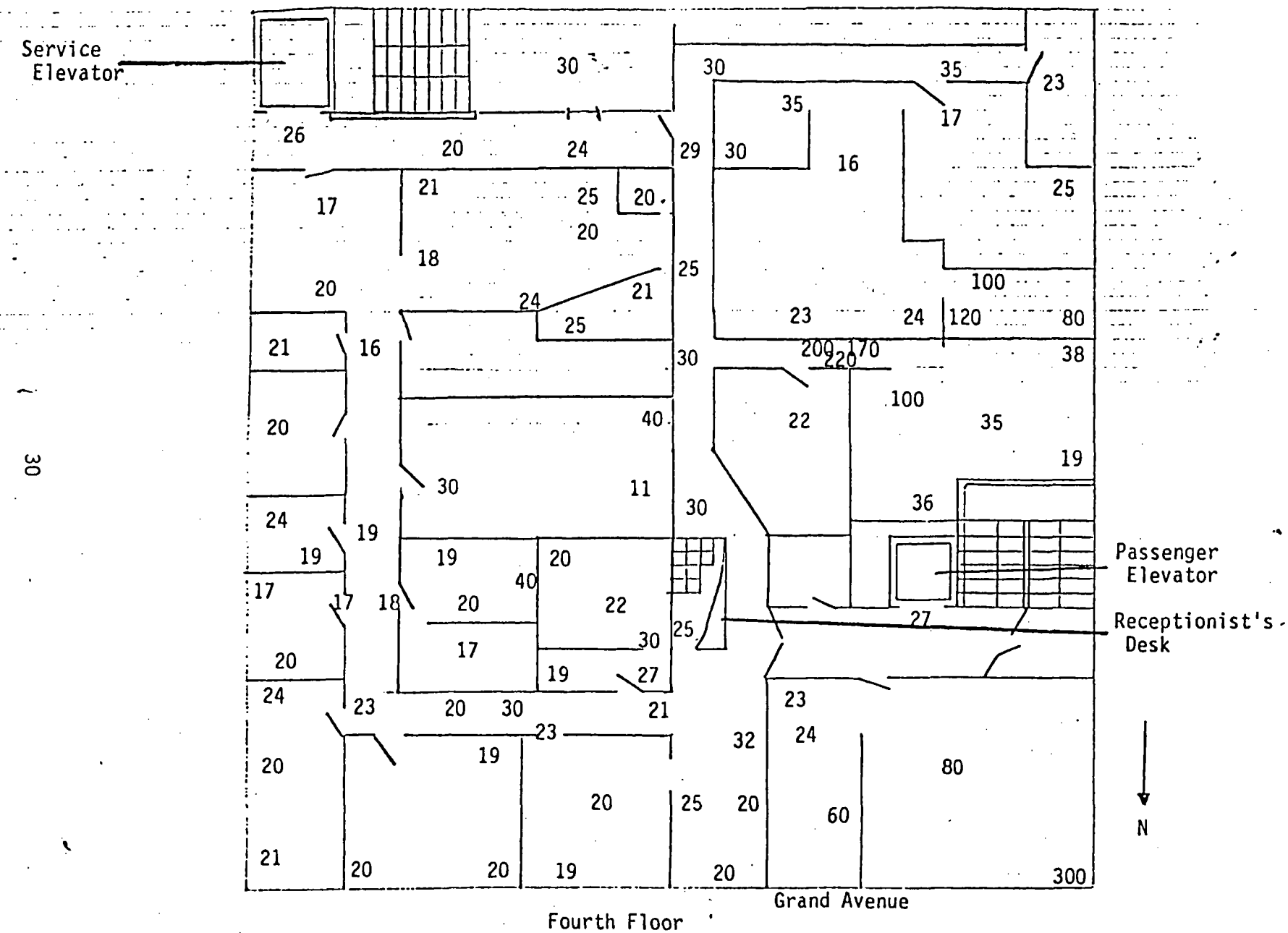
3rd Floor

Figure 21 : Micro - Roentgen Meter Readings , Contact With Floor
(All readings are in micro - roentgens per hour,uR/hr.)



Fourth Floor

Figure 22 : Micro - Roentgen Meter Readings at One Meter Distance
(All readings are in micro - roentgens per hour , uR/hr.)



B. Gamma Energy Spectrums

A portable multi-channel analyzer (MCA) was used to obtain the gamma energy spectrums of two contaminated spots within the buildings (See Figs. 23 and 24). Since the gamma rays emitted by various radionuclides have unique energies, the MCA can be used to identify these energies and thereby identify unknown radionuclides. One set of spectrum was obtained during the Preliminary Survey for the inside of the doorway in Room 202. The other was obtained during the Comprehensive Survey for the Basement in Room 8 where the highest gamma exposure rate reading in the building was measured. In the former spectrum a cesium-137 check source was used to calibrate the MCA and a modern Coleman brand gas light mantle was used for comparison. For the latter survey a small quantity of thorium dioxide was obtained and used for calibration and comparison. The cesium-137 peak was also used for an comparison. In both cases thorium was easily identified as the source of the contamination by matching the characteristic locations of the known peak positions with the unknown peak positions (See Figs. 23,24).

C. Thermoluminescent Dosimeter Data

Based upon the results of the Preliminary Survey thermoluminescent dosimeters* (TLDs) were placed in critical areas of major concern(See Fig. 25). Three TLDs were placed in a plastic amulet at each location to get an average exposure at that point.

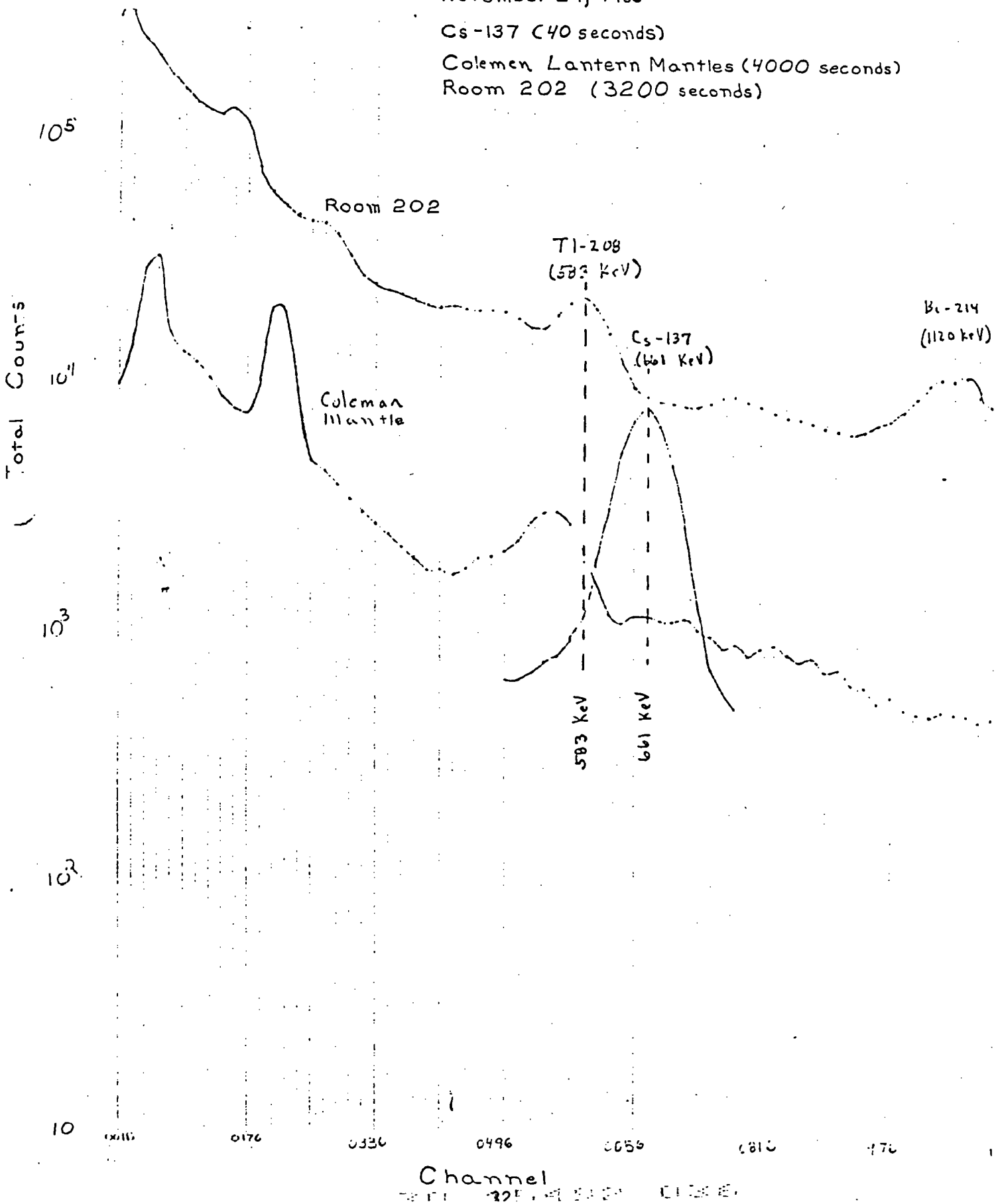
---

* TLDs are 1/8 inch square chips of lithium fluoride that are used like film badges to measure radiation exposure.

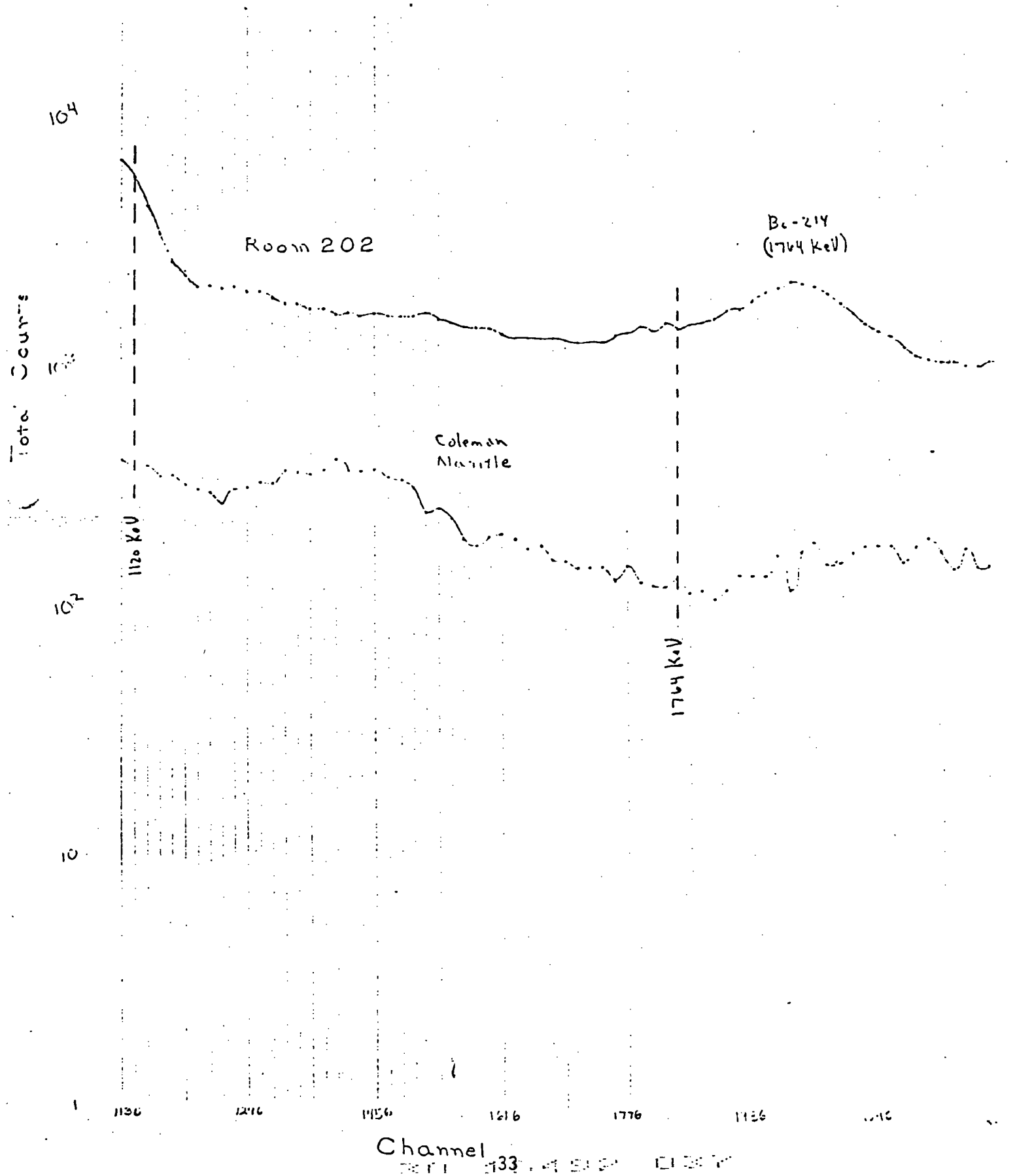
Figure 23 : Multi-Channel Gamma Ray Spectrum
161 East Grand - Chicago, Illinois
November 24, 1980

Cs-137 (40 seconds)

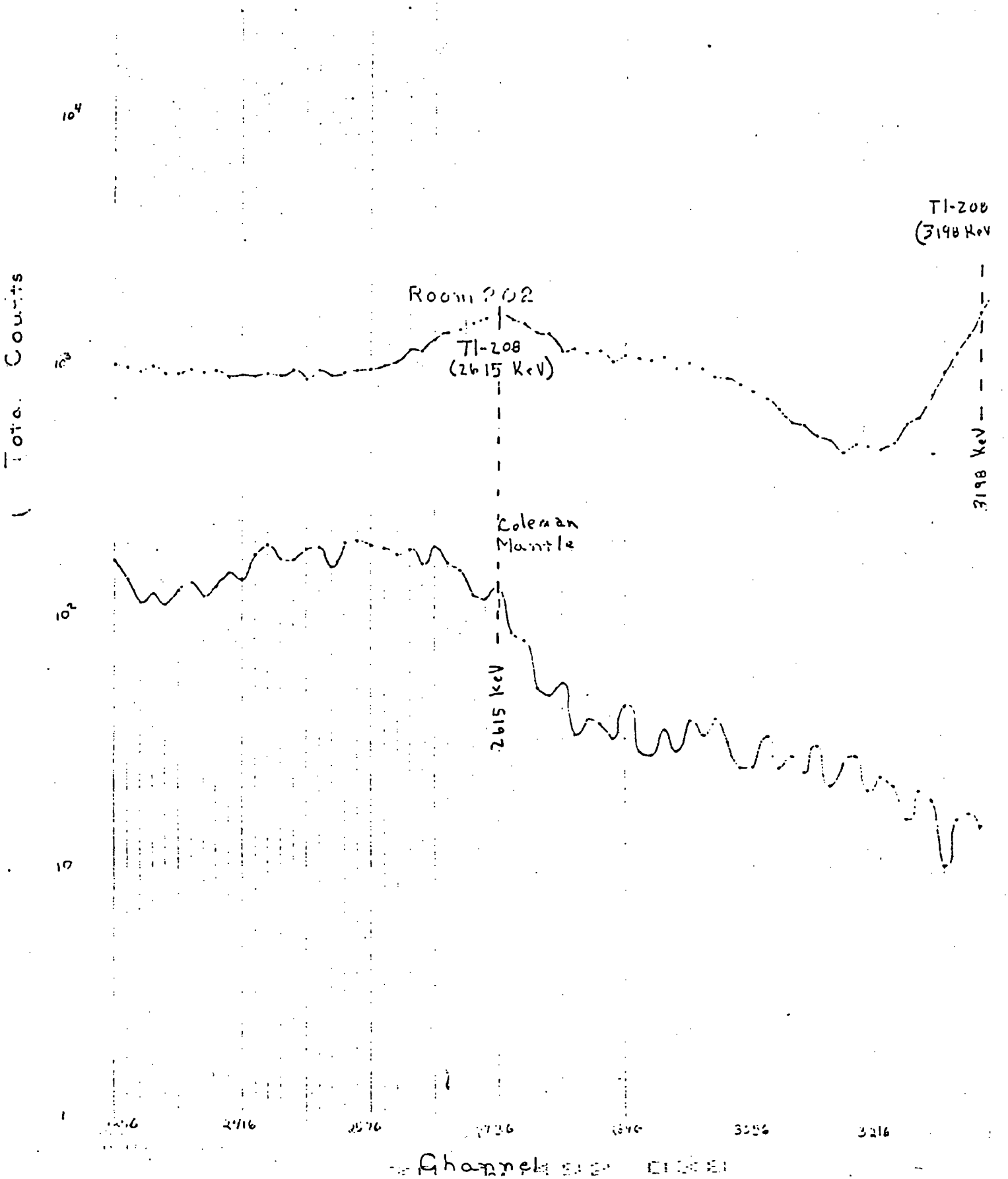
Coleman Lantern Mantles (4000 seconds)
Room 202 (3200 seconds)



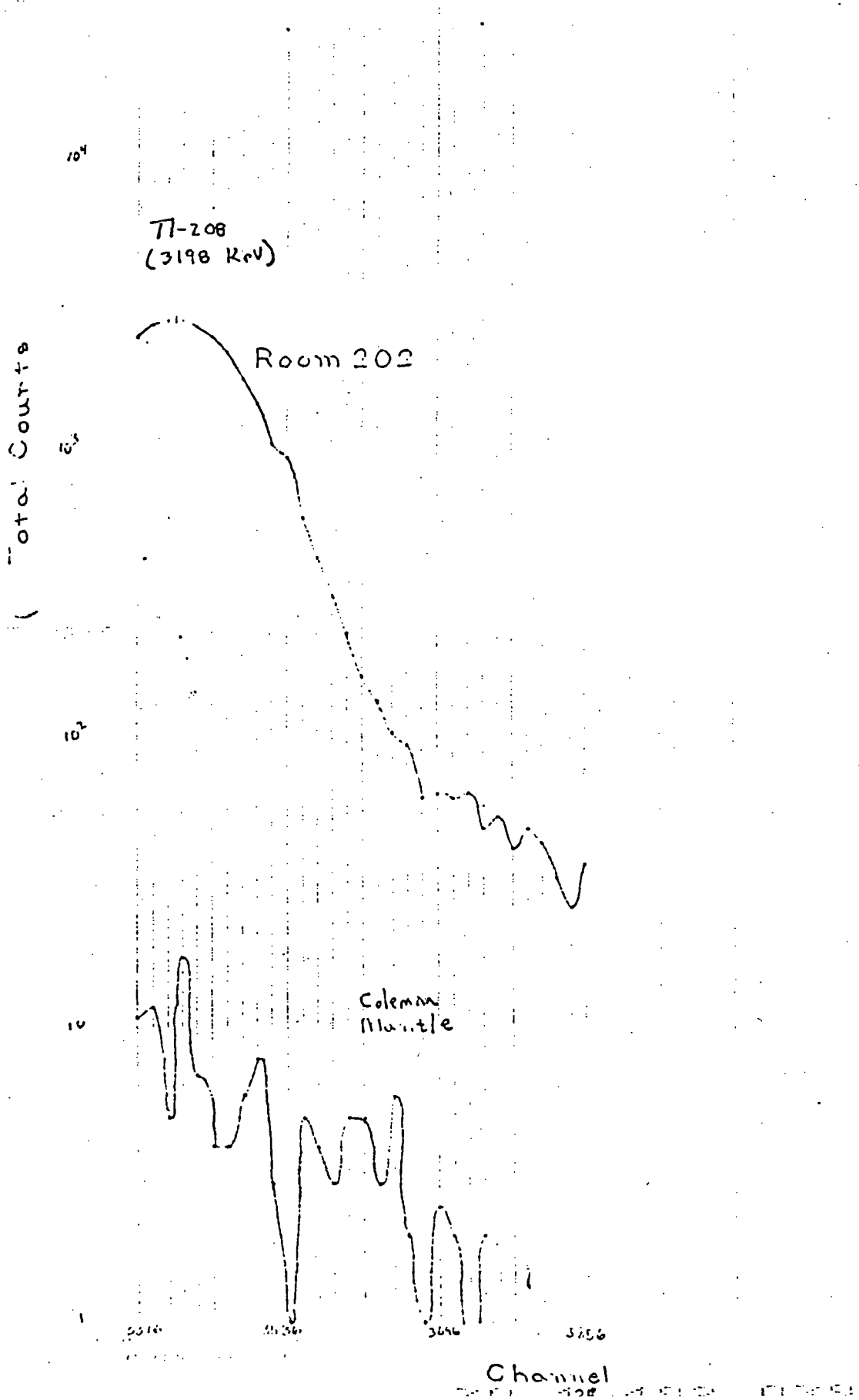
Multi-Channel Gamma Ray Spectrum
(Cont.)



Multi-Channel Gamma Ray Spectrum
(Cont.)



Multi-Channel Gamma Ray Spectrum
(Cont.)



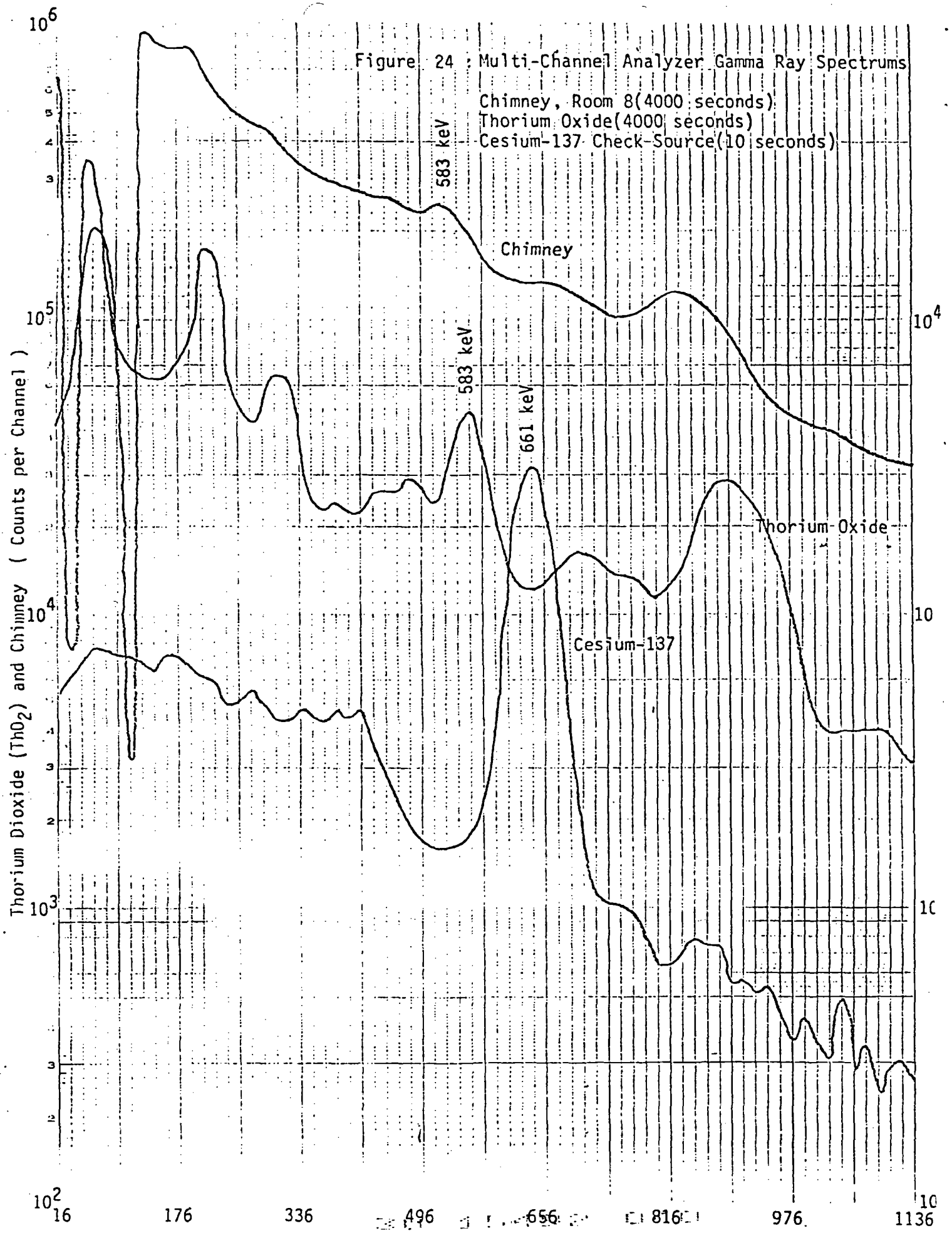
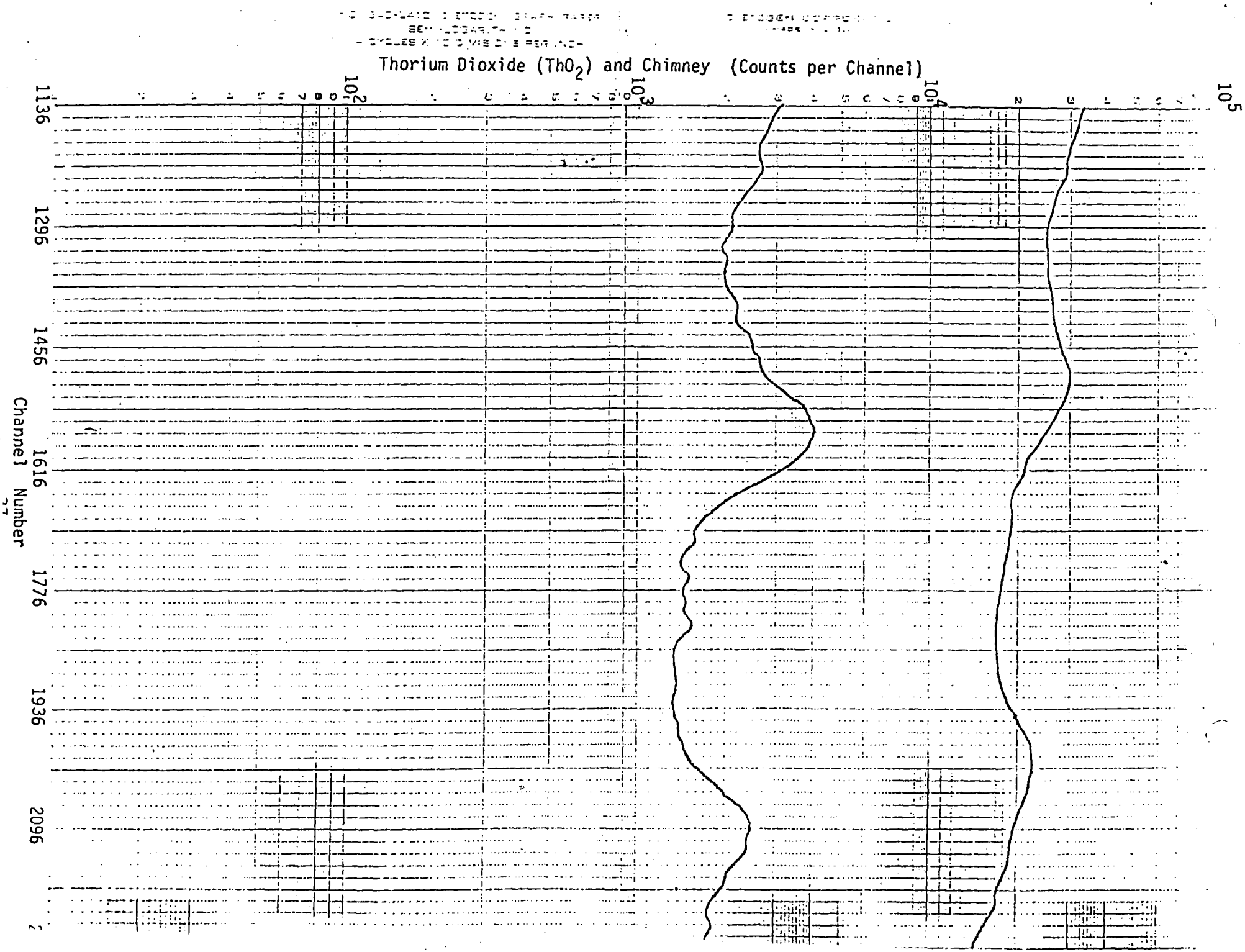
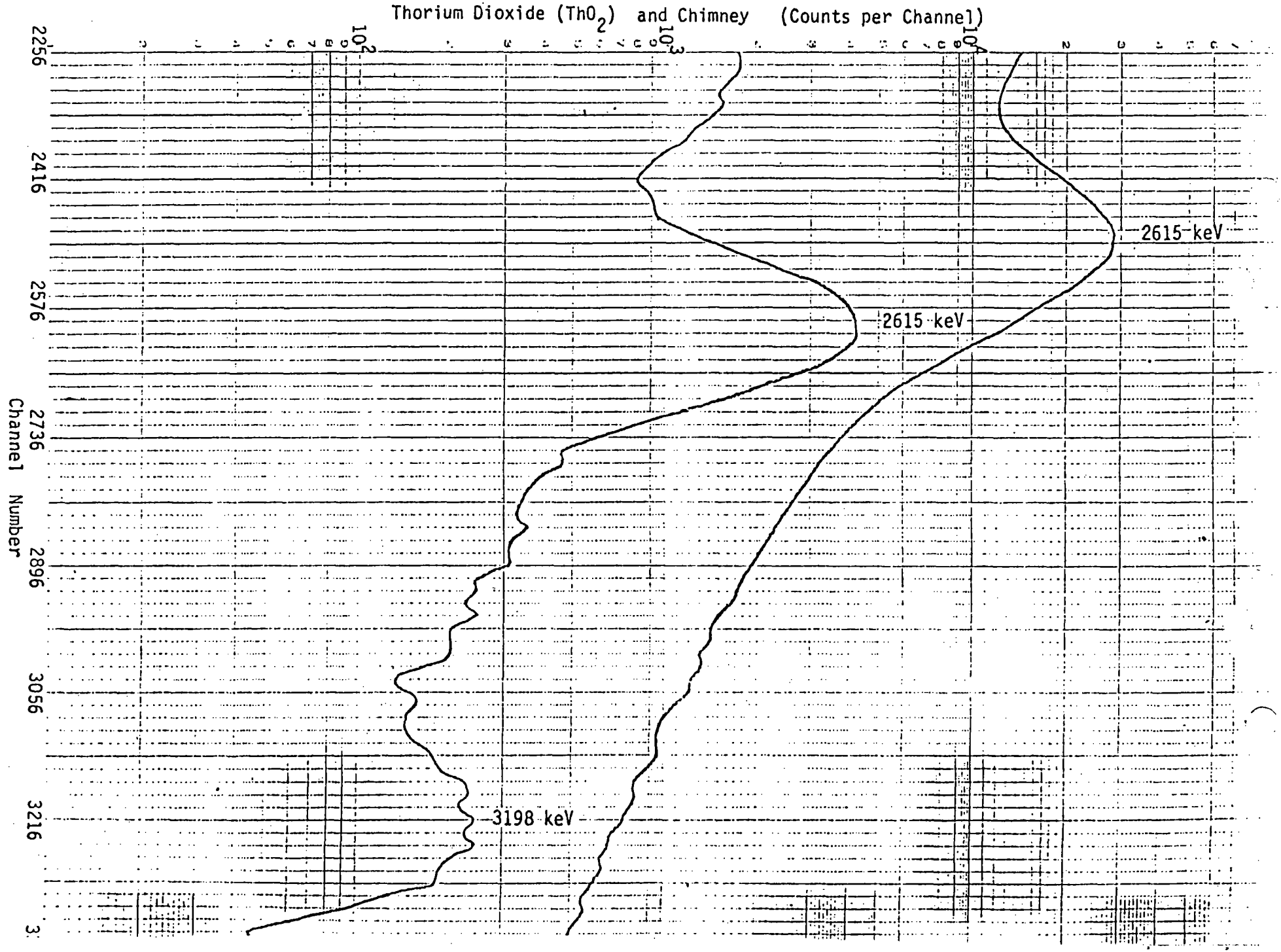
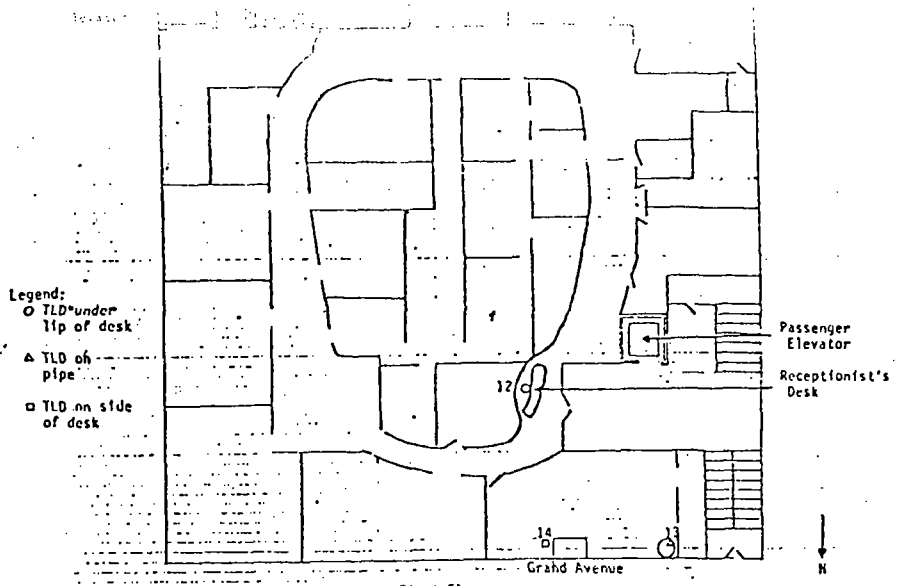


Figure 24 : Multi-Channel Analyzer Gamma Ray Spectrums


Thorium Dioxide (ThO_2) and Chimney (Counts per Channel)
10^2
10^3
10^4
10^5
1136
1296
1456
1616
1776
1936
2096
Channel Number

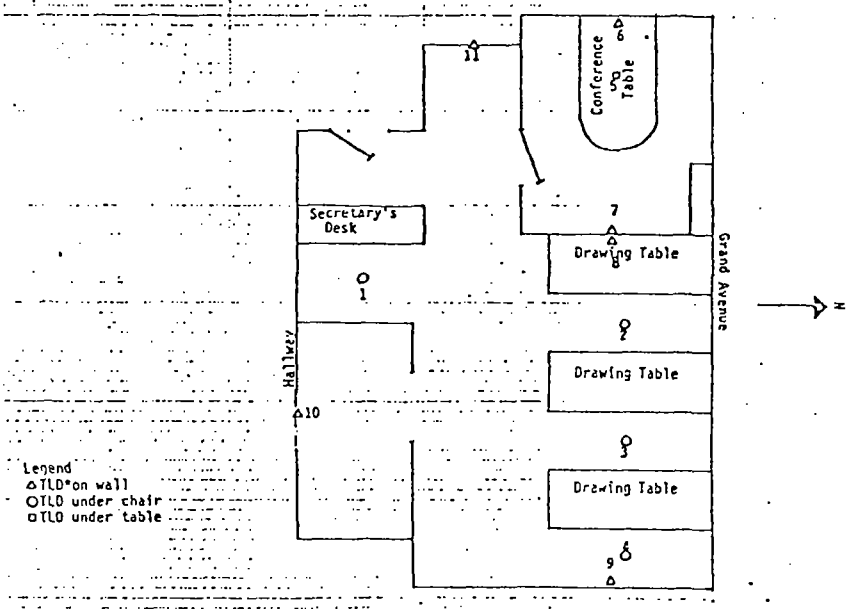

Thorium Dioxide (ThO_2) and Chimney (Counts per Channel)
10^2
10^3
10^4
2256
2416
2576
2736
2896
3056
3216
Channel Number
2615 keV
2615 keV
3198 keV



First Floor

* TLD is an acronym for thermoluminescent dosimeter

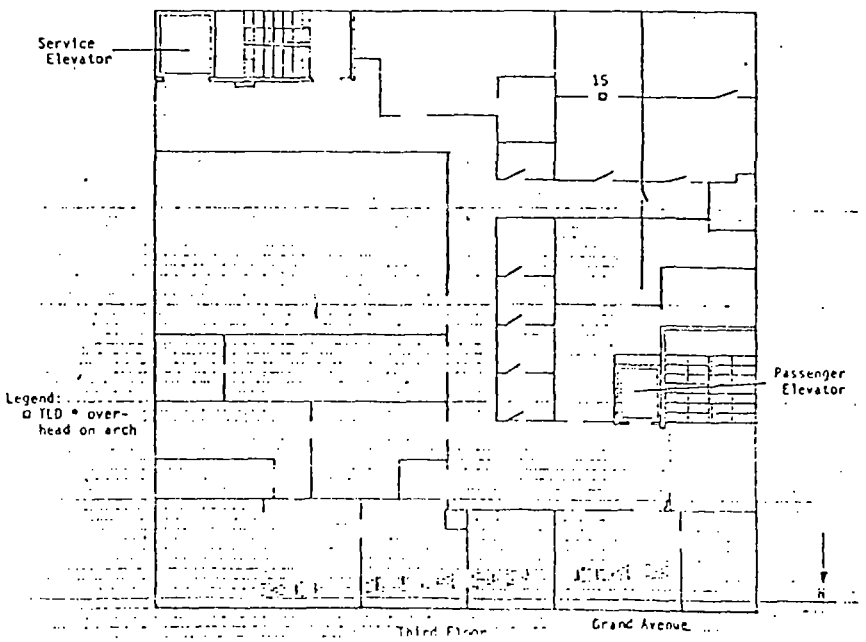
Location of Thermoluminescent Dosimeters in Room 202



Second Floor - Room 202 (Meisel Munson LTD)

* TLD = Thermoluminescent Dosimeter

Location of Thermoluminescent Dosimeter on Third Floor



Third Floor

Room 202 had shown predominantly higher gamma exposure readings and was fully occupied by an architectural firm. Eleven TLD amulets were placed there. On the first floor two TLD amulets were placed in the office area where higher exposure readings had been measured during the Preliminary Survey. One was placed on a pipe and the other was placed on the wall side of a desk. Part way through the exposure period the desk was shifted slightly, but probably not enough to alter the data substantially. A third TLD amulet was placed under the front edge of the receptionist desk because elevated readings from the floor above had been measured there and because it appeared to have a high occupancy. The fifteenth TLD amulet was placed over the arch in the middle of Room 318. This was for background to assess the normal radiation level of the building. Amulets were exposed from January 22 until March 2. Exposure results are shown in Table 1. Dose equivalent numbers in millirem (mrem) were divided by the hours in the exposure period to give hourly rates. The continuous exposure were taken to be 24x7 = 168 hours per week and 24x365 = 8760 hours per year. Workplace exposure was taken to be 40 hours per week and 40x50 = 2000 hours per year. Discussion of these results will be made later in this report.

D. Smears

During the preliminary survey, two smears* were taken at points in the basement that showed elevated micro-R meter readings. The basement floor, unlike most of the building, was readily accessible, not being covered with carpet or tile. Fig. 3 shows the points where smears were taken.

---

*Smears are small disks of paper rubbed across a potentially contaminated spot to assess the degree of removable contamination in a given area, usually 100 cm^2.

Immediate survey of the smears with an alpha scintillation dectector were negative. Smears were sent to the IDNS laboratory for gross alpha and gross beta measurements. The results were so low that it appears the radioactive material is not readily removable. However, if contaminated areas are uncovered in the future this conclusion should be rechecked.

E. Air Samples

During the Preliminary Survey an air sample was taken in Room 202 where elevated gamma readings were obtained and in Room 302 which was believed to be uncontaminated. Subsequent surveying showed the room to have a slightly elevated exposure level.

Air samples were taken because in both the Thorium Decay Series and the Uranium Decay Series (See Figs. 1,2) radioactive gases are formed at one stage in the decay process. For the Thorium Decay Series the gas is called radon - 220 or thoron for short. For the Uranium Decay Series the gas is called radon - 222 or radon for short. Spots of thorium or uranium contamination on the floor will emit thoron and radon, respectively, and this gas can then diffuse through overlying materials like carpets into the air. The risk would be exposing the lungs to the decay products of the radioactive gas.

Air samples taken in Rooms 202 and 302 showed that the gross airborne alpha radiation levels measured immediately after collection ceased were 3.5 times as great in Room 202 as in Room 302. This indicates only that one room has more alpha emitting materials in the air not that the air is hazardous. No absolute airborne alpha concentrations were calculated at that time because:

(1) filters had to be read immediatlely rather than waiting the necessary five hours for decay. This was due to time constraints on being in the building after normal working hours.

(2) glass fiber filters were all that were available at the time and these tend to trap particulates among the fibers where they are less likely to be detected by alpha radiation counting devices.

(3) and calibrations for the air sampler and the alpha scintillation filter reader were inadequate.

Subsequently, during the Comprehensive Survey air samples were collected in Room 8 (basement), Room 202 and Room 306 (See Figs. 3,10,19). These rooms were chosen because Room 8 had the high exposure chimney, Room 202 showed extensive contamination and was fully occupied, and Room 306 showed low background levels. It was decided to measure the thoron and radon levels directly, rather than measuring gross alpha levels. A surface filter was used to obtain an air sample in each room and the method of Ogden was used to calculate thoron and radon working levels* (See Technical Appendix for Ogden's paper).

The results are:

	Thoron (WL)	Radon (WL)
Room 8	0.229	0.0139
Room 202	0.162	0.0105
Room 306	0.0255	0.00215

*Working levels are energy units related to air concentrations of alpha emitting decay products of thoron and radon.

VI. RESULTS

A. Background Levels

Specification of a background radiation level for the Lindsay building is a necessary first step. Trace amounts of radioactive materials in building materials can elevate the natural background of a structure. The Lindsay building is brick and therefore would be expected to have a slightly higher radiation background. A quantification of this level can be estimated by looking for the lowest measured levels in the survey results shown in Figs. 3-22. In general, the lowest levels are in the range 15-25 uR/hr as measured by the micro-R meter at one meter. First floor levels tend to group more about 15 uR/hr,with several falling near 10 uR/hr. It was reported the First floor had been sandblasted at one time. If so, this may have removed surface contamination and, thus, lowered the background.

Overall, it appears that about 20 uR/hr is a reasonable level for background as measured with the micro-R meter. Recall that, as stated previously the micro-R meter over responds to low energy gamma rays. The PIC is much less susceptible to this drawback and more nearly registers the actual gamma exposure rate. However, it is cumbersome to use. Consequently, surveys were done with the portable micro-R meter, comparing some readings to equivalent ones made with a PIC, and then deriving a correspondence relationship. It was found that the micro-R meter tends to read about twice the PIC for this material. Consequently, the best estimate of the true gamma exposure rate is half the micro-R meter reading. Thus the following will be used as a criteria.

Background Gamma Ray Exposure Levels	
As measured with a micro-R meter	20 uR/hr
As measured with a pressurized ion chamber	10 uR/hr

B. Contaminated Areas

To designate a contaminated area, reference was made to EPA's proposed Remedial Action Standards for Inactive Uranium Processing Sites. Specific reference was made to the standard for gamma radiation indoors of 20 uR/hr over background. While not strictly applicable because this is based on radon from uranium and the problem on Grand Avenue is thorium, it will be taken as the best available designator of contamination levels. Therefore, in looking at Figs. 3-22, areas that have levels above 60 uR/hr at contact with the surface as measured with a micro-R meter should be considered suspect. If the higher reading is anomalous for the general environs then it should not be considered contamination. The criteria for contamination will be set by several readings in a general area exceeding 60 uR/hr. This leads to the designation of the following areas shown in Figs. 26-30 as contaminated.

Basement - area near Room 8 and boiler
- front section of Room 1
- section of Room 5
- Room 12

1st Floor - northwest corner of northwest office
- *reception area not designated contaminated because source is believed to be on 2nd Floor

2nd Floor - portions of Rooms 200, 201, 202, 214 and adjacent hallway
- pipe area near service elevator

3rd Floor - portions of Rooms 300, 301, 302, and 303
- portions of Rooms 301 and 319
- section of Room 316
- pipe area near service elevator

4th Floor - west central area of floor
- area in northwest corner of floor

The original room layouts and operational setup in the Lindsay manufacturing process are unknown. However, contaminated areas show several patterns. The northwest corner of each floor generally shows contamination running along a northwest-southeast line. If piping or ductwork run under floorboards in these areas they should be surveyed.

Figure 26 : Basement Regions of Contamination

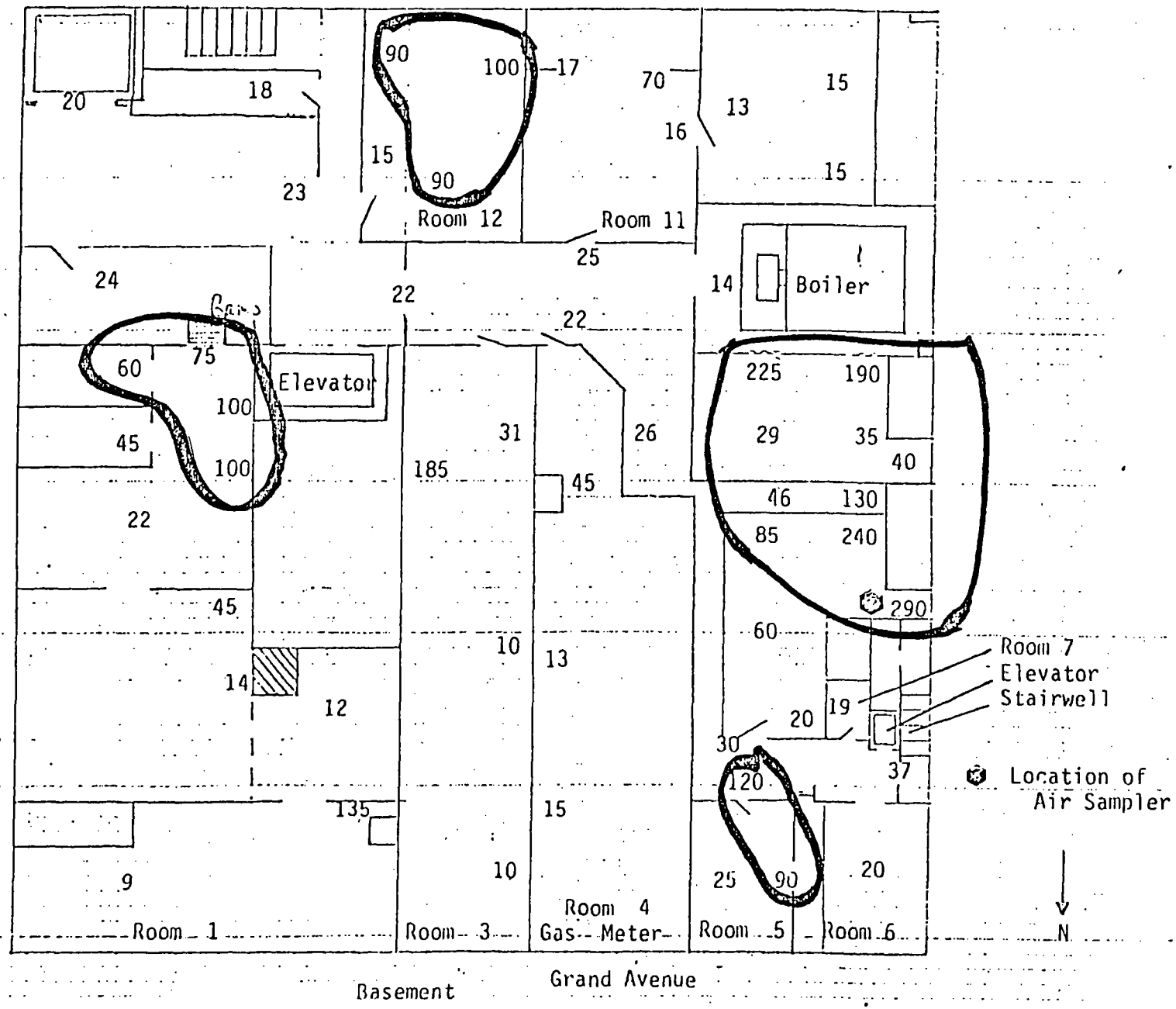


Figure 27 : First Floor Regions of Contamination

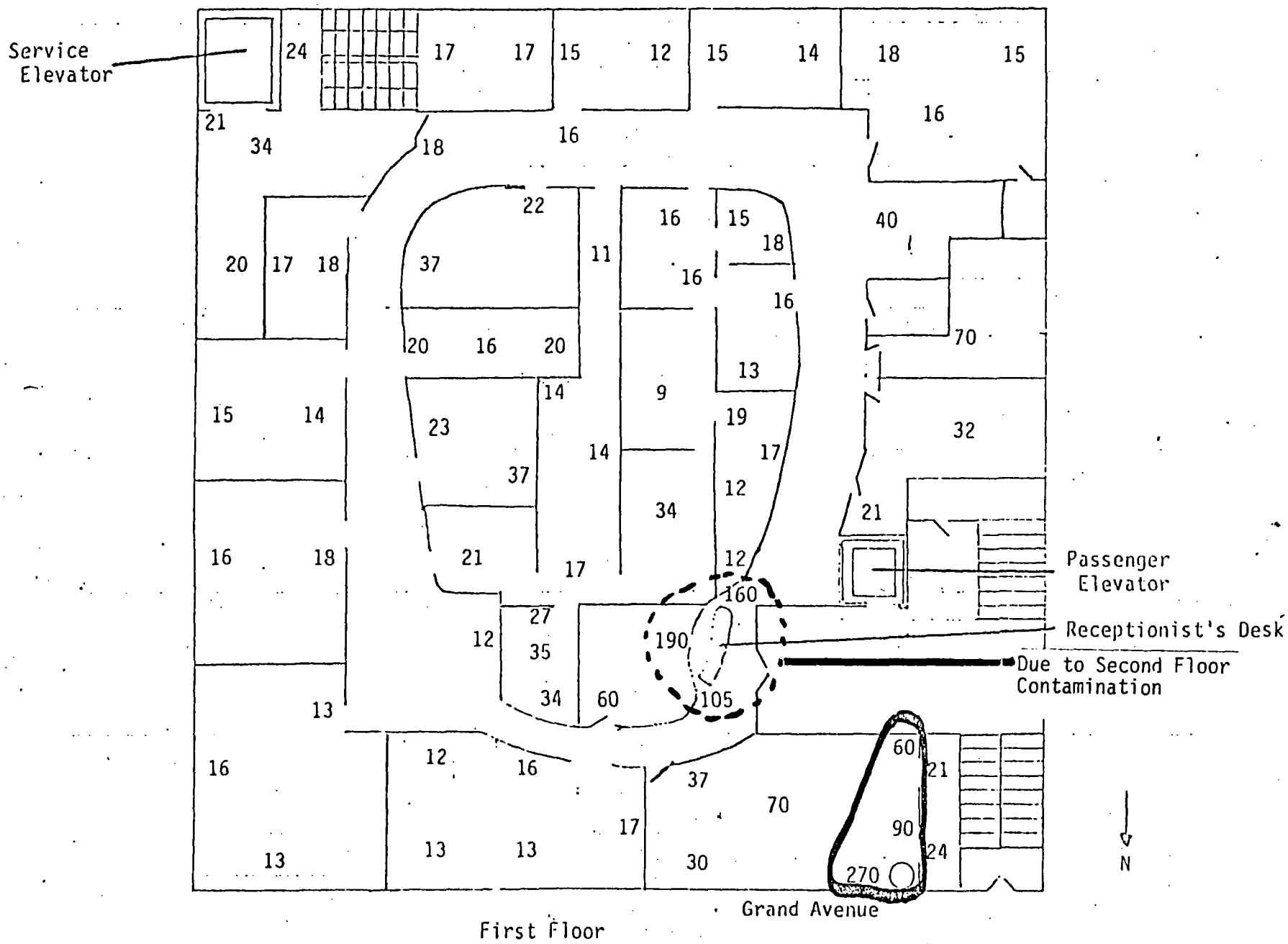


Figure 28 : Second Floor Regions of Contamination

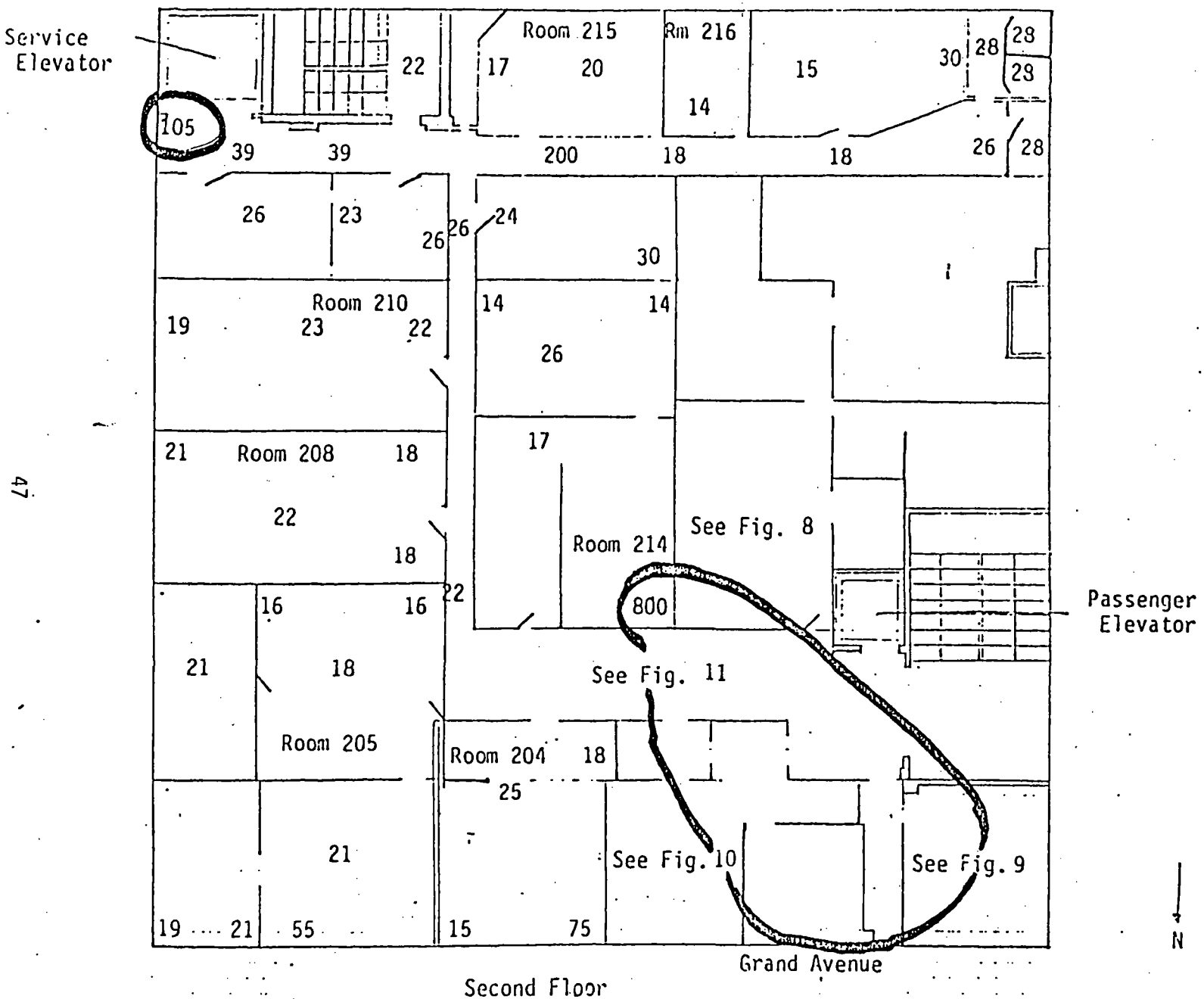


Figure 29 : Third Floor Regions of Contamination

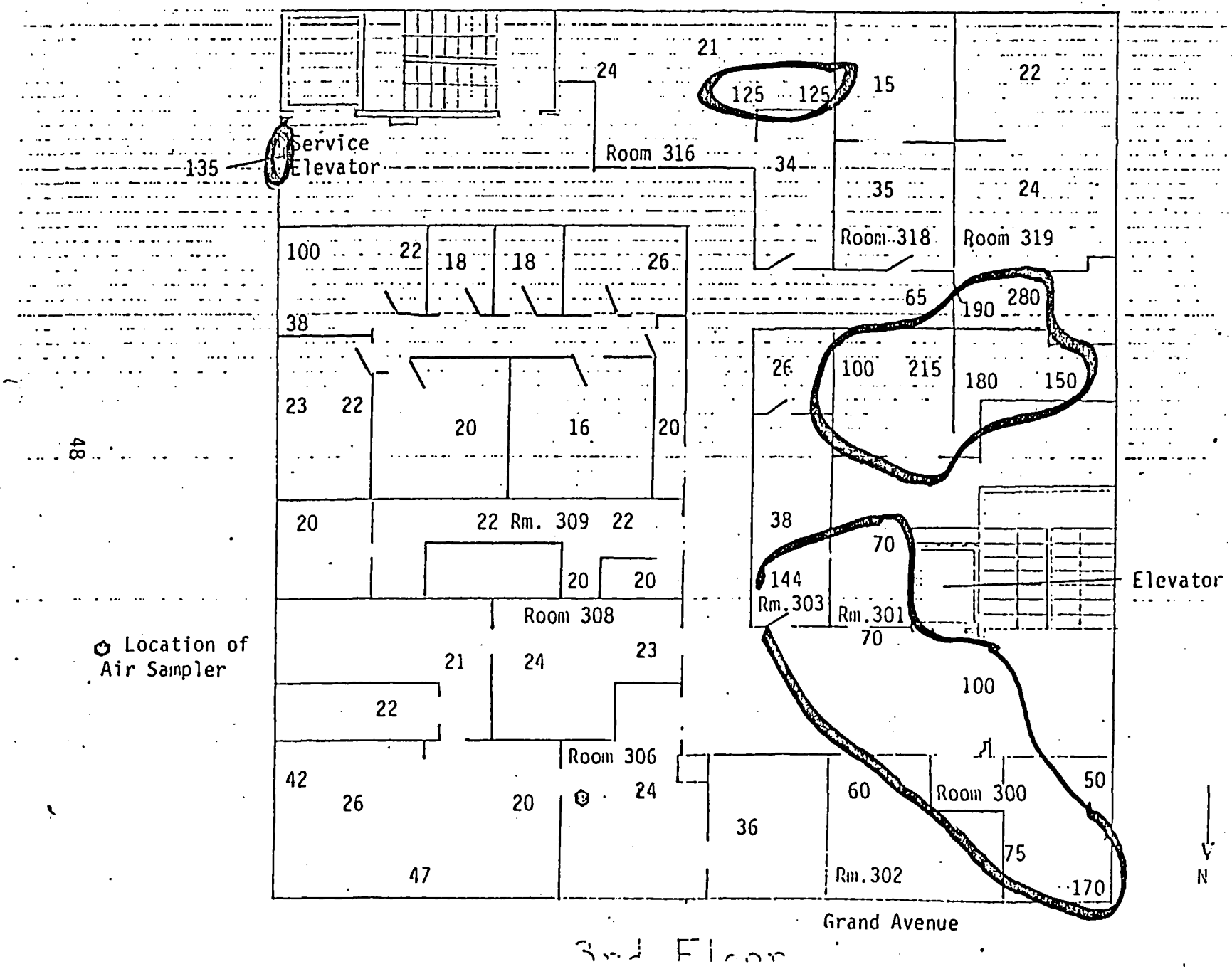
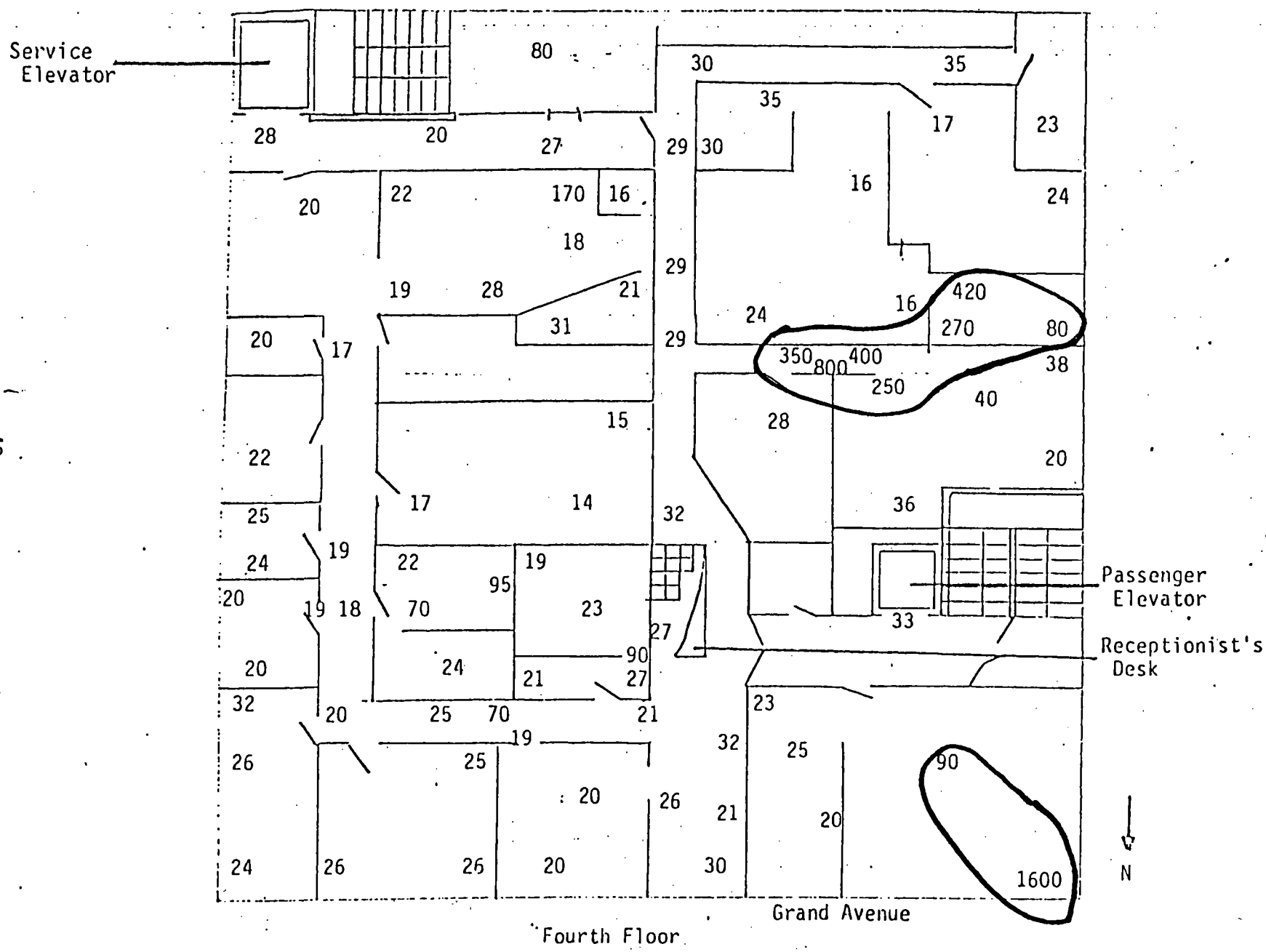


Figure 30 : Fourth Floor Regions of Contamination



The west central portions of the basement, 3rd and 4th floors also show contamination. No good reason for this could be found. Finally, the pipeholes near the service elevator on the 2nd and 3rd floors show elevated levels.

The chimney area found contaminated to high levels in the basement did not manifest itself on other floors but this may have been due to considerable absorption by the surrounding brickwork. This chimney definitely should be checked from basement to roof.

C. Identification of the Contamination

The contamination in question is, as suspected from the nature of Lindsay's operation, thorium. The MCA spectrums for Rooms 8 and 202 established this quite well (See Figs. 23 and 24). Thallium-208 gamma peaks at 583 keV, 2615 keV and 3198 keV are strong thorium indicators. Further, the very close correspondences between the spectrums of the Coleman mantle and the thorium dioxide sample with the spectrums for Room 202 and 8, respectively, are strong thorium indicators.

D. Smear Results

The contamination encountered is not removable by normal wiping techniques, at least where we were able to reach surfaces. On-the-spot surveys of two smears with a hand held alpha scintillation detector were negative. Laboratory analyses by the Illinois Department of Nuclear Safety (IDNS) showed the following results.

	Gross Alpha	Gross Beta
Smear #2	5.35 dpm/100 cm^2	2.35 dpm/100 cm^2

*dpm stands for disintegrations per minute. Each disintegration is one radioactive decay.

When compared to the Nuclear Regulatory Commission's "Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unresticted Use or Termination of Licenses For Byproduct, Source, or Special Nuclear Material" these levels are very low.

	NRC Guidelines
Removable Alpha	200 dpm/100 cm^2
Removable Beta	1000 dpm/100^2

E. Air Sample Results

As discussed with regard to the Preliminary Survey a relative comparison of the alpha radiation present in the air of Room 202 compared to Room 302 showed an enhancement of a factor of 3.5. This was not a firm indicator of alpha contamination in the air. Subsequently, air samples were made to assess the degree of alpha air contamination present due to diffusion of thoron and, possibly radon, through carpets and floor coverings from underlying spots of contamination. The results follow:

	Thoron	Radon
Room 306	0.0255 WL	0.00215 WL
Room 202	0.162	0.0105
Room 8	0.229	0.0139

The radon values can be compared to values measured in comparable buildings as reported in the United Nation's Scientific Committee On the Effects of Atomic Radiation, 1977 Report (UNSCEAR)*.

Brick Buildings	0.001 WL
Brick Home	0.0054
Apartment, Brick	0.007

The Lindsay building numbers are not at variance with this data. Radon in buildings is influenced considerably by the degree and rate of ventilation. If the building was tight or the ventilation rate low the radon levels would be expected to be higher. It can also be noted, however, that the radon levels do increase with the measured gamma exposure levels. Room 8 had the highest working levels, Room 202 intermediate and Room 306 low. This would be expected if uranium were present as contamination. From a legal standpoint the Title 10, Part 20 of the Code of Federal Regulations (10 CFR 20) limit for radon of 1/30 WL (.033 WL) is not exceeded in the Lindsay building.

Comparison values for thoron are much more difficult to come by. The same UNSCEAR document reported that indoor equilibrium equivalent concentrations can, for building materials containing thorium, range from 0.0001 WL to 0.008 WL**

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*Table 28, page 77-78, equilibrium equivalent concentrations in pCi/l were converted to WL by dividing by 100 pCi/l per WL.

**Table 30, page 80, equilibrium equivalent concentrations in pCi/l were converted to WL by dividing by 7.5 pCi/l per WL.

EPA's Office of Radiation Programs, Las Vegas Facility did a study in late 1980 on thoron and radon levels in outside air in Las Vegas. Two samples were also collected from inside homes. The thoron levels in homes were 0.00028 WL and 0.00036 WL.

Finally, if one working level of radon is assumed to be equivalent to one working level of thoron then these levels could be compared to standards for contaminated buildings in Grand Junction, Colorado, and in Florida. This is not strictly true. But, because of the limited amount of material available on thoron, it is the best available comparison we have.

Surgeon General's Guidelines for Remedial Action In Grand Junction, Colorado

Radon levels greater than 0.05 WL* - remedial action indicated

Radon levels from 0.01 to 0.05 WL* - remedial action may be suggested

EPA Recommendation For Residences on Florida Phosphate Lands

Annual average radon greater than 0.02 WL** - remedial action should be taken

Annual average radon less than 0.02 WL** - remedial action to reduce concentrations as low as reasonably achievable

*over a background of 0.004 WL

**including background

With these limited comparisons the thoron levels in the Lindsay building appear to be considerably higher than usual. Where higher gamma exposure levels were found the thoron and radon levels were elevated.

From a legal standpoint, the 10 CFR 20, Appendix B, Table II limit for thoron is 10 pCi/l per WL. When converted to working levels based upon UNSCEAR's conversion of 7.5 pCi/l per WL, the equivalent limit is 1.33 WL. The Lindsay building levels do not exceed this standard.

per MPC
10^{-9} μCi/ml
10 pCi/l

1.33 W.L./MPC for Thoron
Non-occupational!

F. Thermoluminescent Dosimeter Results

TLDs were placed in areas deemed critical by the results of the Preliminary Survey. Results are shown in Table 1. Since Site 15 was used as a background location exposure values at the other 14 locations should be adjusted by subtracting off the Site 15 values, 1.56 mrem/week or 78 mrem/year. Background is a level considered normal in the absence of contamination. Site 6 has lower levels but is in the vicinity of a contaminated area and should not be considered as a background location.

The bases for comparison is 10 CFR 20 Section 20.105 where exposures in unrestricted areas are limited to

10 CFR 20 Limits
2 mrem/hour
100 mrem/week
500 mrem/year

Since the building is a workplace, most people would be expected to spend about 40 hours per week or 40 x 50 hours per year there. These should be considered workplace exposures and compared to the Workplace Exposure columns in Table 1. It can be seen that for measured areas of the building, people should not expect to exceed any of the 10 CFR 20 limits.

The Federal Radiation Council (FRC) in Staff Report No. 1 suggested for average population groups exposed to widespread radioactive contamination tht the yearly whole-body exposure not exceed 170 mrem. This criteria is most applicable here.

Thermoluminescent Dosi r Results For 161 East Grand ue, Chicago, Illinois

Table 1

TLD Chip No.	Location	Dose* (mrem)	Dose* Rate (mrem/hr)	Continuous (mrem/wk	Exposure**** (mrem/yr)	Workplace (mrem/wk)	Exposure* (mrem/yr)
1	Under Secretary's Chair	61	0.065	10.95	569	2.60	130.
2	Under Draftman's Chair	52	0.055	9.27	482	2.20	110
3	Under Draftman's Chair	45	0.048	8.08	421	1.92	96
4	Under Draftman's Chair	39	0.042	7.08	368	1.68	84
5	Under Conference Table	100	0.107	18.03	937	4.28	214
6	On West Wall Above Conference Table	23	0.025	4.2	219	1.00	50
7	On East Wall In Conference Room	61	0.065	10.95	569	2.60	130
8	On West Wall In Main Drawing Room	54	0.058	9.77	508	2.32	116
9	On East Wall In Main Drawing Room	39	0.042	7.08	368	1.68	84
10	On South Wall In Storage Room	40	0.043	7.24	377	1.72	86
11	On West Wall In Entrance Foyer	46	0.049	8.25	429	1.96	98
12	Under Lip Of Reception Desk	56	0.060	10.11	526	2.40	120
13	On Pipe Proximal to Grand Avenue	94	0.100	16.80	880	4.00	200
14	On Side of Desk Near Grand Avenue	65	0.069	11.62	604	2.76	138
15	Over Arch In Middle of Room	37	0.039	6.57	342	1.56	78

*Exposure period 1/22/81, 8:30 p.m. unti 3/2/81 a.m., Total hours 938.5

**Chips 1-11 were located in Room 202, chips 12-14 were located on the first floor, and chip 15 was located in Room 218.

***Continuous exposure is considered to be 168 hours for one week and 8760 hours for one year.

****Workplace exposure is considered to be 40 hours fdor one week and 2000 hours for one year.

However, Site 13 is located beside a desk and typewriter with possibly high occupancy. The net annual occupational exposure at this location would be about 122 mrem (200-78) or 71% the FRC recommendation. Such an exposure should be considered unwarranted. There is no reason to believe at this time that any unmeasured areas of the building are going to be dramatically different from measured areas.

VII. Conclusions

Several conclusions can be drawn from the surveys performed in the Lindsay Light Company Building at 161 East Grand Avenue.

(1) Several areas of the building are contaminated with radioactive materials believed to be residual from the gas light mantle manufacturing operations of the Lindsay Light Company between 1910 and 1936.

(2) The material is thorium.

(3) The distribution of thorium residuals was spotty over an area rather than being uniformly distributed and seemed to be, generally, in the same region of the floor on each floor.

(4) The maximum measured gamma ray exposure rate (one meter off the surface) in an occupied area was 15 times the apparent background and 50 times the apparent background in an unoccupied area. This is clearly excessive although not in violation of hourly or weekly rates in Title 10, Part 20.105 of the Code of Federal Regulations (10 CFR 20.105).

(5) Radon gas levels in contaminated areas increase with increasing gamma exposure levels but do not appear to be out of line with normal levels for similar structures.

(6) Radon gas levels do not exceed the legal limits of 10 CFR 20, Appendix B, Table II for radon-222.

(7) Thoron gas levels in contaminated areas increase with increasing gamma exposure levels. Based upon limited comparison data thoron levels appear much higher than expected.

(8) Thoron gas levels indicate considerable unwarranted lung exposure could arise to persons in the building for long periods of time even though the legal limits of 10 CFR 20, Appendix B, Table II, are not exceeded.

(9) Continued exposure of persons in this workplace to elevated gamma ray emissions and to elevated thoron gas concentrations is contrary to sound health physics practice of maintaining radiation exposures as low as reasonably achievable (ALARA).

VII. Recommendations

The overriding consideration upon which this report is based is well founded in health physics, that where unnecessary radiation exposures can be reduced to lower the possibilities of unwarranted health effects, then steps should be taken to do so, even when regulatory limits are not exceeded. We do not wish to convey the impression there is a substantial crisis or that people are in great peril. These recommendations are made primarily to initiated prudent actions.

It is strongly recommended that a cleanup program to remove residual radioactive materials in those areas shown in Figs. 26-30 be initiated as soon as possible. Cleanup should have the goal of restoring radiation levels in contaminated portions of the building to those comparable with uncontaminated portions of the building.

In no case should such work be performed by any but personnel trained and experienced in handling radioactive materials.

If at any time in the future modifications in this building are made, radiation surveys should be taken to protect personnel and to detect any further contamination. Such modifications could be replacement of carpets, sanding floors, sandblasting walls or altering or replacing piping or ductwork. If new areas of contamination are detected then further cleanup should be initiated before commencing work.

If at any time in the future the building is sold the new owners should be informed of cleanup done and forewarned of the necessity of checking radiation levels before doing work such as suggested above.

The U.S. Environmental Protection Agency and the Occupational Safety and Health Administration offer their assistance in making recommendations about cleanup. Both agencies would expect that they would be allowed to make radiation surveys after cleanup to assure that effective reduction of radiation levels have been achieved.

TECHNICAL APPENDIX

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- B. Exposure Sites
- C. Exposure Data and Results

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- A. Air Sampling Sites
- B. Ogden Method
- C. Air Sample Results

I. Instrumentation

Table TA1

Manufacturer	Instrument	Serial Number	Attachment	Serial Number	
Eberline	PRM-5-3	EPA#127371	1"x1" NaI Scintillation Crystal	----------	X
Ludlum	Model 19 Micro-R Meter	EPA#164325			X
D.S. Davidson	Model 4106 Multi-Channel Analyzer	EPA#164321			X
Harshaw			3"x4" NaI Scintillation Crystal, Model 12A12/3A	EPA#101063	X
Ludlum	Model 2200 Scaler	EPA#164320	Model 43-10 Alpha Scintillation Counter	EPA#164355	X
Eberline	RAS-1 Air Sampler	EPA#164349			X
Gelman			47mm Glass Fiber Filters, Type A/E		X
Gelman			47mm Metricel Filters GN-4, .8 um pore size		
Rocky Mountain Glass Blowing			Lucas Cells	EPA#164333 164334 164335 164336 164337 164338	
Harsaw	Model 2000A TLD Reader	EPA#164361	Model 2000B Picoammeter TLD-100 Thermoluminescent Dosimeter	EPA#164362	
Reuter-Stokes	Pressurized Ion Chamber	Borrowed, Nuclear Regulatory Commission			

II. Room Survey Data

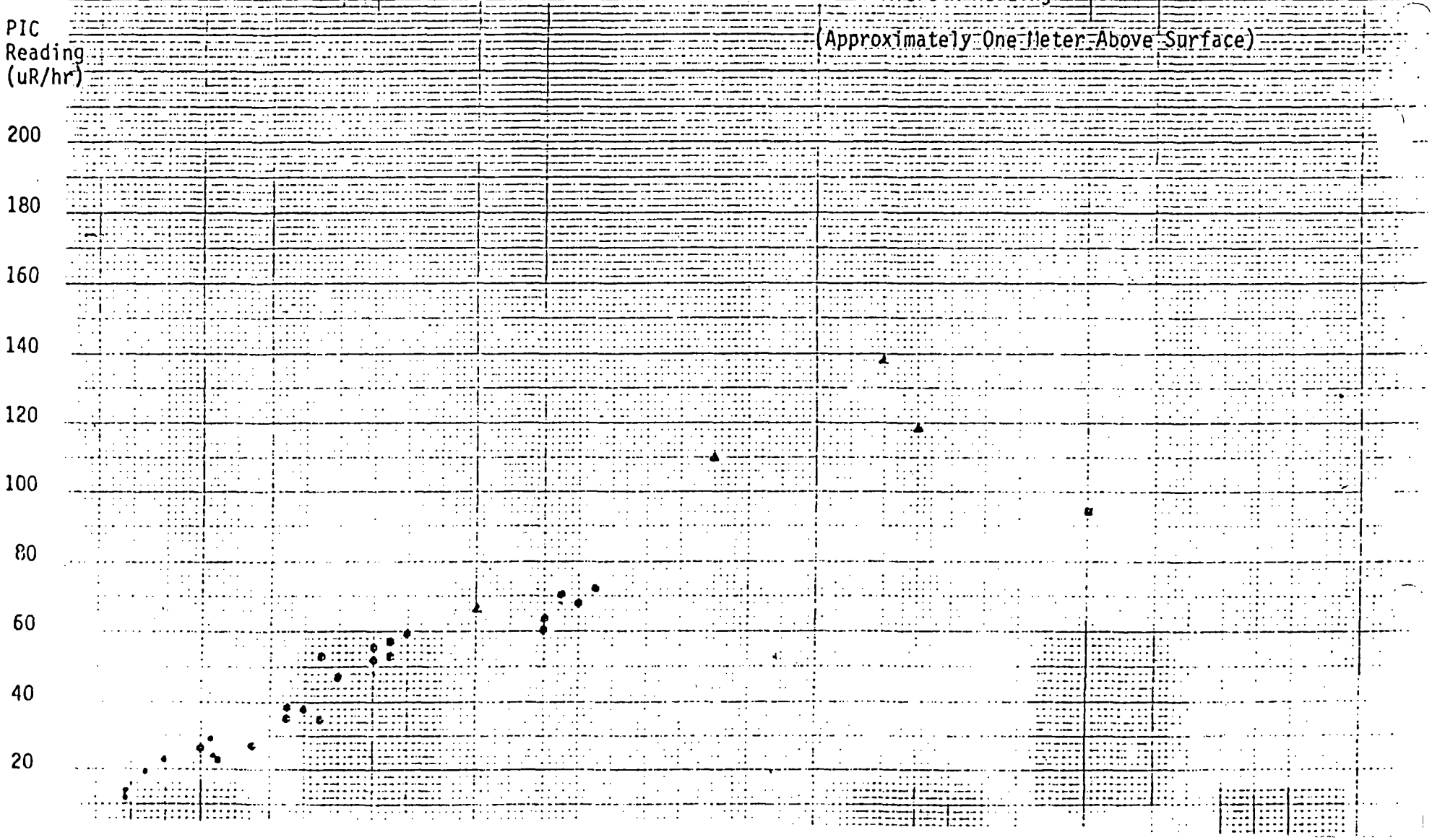
All rooms in the basement and on each of the four floors were surveyed with a micro-roentgen (micro-R) meter at contact with the surface and at one meter above the surface. Rooms 201, 202, and the adjoining hallway area were also surveyed with a pressurized ion chamber (PIC) borrowed from the Nuclear Regulatory Commission's Region III office in Glen Ellyn, Illinois. Simultaneous readings with both the PIC and the micro-R meter were taken in this area of the building to develope a correspondence for the remaining readings using the micro-R meter. The rationale for this being that the PIC does not over respond to low energy gammas the way the micro-R meter does. With a correspondence relationship much of the over response could be allowed for. The average result over four scales of the micro-R meter (0-50, 0-250, 0-500, 0-5000 uR/hr) was a ratio of 0.56:1, PIC:micro-R meter. A reasonable relationship then is that micro-R readings should be reduced by half to more nearly represent the true exposure rate. Room survey results for both instruments were given in Figs. 13-18 in the Main Report. The cross calibration data follows.

Simultaneous Readings, Pressurized Ion Chamber and Micro-Roentgen Meter
(Both approximately one meter above surface)

Table TA2

Micro-R Meter Scale	Micro-R Meter Reading	Pressurized Ion Chamber Reading	Ratio PIC/Micro-R Meter
0-50	19	12	0.63
	19	13	0.68
	25	19	0.76
	30	23	0.77
	43	29	0.67
	44	24	0.55
0-250	40	26	0.65
	45	23	0.51
	55	27	0.49
	65	35	0.54
	65	38	0.58
	70	38	0.54
	75	35	0.47
	75	53	0.71
	80	47	0.59
	90	52	0.58
	90	52	0.58
	90	55	0.61
	95	53	0.56
	95	57	0.60
	100	59	0.59
	140	60	0.43
	140	63	0.45
	145	70	0.48
	145	70	0.48
	150	68	0.45
	155	72	0.46
0-500	120	66	0.55
	190	110	0.58
	240	138	0.58
	250	118	0.47
0-5000	300	94	0.31
		Mean	0.56

Figure TAA : Pressurized Ion Chamber Readings
versus
Micro-R-Reading
(Approximately One Meter Above Surface)



III. Multi-Channel Analyzer Spectrums

A. Room 202

The first attempt to identify the contamination found in Room 202 was made during the Preliminary Survey. A 3"x4" sodium iodide crystal was connected to a portable multi-channel analyzer (MCA). The MCA was calibrated to the 661 keV peak of a cesium-137 check source. Also, a Coleman brand gas lantern mantle purchased in a local hardware store and believed to be similar to those manufactured by Lindsay Light Company, was used to obtain a mantle spectrum. The spectrum from Room 202 was obtained by setting the crystal directly on the carpet over one of the highest reading spots in the room. No attempt was made to subtract background.

All three spectrums are plotted in Figs. 23 and 24 in the Main Report. It can be noted that the 583 keV thallium-208 peak corresponds well to a similar peak for the mantle and falls about where expected based on the cesium-137 peak at 661 keV. The distinctive thallium-208 peak at 2615 keV is well defined in the Room 202 spectrum, but much less well defined in the mantle spectrum. Also, probably due to the close proximity of the sodium iodide crystal to the floor source, there is a sum peak formed at 3198 keV (2615+583 keV). Because the MCA was only calibrated at a single point, the energy to channel relationship was not as good as at higher gamma energies. No attempt was made to quantify the floor source activity.

B. Room 8

The highest reading point in the building was located in Room 8 in the basement at what appeared to be an old chimney. A hole about a meter off of the floor was partially filled with concrete.

A spectrum was taken there by placing the sodium iodide crystal in contact with the chimney. See Fig. 24 in the Main Report. For comparison two other spectrums were taken. One again shows the 661 KeV peak for the cesium-137 check source. The other is the spectrum of a small quantity of thorium oxide. Before the Room 8 spectrum was taken the 2615 keV peak of the thorium oxide was used to calibrate the MCA. It appears there may have been some drift of the MCA during collection of the spectrums. No attempt was made to quantify the activity of the chimney source.

IV. Smear Data

Two smears were taken during the Preliminary Survey in the basement at the points shown in Fig. 3 in the Main Report. The Illinois Department of Nuclear Safety Laboratory performed gross alpha, gross beta tests on the smears. The results follow on the computer printout sheet (Table TA3). When converted to disintegrations per minute (dpm) per 100 cm^2 wipe the results are as follows:

Smear #1	Gross Alpha	$2.28 \times 10^{-7} - 1.93 \times 10^{-7}$ uCi/wipe
		0.506 - 0.428 dpm/100 cm^2
	Gross Beta	$<4.91 \times 10^{-7}$ uCi/wipe
		<1.09 dpm/100cm^2
Smear #2	Gross Alpha	$2.41 \times 10^{-6} - 5.00 \times 10^{-7}$ uCi/wipe
		5.35±1.11 dpm/100cm^2
	Gross Beta	$1.06 \times 10^{-6} \pm 6.66 \times 10^{-7}$ uCi/wipe
		2.35±1.48 dpm/100 cm^2

Table TA3

DATE 1/21/81 MICROFILM ----

CDDCF017 LABORATORY INPUT SHEET FOR RADIOLOGICAL SAMPLES PAGE 4

TA8

TRAN CODE 45
SAMPLE KEY 8035845059 SAMPLE DATES 11/24/80
PROGRAM CODE FLM 11/24/80
FACILITY ID LINDSAY LIGHT BLDG 161 E GRAND CHICAGO WIPE #1
REGION 2B SAMPLE TYPE WIPE
COLLECTOR ID 646 ANALYSIS DATES 1/ 5/81
1/ 7/81

	PARAMETER ID	R E S U L T			
GROSS ALPHA	4110	.22826881E -6	+-	.19253326E -6	UCI/W (.506 dpm/100 cm^2)
GROSS BETA	4120	LESS THAN		.49125403E -6	UCI/W (1.09 dpm/100 cm^2)

DATE 1/21/81 MICROFILM ----

CDGCF017 LABORATORY INPUT SHEET FOR RADIOLOGICAL SAMPLES PAGE 5

TAG

TRAN CODE 45
SAMPLE KEY 8035845067 SAMPLE DATES 11/24/80
PROGRAM CODE FLM 11/24/80
FACILITY ID LINDSAY LIGHT BLDG 161 E GRAND CHICAGO WIPE #2
REGION 2B SAMPLE TYPE WIPE
COLLECTOR ID 646 ANALYSIS DATES 1/ 5/81
1/ 7/81

	PARAMETER ID	RESULT				
GROSS ALPHA	4110	.24095041E -5	+-	.49959815E -6	UCI/W	(5.35 dpm/100 cm^2)
GROSS BETA	4120	.10596226E -5	+-	.66358740E -6	UCI/W	(2.35 dpm/100 cm^2)

The bases of comparison for the smears is the Nuclear Regulatory Commission's "Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestrected Use or Termination of Licenses For Byproduct, Source, or Special Nuclear Material". Excerpted Table I is copied here and shows that the natural thorium limits for removable gross alpha are 200 dpm/100 cm^2 and for removable gross beta are 1000 dpm/100 cm^2. All measured values listed above are well below the natural thorium limits.

V. Thermoluminescent Dosimeter Data

A. Calibration Data

Thermoluminescent dosimeters (TLD-100) were first sorted. One hundred TLD's were annealed by the common procedure of 400°C for one hour,one minute cooling at room temperature, 2 hours at 100°C. Annealed chips were all irradiated to 500 mR with a radium source at Argonne National Laboratory (ANL). TLD's were read once and all chips that fell outside 5% of the mean were culled out.

A calibration curve was obtained by irradiating sorted chips with ANL's radium source to levels from 10-100 mR. Each chip was read by the process suggested by the Harshaw Chemical Company, manufacturer of both our TLD's and our reader. The process is to read a chip, turn it over and read it twice (identified as A, B, C, readings, respectively). Annealed but unexposed chips are also read (identified as D reading). The net reading value is obtained by the relationship (A-C) + (B-C) -D. This process gave us the calibration curve in Fig. TAB.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDE[a]	AVERAGE[b c]	MAXIMUM[b d]	REMOVABLE[b e]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm β-γ/100 cm^2	15,000 dpm β-γ/100 cm^2	1000 dpm β-γ/100 cm^2

[a]Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b]As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c]Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d]The maximum contamination level applies to an area of not more than 100 cm^2.

[e]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f]The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

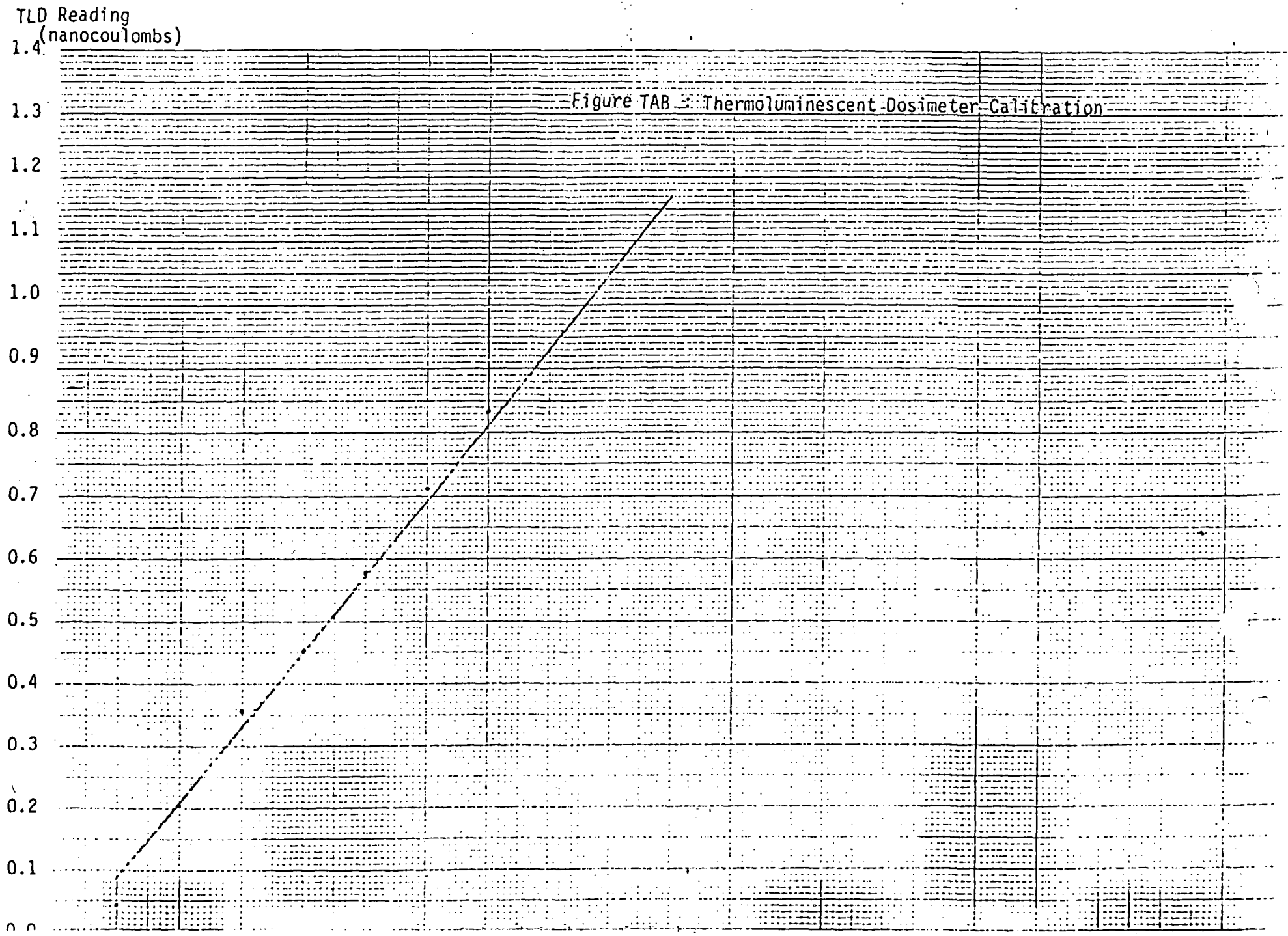


Figure TAB - 3: Thermoluminescent Dosimeter Calibration

Once the calibration was obtained, sorted chips were annealed and placed in amulets obtained from the Illinois Department of Nuclear Safety. Three chips went in each amulet. Fifteen amulets were hung in areas in the Lindsay building deemed critical by the Preliminary Survey. See Fig. 25 in the Main Report. After a 39 day exposure the amulets were collected and read immediately. The process for reading was as described above except that in place of a reading for an annealed but unexposed chip, the dark current was substituted. Results are given in Table TA4. The period exposure numbers were reduced to hourly exposure rates and then converted to weekly and annual exposures based upon continuous occupancy (168 hours/week, 8760 hours/year) and workplace occupancy (40 hours/week, 2000 hours/year). The latter exposure is most relevant in this situation.

B. Exposure Sites

Exposure sites were chosen based upon the Preliminary Survey results. Namely, Room 202 showed considerable, spotty contamination and the first floor showed elevated gamma readings over the receptionist desk and a wall-pipe area in a front office. A third floor office, Room 318 was selected for background. Based upon the results of the Comprehensive Survey additional TLD's could have been placed in Room 8 in the basement, in the entrance way to Room 319, in the backrooms of Room 301 and in the short 4th floor hallway east of center on the floor. From the TLD results obtained it did not appear further TLD studies were warranted.

Thermoluminescent Dosir · Results For 161 East Grand A ue, Chicago, Illinois

Table TA4

TLD Chip No.	Location	Dose* (mrem)	Dose* Rate (mrem/hr)	Continuous (mrem/wk	Exposure**** (mrem/yr)	Workplace (mrem/wk)	Exposure** (mrem/yr)
1	Under Secretary's Chair	61	0.065	10.95	569	2.60	130
2	Under Draftman's Chair	52	0.055	9.27	482	2.20	110
3	Under Draftman's Chair	45	0.048	8.08	421	1.92	96
4	Under Draftman's Chair	39	0.042	7.08	368	1.68	84
5	Under Conference Table	100	0.107	18.03	937	4.28	214
6	On West Wall Above Conference Table	23	0.025	4.2	219	1.00	50
7	On East Wall In Conference Room	61	0.065	10.95	569	2.60	130
8	On West Wall In Main Drawing Room	54	0.058	9.77	508	2.32	116
9	On East Wall In Main Drawing Room	39	0.042	7.08	368	1.68	84
10	On South Wall In Storage Room	40	0.043	7.24	377	1.72	86
11	On West Wall In Entrance Foyer	46	0.049	8.25	429	1.96	98
12	Under Lip Of Reception Desk	56	0.060	10.11	526	2.40	120
13	On Pipe Proximal to Grand Avenue	94	0.100	16.80	880	4.00	200
14	On Side of Desk Near Grand Avenue	65	0.069	11.62	604	2.76	138
15	Over Arch In Middle of Room	37	0.039	6.57	342	1.56	78

* Exposure period 1/22/81, 8:30 p.m. until 3/2/81 a.m., Total hours 938.5

** Chips 1-11 were located in Room 202, chips 12-14 were located on the first floor, and chip 15 was located in Room 318.

*** Continous exposure is considered to be 168 hours for one week and 8760 hours for one year.

**** Workplace exposure is considered to be 40 hours for one week and 2000 hours for for one year.

VI. Air Sample Data

A. Air Sample Sites

During the Preliminary Survey an air sample was taken in Room 202 where elevated gamma readings were obtained and in Room 302 which was believed to be uncontaminated. Subsequent surveys showed the room to have a slightly elevated exposure level.

During the Comprehensive Survey air samples were collectd in Room 8 (basement) near the highly contaminated chimney, in Room 202 which showed extensive contamination and was fully occupied, and in Room 306 which showed background levels.

B. Air Sample Results

During the Preliminary Survey two air samples were collected in Rooms 202 and 302 to get a rough estimate of the relative alpha radiation air concentrations between a known area of contamination and an area believed to be low or free from contamination. An air sample at 50 liters/minute was used with glass fiber filters. Since then a recalibration has been performed and the actual flow was 41.8 liters/minute. The alpha scintillation detector was also recalibrated and found to have an efficiency of 25%. Although glass fiber filters are not preferable for alpha collections because of deep trapping and self-absorption by the filter, these were all that were available for use at the time. Because of time constraints on overtime personnel in the building we were not able to stay long enough to allow for the normal 5 hour radon decay. Due to all of these drawbacks only a relative concentration is computed here and this is just for the record. Later collections with surface filters are considered superior. (See Table TA5)

Table TA5 Preliminary Survey Air Sample Data and Calculations

Room 202			
Time	Counts/minute*	Time	Counts/minute*
6:52 PM	1710	7:09 PM	1819
6:53	1664	7:10	1829
6:54	1659	7:11	1811
6:56	1685	7:13	1834
6:57	1703	7:14	1752
6:58	1683	7:15	1777
7:02	1777	7:16	1883
7:03	1798	7:17	1824
7:04	1802	7:18	1899
7:05	1735	7:19	1857
7:07	1773	7:21	1841
7:08	1847	Average	1781
		Sampling Time 64 minutes	

* Counting time 1 minute

Room 302	
Time	Counts/minute*
7:35 PM	310
7:38	309
7:39	331
7:40	316
7:41	315
7:42	316
Average	316
Sampling Time 39 minutes	

Blank Filter	
Time	Counts/minute*
7:24 PM	4
7:25	0
7:27	3
Average	2

B. Ogden Method

The method of T.L. Ogden (paper attached) was used in determining the working level* concentrations for radon-220 and radon-222 in Rooms 8,202 and 306.

The method requires at least a 2.5 hour collection, followed by a 20 minute wait and then counting of the filter for 85 and 105 minutes. In this survey collections ranged from 13:26 hours to 18:55 hours. Thoron and radon working levels were computed from:

$$W_T = 6.068 \times 10^{-10} c\ (d \cdot A_2 - A_1)/V$$

$$W_R = 4.736 \times 10^{-9}\ a\ (b \cdot A_1 - A_2)/V$$

where

a, b, c, d = Constants based upon wait times and sampling times, these are obtained from tables or from equations generated by Ogden

A_1, A_2 = counts in 85 and 105 minute periods, respectively, corrected for counter efficiency and blank filter counts

V = collection rate in liters per second

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*Technically the definition for the radon-220 working level is the quantity of lead-212 per liter of air which in decaying through bismuth-212, polonium-212 and thallium-208 to lead-208 will yield 1.3×10^5 MeV of alpha energy. The definition for radon-222 is any combination of polonium-218, lead-214 and bismuth-214 per liter of air which will yield 1.3×10^5 MeV of alpha energy in decaying completely through polomium-214 to lead 210. (From R.L. Rock, "Sampling Mine Atmospheres for Potential Alpha Energy due to the Presence of Radon-220 (Thoron) Daughters", Mining Enforcement and Safety Administration, Informational Report 1015).

AIR SAMPLES

I. Room 202, Average 1781 counts/minute

Background 2 cpm

Net, Room 202 1779 cpm

Air Sampling Rate 41.8 liters/minute

Air Sampling Time 64 minutes

Air Sampling Volume 2675 liters = 2.675×10^6 milliliters

Concentration

$$\frac{1779 \text{ cpm}}{2.675 \times 10^6 \ \frac{}{\text{ml}}} = 6.65 \times 10^{-4} \text{ cpm/ml}$$

II. Room 302, Average 316 cpm

Background 2 cpm

Net, Room 302 314 cpm

Air Sampling Rate 41.8 liters/minute

Air Sampling Time 39 minutes

Air Sampling Volume 1630 liters = 1.63×10^6 ml

Concentration

$$\frac{314 \text{ cpm}}{1.63 \times 10^6 \ \frac{}{\text{ml}}} = 1.93 \times 10^{-4} \text{ cpm/ml}$$

III. Relative Concentration

$$\frac{\text{Room 202}}{\text{Room 302}} = \frac{6.65 \times 10^{-4} \text{ cpm/ml}}{1.93 \times 10^{-4} \text{ cpm/ml}} = 3.45$$

Route Benkert

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RADON AND THORON WORKING LEVELS FROM ORDINARY INDUSTRIAL-HYGIENE DUST SAMPLES

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Abstract—The method is an improvement of that of OGDEN (1974), and has the following advantages over other methods: the measurements do not require special samples, but can be made on ordinary airborne dust samples; the long sampling time (> 2½ h) is more suitable for estimating average exposure than the conventional short sample; radon and thoron working levels are both obtained; and the method is very sensitive (0.001 WL is easily measured). Side-by-side comparisons show good agreement with other methods.

INTRODUCTION

WORKERS in many types of mine are exposed to relatively high concentrations of radon and thoron, and it has been proposed that miners exposed to an average radon daughter concentration exceeding 0.1 WL should be subject to medical and environmental surveillance (STRONG *et al.*, 1975). This note describes how average working levels can be determined from dust samples of the type already commonly taken in mines and other industries. The method is an improvement of that described by OGDEN (1974). The earlier method was restricted to dust samples taken at 2.5 l./min (0.0417 l./s) for at least 5.7 h, and required a 50 min wait between the end of sampling and the start of counting. The new version is much more flexible.

METHOD

An airborne dust sample is collected on filter paper at a sampling rate V (l./s) for a period T of at least 2½ h. After a wait t_Q of at least 20 min from the end of sampling the dust-covered filter is exposed to an alpha detector, and the alpha particles given off are counted for two successive periods, the first lasting 85 min and the second 105 min. The counts are corrected for counter efficiency (and the background count in the absence of dust) to give the number of disintegrations A_1 and A_2 in these two periods. The radon working-level value w_R and the thoron value w_T are given by

2½ h sample

Following (after the other in sequence; i.e. 20–105 and 105 to 210.

$$w_R = 4.736 \times 10^{-9}\, a(bA_1 - A_2)/V$$
$$w_T = 6.068 \times 10^{-10}\, c(dA_2 - A_1)/V \qquad (1)$$

lps

where a, b, c and d are given in Table 1 in terms of sampling time T and wait time t_Q (see Appendix for theory).

Although standards are in terms of radon working levels, the thoron contribution is often appreciable when radon levels are low, for example in coal mines or on the surface, and the total working-level value ($w_R + w_T$) is then perhaps a better measure of the hazard. Some uncertainly is introduced by γ, the activity concentration ratio of thorium-C to thorium-B (see OGDEN, 1974). Usually, $\gamma \ll 1$ (DUGGAN, 1973), and the

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TABLE 1. VALUES OF a, b, c, AND d FOR SUBSTITUTIONS IN EQUATION (1)

Sampling Flow T (cfs)		Well Flow t_Q (min) 20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
150	a	5.81	6.51	7.20	8.20	9.21	10.36	11.65	13.12	14.79	16.67	18.01	21.23	23.97	27.08	30.61
	b	1.39	1.37	1.35	1.34	1.32	1.31	1.30	1.28	1.27	1.26	1.26	1.25	1.24	1.23	1.22
	c	22.74	22.27	21.86	21.43	21.16	20.87	20.61	20.37	20.16	19.98	19.81	19.66	19.53	19.41	19.31
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
160	a	5.18	6.50	7.37	8.27	9.28	10.43	11.74	13.21	14.88	16.77	18.91	21.34	24.09	27.20	30.73
	b	1.37	1.36	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22
	c	21.37	20.93	20.54	20.20	19.89	19.62	19.38	19.16	18.96	18.79	18.64	18.50	18.37	18.27	18.17
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
170	a	5.94	6.64	7.43	8.33	9.35	10.51	11.81	13.29	14.96	16.86	19.00	21.43	24.19	27.31	30.85
	b	1.36	1.35	1.33	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22
	c	20.16	19.75	19.39	19.06	18.78	18.52	18.29	18.09	17.91	17.75	17.60	17.47	17.36	17.26	17.17
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
180	a	5.99	6.70	7.49	8.40	9.42	10.57	11.88	13.36	15.04	16.94	19.09	21.53	24.29	27.41	30.96
	b	1.35	1.34	1.32	1.31	1.30	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.22	1.21
	c	19.09	18.70	18.36	18.06	17.79	17.55	17.33	17.14	16.97	16.82	16.68	16.56	16.46	16.35	16.28
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
190	a	6.04	6.75	7.55	8.45	9.40	10.64	11.95	13.43	15.12	17.02	19.18	21.61	24.38	27.51	31.07
	b	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21
	c	18.13	17.77	17.45	17.16	16.90	16.68	16.48	16.29	16.14	15.99	15.86	15.75	15.65	15.56	15.48
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
200	a	6.09	6.80	7.60	8.51	9.54	10.70	12.01	13.50	15.19	17.09	19.25	21.70	24.47	27.60	31.16
	b	1.33	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.21
	c	17.27	16.93	16.63	16.35	16.11	15.90	15.71	15.54	15.38	15.25	15.13	15.02	14.93	14.83	14.77
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
210	a	6.14	6.85	7.65	8.56	9.59	10.75	12.07	13.56	15.25	17.16	19.33	21.77	24.55	27.69	31.26
	b	1.32	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20
	c	16.50	16.17	15.88	15.63	15.40	15.19	15.01	14.85	14.71	14.58	14.46	14.36	14.27	14.19	14.12
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
220	a	6.18	6.89	7.70	8.61	9.64	10.81	12.13	13.62	15.31	17.23	19.39	21.85	24.63	27.77	31.34
	b	1.32	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.20	1.20
	c	15.80	15.49	15.21	14.97	14.75	14.56	14.39	14.23	14.09	13.97	13.86	13.76	13.68	13.60	13.54
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
230	a	6.22	6.93	7.74	8.65	9.69	10.85	12.18	13.68	15.37	17.29	19.46	21.92	24.70	27.85	31.42
	b	1.31	1.30	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.21	1.21	1.21	1.20	1.20
	c	15.15	14.86	14.60	14.37	14.16	13.97	13.81	13.66	13.53	13.41	13.31	13.22	13.14	13.07	13.00
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
240	a	6.26	6.97	7.78	8.70	9.73	10.90	12.23	13.73	15.43	17.35	19.52	21.95	24.77	27.92	31.50
	b	1.30	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19
	c	14.58	14.29	14.04	13.82	13.62	13.44	13.28	13.14	13.02	12.91	12.81	12.72	12.64	12.57	12.52
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
260	a	6.33	7.05	7.86	8.78	9.81	10.99	12.32	13.82	15.53	17.45	19.63	22.10	24.89	28.06	31.64
	b	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19
	c	13.55	13.29	13.06	12.85	12.67	12.50	12.36	12.23	12.11	12.01	11.92	11.84	11.77	11.71	11.65
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
280	a	6.39	7.11	7.93	8.85	9.89	11.07	12.40	13.91	15.62	17.55	19.73	22.20	25.01	28.18	31.77
	b	1.28	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18
	c	12.68	12.43	12.22	12.02	11.85	11.70	11.57	11.45	11.34	11.25	11.16	11.09	11.02	10.97	10.92
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
300	a	6.45	7.17	7.99	8.91	9.95	11.14	12.47	13.98	15.70	17.63	19.82	22.30	25.11	28.28	31.88
	b	1.27	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18
	c	11.92	11.69	11.49	11.31	11.15	11.01	10.89	10.77	10.68	10.59	10.51	10.44	10.38	10.33	10.28
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
340	a	6.54	7.27	8.09	9.02	10.07	11.26	12.60	14.12	15.83	17.78	19.95	22.46	25.28	28.47	32.08
	b	1.25	1.24	1.24	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.19	1.19	1.18	1.18	1.17
	c	10.69	10.48	10.30	10.14	10.00	9.88	9.77	9.67	9.58	9.51	9.44	9.38	9.32	9.28	9.24
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
360	a	6.62	7.35	8.17	9.11	10.16	11.35	12.70	14.22	15.95	17.90	20.10	22.60	25.42	28.62	32.24
	b	1.24	1.23	1.22	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17
	c	9.72	9.54	9.38	9.23	9.11	8.99	8.89	8.80	8.73	8.66	8.60	8.54	8.49	8.45	8.42
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
420	a	6.69	7.42	8.24	9.18	10.24	11.43	12.78	14.31	16.04	18.00	20.21	22.71	25.54	28.74	32.37
	b	1.23	1.22	1.22	1.21	1.20	1.20	1.19	1.19	1.19	1.18	1.18	1.17	1.17	1.17	1.17
	c	8.94	8.78	8.63	8.50	8.38	8.28	8.19	8.11	8.04	7.98	7.92	7.87	7.83	7.79	7.76
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
460	a	6.74	7.47	8.30	9.24	10.30	11.50	12.86	14.39	16.12	18.08	20.30	22.80	25.64	28.85	32.48
	b	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.17	1.16	1.16
	c	8.31	8.15	8.02	7.90	7.79	7.70	7.61	7.54	7.47	7.42	7.37	7.32	7.28	7.25	7.22
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
500	a	6.78	7.52	8.35	9.29	10.35	11.56	12.92	14.45	16.19	18.15	20.37	22.88	25.72	28.94	32.58
	b	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.16	1.16	1.16	1.16
	c	7.78	7.64	7.51	7.40	7.30	7.21	7.13	7.06	7.00	6.95	6.90	6.86	6.82	6.79	6.76
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50
540	a	6.82	7.56	8.39	9.34	10.40	11.60	12.97	14.50	16.24	18.21	20.43	22.95	25.79	29.01	32.66
	b	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.18	1.17	1.17	1.17	1.16	1.16	1.16	1.16
	c	7.33	7.20	7.08	6.97	6.88	6.80	6.73	6.66	6.60	6.55	6.51	6.47	6.44	6.41	6.38
	d	6.31	6.44	6.55	6.66	6.76	6.86	6.95	7.03	7.11	7.19	7.26	7.32	7.39	7.45	7.50

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entries in Table 1 assume $\gamma = 0$, but levels for other values of γ can be calculated from the equations in the Appendix. The changes produced by assuming other values of γ are usually <0.001 WL.

The daughter atoms whose activity is measured usually attach to fine dust, and in coal mines the same w values are obtained from respirable and total dust samples. Where dust levels are low, however, a sample from an open filter holder may be preferable. Any size of filter can be used. It may be best to use a membrane filter, where the dust sits on the surface of the filter, but glass fibre filters appear to be satisfactory. For samples of a few milligrams, absorption in the dust should not be a problem. Where concentrations vary with time, the method gives greater weight to the end of the sampling period, but errors in exposure estimate due to this will not usually exceed 20% (OGDEN, 1974). For measuring average exposure to the worker, this method, with its relatively long sampling time, should give a better estimate than a method requiring a very short sample.

Sensitivity is greatest for high values of V and low values of t_Q, but there is no difficulty in measuring a normal surface value of 0.001 WL. The theory assumes $t_Q \gg \tau_{RA}$ (4.5 min), which is why the recommended minimum t_Q is 20 min.

VERIFICATION

As opportunity has arisen, side-by-side comparison has been made with methods used by other workers. The results are given in Table 2.

TABLE 2. RESULTS OF SIDE-BY-SIDE COMPARISONS WITH OTHER METHODS

Comparison method	Duration of test sample (h)	Number and duration of comparison samples	Mean comparison value (WL) (range)	Equation (1) results w_R (WL)	Equation (1) results w_T (WL)
JAMES and STRONG (1974)	5.7	8 of 5 min	0.0009* (0.0005–0.0012)	0.0010	0.0004
JAMES and STRONG (1974)	2.7	2 of 5 min	0.0041† (0.0037–0.0045)	0.0033	0.0020
JAMES and STRONG (1974)	3.8	3 of 5 min	0.0054† (0.0046–0.0062)	0.0033	0.0025
Modified Kusnetz‡	2.5	9 of 10 min	0.040† (0.034–0.051)	0.047	0.002
Modified Kusnetz‡	2.5	10 of 10 min	0.134† (0.110–0.147)	0.149	0.006
Modified Kusnetz‡	2.5	10 of 10 min	0.154† (0.127–0.179)	0.177	0.004
Modified Kusnetz‡	2.5	10 of 10 min	0.181† (0.151–0.211)	0.201	0.004

* Corrected for thoron daughters.
† Assuming thoron daughters negligible.
‡ See STRONG *et al.* (1975).

It can be seen that in five of the seven comparisons equation (1) gave radon levels 10–20% higher than the comparison method, a difference well within the expected possible errors. In the other two cases, the comparison method assumed thoron

daughters to be negligible, and our results show this to be unjustified. The comparison method would then be expected to give a result between our w_R and our $w_R + w_T$, as observed. The first three comparisons in Table 2 were carried out in surface buildings, and the other four in an iron-ore mine.

As a check on Table 1, the same sample was evaluated for four different values of t_Q, *viz.* 10, 30, 50 and 70 min. The answers were within a few per cent of each other.

The decay of activity of a coal mine dust sample was followed in detail by taking counts every five minutes for four hours. The decay curve predicted by the calculated values of w_R and w_T fitted the results exactly, confirming that the theory accounted for all the observed activity.

Acknowledgement—Thanks are due to the various NRPB personnel who co-operated in the comparisons with other methods.

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APPENDIX—THEORY

THE theory given by OGDEN (1974) was aimed at coal-mine sampling, and covered samples taken for about a shift at 2½ l./min, with a wait time t_Q of 50 min. The theory can be extended as follows (using the symbols of OGDEN, 1974).

Different sampling rates can be accommodated by putting the sampling rate V (l./s) in equations (7) and (14) of OGDEN (1974) instead of the specific value 0.0417 l./s, and carrying V through to equations (16) and (17).

Shorter sampling times than about 5.7 h invalidate the assumption $\exp(-T/\tau_{TC}) \ll 1$, made in equation (12). However, the departure from a shift length of 7 h (2.52×10^4 s) can be allowed for by factors

$$k_{TB} = \{1 - \exp(-T/\tau_{TB})\}/\{1 - \exp(-2.52 \times 10^4/\tau_{TB})\}$$
$$k_{TC} = \{1 - \exp(-T/\tau_{TC})\}/\{1 - \exp(-2.52 \times 10^4/\tau_{TC})\}$$

Equation (12) of OGDEN (1974) then becomes (taking $\tau_{TB} = 5.527 \times 10^4$ s and $\tau_{TC} = 5247$ s; T in seconds)

$$A_T = n_{TB}\{0.4047\, k_{TB} \exp(-1.809 \times 10^{-5}\, t) - 0.09415\,(1.105 - \gamma)\, k_{TC} \exp(-1.906 \times 10^{-4}\, t)\}$$

k_{TB} is the same as k in OGDEN (1974) (k is incorrectly defined in the list of symbols there as the reciprocal of its true value). T must still exceed 2½ h, unless similar corrections are made to the radon daughter terms.

Counting begins at a time t_Q after the end of sampling. A_1 alpha particles are emitted in the next 85 min and A_2 in the following 105 min. The count-rate equation (14) of OGDEN (1974) can be integrated between these limits to give

$$w_R = 4.736 \times 10^{-9}\, a(bA_1 - A_2)/V$$
$$w_T = 6.068 \times 10^{-10}\, c(dA_2 - A_1)/V$$

where

$$a = 10^5 K/(JM - LK)$$
$$b = M/K$$
$$c = 10^5 L\,(1 + 0.0949\gamma)/(JM - LK)$$

$$d = J/L$$
$$J = 3.859\times10^{4}\exp(-4.310\times10^{-4}\,t_Q) - 1.821\times10^{4}\exp(-5.862\times10^{-4}\,t_Q)$$
$$K = 1.972\times10^{3}\,k_{Ta}\exp(-1.809\times10^{-3}\,t_Q) - 309.6\,(1.105-\gamma)k_{Tc}\exp(-1.906\times10^{-4}\,t_Q)$$
$$L = 4.499\times10^{3}\exp(-4.310\times10^{-4}\,t_Q) - 940.6\exp(-5.862\times10^{-4}\,t_Q)$$
$$M = 2.197\times10^{3}\,k_{Ta}\exp(-1.809\times10^{-3}\,t_Q) - 131.7\,(1.105-\gamma)k_{Tc}\exp(-1.906\times10^{-4}\,t_Q)$$
(t_Q in seconds).

The overnight collections which we used foreclosed use of Ogden's tables so that constants a,b,c,d, were derived from the equations and then cross-checked by plotting each constant from the table (See Fig. TAC) and extrapolating to the desired sampling time. Both methods agreed.

In the counting process for the sample filter, total counts during the 85+105 minute periods were recorded every 5 minutes. For each room total counts versus time were plotted in Fig. TAD. No attempt was made to subtract background since this would be a minor correction. No attempt was made to correct for counter efficiency, although multiplying counts by 4 or 1/25% would do this. Two points can be made with this graph. First, all rooms show similar decay rates, only the level is different. Second the flatness of the decay curve is indicative of predominantly thoron decay product content on the filter. As shown by Rock in "Sampling Mine Atmospheres for Potential Alpha Energy due to the Presence of Radon-220 (Thoron) Daughters," Informational Report 1015, Mining Enforcement and Safety Administration, a mixed radon-thoron sample would show a rapid decrease in count rate with a half life on the order of 26.8 minutes followed by a long half-life decay on the order of 10.64 hours. The first is due to the radon (lead-214) the second is due to the thoron (lead-212). Here no rapid decay is evident indicating little radon. The half life is about 14 hours supporting a largely thoron atmosphere.

C. Air Sample Results

Table TA6 gives collection data on air samples taken during the Comprehensive Survey. These collections were aimed at measuring thoron and radon working levels. Data and results using the Ogden Method are given in Table TA7.

Figure TAC : Constants' Values versus Sampling Time (minutes)
(Used in Ogden Method for Determination of Radon and Thoron Working Levels)

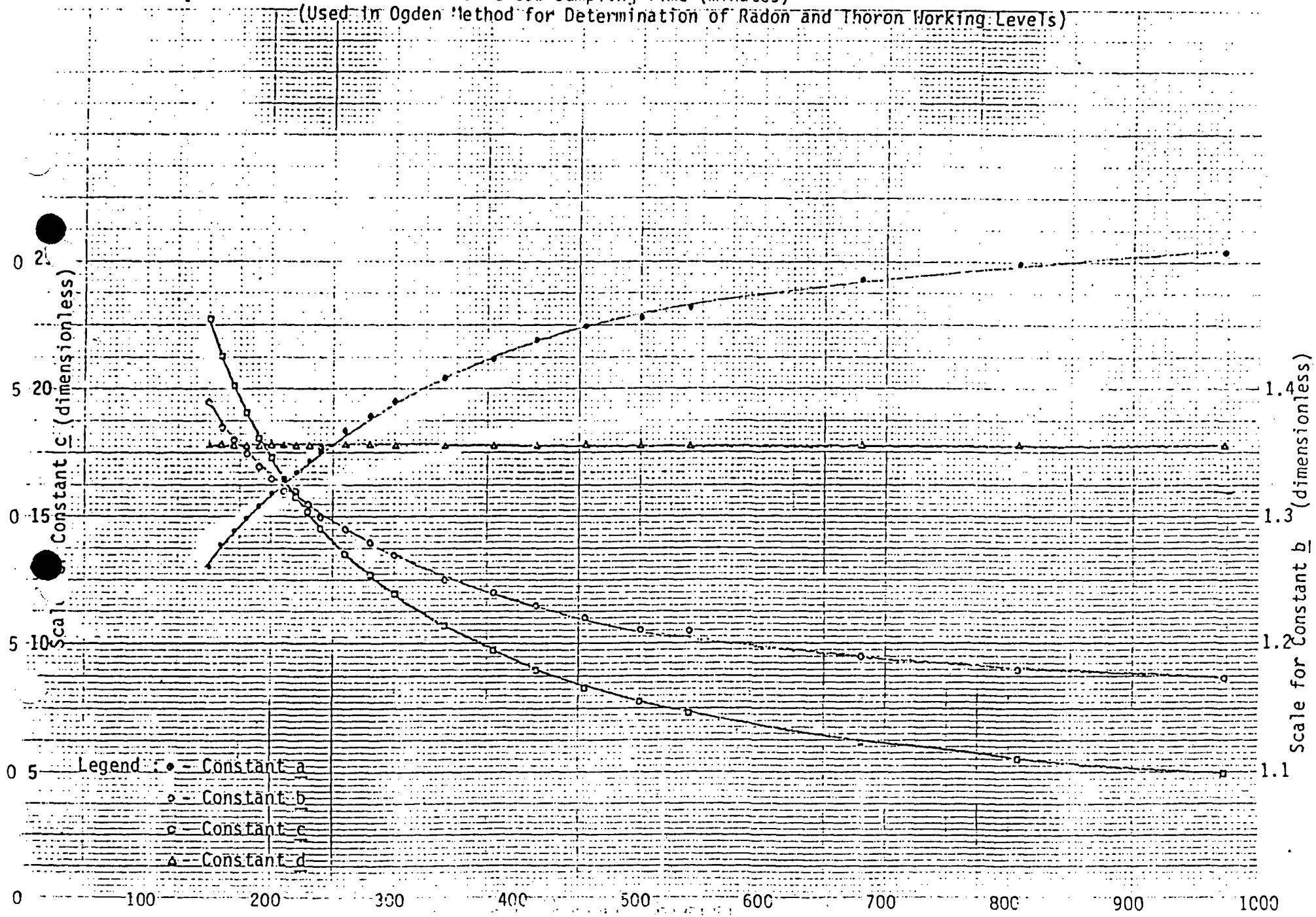

Table TA6: Air Sample (Filter) Collection and Background Counting Periods

Collection Site	Collection Period	Time (min)	Background* Period	Background Time (min)	Flow Rat (l/mir
Room 8	Start 2/25/81, 1:40 P.M. Stop 2/26/81, 8:35 A.M.	1135	2/26/81, 12:10 P.M. 2/25/81, 1:35 P.M.	85	18.4
Room 202	Start 2/24/81, 4:20 P.M. Stop 2/25/81, 8:33 A.M.	973	2/25/81, 12:05 P.M. 2/25/81, 1:30 P.M.	85	18.
Room 306	Start 2/26/81, 7:10 P.M. Stop 2/27/81, 8:36 A.M	806	2/27/81, 12:10 P.M. 2/27/81, 1:35 P.M.	85	18

*Sample (Filter) counting times were between the end of collection and the beginning of the background count.

Working Level Results Using Ogden's Method

Table TA7

		Room 8	Room 202	Room 306
Calibrated (1/min)		18.42	18.42	18.42
		0.307	0.307	0.307
Alpha Detector Efficiency		25%	25%	25%
Counting Periods	85 Minutes (counts	1,033,280	670,340	95,320
	105 Minutes		762.722	107,587
Ogden Contants	a	7.071	7.04	6.99
	b	1.169	1.174	1.181
	c	4.533	4.94	5.533
	d	6.315	6.315	6.315
Background Collection Time (min)		85	85	85
	Counts	134	132	74
	Count Rate counts/min	1.58	1.55	0.87
Working Levels	W_T(WL)	0.229	0.162	0.0255
	W_R(WL)	0.0139	0.0105	0.00215

The regular meeting of BOARD OF DIRECTORS held in the office of Lindsay Light Company, 161 East Grand Avenue, Chicago, Illinois, September 8th, 1914, four P. M.

There were present:

Chas. R. Lindsay, Jr.
George P. Gilman,
Jos. M. Sherburne

Same being a majority of the directors of Lindsay Light Company.

Chas. R. Lindsay, Jr. in the chair.

The following resolution was adopted:

Resolved that Lindsay Light Company rent building #316 to #322 Illinois Street, Chicago, for manufacturing purposes necessary to this business for a period of five years and four months beginning from January 1st, 1915 to April 30th, 1920 at $150.00 a month, this building to be rented from The Chicago Dock & Canal Company as per their lease September 3rd, 1914.

There being no further business before the meeting, it was adjourned.

Jos. M. Sherburne

SECRETARY.

TRADE MARK REGISTERED

JOS. M. SHERBURNE, PRESIDENT.
HERBERT N. McCOY, VICE PRES'T.
OTTO N. BERNDT, SEC'Y & TREAS.

Lindsay Light Company

Chicago September 9, 1922.

To the Stockholders of

Lindsay Light Company:

Enclosed herewith is a formal notice and blank proxy relative to the special meeting of our stockholders to be held on September 20th, 1922.

Your Directors feel that an explanation is proper at this time as to the reason why it is desired to increase our capital stock.

The real estate and buildings carried on our books at $146,955.76, have recently been appraised and show a replacement value of over $200,000.00. The Directors and the Officers of this Company have realized that this property which they now occupy is far too valuable for manufacturing gas mantles. The lease on the monazite refinery which we occupy on Illinois Street expires April 30th, 1923.

We all feel that the time has now arrived when arrangements should be made to get into a location where the entire operations of this business might be concentrated and operated with greater economy. It would seem to us unwise to go into new property with the investment that would be required, if it were possible to take over a property engaged in this kind of business adapted to our needs.

Because of the above reasons we have concluded that our interests would be best served by completing negotiations which have been carried on for some time. This $200,000.00 increase in Preferred Capital Stock of this Company is to be used toward acquiring the manufacturing property of the Block Gas Mantle Company of Youngstown, Ohio, if the deal, as now planned, can be consummated, which consists of approximately three acres of land, exceedingly well located for shipping facilities, etc. Of course, if for any reason the deal cannot be consummated as now planned, the capital stock will not be increased or the stock will not be issued at this time.

Your Officers and Directors have investigated the value of the property to be acquired very carefully and are of the opinion that it is reasonably worth considerably in excess of the par value of the Lindsay Preferred Stock to be issued in exchange therefor.

We believe it is an economic move of considerable value and will tend to increase the earnings and the value of the stock of the Lindsay Light Company.

For the reasons above stated your Directors and Officers believe this move an exceedingly wise one and we hope that you will send in your proxy at once.

Yours very truly,

JOS. M. SHERBURNE,
President.

Minutes of the regular annual meeting of the Stockholders of Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, January 20th, 1920 at the hour of four o'clock P. M., pursuant to notice.

-:-

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

The Secretary presented to the meeting a copy of the notice which had been mailed to each of the Stockholders. Said notice to the Stockholders, to which is attached an affidavit showing the mailing thereof, to each and every Stockholder, is in the words and figures following, viz:

Chicago, January 6-1920.

To the Stockholders of the
LINDSAY LIGHT COMPANY:

YOU ARE HEREBY NOTIFIED that the regular annual meeting of the Stockholders of the Lindsay Light Company will be held on Tuesday, the 20th day of January, 1920, at the hour of four o'clock P. M., at the general offices of the Company, 161 East Grand Avenue, Chicago, Illinois, for the purpose of electing Directors for the ensuing year, and for the transaction of such other business as shall come before said meeting.

You are also hereby notified that at said meeting, the question of increasing the number of Directors of the Lindsay Light Company from five to seven will be presented to the Stockholders for consideration and action.

If you have not already done so, please send in a proxy so that your stock may be voted at the meeting.

Yours very truly,
LINDSAY LIGHT COMPANY
Otto N. Berndt.
SECRETARY.

State of Illinois }
County of Cook } ss.

Mr. Otto N. Berndt, being first duly sworn on oath says that a duplicate of the above notice was mailed to each and every Stockholder of the Lindsay Light Company at Chicago, Illinois, postage prepaid, at the last known address of each Stockholder, respectively, on January 9th, 1920.

Subscribed and sworn to before me, this day, the 20th day of January 1920.

Thereupon, the roll of Stockholders was called with the result that the following were found to be present:

Present in Person	Number of Shares Common	Preferred
Bremner, John B.	150	
Davis, J. W.	400	
Laubenheimer, Geo.	200	
McCoy, Herbert N.	520	400
Starr, Arthur P. Estate of	100	
Stenersen, C.	70	
Tydings, Oliver	100	200
Wilsey, Robert E.		50
Beste, H. C.		
Berndt, Otto N.		
Coffelt, O. T.		
Cordell, F. P.		
Buchannan, W. W.		
Hoggins, E.		
Hannah, W. P.		
Hellerman, L.		
Lanthrop, Jos. C.		
Lindsay, Jr., Chas. R.		
Sherburne, Jos. M.		
Sinai, Alexander		
	1540	650

Total present in Person ----------2,190

Present by Proxy	Number of Shares Common	Preferred
Mr. Jos. M. Sherburne, personally, holding proxies for the following:		
Alcan, Irvin	20	
Antonisen, W. M.	100	
Baecker, F. G.	10	
Bangs, Emma Ruth	10	
Bangs, Ruth	10	
Barton, Wm. S.	50	
Barrett, Oliver B.	100	
Baumbauer, John V.	5	
Bauer, Joseph	10	
Beattie, John	60	
Behrend, M. A.	50	
Bennett, J. Frank	200	
Berndt Sr., Otto		500
Beste, H. C.		1025
Beste, Mary H.		100

	Common	Preferred
B[illegible]el, Clarence A.	50	
Bigley, Joseph	25	
Blank, Emma	12	100
Blazek, Jos. F.	20	
Blanckencie, E. E.	10	
Blodgett, John J.	50	
Blomquist, A. F.	10	
Blonquist, Carl I.	50	
Boand, Lena J.		100
Boisot, Louis	300	
Boisot, Mary	20	
Bosker, Harry E.	30	
Bosshart, Chas. M.	160	
Boye, C. L.	200	
Broadhurst, Wallace C.	25	
Brinton, C. W.	15	
Breen, May E.	115	
Brown, Clarence	10	
Buettner, Louis F.	100	
Burns, Thomas	20	
Byer, Peter W.	30	
Bender, Geo. S.	10	
Carrie, Miss Beatrice	25	
Castle, R. S.	75	
Cederholmes, N. E.	10	
[illegible]ark, Geo. D.	50	
Clement, Curtis & Co.	585	
Cokins & Company	30	
Colby, J. A.	100	
Colligan, Patrick J.	30	
Colvin & Co., Wm. H.	2770	55
Conrad, J. W.	50	
Cross, Jas. W.	32	
Curtis, Robert M.	200	
Crowley, Martin J.	10	
Davison, Jessie E.	50	
Daly, Joseph D.	100	
Danahy, Nellie	10	
Danahy, Arthur	30	
Denvir, John F.	20	
De Hauriac, Antoinette	5	
Dohrman, Will H.	10	
Doran, Harry E.	25	
Dresher, Mrs. Elizabeth	10	
Dumais, Leo J.	10	
Dunlevy, Lorimer	15	
Donahoe, E. S.	10	
Enright, Teresa E.	100	
Edwards, Emma L.	10	
Egan, R. Ben.	50	
Eifrig, E. C.	10	
Esdohr, Herman H.	200	
Esdohr, Fred H.	100	
Falk, M. L.	100	
Farrell, Michael	115	
Faude, William	85	

	Common	Preferred
Favel, Nellie	10	
Fenimore, Alvin S.	50	
Feldmann, John L.	10	
Field, Wentworth G.	166	
Finesilver, Joe	35	
Ford, Arthur	3	
Frank, Fred W.	25	
Gauer, Nicholas J.	50	
Gazlay, William S.	20	
Gazlay, Richard C.	1	
Gardiner, Mary P.	20	
Geiger, May S.	20	
Gielow, Martha	25	
Gilman, Hattie S.	50	
Gilmore, Emma C.	10	
Goldsmith, Nathan	30	
Goldstone, David		20
Grant, Joseph O.	40	
Gunther, John	50	
Gunton, Ruby V.	5	
Gillis, Sadie Jones	5	
Haggerty, Mary J.	50	
Halvorson, Hedwig E.		50
Haines, Ernest H.	30	
Harmke, Charles	150	
Harris, Winthrop & Co.	585	
Hawley, Mrs. Frances H.	20	
Heffernan, Richard J.	40	
Heffernan, John J.	150	
Hefter, Mrs. Nettie	25	
Heiden, Wm. H.	15	
Henger, C. W.	120	80
Hector, Beatrice L.	40	
Henn, Frank J.	40	
Hinde, Thos. M.	100	
Hoebel, F. C.	50	
Holmquist, Anna		110
Hoggins, Edwin	10	
Hornblower & Weeks	925	
Hoover, Harry	10	
Hoover, W. W.	100	
Hulburd, Warren & Chandler	35	50
Hill, Frederick	10	
Hahn, Evelyn	5	
Ireland, Andrew J.	5	
Irvin, A. J.	100	
Isaacson, Roger S.	100	
Isaacson, Thora K.	50	
Jensen, Emilie J.	15	
Jensen, Julia E.	5	
Jensen, Agnes C.	15	
Joiner, Zella M.	20	
Johnson, Harry O.	15	

	Common	Preferred
Johnson, George L.	20	
Jones, Roy E.	10	
Jones, J. B.	10	
Jones, Bernard T.	30	
Kane, Helen L.	10	
Keller, Lewis A.	10	
Kelley, Walter J.	10	
Kelly, Nonie E.	30	
Kelly, James J.	30	
Kelly, Arthur J.	10	
Kelly, W. H.	15	
Kelly, Mrs. Bessie C.	35	
Kennedy, George A.	150	
Kesner, Isaac L.	85	
Klatte, Wm. A.	30	
King, Geo. S.	25	
King, Farnum & Co.	25	
Krouch, John L.	100	
Kroeber, Ottilie H.	10	
Kenoyer, Welden R.	50	
Kelly, James J.	10	
Laird, Marion	20	
Lane, Jr., James H.	30	
Lally, R. T.	15	
Laverty, James	25	
Lauzon, David J.	10	
Lee, Susie	80	
Leitmer, Leo H.	25	
Lester, Carter & Co.		50
Lindsay Jr., Chas. R.		23694
Lindsay Jr., Chas. R. Guardian of C. R. Lindsay, 3rd.		3868
Lindsay Jr., Mrs. C. R.		600
Lindsay, Ella W.		200
Lindstein, Edward J.	100	
Loeffel, John C.	50	
Logan & Bryan	455	
Logan, Anne Shay	50	
Lommatzech, Otto	12	
Lowenstine, Mandel	500	
Lutz, Jos. A.	50	
Lux, William A.	50	
Lyons, Tom	40	
Mac Farlane, R. E.	5	
Maginnis, C. S.	40	
Mann, A. C.	50	
Markle, A. M.		100
Marcuse & Company	25	
Massey & Company, Harry A.	3103	
Maurd, Martin	10	
Mayer, David	40	
Mayer, John M.	400	110

	Common	Preferred
Lagher, M.		232
Merrill, Lynch & Co.	325	
Memmel, Simon G.	5	
Meyer, G. A.	45	
Meyers, Richard L.	30	
Metcalf, Arthur G.	200	
Miller, Robert W.	30	
Miller, Emma	90	
Miller, Lucile	5	
Milmine, John	150	
Milmine, Mrs. Mabel Clare	100	
Morrisey, John J.	50	
McCarty, John A.	65	
McGonagil, W. J.	10	
McHugh, Mary E.	20	
McLaughlin F. L.	50	200
McManus, Mary G.	60	
McMahon, Stephen E.	75	
Nason, Frank	150	
Nenneman, W. T.	15	
Newhall, Walter W.	20	
Noyes & Jackson	260	
Olds, Caryl E.	30	
Oliphant & Co., Jas. H.	415	3135
Mann, Louisa	40	
penheim, A.		100
Osgood, Roy C.	15	
Olson, Ebba J.	39	
Paulus, Lizzie M.	50	
Palash, Bernard	25	
Palma, Domenico	10	
Paine, Webber & Co.	465	
Peckhouldt, William	10	
Pendell, C. M.	50	
Phillips, Parker	30	
Pinkowitz, Julius G.	50	
Pickett, Ada H.	10	
Pond, George F.	22	
Postma, Frances G.	5	
Powell, William H.	100	
Price, J. Edward	25	
Pynchon & Company	120	
Peterson, John O.	25	50
Radewagen, Alfred	100	
Radewagen, Richard	68	
Randall, Frank C.	50	50
Raff, Mary E.	10	
Reinlie, Albert	100	
Reinhardt, Fred W.	100	
Risdon, Ambrose	60	
binson, Adelia E.	5	
lley, J. R.	30	
Rosenburg, C. T.	35	
Rosenfeld, Julia S.	25	

	Common	Preferred
Rose, Belle	50	
Rubey, Clara	5	
Russell, Brewster & Co.	430	
Russokov, Milton	50	
Ryan, Margaret J.	90	
Roney, Harry K.	30	
Roach, C. Myrtle	10	
Salzman, Jack L.	50	
Saunders, Charles L.	30	
Scanlan, William J.	260	
Scheer, W. N.	10	
Schneider, Lillian E.	20	
Schweer, Fred J.	125	
Schweer, A. W.	50	
Schuetzner, John	300	
Schmidt, Walter C.	10	
Schmitz, Louis	100	
Semrad, Earl L.	10	
Shearson, Hammill & Co.	750	
Shaver, Mary L.	30	
Siebken, Bertha	30	
Simmons, India S.	30	20
Simmons, J. W.	660	440
Sincere & Co., Charles	522	
Smith, Julian C.	75	
Smith, C. A.	25	
Smith, Claude F.	50	
Smith, C. T. E.	100	
Smith, Marion	55	
Smith, Amos R.	150	
Spies, Geo. H.	20	
Spitler, Anna L.	75	
Sonnenschein, J.	50	
Stern, Milton	20	
Stein, Adolph Estate of	100	
Stevens, Robert W.	50	
Stapleton, Mae	63	
Stone, Elmer L.	25	30
Stretch, Mary	20	
Suess, Geo. P.	40	
Sullivan, Ella	5	
Sullivan, Mrs. Julia	10	
Swenson, Axel E.	25	
Sheehan, Lillie	20	
Sherburne, Anne E.		100
Sherburne, Jos. M.	10	750
Slayton, Florence E.	50	
Talbot, James R.	10	
Taylor, Edward B.	5	
Temple, Frances C.	10	
Thorsen, R. Thor	100	
Thompson, Racine	10	
Thomas, George W.	40	
Toole, Sellie H.	50	
Townsend & Co., J. J.	110	
Twitchell, Mrs. S. Geraldine	25	
Ulrich, Rhoda	10	

	Common	Preferred
Van Alstyne, Mabelle	27	
Van Duzer, Obie W.	35	
Waldmann, Henry A.	275	
Wade, R. M.	25	
Wagg, Mrs. Eunice	10	
Walkowiak, Anthony E.	20	
Ward, Hayden W.	20	
Ware & Leland	275	
Weber, Josephine	25	
Westpfahl, Frank C.	200	
Wharton, Francis A.	60	
Wheeler, E. C.	5	
White, William S.	15	
Whitcher, Mrs. C. M.		800
Wilson, Eleanor Spry	100	
Wilmot, Ross H.	100	
Williams, Oliver A.	35	
Williams, Miss Margaret	25	
Winger, Marie K.	10	
Wiseman, Evelyn	15	
Wolff, Mrs. Sarah	50	
Wolf, Mrs. Eva	50	
Woitek, June	10	
Woitek, Laurine C.	10	
Woitek, Mrs. F.	10	
Wright, Rachal M.	8	
Weber, Agnes	25	
Wilsey, Robert E.		50
Zacharias, Jr., John L.	50	
Zearing, Louis A.	30	
Zeiler & Co., F. M.	590	
Zinnbrabe, Louis	10	
Zwicky, Mrs. Michael	21	14
	27344	36783

Total number of Shares represented by proxies, held by Mr. Sherburne ---------- 64,127

-:-

Mr. Otto N. Berndt, as Secretary of Lindsay Light Company, holding proxies for the following:

Adams, Alice	5	10
Andreoni, Louis		50
Aschermann, Elmer S.	10	
Berndt, Otto N.	100	200
Berryman, Bertha B.	30	
Berryman, Lloyd V.	10	
Berryman, Martha J.	25	
Bolle Henry		100
Bolley, John R.		50
Burke, Thos. J.	35	

	Common	Preferred
Cahill, Nora	30	10
Cameron, F. L.	50	
Chevaux, Emil		50
Clader, Emma E.	30	
Coffelt, O. T.	5	
Coleman, Emil	100	
Corn, Frances	50	
Counter, Dray H.		50
Cramer, Harry W.	20	
Crowe, John V.	200	
Cumming, George H.	50	
Cumming, Margaret R.	25	
Desjardines, Emma	10	
Desjardines, Noel D.	30	
Donovan, Daniel J.	10	
Doniat, Josephine C.	25	
Dunne, William J.	40	
Egbert, Eva	20	
Ehrlicher, George	20	
Enright, Michael E.	25	
Enright, Teresa E.	100	
Eppstein, Joe R.	100	
Erion, Jr., John	200	
Flynn, Michael J.		20
Gadbois, Mabel		10
Geegan, Thomas J.	40	
Gensert, Carrie W.	25	
Gerlach, Margaret T.	10	
Gillen, Mary	10	
Gohs, Mabelle R.		50
Goldberg, S. M.	10	
Griesemer, Charles J.		10
Haines, Ernest H.	30	
Hannifin, Catherine	200	
Hansen, L. H.	15	
Hellerman, Leslie		10
Hopkins, Maude D.	5	
Hoyne & Co., Eugene M.	25	
Hunter, Anna	50	
Inderrieden, Jos. S.	100	
Jackson, V. T.	8	35
Jellum, E.	20	
Jones & Baker	20	
Kavanagh, Edward	50	
Keil, Mayme	25	
Keuper, Harriet M.	10	
Lalor, Wm. H.	75	
Landsberg, Edward		100
Latham, Amelia		50
Lewis, Charles L.	100	
Lomax, Mrs. Louise E.	100	
McDermott, Lillian	30	20
McGhee, Mary		20
McGovern, Elizabeth,		200
Mahoney, Julia C.	20	
Martin, Patrick	10	

	Common	Preferred
Masters, Joanna	20	20
Melody, Estella	50	
Milroy, Admirelda	100	
Moss, F. J.	15	
Nevins, M.	200	
Newburn, John W.	140	
Newhall, Walter W.	20	
Periolat, E. J.	63	
Periolat, John A.	62	
Peterson, Arvid L.	10	
Peterson, Frank	50	
Peterson, Ingolf	50	
Phelan, Margaret		60
Platt, Frank J.		100
Platzer, Carl	25	
Postma, Gertrude	10	
Ratty, Anna	10	
Ratty, Mary	10	
Ratty, Catharine	50	25
Rau, Emanuel	30	
Raymond, Cora E.	10	
Reinecker, Louis	30	
Richards, George F.	20	
Ricker, Elizabeth Shay	25	
Robinson, Edward	10	
Rothschild & Co.	170	
Rowen, R. W.	25	
Salisbury, John R.		60
Schaller, Peter J.	20	
Shane, Seymour	100	
Sheehan, Lillie	20	
Sinai, Alexander	125	100
Sinai, Ray Miss		60
Shorter, Fred J.	10	
Smith, Dr. Angie G.		20
Smith, William T.	25	
Spiro, Philip	25	
Stein, Ignatz	175	
Steinberg, Wm. R.	150	
Stenhouse, Bessie C.	8	
Stenhouse, Evangeline	9	
Stoneman, Ernest		50
Strebbell, Irene		20
Sullivan, Dennis	40	
Test, Wm. H.	10	
Trainor, Rose A.	100	
Volkens, William J.	20	
Watson, Alice C.	5	
Westerlund, Gustaf A.		50
Williams, C. E.	25	
Williams, Katherine I.	50	
Wiseman, Evelyn H.	15	

	Common	Preferred
Yavitts, Jacob M.		10
Young, Aloysisus L.	10	
	4480	1620

Total number of Shares represented by proxies, held by Mr. Berndt ---------- 6,100

-:-

Mr. Herbert N. McCoy holding proxy for:

Wells, Francis R.	2000
Total ----------	2,000

-:-

Mr. W. W. Buchannan holding proxies for the following:

Block, Maloney & Co.	595
Stein, Alstrin Co.	1890
	2485
Total ----------	2,485

-:-

Total present by Proxy -------- 74,722 Shares.

	Common	Preferred
Total Present In Person ----------	1540	650
Total Present By Proxy ----------	36309	38403
	37849	39053

Total Present In Person and By Proxy ----------76,902

The President thereupon stated that there was present in person or represented by proxy at the meeting a total of 37,849 shares of Common and 39,053 shares of Preferred, making a grand total of 76,902 shares of the total of 100,000 shares outstanding, and that as considerably more than two-thirds of the total stock of the Company was represented at the meeting, it would now be in order to take up any business coming before the meeting.

Thereupon, on motion duly made and unanimously carried, it was voted to dispense with the reading of the minutes and said minutes were approved without reading.

Thereupon, the President of the Company presented a report covering the operations of the Company during the year 1919, which report on vote duly had and taken was unanimously accepted, approved and ordered spread upon the records of this meeting. The president also presented to the meeting a statement showing the comparative assets and liabilities of the Company on December 31, 1918 and December 31, 1919. These two reports are in the words and figures following, to wit:

	18th Annual Statement Ending Dec.31-1919.	17th Annual Statement Ending Dec.31-1918.
ASSETS:		
BUILDING AND REAL ESTATE	$144,016.00	$143,966.00
MERCHANDISE	353,148.86	348,772.52
MACHINERY AND FIXTURES	43,002.72	32,521.06
ACCOUNTS RECEIVABLE	159,139.63	289,657.11
GOOD WILL, TRADE MARKS & PATENTS	600,000.00	600,000.00
U. S. LIBERTY BONDS, 4-1/4%	0.00	287,500.00
ACCEPTANCES	0.00	3,456.00
CASH	71,852.65	32,842.14
	$1,371,159.86	$1,738,714.83
LIABILITIES:		
CAPITAL STOCK:		
7% CUMULATIVE PREFERRED	400,000.00	400,000.00
COMMON	600,000.00	600,000.00
ACCOUNTS PAYABLE	52,507.63	77,249.57
NOTES PAYABLE, BANK	0.00	100,000.00
RESERVED FOR FEDERAL TAXES 1918	14,711.36	77,480.88
RESERVED FOR FEDERAL TAXES 1919	7,500.00	
SURPLUS	296,440.87	483,984.38
	$1,371,159.86	$1,738,714.83

OTTO N. BERNDT,
TREASURER.

After reading the above statement, the President's report continued as follows:

"The resignation of Mr. Gilman as President and Director and Mr. Baxter as Secretary and Director effective December 31, 1919 made it necessary to call a special meeting of the majority of your Directors January 2, 1920 and at this meeting, Mr. Charles R. Lindsay, Jr. was elected Director, Mr. Otto N. Berndt, elected Director and Secretary-Treasurer, Mr. Jos. M. Sherburne was elected President having resigned as Vice-President and Treasurer and Mr. H. N. McCoy was elected Vice-President.

We have charged off our books as of December 31, 1919, the following accounts.

A/C Merchandise ----------	$68,013.57
A/C Loss in Sale of Liberty Bonds -----	27,570.00
A/C Polish ----------	42,453.85
A/C Dye Plant ----------	28,033.79
Total ----------	$166,071.21

The surplus account of December 31st, 1918 of $483,984.38 has been decreased to $296,440.87. This decrease of $187,543.51 is accounted for as follows:

Paid in Common Dividends ----------	$70,000.00
Paid in Preferred Dividends ----------	30,333.33
Charged Off ----------	166,071.21
Reserved for 1919 Taxes ----------	7,500.00
Leaves----------	273,904.54
Deduct Decrease in Surplus ----------	187,543.51
Leaves ---------	86,361.03
Deduct Credit Received from London SAND	56,219.45
Leaves - Earned from Operations -------	$30,141.58

This amount was earned in the business during 1919 but cannot be applied to surplus because of the foregoing deductions.

The amount charged off of merchandise is principally on account of Monazite Sand and is the difference between the cost of this material during the war and its replacement at present prices December 31st, 1919.

We sold in December $350,000.00 worth of Liberty Bonds at market for $27,570.00 less than their cost.

The polish department was started last Spring and during the first few months a very considerable amount of business was obtained which seemed to indicate a possibility worth while and one which would fit into our general business and help reduce our selling cost. The future policy of this department must be determined by your Directors. "LINDSAY LICHT POLISH" is of unquestionable merit.

We started to equip the Dye Plant in May. Up to September 1st nothing was produced by the man that we had in charge and he was therefore released. On September 1st this department was put into the hands of our Doctor McCoy and our Chemists who zealously went to work and by November began to produce METHYLENE BLUE in very small quantities but of most excellent quality. These quantities have been increased until it has now reached about one-half of what we hope to have within the next few months, if the additions necessary to accomplish this are approved by your Directors.

I believe that this can be made a desirable part of our general business and slowly enlarged to considerable volume, especially as it seems to be quite clearly a plan of our Government to protect the dye industry as a part of the policy of National Defense.

The monazite refinery produced in 1919 - 90,065 pounds of Thorium Nitrate against the production in twelve months ending December 31st, 1918 of 181,605 pounds. Thorium sold in 1919 at about 40% less than in 1918.

It now appears likely that a considerable portion, if not all, of our foreign market will be lost due to the restrictions to be imposed by producers of monazite sand who can, and likely will, control the refiners and allocate the countries in which such refiners may sell their production. We will undoubtedly be confined to sales in U.S.A. with the possibility of this business being divided between ourselves and other manufacturers, and while we at this time furnish the larger percentage of American mantle manufacturers with Thorium Nitrate, and expect to continue to do so, there is a possibility that the German refiners may not be controlled by the producers and therefore may become a factor in the American market until it is possible for Congress to take some action in the way of protection either by tariff or by licenses and as a part of the problem of National Defense. This has already been taken up with the proper authorities in Washington with that end in view.

Fortunately, some of the equipment formerly devoted to the manufacture of Thorium Nitrate and no longer necessary on account of reduced production, is now being utilized in our refinery in the manufacture of other materials. These show a steady increase in volume at a small profit. Such production is small but much larger than it was the year before and is continuously growing and it is believed that it can be maintained and still increased further, and thus in a small way contribute to the general profits of this business.

The gas mantle business shows a decrease in production of 22%, which is accounted for by our inability to obtain usual quantities of supplies and by the shortage of labor. We now have on unfilled orders, 1,760,080 mantles at better average prices, and are now running about sixty percent of our capacity. There is a considerable shortage in the production of gas mantles and much higher prices are prevailing than last year.

You have received notice that at this meeting you will be called upon to decide as to the advisability of increasing the number of Directors from five to seven, and if favorably voted upon at this meeting, will result in the addition of men whom it is felt will be of considerable value to the management during this year.

I cannot make any predictions for 1920, as conditions generally are very much unsettled; labor such as we require is difficult to obtain at the price we can afford to pay; material costs are today as high and in many cases considerably higher than during the war."

-:-

The President thereupon stated that the next thing in order would be to consider the question of increasing the number of Directors from five to seven. The matter was thereupon discussed by the Stockholders, after which the following resolution was unanimously adopted, the entire 76,902 shares voting in favor of the adoption of said resolution, viz:

RESOLVED, that the number of Directors of the Lindsay Light Company be and the same is hereby increased from five (5) to seven (7).

The Chairman thereupon announced that the foregoing resolution, having received the votes of 76,902 shares, had been duly and regularly adopted.

The Chairman thereupon announced that the next thing in order would be the election of seven Directors for the ensuing year, and suggested that five of these Directors be elected to take the place of the five Directors whose terms expired this year, and that two additional Directors be elected to fill the two additional places created by the proposed increase in the number of Directors.

Thereupon, on motion duly made by Mr. Chas. R. Lindsay, Jr., seconded by Mr. Alexander Sinai and unanimously adopted, the following persons were elected Directors of the Company for the ensuing year:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Otto N. Berndt
Mr. H. C. Beste
Mr. Robert E. Wilsey

Thereupon, on motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously adopted, the following persons were elected Directors of the Company to serve during the ensuing fiscal year to fill the two additional places created by the increase in the number of Directors.

Mr. Chas. R. Lindsay, Jr.
Mr. Alexander Sinai.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

Otto N. Berndt
SECRETARY.

Minutes of a regular meeting of the Board of Directors of the Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, July 20th, 1920, at the hour of three o'clock P. M., pursuant to notice.

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The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

There were present:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Otto N. Berndt
Mr. Chas. R. Lindsay, Jr.
Mr. Harry C. Beste
Mr. Alexander Sinai
Mr. Robert E. Wilsey

Same being all the seven Directors of Lindsay Light Company.

The first order of business was the reading of the quarterly report ending June 30th, 1920, which is as follows:

2ND QUARTERLY STATEMENT ENDING JUNE 30-1920.

	JUNE 30-1919	JUNE 30-1919
ETS:		
BUILDING & REAL ESTATE	$141,516.00	$144,016.00
MERCHANDISE	324,508.44	481,349.21
MACHINERY & FIXTURES	47,453.85	32,584.17
ACCOUNTS RECEIVABLE	253,394.40	165,761.28
GOOD WILL, TRADE MARKS & PATENTS	600,000.00	600,000.00
BONDS & STOCK	48,691.79	351,000.00
CASH	19,654.79	5,544.94
	$1,435,219.27	$1,780,255.60
ABILITIES:		
CAPITAL STOCK:		
7% CUMULATIVE PREFERRED	400,000.00	400,000.00
COMMON STOCK	600,000.00	600,000.00
ACCOUNTS PAYABLE	25,319.38	56,775.44
NOTES PAYABLE (BANK)	0.00	200,000.00
RESERVED FOR TAXES	38,169.97	46,942.36
SURPLUS	371,729.92	476,537.80
	$1,435,219.27	1,780,255.60

EARNINGS FOR SECOND QUARTER

NET EARNINGS FROM OPERATIONS	52,323.66	11,699.36
DIVIDEND PAID ON PREFERRED STOCK	7,000.00	7,000.00
DIVIDEND PAID ON COMMON STOCK	0.00	30,000.00
RESERVED FOR TAXES	13,000.00	0.00
CARRIED TO SURPLUS	32,323.66	x 25,300.64
	$52,323.66	$11,699.36
ADDED TO SURPLUS A/C OVERPAYMENT FEDERAL TAXES 1918-1919	14,767.18	

x-WITHDRAWN FROM SURPLUS ACCOUNT.

	1920	1919	
ATEMENT FOR SIX MONTHS ENDING JUNE 30TH:			
EARNINGS FROM OPERATIONS - 1ST QUARTER	$42,198.21	$10,449.00	
" " " - 2ND QUARTER	52,323.66	11,699.36	
	$94,521.87	$22,148.36	(A)
IDENDS PAID ON PREFERRED STOCK	$14,000.00	$16,333.33	(C)
" " " COMMON "	0.00	70,000.00	(D)
ERVED FOR TAXES	20,000.00	0.00	
RIED TO SURPLUS	60,521.87	7,446.58	(B) x
	$94,521.87		

x: ADD "C" & "D"
DEDUCT "A" & "B"
EQUALS SPECIAL
CREDIT FIRST
QUARTER ----
$56,738.39.

DEPARTMENT PROFIT & LOSS ACCOUNT FOR SIX MONTHS ENDING 6/30/20.

	MONAZITE	MANTLES	POLISH	DYE	
NED 1ST QUARTER	38,046.25	10,802.83	1544.99x	5105.88x	
NED 2ND QUARTER	29,367.94	17,162.52	1391.00x	7184.20	
FOR SIX MONTHS	67,414.19	27,965.35	2935.99x	2078.32	=$94,521.87

	1920	1919	
NED 1ST QUARTER	9,343.11	1,105.89	
NED 2ND QUARTER	16,655.53	4,956.17x	
	25,998.64	3,850.28x	=$22,148.36

x-DEFICIT.

Thereupon, our Chairman read a report showing that our stock of Thorium on hand January 1st, 1920 was 31,860 pounds; the shipments for six months equaled 46,700 pounds, making a total of 78,560 pounds. The inventory of June 30th, 1920 shows 44,565 pounds, which leaves a balance of 33,995 pounds. Our Chairman thereupon read the recommendation as made by our London Agent.

Upon motion duly made by Mr. Robert E. Wilsey, seconded by Mr. Harry C. Beste and approved by all, it was RESOLVED that the authority be given for the further shipment to our London warehouse of not to exceed 500 cases of Thorium Nitrate as soon as such can be conveniently manufactured, and ratify the foreign

business done through our London Agent for the first six months of 1920.

The Board ratified and approved of the action taken by the Officers, in which we have transferred a liability of $10,000.00, accruing to us for sales of Thorium Nitrate to the Beacon Lighting Company, into a second mortgage on their two-story building and lot located at #7000 Bennett Street, Pittsburgh, Pa.

On motion duly made by Mr. Harry C. Beste, seconded by Mr. Alexander Sinai and approved by all, it was decided to invest up to $10,000.00 in Canadian Bonds, all moneys paid to us by the Hamilton Gas Mantle Company, Ltd., of Hamilton, Ontario, and any other Canadian accounts to whom we may sell goods, thereby saving the exchange premium.

Our Chairman made the gratifying report that the Welsbach suit, regarding the infringement of certain baking processes has been finally dismissed, each party to bear their own respective costs.

The Board of Directors authorized our President, Mr. Jos. M. Sherburne, to have a conference with Mr. Sidney Mason, President of the Welsbach Company, and to disclose to him that we are ready for a proposal and wish to obtain an expression of opinion from him and his Directors regarding a possible merger or consolidation.

After a very lengthy discussion regarding the acquisition of land and the erection of new buildings for the manufacture of chemicals therein before we definitely decided to purchase, Mr. Sherburne was authorized to instruct Mr. Bowes, the real estate Agent, to submit within ten days a definite tangible proposition regarding the rental for a 20-year period of the premises owned by us at #161 East Grand Avenue.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. Harry C. Beste and approved by all, a quarterly dividend of 2% was declared upon the Common Stock of this Company, payable August 31st, 1920 to Stockholders of record at the close of business July 31st, 1920. The following letter was sent to all Stockholders under date of July 20th:

CHICAGO, JULY 20-1920.

To the Stockholders of
Lindsay Light Company:

At a regular meeting of the Board of Directors of this Company held this day, a quarterly dividend of 2% was declared upon the Common Stock, payable August 31st, 1920 to Stockholders of record at the close of business July 31st, 1920.

Transfer books will not be closed.
Checks will be mailed on August 31st, 1920.

In case of any change in your post office address please notify us promptly.

Yours very truly,
LINDSAY LIGHT COMPANY
OTTO N. BERNDT,
SECRETARY.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

Otto N. Berndt
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company and having been present at the meeting of said Directors held on July 20th, 1920, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

J. A. M. Fierbourne
Herbert N. McCoy
Otto N. Berndt
R. Gloussey
Harry C. Beeston
C. Lindsay
Alexander Dimai

Minutes of a regular meeting of the Board of Directors of the Lindsay Light Company, held at the office of said Company, #161 East Grand Avenue, Chicago, Illinois, on Tuesday, September 21st, 1920, at the hour of four o'clock P. M., pursuant to notice.

-:-

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and as the Secretary of the Company, Mr. Otto N. Berndt, was out of the City and therefore not present, Mr. Herbert N. McCoy acted as Secretary of the meeting.

There were present:

Mr. Jos. M. Sherburne
Mr. Herbert N. McCoy
Mr. Harry C. Beste
Mr. Robert E. Wilsey

Same being four of the seven Directors of Lindsay Light Company.

The Chairman informed the Directors present that on the 10th day of September, with the sanction of Mr. Herbert N. McCoy and Mr. Otto N. Berndt, this Company loaned Mr. Clifford W. Stabenau, the Chemist in charge of our Monazite Plant, $750.00 to enable him to make his first payment on a home, to be paid back at the rate of $75.00 per month, beginning October 1st, for which he has given notes with interest at six percent. Explanation was given that it was thought best to do this through the Company rather than individually, so as to have a hold on this man's services.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously approved, this action was ratified.

The Chairman then proposed that a loan for $600.00 be made to Mr. R. P. Sullivan for this same purpose on October 2nd, to be paid back at the rate of not less than $75.00 per month and partly secured by collateral.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. H. C. Beste and unanimously approved, this authority was issued.

Upon motion duly made by Mr. Herbert N. McCoy, seconded by Mr. R. E. Wilsey and unanimously approved, the Chairman was instructed to send to Mr. J. H. Fall, Jr., of the Benjamin Electric Manufacturing Company, a check for $100.00 on behalf of the work of the United Americans, who, by propaganda, are endeavoring to act as a counter influence against such outrages as recently occurred in New York.

The Chairman reported the following, according to instructions given at the regular meeting of the Board of Directors held on August 17th to obtain a definite proposal regarding the rental of this building and figures of the estimated cost of new buildings on acreage.

He stated that up to this time Mr. Bowes had not made a proposal or been able to obtain a customer who would take over the property at #161 East Grand Avenue on a long lease at not less than $40,000.00 per year, but that he was working very hard on this and believed the season was now approaching when such a lease can be made and such an amount obtained net to this Company from reliable sources.

The Chairman also reported that plans had been made by Mr. Ernest Mayo at no cost and the estimated cost of the new buildings as shown on such plans would be in the vicinity of $400,000.00 plus the architects' fee of five percent. This estimate is believed to be very much higher than the actual work can be done for but it is given on this basis for the sake of being safe.

The additional cost of land would mean approximately another $100,000.00, making a total cost for land and new buildings of about $500,000.00. No action on these matters was taken because of the various proposals before this Company regarding a possible consolidation.

The Chairman reported that the mantle plant was averaging about 90% production - the monazite plant was working to capacity - and the dye plan for the present is without orders and is accumulating a little stock.

This is due to the fact that the textile industry is very, very quiet, but it is believed that there is no danger in accumulating a stock of dyes during the next few months, because it is known that they can be sold at any time against market competition now prevailing, but it is believed that they can be sold for much higher prices within the next sixty or ninety days. This does not apply to the Methylene Blue U.S.P., the usual quantity of which is being made and shipped to our Friends, Merck & Company, New York City.

There being no further business before the meeting, the same on motion duly made and carried was declared adjourned.

VICE PRESIDENT.

We, the undersigned, being Directors of the Lindsay Light Company and having been present at the meeting of said Directors held on September 21st, 1920, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

Minutes of the Special Meeting of the Board of Directors of the Lindsay Light Company held in lieu of the February regular meeting on March 9, 1923, at the Old Colony Club at the hour of 1:00 p.m.

The meeting was called to order by Mr. Jos. M. Sherburne, the President of the Company, who acted as Chairman of the meeting, and the Secretary of the Company, Mr. Otto N. Berndt, acted as Secretary of the meeting.

Five of the Directors were present, namely;-

Mr. Jos. M. Sherburne
Mr. H. N. McCoy
Mr. O. N. Berndt
Mr. R. E. Wilsey
Mr. H. C. Beste

Same being five Directors of the Lindsay Light Company, thereby constituting a quorum.

The first order of business was the taking up of the renewal of leases. Upon motion duly made by H. N. McCoy, seconded by H. C. Beste, and unanimously approved, it was decided to renew our lease for our chemical plant at 316 E. Illinois St., for the same terms and conditions at the same rental for another year, which will make our term of occupancy expire April 30, 1924.

Thereupon motion duly made by Mr. R. E. Wilsey, seconded by H. N. McCoy, and unanimously approved, it was decided to renew the lease of our New York office at 91 Chambers Street, for a period of one year at a rental of $3500 per year. It was pointed out by the President that inasmuch as the New York office had sub-leased a loft at an annual rental of $900 and as the rental mentioned above showed a saving of $500 over the previous rental, the total net saving to the New York Department amounts to $1400, making the net cost for rental of our New York office $2600 annually.

Thereupon ensued a discussion upon the Thorium contracts which Mr. Sherburne has been negotiating with The Coleman Lamp Company, of Wichita, and The Block Gas Mantle Company, of Youngstown. It was regularly moved by Mr. R. E. Wilsey, seconded by H. C. Beste, and unanimously approved by all present, that the contracts as tentatively made by Mr. Sherburne were fully approved and authorized.

Mr. Sherburne thereupon brought up the subject matter of the Monazite Sand contracts with the Travancore Minerals Company, London, and after a very thorough comprehensive discussion of same, it was deemed advisable to postpone any definite decision on this subject matter until the regular March meeting of the Board of Directors.

Thereupon, Mr. Sherburne read the following proposal from Mr. C. R. Lindsay to purchase our building at 161 E. Grand Ave.:

> "I will buy the building and real estate located at 161 E. Grand Ave., Chicago, owned by Lindsay Light Company for $275,000.00, payable in Lindsay Light 7% preferred stock at par, and if the Company desires to lease same from me, will make a one, three, or five year lease at $15,000 per year, they to assume all taxes, insurance, and repairs to building. If this is favorable to the Directors and legal, it can be acted on at once, but if lawyers think it should be submitted to a vote of the stockholders, it would be satisfactory to me."

After a thorough discussion of the matter, it was suggested that no decision be reached until the regular March meeting.

Thereupon motion duly made by Mr. R. E. Wilsey, seconded by H. N. McCoy, and unanimously approved, it was decided to withdraw our building at 161 E. Grand Ave., from sale. The officers were likewise authorized to vacate any floor and make diligent effort to rent same under the most favorable rental prices obtainable, if the manufacturing operations could be so arranged.

Otto N. Bender
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company, and having been present at the meeting of said Directors held on March 9, 1923, hereby certify that the foregoing record thereof is a true record and that we consent thereto.

Jos M Sherburne

Otto N. Bender

R E Wilsey

H C Best

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

NOVEMBER MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 E. GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY NOVEMBER THE 24TH, 1925, AT THE HOUR OF 3 P.M.

There were five Directors present, viz:

C. R. Lindsay, Jr.
J. M. Sherburne
H. N. McCoy
H. C. Beste
C. R. Lindsay III

Same being five of the Directors of the Lindsay Light Company, thereby constituting a quorum.

Mr. C. R. Lindsay, Jr. acted as Chairman and Mr. C. R. Lindsay III as Secretary of the meeting.

Minutes of the September meeting were approved.

As the first order of business, Mr. C. R. Lindsay, Jr. brought up the name of Mr. Frederick J. Clifford to serve as a Director to fill the unexpired term of the late Otto N. Berndt. Mr. Sherburne nominated Mr. Clifford for this position and Mr. McCoy seconded this. Mr. Clifford was then unanimously elected by the Directors and the Secretary was instructed to notify him accordingly of this action.

The Chairman then proceeded to read a report to the meeting of his work, since August the 1st, while in charge of the Company's affairs. This reads as follows:

- TO THE DIRECTORS OF LINDSAY LIGHT CO. -

Our regular October Meeting was omitted, as I was in New York at the time, but I sent each of you a statement showing our net worth as of September 30, 1925 to be $334,788.34, after charging off for depreciation, bad debts, etc. $77,532.18. For that Quarter our operating loss was $6,039.89, which compares with $16,778.58 for the corresponding quarter last year. Both of these losses are figured before depreciation, etc.

On my arrival in Chicago, July 26, I found instead of our business showing improvement, it showed an increase in losses; that our Second Quarter showed a loss of $20,978.58 before deducting for depreciation, etc. This was the worst loss in any quarter we have had for years, so I decided to remain in Chicago and was put in charge of the business by the Directors at the July 28 meeting, until the annual meeting, January 1926, at which time the Directors for 1926 will be elected by the stockholders, and the Directors will then, in turn, elect the Officers.

During these four months radical changes have been made, overhead being reduced over $60,000.00 annually, prices advanced on merchandise which showed little or no profit, residential electric line, of which we had an enormous stock, and which was and is one of the main causes for our losses, (thousands of dollars of which have been returned to us in the past few months and thousands of dollars worth of which we have disposed of at less than $0.25 on the dollar) is being cut down to a small line of profitable merchandise most of which we shall manufacture ourselves, our New York Department has been turned into an office in place of an expensive branch, and when our present lease expires April 30, we will move into less expensive quarters.

Bankruptcy surely would have followed if these radical changes had not been made, and today I am pleased to report we owe the bank $45,000.00 compared to $90,000.00 last July and have a fair deposit in the bank instead of a continued overdraft as then.

Our gas mantle business is comparatively good, manufacturing and selling about thirteen thousand (13,000) per day, which is about the same amount compared with the same period last year.

We have very little electric business direct with dealers and Public Service Corporations, but our business with Western Electric Company shows an increase, for the first ten months of this year, of 60%, compared with the same period last year and would show higher were it not for the residential electric fixtures which we were obliged to take back.

In chemicals we were fortunate in closing a contract with National Carbon Company for a by-product from our Monazite Sand, delivery to start March 1, 1926 at a 23% higher price. This will enable us to keep our Refinery going from now on at 100% increase in capacity for a year and a half. I, therefore, renewed our lease on the Illinois Street property for one year to May 1, 1927.

Our gross business during the past four months shows but 10% increase for the corresponding four months last year, and 40% of our total business is through Western Electric Company. The reasons our gross business has not proved more are that last year we sold more Thorium and considerably more in sundries, but what we are doing today is with seven less salesmen. We have at present but five men selling. While our business with Western Electric Company is not so large as we had been led to expect, still, it shows a good continued increase.

I believe we are now making money for the first time in years and that this, our last quarter, will show a profit after charging off depreciation, etc., unless we reduce our inventory on the present stock of Thorium from $2.50 per pound old cost to about $2.02 per pound present cost, which is on account of making double the quantity of the Rare Earths, which we supply National Carbon Company; but even at the new cost of $2.02 we figure the entire cost of the sand into the Thorium. If we make this depreciation of $0.48 per pound, it will amount to about $11,000.00. I recommend that this be done.

I have nothing of further importance to bring up at this meeting, so if there are any questions or suggestions

to offer, I would be pleased to hear them. I might add that we will, in a short time, have to get out our proxies for the annual meeting and decide amongst ourselves as to the Directors and Officers for next year, so it is up to you as to whether it should be done at this meeting or regular December Meeting.

Chas. R. Lindsay Jr.
Chairman - Board of Directors

This report as submitted was given the full approval of the Directors.

The Chairman then suggested the advisability of cutting down the inventory value of Thorium in stock from $2.50 per pound to $2.02 per pound, based upon new cost of production data recently obtained. This cut he suggested as being effective in the next inventory of December 31st. Mr. Sherburne accordingly made the motion to lower inventory price of Thorium to present revised cost, figured on basis of 250% overhead, with the understanding that the actual figure would be definitely decided upon at the next meeting. Mr. Beste seconded this motion and was passed unanimously.

The Chairman then announced that he had received information that the Company would be able to secure about $4,000.00 refund from the Government on 1918 taxes. He further stated that under a new court ruling, the Company might recover 1919 and 1920 tax refunds in addition. This ruling was to the effect "that invested capital cannot be reduced by taxes paid in previous years".

The Chairman then explained to the Directors that due to the recent failure of Gaites, Peace Company, Lindsay Light Company had definitely made arrangements to manufacture certain staple residential fixtures. He believed that by so doing, cost could be reduced very materially.

The Chairman brought up again the suggestion that the Company buy in on the open market a certain amount of its Preferred Stock. It was decided to defer decision on this until a later meeting.

There being no further business, the meeting was adjourned.

Chas. R. Lindsay Jr.
SECRETARY.

We, the undersigned, being Directors of the Lindsay Light Company, and having been present at the meeting of said Directors held on November 24th, 1925, hereby certify that the foregoing record hereof is a true record and we consent thereto.

Chas R Lindsay Jr

J D M Pierburne

Chas. R. Lindsay III

We concur in the foregoing and ratify and approve the said records and the proceedings described therein.

APRIL 1934 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 EAST GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY, APRIL THE 24TH, 1934, AT THE HOUR OF 2 P. M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary of the meeting.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

Mr. Lindsay, Jr., reviewed the statement for the quarter ending March 31st, 1934.

Mr. Lindsay, Jr., also advised that The New England Mutual Life Insurance Company had offered the Company a ten-year mortgage dated May 1st, 1934, for $90,000.00 at 5½%, $5,000.00 to be paid annually on the principal. This offer was made through E. G. Krumrine and Company whose commission charges are to be $1,800.00. This mortgage is to replace mortgage for $105,000.00 which expires August 1st, 1934. This means that we are to pay The New England Mutual Life Insurance Company $15,000.00 with accrued interest before May 1st, 1934. Mr. Little motioned that this mortgage be accepted which was seconded by Mr. Stabenau and unanimously approved.

It was decided to pay Dr. McCoy an extra bonus of $500.00 for work he has done and will do during the Year 1934.* A motion to this effect was made by Mr. Lindsay, III, seconded by Mr. Stabenau and unanimously approved.

At the suggestion of Mr. Lindsay, Jr., a motion was made by Mr. Eichelberger, seconded by Mr. Stabenau, and unanimously approved that effective May 1st, 1934, salaries be restored to a basis prior to that of May 1st, 1932, with a few minor exceptions at the Grand Avenue Plant. All employees at the West Chicago Plant with Saturday off will receive less 15% and employees with any additional day off will receive a further reduction of 20%.

*Revised as per May 1934 meeting: "All Directors present unanimously decided to change "for work he has done and will do during the Year 1934" to "for extra services to date."

There being no further business, the meeting was adjourn

Respectfully submitted,

Mark W Eichelberger
SECRETAR

We, the undersigned, being Directors of Lindsay Light Company and having been present at the meeting of said Directors held on April 24th, 1934, hereby certify that the foregoing recor hereof is a true record and we consent thereto.

Chas R Lindsay

C. W. Stabenau

Robert L Little

Chas R Lindsay III

Mark W Eichelberger

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

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_____

24th April, 1934.

TO THE DIRECTORS OF
LINDSAY LIGHT COMPANY:

I hand you herewith statement for the quarter ending March 31st, 1934, showing net profit of $6,316.86. The actual net profit was $7,888.26, but the Government assessed us an additional tax of $1,571.40 for the Year 1932. The reasons for this are that our final City and County Taxes for that year were later reduced and the Government would allow us but 10% for depreciation on Machinery and Fixtures instead of 20%.

The best I have been able to accomplish on our mortgage for $105,000.00 which expires August 1, 1934, is a new ten year mortgage dated May 1st, 1934, for $90,000.00 at 5½%, $5,000.00 to be paid annually on the principal; this renewal to be made through E. G. Krumrine and Company and their commission to be $1,800.00; we to pay The New England Mutual Life Insurance Company $15,000.00 with accrued interest before May 1st. We will be able to take care of this transaction without borrowing from the bank or selling Treasury Preferred Stock, as some of our larger customers have increased their purchases from us which I hope will continue.

Respectfully submitted,

Chas R Lindsay

President

CRL/EA

NOVEMBER 1935 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT & CHEMICAL COMPANY, DULY CALLED AND HELD IN ITS OFFICE, 161 EAST GRAND AVENUE, CHICAGO, ILLINOIS, ON TUESDAY, NOVEMBER 26TH, 1935, AT THE HOUR OF 2 P.M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light & Chemical Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

Upon motion by Mr. Stabenau, seconded by Mr. Little, and unanimously carried, the regular quarterly dividend of 1¾% was declared upon the Preferred Stock for the quarter ending December 31st, 1935, payable December 16th, 1935, to stockholders of record at the close of business December 7, 1935.

Mr. Lindsay, Jr., submitted a report to the Directors which is found incorporated in the minutes of this meeting. Due t a misunderstanding, he reports that it was not his intention to obligate the Company to repurchase the 500 shares Lindsay Light Preferred Stock at par. In this report he also outlined his views regarding the removal of our operations at 161 East Grand Avenue, Chicago, including the offices to our West Chicago Plant. The Directors entered into a discussion of the advisability of immediately preparing our West Chicago Plant for such a move, and it was unanimously agreed that it was advisable at this time to make this move as rapidly as possible, preferably before July 1st, 1936, but in all events not later than September of 1936. It was also decided to rebuild the portion of the West Chicago Plant which is to be used for office space, as the offices at West Chicago in its present condition is both inadequate and unsuitable.

Mr. Lindsay, Jr., submitted the following savings which he estimated would be accomplished by the removal of our Chicago operations to West Chicago:

Electricity	$2,000.00
Gas	300.00

Coal	$2,000.00
Personal Property Taxes	1,600.00
Two Watchmen	1,800.00
One Engineer	1,000.00

or a total saving of between eight and nine thousand dollars per year. It was roughly estimated that the total cost of this remova including the rebuilding of the offices would not exceed $15,000.(

There being no further business, the meeting was adjourr

Respectfully submitted,

Mark Weichelbergen
SECRETARY

We, the undersigned, being Directors of Lindsay Light & Chemical Company and having been present at the meeting of said Directors held on November 26th, 1935, hereby certify that the fo going record hereof is a true record and we consent thereto.

O. W. Lindsay

C. W. Stabenau

R. L. Little

Chas. R. Lindsay Jr.

Mark Weichelbergen

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

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26th November, 1935

TO THE DIRECTORS OF
LINDSAY LIGHT & CHEMICAL COMPANY:

On account of sickness I was absent from the October Meeting and wish to correct that part of it where I was willing and did purchase 500 shares Lindsay Preferred Stock at par with an option of selling it back to the Company at the same price at any future date, as I had no intention of obligating the Company to repurchase this stock at par.

It has been over four years since we purchased our West Chicago property with the hope that we would be able to sell our Chicago property and move our entire business there. I now recommend that as soon as possible we prepare our West Chicago Plant so that we may move our entire business there within a year. My reasons for this are that taxes on Chicago Personal Property have almost doubled and our expenses with one plant would be considerably further reduced, as gas, electricity and water, watchman and engineer services, and other duplications that we have would not be necessary under one plant.

The cost of moving and putting the West Chicago Plant in proper condition for offices and mantle and electric departments would be quite an item, but it would have to be done sooner or later and I believe the sooner we get at it, the better it will be for our future business.

Respectfully submitted,

Chas R Lindsay

President

CRL/EA

FEBRUARY 1937 MEETING

MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS OF LINDSAY LIGHT & CHEMICAL COMPANY, DULY CALLED AND HELD IN ITS OFFICE AT WEST CHICAGO, ILLINOIS, ON TUESDAY, FEBRUARY 23RD, 1937, AT THE HOUR OF 2:00 P.M.

The meeting was called to order by Mr. Chas. R. Lindsay, Jr., presiding Chairman. Mr. Mark W. Eichelberger acted as Secretary.

Present:

Mr. Chas. R. Lindsay, Jr.
Mr. Chas. R. Lindsay, III
Mr. R. L. Little
Mr. C. W. Stabenau
Mr. Mark W. Eichelberger.

Same being five of the Directors of Lindsay Light & Chemical Company, thereby constituting a quorum.

Minutes of the previous meeting were approved.

On motion of Mr. Little, seconded by Mr. Lindsay, III, and unanimously carried, the regular quarterly dividend of 1¾% was declared upon the Preferred Stock for the quarter ending March 31st, 1937, payable March 15th, 1937, to stockholders of record at the close of business March 6th, 1937.

A motion was made by Mr. Stabenau, seconded by Mr. Little, and unanimously carried, that proxies be sent out on Thursday, March 11th, 1937, together with the audited statement of the Company's 1936 business.

Mr. Lindsay, Jr., then read the enclosed report. Upon motion made by Mr. Little and seconded by Mr. Stabenau, this report was unanimously approved. It was, therefore, decided that, starting March 1st, 1937, a 10% increase be given to all wage earners and salaried employees of the Company.

There being no further business, the meeting was adjourned.

Respectfully submitted,

Mark W. Eichelberger
SECRETARY

We, the undersigned, being Directors of Lindsay Light & Chemical Company and having been present at the meeting of said Directors held on February 23rd, 1937, hereby certify that the foregoing record hereof is a true record and we consent thereto.

Chas R Lindsay

Chas. R. Lindsay III

C. W. Stabenau

A. L. Little

Mark W Eichelberger

We concur in the foregoing and ratify and approve the said records and proceedings described therein.

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DECONTAMINATION ACTIVITIES

AT

LINDSAY LIGHT BUILDING (I)
161 E. Grand Avenue
Chicago, Illinois

INTRODUCTION

The 161 E. Grand Avenue Building housed the Lindsay Light Company from about 1910 to the mid-1930's. The company first imported and then manufactured incandescent gas light mantles employing natural thorium compounds and incidental to its operations deposited thorium materials on surfaces, particularly floors, of the building.

The United States Environmental Protection Agency (EPA) reported on the results of several surveys performed at 161 E. Grand Avenue and recommended that, although there is no statutory requirement, the building be decontaminated where practicable. This recommendation was made to reduce the dose from radiation exposure to members of the general public who work in or frequent the building.

The building management chose Radiation Safety Services, Inc., to evaluate and, where appropriate, attempt to decontaminate the more heavily contaminated floors in the building. This was to be accomplished by removal of contaminated floor surfaces followed by replacement of the floors with new material. The work took place during the month of August, 1981.

Technical Approach.

The building management and Radiation Safety Services identified areas where the gamma dose rate at 1 meter above the floor was 100 microrads per hour or greater. These areas were candidates for decontamination.

The first step for most of the areas was the removal of the existing floor coverings, exposing the oak floors. These floors were surveyed and were frequently found to contain significant surface alpha contamination. The building engineer supplied laborers and tools with which the surface layer of the flooring could be removed.

When contamination was found to extend to a greater depth in the oak flooring, the floor boards were cut and removed. Frequently, the subfloor, which was the original plank flooring in the building, was found to be badly contaminated indicating the oak flooring had been installed subsequent to the initiation of Lindsay Light operations. Since the planking was structural, the decision was made to attempt to chisel out contamination to a depth of 1/2 inch. It was felt that removal of more material might compromise the structural integrity of the floors.

Where contamination did not appear to extend to a great depth into the floor the floors were power sanded. The dust from sanding operations was controlled by the use of plastic

sheets. Personnel respiratory protection and hearing protection was supplied to the building laborers.

The operations were terminated at the request of an owner-tenant. And the areas in which work had been performed were resurveyed. The survey reports are in Appendix A.

Results and Recommendations

Areas on the basement, second and fourth floor levels were decontaminated. The areas for decontamination were selected by the building management and decontamination was interrupted at the request of the owner-tenant. The areas decontaminated represent the most significant contamination for areas which are generally occupied and doses were significantly reduced or eliminated at a height of 1 meter from the floor.

The basement pump room, which is immediately north of the boiler room, had a hot spot due to contaminated material used as fill around a pipe. The contaminated material was removed and the created void was filled with concrete. This reduced the external gamma dose from 225 microrads per hour at contact with the floor to 60 microrads per hour at contact and 50 microrads per hour at 1 meter.

The highest readings in the building were found in the basement in Room 8 which was not decontaminated since this is an area which is not occupied. If this area is to be occupied in the future, decontamination is strongly recommended and would be mandated by State law.

The EPA reported dose rates of 800 microrads per hour at 1 meter from the floor in the vicinity of the secretary's desk in Room 202. The floor covering and oak flooring were removed and the planking chiseled to a depth of 1/2 inch reducing the dose rate in the vicinity of the secretary's desk to 250 microrads per hour at 1 meter from the floor.

We recommend that where possible the planking be sealed with bituminous material to retard radon escape and that a 1/2 inch plate of lead be installed prior to replacement of the floor and floor covering. This should further reduce the dose rate by approximately a factor of 2.

The conference room in 202 received treatment similar to the floor adjacent to the secretary's desk. This reduced the dose rate at 1 meter from the floor from the EPA reported maximum of 155 microrads per hour to a maximum of 90 microrads per hour.

We recommend that the floor be sealed with bituminous material to retard radon escape prior to the replacement of the floor and floor covering material.

On the fourth floor Streeterville post-production room the thin concrete floor was broken up, the oak flooring removed, and the planking chiseled and sanded. This reduced the dose rate from the 300 microrads per hour reported by the EPA to 150 microrads per hour at 1 meter from the floor.

We recommend that the floor be sealed with bituminous material to retard the release of radon from this floor.

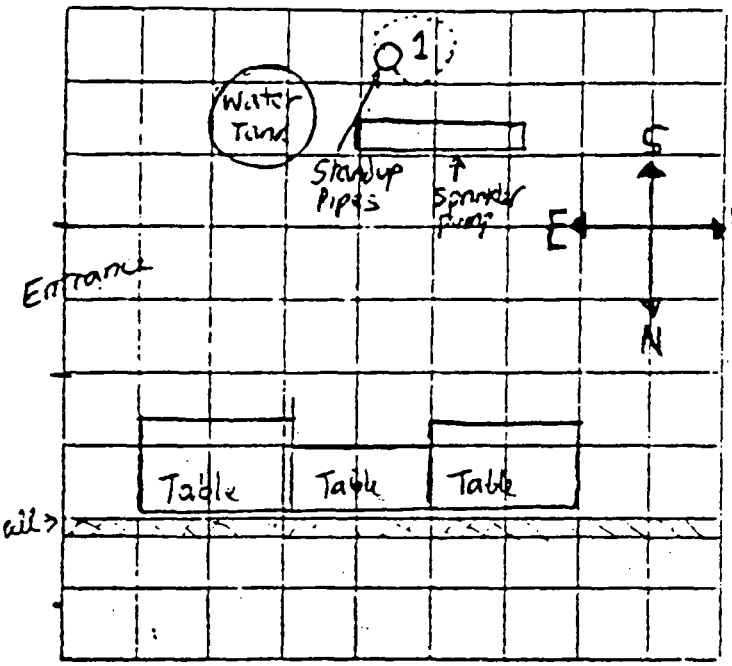
Although decontamination was terminated before completion, the most important occupied areas demonstrated a significant dose reduction consistent with the decontamination effort. Changing space utilization, particularly in the basement, may dictate further decontaminations to the levels recommended by the EPA. It is recognized that there is a very serious trade-off between reductions in already low doses and the expense of decontamination.

SURVEY REPORT

BUILDING: 61 E Grand ROOM: Basement - Pump Room DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nitr		

Ventilation:

Comments:

SURVEY FINDINGS

AREA	(uR/hr) Contact	(uR/hr) 1 meter above Floor	
1 - around standup pipe	60	50	

Background

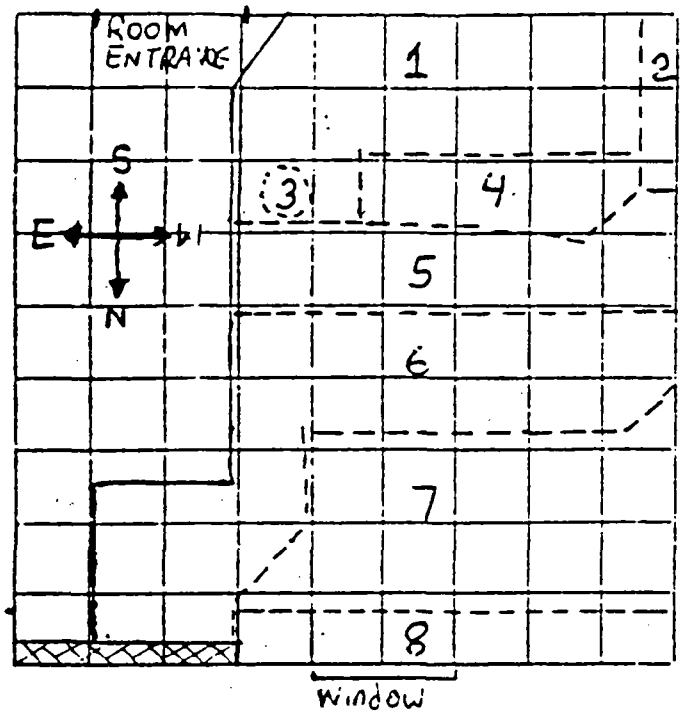
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 101 E. Grand ROOM: 202 Conference Room DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat.		

Ventilation:

Comments: All reported exposure rates represent the highest readings observed.

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	80	—	
2	550	—	
3	250	—	
4	150	90	
5	100	70	
6	80	60	
7	200	—	
8	500	—	

Background

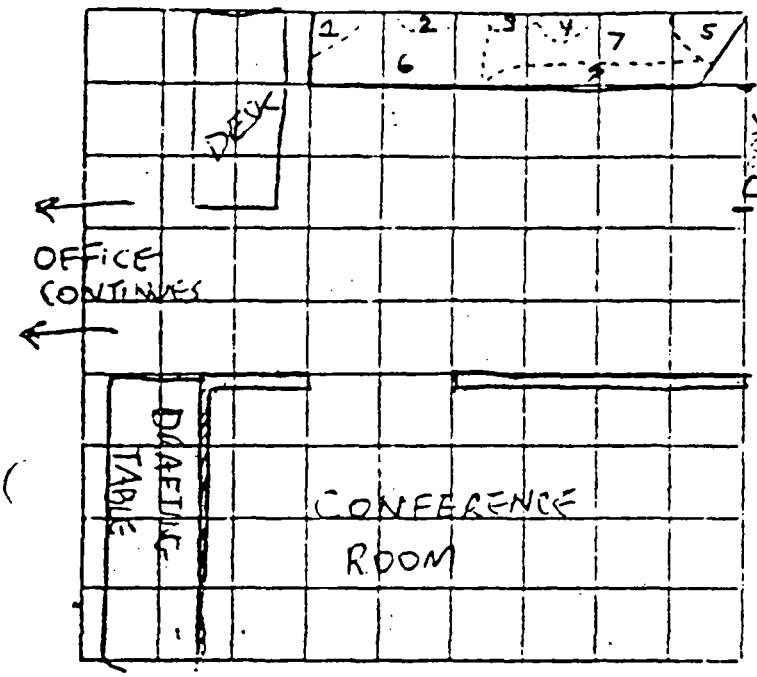
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 16 E. Grand ROOM: 202 DATE: 9-8-81 BY: BH

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat.		

Ventilation:

Comments:

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	600	—	
2	900	—	
3	800	—	
4	400	—	
5	400	—	
6	500	250	
7	300	200	
8	200	—	

Background

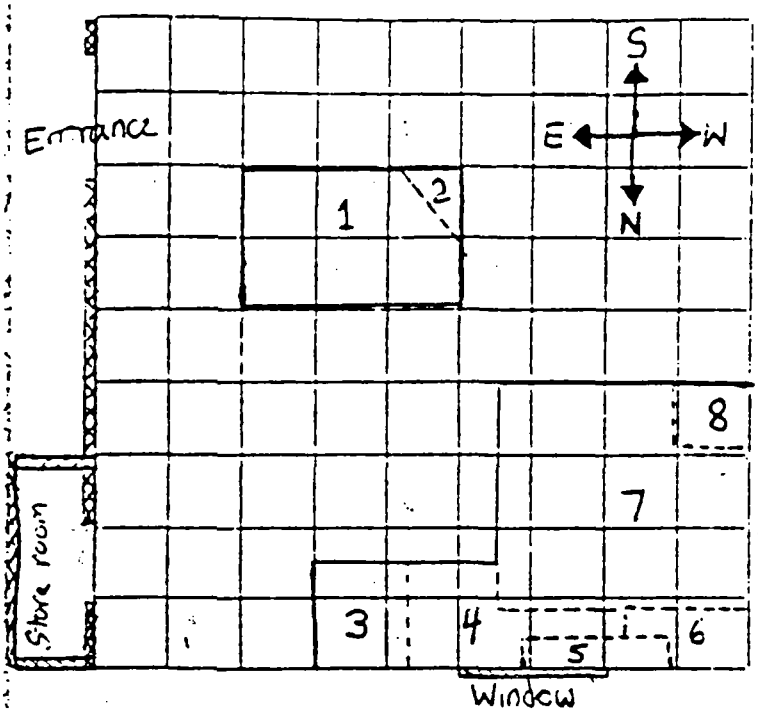
RECOMMENDATIONS:

SURVEY REPORT

BUILDING: 161 E. Grand ROOM: 4th FL. Streeterville Post-Production 2m DATE: 9-8-81 BY: B.H.

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument Eberline E-500B, HP-270 Source of Ionizing Radiation



TYPE	FORM	ACTIVITY
Thorium Nat.		

Ventilation:

Comments: All reported readings are the highest readings.

SURVEY FINDINGS

AREA	(uR/hr) CONTACT	(uR/hr) 1 METER ABOVE FLOOR	
1	80	60	
2	90	—	
3	70	40	
4	100	—	
5	700	150	
6	140	—	
7	80	80	
8	120	—	

Background

RECOMMENDATIONS:

RADIATION SAFETY SERVICES, Inc.
1564 Ashland Avenue
Evanston, Illinois 60201
312/866-7744

April 11, 1984

Ron Klyber
161 East Grand Associates
161 East Grand Avenue
Chicago, IL 60611

Dear Ron:

Attached is the final report of the radiological aspects of the remodeling operation. As is clear in the report, no construction workers or other individuals were exposed to any significant radiological hazard nor was there any significant amount of radioactive rubble produced.

Should you have any questions or require further information regarding these activities or contamination of the building, please feel free to contact me at 866-7744.

Sincerely,

Eli A. Port
Certified, American Board of Health Physics
Registered Professional Engineer (Safety)

EAP:ts

Enclosure

RADIOLOGICAL ASPECTS OF THE FEBRUARY 1984 REMODELING OF THE 161 E. GRAND AVENUE BUILDING

Prepared by

RADIATION SAFETY SERVICES, INC.

April 9, 1984

INTRODUCTION

Remodeling on the second floor of the 161 E. Grand Avenue building during February 1984 included work in areas previously identified by the EPA as contaminated with small quantities of natural thorium. Monitoring was performed to locate contamination on building materials disturbed or removed during the remodeling. Protective actions were taken by workers as recommended by the City of Chicago Department of Inspectional Services.

TRAINING

A one-hour training session was conducted by Eli A. Port, CHP. The sign-up sheet is attached in Appendix A.

The training was based upon a presentation developed by the Health Physics Society for non-technical audiences and included information regarding the production of radiation and its interaction with matter, biological effects, dose-effect relationships, the concept of risk and protective measures.

PROTECTIVE ACTIONS

Workers and ancillary personnel in the construction area were issued Tyvek coveralls and 3-M dust masks. Instructions were given regarding proper wearing and use of the protective apparel. Workers' clothing, gloves and shoes were checked for contamination at the end of each work period. As contaminated portions of the original floor were uncovered, surface wipes were taken to determine if removable contamination was present. While the contaminated floor was uncovered a rope barrier was erected to prevent access. The exposed portions of the contaminated floor were covered with an epoxy paint to seal the surface and prevent dispersal of contamination.

RADIATION SURVEY RESULTS

No removable contamination was detected at a 95% confidence level on filter paper wipes taken from the contaminated floor. Contamination was not found on dust which had accumulated in the walls.

Low-level contamination was detected on several 2" x 4" wood beams in direct contact with the contaminated floor. Water stains on the beams suggest that water-soluble contamination may have been transferred during a past flood which originated on the

roof. Slight contamination was found on tar paper which was in direct contact with the original floor under several superficial layers of flooring.

Dose rate and surface contamination surveys were conducted after the contaminated floor was uncovered. The contaminated areas ranged up to 5,000 dpm/100cm^2. From the data the size and shape of the contaminated area was determined. See Appendix B for survey results.

No contamination was found on any shoes, coveralls, gloves or tools. Surveyed dust masks also revealed no contamination. Air samples were collected and used as an early indicator of possible airborne contamination. The results of air sampling from a cooperative effort were obtained from the USEPA and are reproduced in Appendix C.

WASTE DISPOSAL

Debris from contaminated areas was surveyed with a Ludlum Model 6/Eberline HP210T survey meter. Contaminated material was segregated pending disposal. Uncontaminated debris and debris from uncontaminated areas was collected in waste bins and surveyed with a Ludlum Model 2220 analyzer utilizing an Eberline SPA-2" x 2" NaI (Tl) detector in a low background area. No additional contamination was detected on this material which was

released to a scavenger service. Material with detectable activity was collected in a DOT spec container and will be transferred by ADCO, a licensed radioactive waste collector, for transfer to a radioactive waste disposal site in Richland, Washington.

CONCLUSIONS

Radiation surveys demonstrate that radioactive contamination in the construction area was not readily transferable. A small amount of contamination was transferred to building materials in direct contact with the contaminated floor for many years. Remaining removable contamination was sealed into the floor with epoxy paint which will inhibit the release of Rn-220, a gaseous daughter of Th-232.

Contamination detected on a small quantity of debris slightly exceeded 3,000 dpm/100 cm^2, the USNRC limit for release of thorium contaminated facilities for unrestricted use. While consumer products containing significantly larger quantities of radioactive material are routinely and legally disposed of as ordinary trash, the rubble was transferred to a USNRC licensed radioactive waste collector for disposal.

No contamination was detected on protective apparel or tools used during the construction. Results of air sampling by the EPA and RSSI did not indicate an increase in airborne radioactivity levels in the work area.

APPENDIX A

TRAINING

SIGN-UP SHEET

Feb 7, 1984 1 hr Training

Attendance List 161 E. Grand Ave.

Marge Thurlault
Johnston Bell
Christie Brown
Ron Klyber
Ellin Manowicz
Joseph Stancle

APPENDIX B

RADIATION SURVEY RESULTS

SURVEY REPORT

BUILDING: 161 E. Grand ROOM: 2nd floor DATE: 02/07&08/84 BY: Dave Derenzo & Eli A. Port

Routine ☐ Spot Check ☐ Special ☒ Equipment ☐

Survey Instrument: ~~Dose Rate- HPI 1010~~ Wipes-Ludlum 2220/HP-210

Source of Ionizing Radiation: Natural Thorium

See Attached Drawing

TYPE	FORM	ACTIVITY

Ventilation:

Comments:

SURVEY FINDINGS

AREA	WIPES		DOSE RATE
1 Floor	131 c/1min	158c/1min (After 2x4 removed)	See separate survey attached
2 Floor	125c/1min		
3 Floor	118c/1min		
4 Floor	105c/1min		
5 Floor after removal of tile	133 c/1min		
6 Floor after removal of tile	142c/1min		
7 Floor after removal of tile	123c/1min		

Background 680 c/6 min = 113 cpm

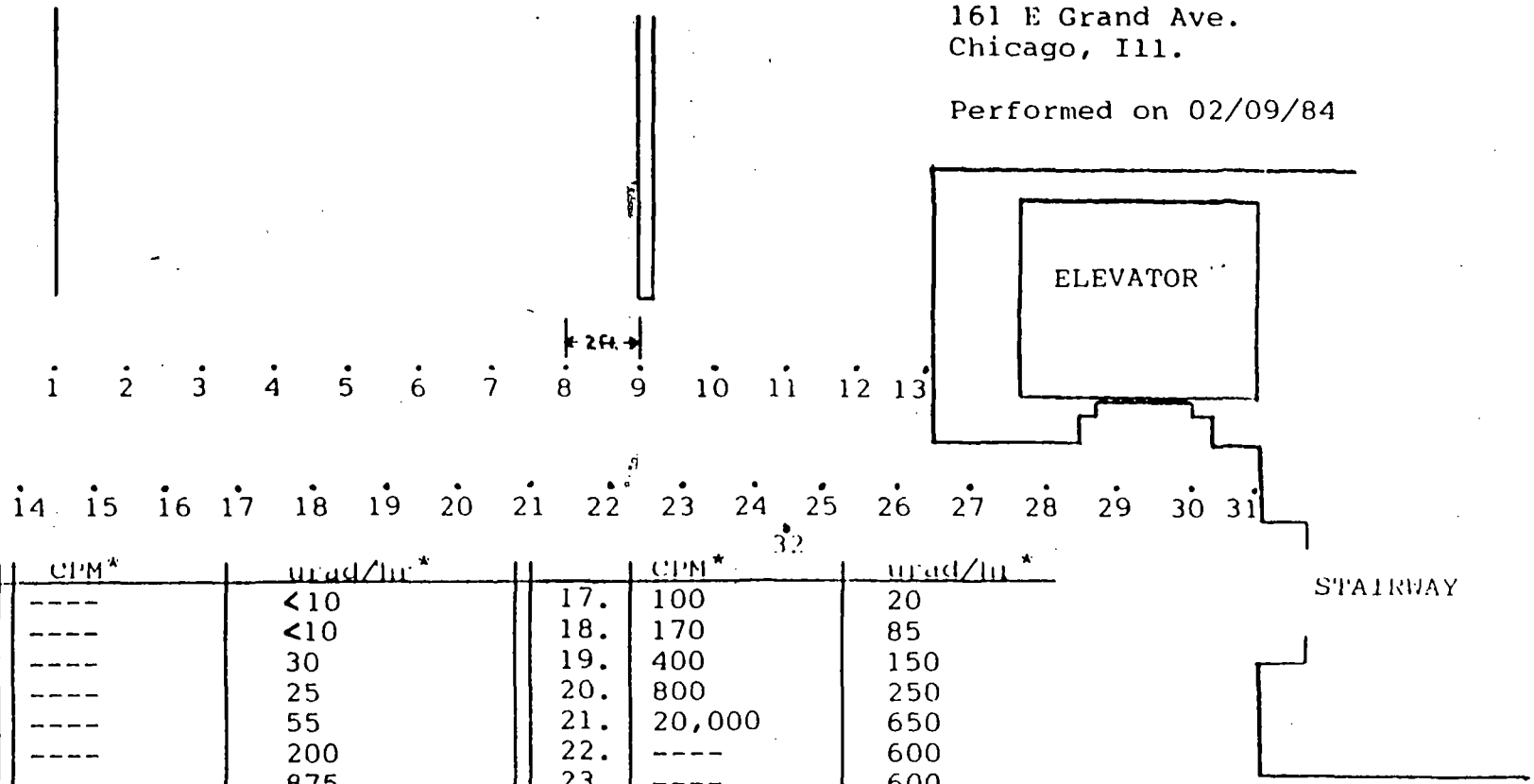
RECOMMENDATIONS:

Ld 95% = 40.5 cpm ∴ Activity detected at 95% confidence level if 113 + 40.5 = 154 cpm is exceeded.

Radiation Safety Services, Inc.

2nd Floor
161 E Grand Ave.
Chicago, Ill.

Performed on 02/09/84



	CPM*	urad/hr*		CPM*	urad/hr*
1.	----	<10	17.	100	20
2.	----	<10	18.	170	85
3.	----	30	19.	400	150
4.	----	25	20.	800	250
5.	----	55	21.	20,000	650
6.	----	200	22.	----	600
7.	----	875	23.	----	600
8.	----	350	24.	----	400
9.	----	300	25.	16,000	300
10.	----	250	26.	2,000	100
11.	----	200	27.	1,100	60
12.	----	100	28.	2,100	80
13.	----	90	29.	900	65
14.	60	15	30.	2,000	50
15.	60	10	31.	1,300	60
16.	70	10	32.	90,000	---

PERFORMED BY:
Radiation Safety Services, Inc.
1564 Ashland Ave
Evanston, Ill. 60201
312-866-7744

DJD 02/13/84

INSTRUMENTS: All CPM readings taken with a Ludlum Model 16 using an Eberline HP-210T detector. All urad/hr readings taken with a Health Physics Instruments, Inc Model 1010.

BACKGROUND: The background in relatively uncontaminated portions of the building are 10 to 15 urad/hr. In these areas the Model 16/HP-210T background was 50-70 CPM.

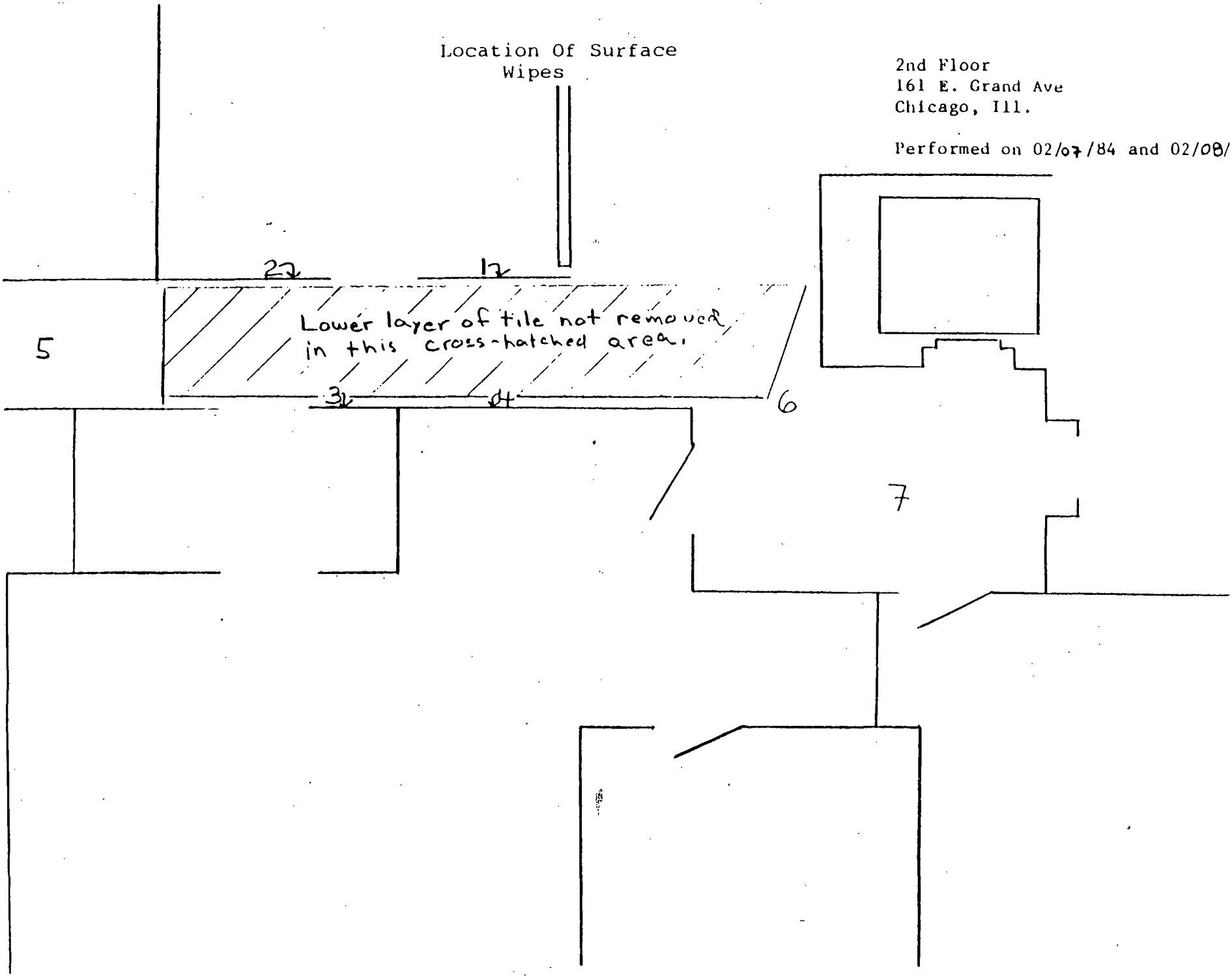
SCALE
1"=5'

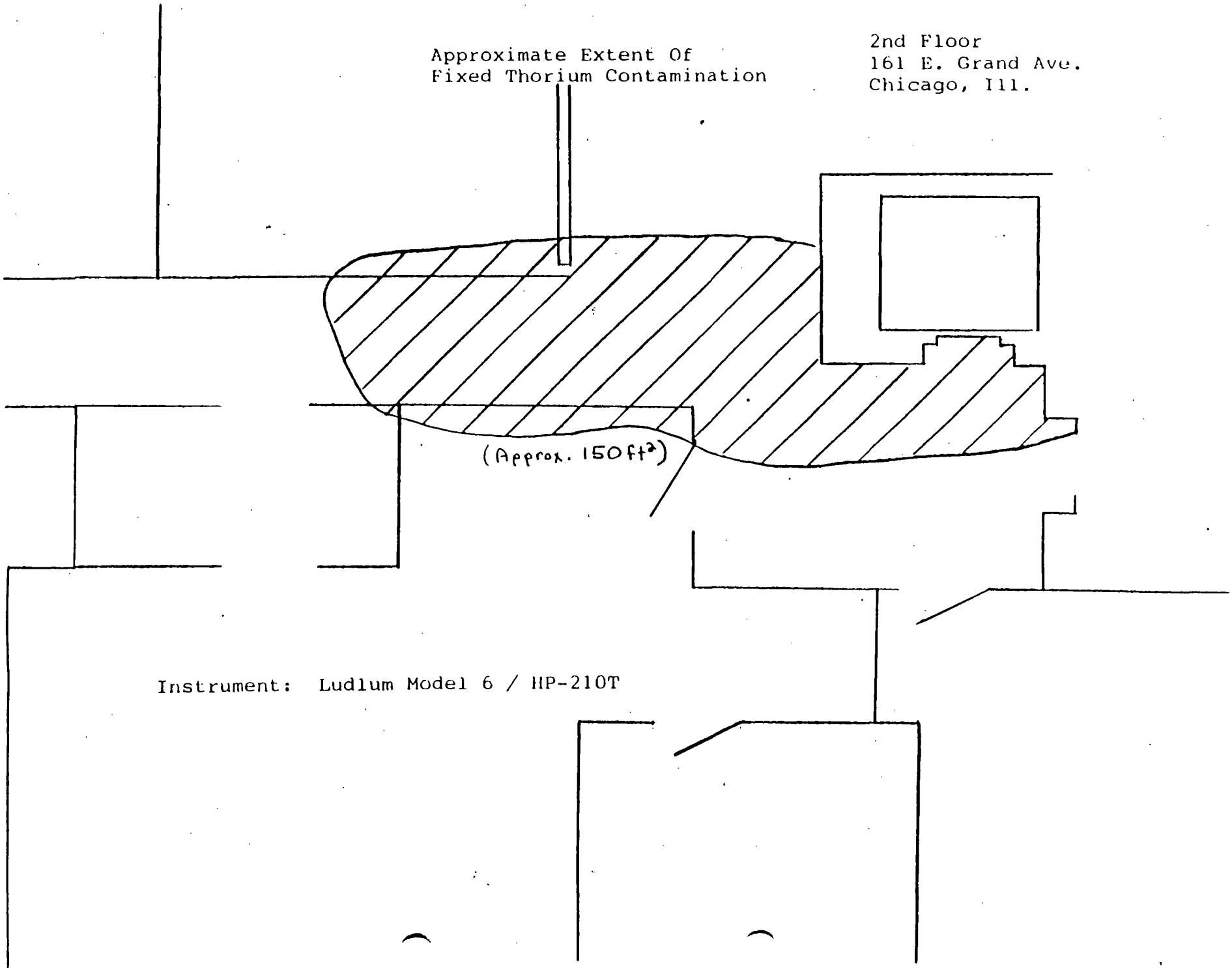
*Readings taken at the surface of the existing floor. The HPI 1010

Location Of Surface Wipes

2nd Floor
161 E. Grand Ave
Chicago, Ill.

Performed on 02/07/84 and 02/08/84




Approximate Extent Of
Fixed Thorium Contamination
2nd Floor
161 E. Grand Ave.
Chicago, Ill.
(Approx. 150 ft²)
Instrument: Ludlum Model 6 / HP-210T

APPENDIX C

AIR SAMPLING RESULTS

FROM

USEPA REPORT

Dated

February 2, 1984

Background airborne radon and thoron daughter concentrations were measured on February 7, before demolition activities. Thoron daughter concentrations were collected for 30 minute intervals during the day. Samples were collecte at 20 liters per minute on Metricel filters with 0.45 micron pore size. Collection and analysis was by the method given in "Radiation Monitoring" published by the U.S. Department of Labor, Mine Safety and Health Administ Results are given in Table 1 and in Figure 3. The background radon daughte concentration was 0.005 working levels, a normal indoor level, but the thoron daughter concentration was 0.038 working levels, showing the presence of thor decay products in the air. Generally, it would be expected thoron daughter levels would be less than radon daughter levels. During the course of demolition activities thoron daughter levels fluctuated, reaching a maximum of 0.060 working levels.

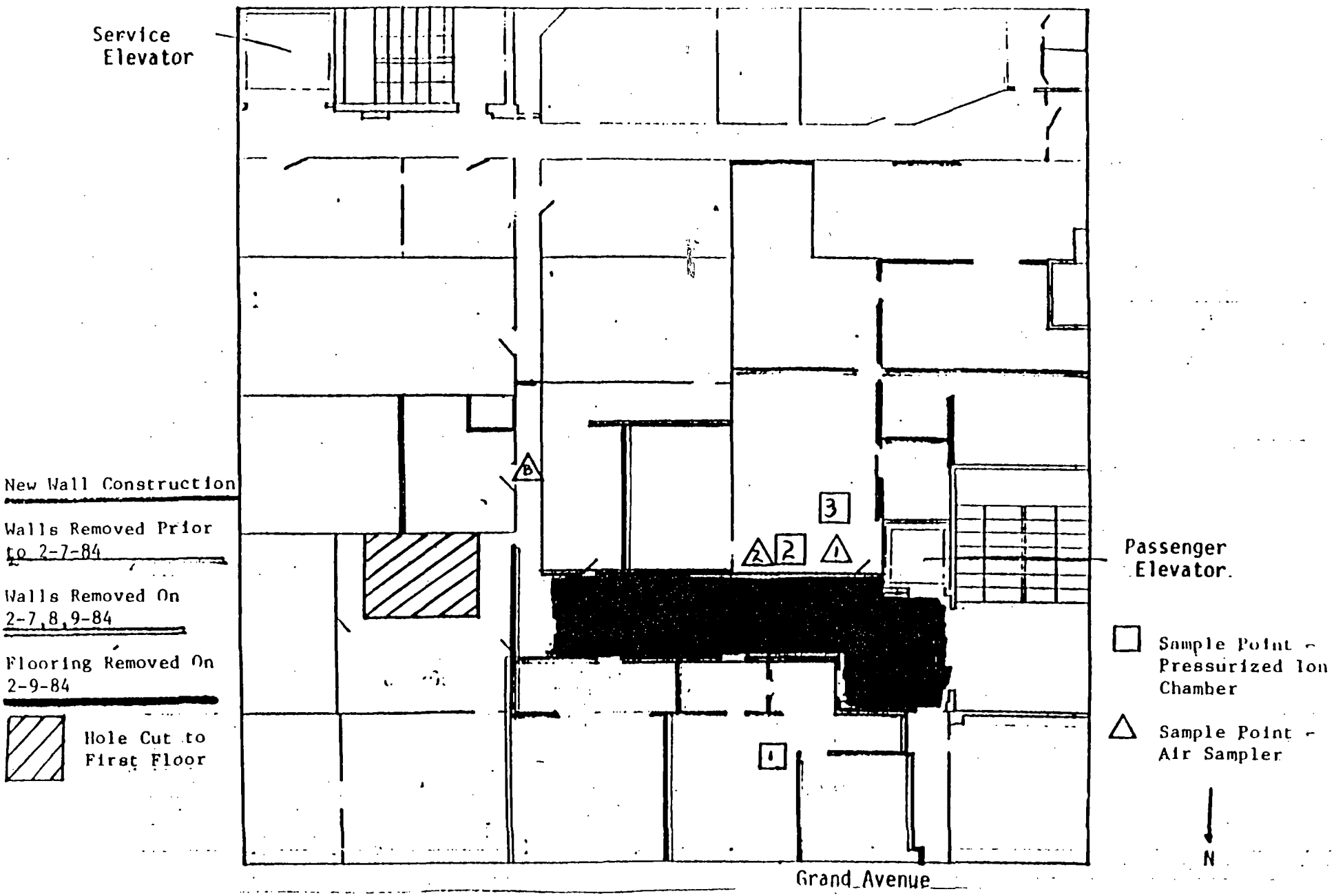
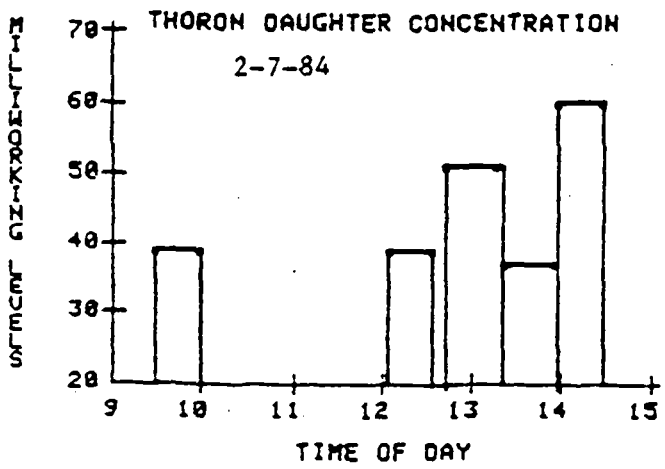


Figure 1: Floor Plan of Second Floor Showing Work Areas and Sample Collection Results

Table 1: Radon/Thoron Daughter Concentrations - Air Sample Results

	DATE	TIME PERIOD	DAUGHTER CONCENTRATION RADON (MILLIWORKING LEVELS)	DAUGHTER CONCENTRATION THORON (MILLIWORKING LEVELS)	
B	2-7-84	9:12 - 9:17	5	39	BACKGROUND
1	2-7-84	9:28 - 9:28		39	
1	2-7-84	12:04 - 12:34		51	
1	2-7-84	12:43 - 1:14		37	
1	2-7-84	1:22 - 1:55		60	
1	2-7-84	1:59 - 2:29			
2	2-9-84	12:18 - 12:48		28	
2	2-9-84	12:55 - 1:25		45	
2	2-9-84	1:25 - 1:55		35	
2	2-9-84	1:56 - 2:26		35	

△ Air Sampler Location - See Figure 1



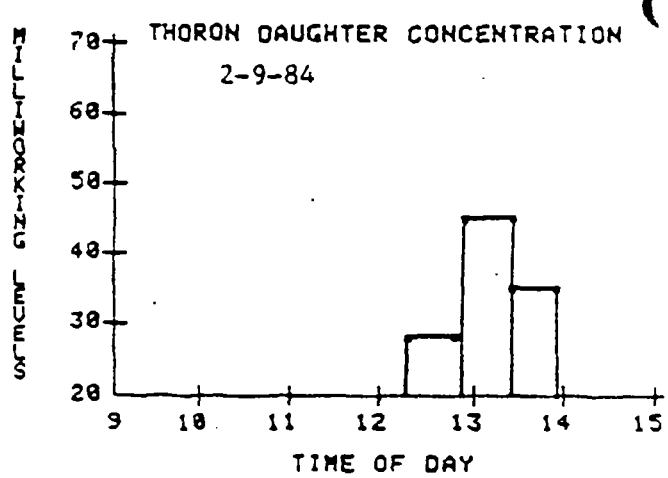


Figure 3: Radon/Thoron Daughter Concentrations - Air Sample Results

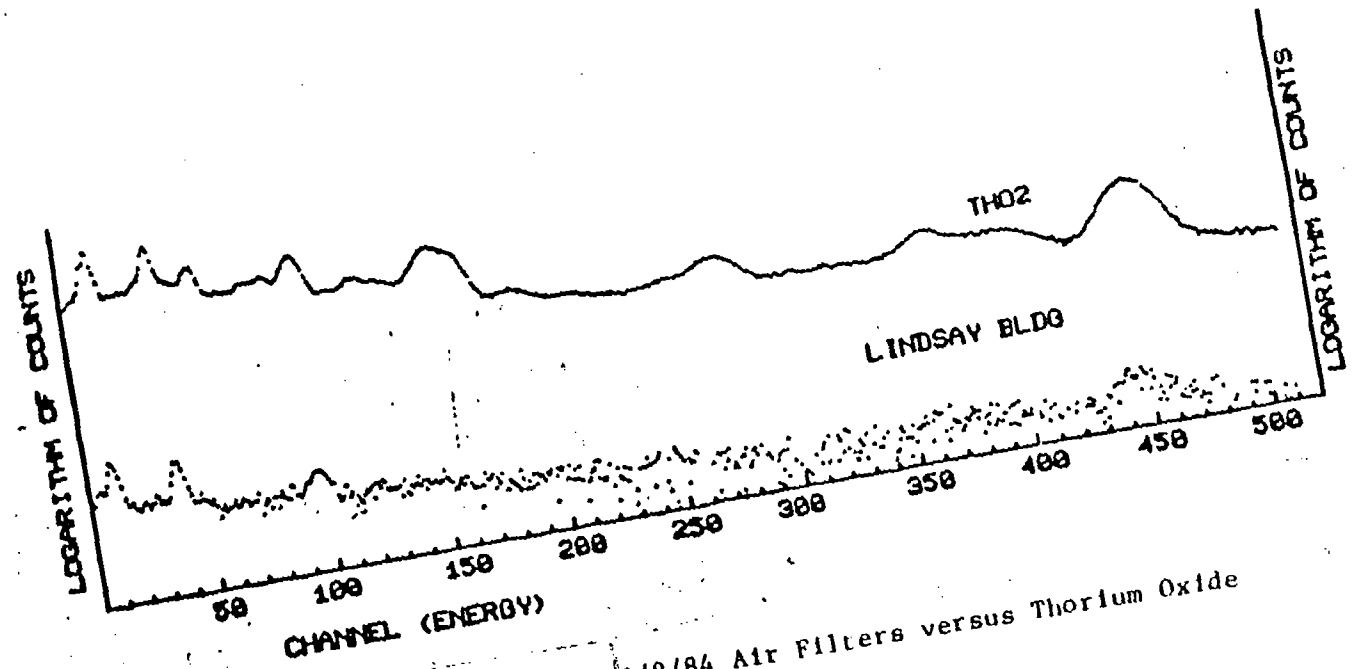


Figure 4: Gamma-ray Spectra - 2/8/84 Air Filters versus Thorium Oxide

APPENDIX D

USNRC GUIDELINES
FOR THE RELEASE OF FACILITIES
FOR UNRESTRICTED USE

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

July 1982

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organizati continuing work with radioactive materials, or conversion of facilit to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

   Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
nat, U-235, U-238, and sociated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
ansuranics, Ra-226, Ra-228, -230, Th-228, Pa-231, -227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
-nat, Th-232, Sr-90, -223, Ra-224, U-232, I-126, 131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
ta-gamma emitters (nuclides th decay modes other than pha emission or spontaneous ssion) except Sr-90 and ners noted above.	5000 dpm βγ/100 cm^2	15,000 dpm βγ/100 cm^2	1000 dpm βγ/100 cm^2

ere surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting uclides should apply independently.

; used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the ounts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

easurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average hould be derived for each such object.

e maximum contamination level applies to an area of not more than 100 cm^2.

he amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft bsorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of ow efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced roportionally and the entire surface should be wiped.

e average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of tal absorber.

ENDANGERMENT ASSESSMENT
LINDSAY LIGHT COMPANY BUILDING
161 EAST GRAND AVENUE
CHICAGO, ILLINOIS

FOI EXEMPT

1.0 Site Description and History

1.1 Description

The Lindsay Light Company Building is a four-story commercial building located at the corners of Grand Avenue and St. Clair Street in Chicago, Illinois. Grand Avenue is about one-half mile north of the central Chicago "Loop" area and St. Clair Street is about one-fourth mile west of Lake Michigan. The geographical location is 41° 53' 30" north latitude and 88° 36' 30" west longitude.

1.2 History

The Lindsay Light Company manufactured incandescent gas mantles for home and street lighting in this building from at least 1910 until 1936. Over the period of about 1931-36 operations were relocated to West Chicago, Illinois. The building is presently owned by the 161 East Grant Associates who are major tenants and is managed by Browne and Storch, a real estate firm. Offices not occupied by the owners are rented to a variety of small businesses.

2.0 Hazardous Properties of the Substances

The principal ingredient in gas mantle manufacture is thorium as a nitrate. Small amounts of cerium, beryllium and magnesium nitrates are also used. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium radionuclides are also found in the Uranium Decay Series and the Actinium Decay Series. It is believed that the principal source of contamination in this building is the Thorium Decay Series.

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Radiological properties of the constituents are listed in Figure 1. The parent of the series, thorium-232, has a radiological half-life exceeding the estimated life of the Earth, thereby making it an essentially permanent contaminant and a continuing source of daughter products. Daughters have radiological half-lives less than 7 years and can therefore be expected to return to equilibrium throughout the Thorium Decay Series about 35 years after any chemical separation of thorium.

Alpha particles, beta particles, X-rays and gamma-rays are all emitted from the Thorium Decay Series. The primary hazards arise from external whole-body exposure to gamma-rays emitted by actinium-228, lead-212 and thallium-208 and from lung exposure to alpha particles emitted by daughter products of the noble gas radon-220. Gamma-rays are highly penetrating and can expose persons at a distance from the source even when there are intervening shielding materials. Radon-220 is a gas and has high mobility once in the ambient air. Its short radiological half-life of 55.6 seconds can limit its impact because it may decay back to a solid before it penetrates overlying materials. Health risks for radon-220 occur not so much from the gas as from its solid decay products which attach to ambient dust, are breathed in, trapped in the mucus layer in the airways of the lung and irradiate the surrounding tissue before being expelled. The radon-220 decay product lead-212 will also be transferred from the lung to red blood cells, kidneys, and bone surfaces.

3.0 Form, Amount and Levels of Substances

3.1 Form

Based upon research into the industrial process of gas mantle manufacture and several on-site inspections it is believed that material deposited

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in flooring and structural elements of the building is a soluble form of thorium, probably thorium nitrate. The thorium materials appear to have been absorbed into porous flooring materials. Powder forms of thorium compounds may also be present.

3.2 Amount

No estimation of the total activity or mass of contaminant in the building has been made. Fourteen areas of contamination have been identified. One is a chimney along the west wall of the building. The remaining thirteen areas of contamination cover regions on the order of hundreds of square feet and are located on all floors of the building, including the basement.

3.3 Levels

3.3.1 Gamma-ray Exposure Rates

Detailed results of the original survey are given in "Final Report On a Survey of the Former Lindsay Light Company Building at 161 East Grand Avenue, Chicago, Illinois" (May, 1981). Limited cleanup was performed subsequently by the building owner's consultant and results of the EPA followup survey, given in "Confirmatory Survey At The Former Lindsay Light Company Building" (December, 1981), show some reductions in contact exposure rates in some areas. Floor plans derived from the original report giving gamma-ray exposure rates one meter off the floor are provided in Figures 2-9.

Background for the building was estimated to be about 10 microroentgens per hour (uR/hr) based upon the lowest measured values

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during the original survey. This is consistent with commonly reported background levels for uncontaminated buildings in general. The highest gross exposure rate was 1600 uR/hr measured on contact with a concrete plug in the chimney in the basement. Gross exposure rates for the remainder of the building ranged between background and 150 uR/hr measured one meter off the floor.*

3.3.2 Gamma-Ray Doses

3.3.2.1 By Thermoluminescent Dosimeters

During the original survey thermoluminescent dosimeters (TLDs) were placed in 14 areas of concern that showed elevated gamma-ray exposures and in one background location. Results, based upon 40 hour per week, 50 week per year exposure periods, ranged up to 136 millirem per year in excess of background. Complete results are given in "Final Report On a Survey of the Former Lindsay Light Company Building at 161 East Grand Avenue, Chicago, Illinois" but will not be reported here because they will not be used later in this risk assessment. It was felt the gamma-ray exposure rates in the original survey were preferable for the risk assessment because they provided more detail.

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* Survey results were obtained with both a Micro-R Meter and a Pressurized Ion Chamber (PIC). The Micro-R Meter has an energy dependent gamma-ray response. It was found to overrespond by a factor of two when compared to the energy independent PIC. Where Micro-R Meter readings were reported in the original survey, they have been converted to equivalent PIC readings in this report by dividing by two.

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3.2.2.2 By Film Badges

During June of 1983, at the request of the building owners, 7 film badges were furnished for dose measurements at specific locations of concern to them. Twenty-five day gross dose equivalents ranged from "minimal" (5 badges) to 20 millirem (2 badges). Complete information is included in EPA - Region V files. Because this set of measurements was performed for the owner's information and, in spite of specific directions, complete control could not be maintained over exposure locations and conditions, it was felt that these dose equivalent values are not appropriate for this endangerment assessment. Foremostly, however, it was felt the gamma-ray exposure rates in the original survey provided more detail for the risk assessment.

3.3.3 Radon Daughter Concentrations

During the original survey radon-220 and radon-222 daughters were collected on air filters in the basement and in rooms on the second and third floors for periods between 12 and 19 hours. These results are 0.018, 0.010 and 0.002 working levels (WL) for radon-222 daughters, respectively, and 0.211, 0.149, and 0.024 WL for radon-220 daughters, respectively.

During remodeling work on the second floor in February, 1984, EPA measured radon daughter concentrations. Before demolition activities began the levels were 0.005 WL (radon-222 daughters) and 0.039 WL (radon-220 daughters). Seven half-hour samples for radon-220 daughters were taken during 3 days of work. These ranged from 0.028 - 0.060 WL.

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4.0 Exposure Pathways

4.1 Whole-body Exposure to Gamma-rays

Gamma-ray emissions from the radioactive decay of the Thorium Decay Series producing potential human exposures will continue as long as contaminants remain in the building. The extremely long half-life of thorium-232, the series parent, means there will be a continual replenishment of daughters in the series and there will be no expectation that eventually the contaminants will decay to acceptable levels.

Recent remodeling on the second floor where walls were moved, offices restructured, new work stations established and a hole for a new stairway cut to the first floor clearly establishes that the building environment is a dynamic structure. Consequently, it was seriously considered to treat every area of contamination conservatively as an area of full-time workyear exposure. This was rejected in favor of assessing the situation as it exists now (or as it is expected to exist shortly) with exposure periods based upon estimates as close to the present situation as possible.

The risk estimates for whole-body exposure to gamma-rays are based on NAS-BEIR 3 estimates of fatal cancer due to ionzing radiation. This estimate was made using a relative risk projection model for solid tumors, and an absolute risk projection model for leukemia and bone tumors in a linear dose response model for a working lifetime (ages 18-65). The single coefficient risks are based on a life table analysis of an adult population having the vital statistics of the 1970 U.S. population and was prepared by the Bioeffects Analysis Branch in the

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EPA's Office of Radiation Programs. Single coefficient sex-specific risk estimates, so calculated, are 311 male cancer fatalities and 407 female cancer fatalities, respectively, per million person-rem.

Area average exposure rates were computed from exposure rates reported in the original survey report (May, 1981) or as modified by the limited cleanup and reported in the followup survey (December, 1981). Contaminated areas were originally identified as extended regions with exposure rates exceeding 30 uR/hr measured with a PIC. This level is compatible with recent standards promulgations by EPA for active and inactive uranium sites (40 CFR 192) and was kept as the basis of contamination for this endangerment assessment.

Fourteen contaminated areas were identified. One of these, a chimney on the west wall, probably contains a considerable quantity of radioactive material judging by the 1600 uR/hr exposure rates on the outside of the chimney. It represents a potential risk should the chimney be opened and an ongoing exposure risk to people who enter Room 8 in the basement. Since the chimney interior is inaccessible only the latter risk was assessed. For each of the thirteen remaining areas equivalent area-average net PIC exposure rates* were computed and annual doses determined based upon best estimates of occupancy times. Full-time work exposure was taken as 40 hours per week, 50 weeks per year. Annual doses, in person-millirem, were estimated based on expected occupancy in the area and measured dose rates. From these, the lifetime risk for exposure during the working lifetime was calculated for an

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* Micro-R Meter readings adjusted to equivalent PIC readings, exposure rates averaged over contaminated area, net readings from gross reading less background reading.

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individual who was in the area for the expected time. Data and estimates of lifetime risk of fatal cancers are given in Table 1.

4.2 Inhalation of Radon-220 Daughters

The decay of radon-220 gas produces charged solid decay products that attach to ambient dust, can be breathed in, trapped in the mucus layer in the airways of the lungs and expose the surrounding tissue before being expelled. Absorption of the decay product lead-212 can result in irradiation of red blood cells, kidneys and bone surfaces.

EPA - Office of Radiation Programs has computed lifetime cancer mortality risk coefficients for occupational exposure as 1.8×10^{-2} per 0.1 working levels (WL) ("Informal Technical Note on Thoron risk, W.H. Ellett and N.S. Nelson, May 1984"). Several short-term air samples have been taken in the Lindsay Light Company Building that show a range of 0.028 - 0.211 thoron working levels. Thoron levels may fluctuate on a daily and a seasonal basis depending upon the building ventilation rate, ambient air pressure, wind speed and other factors making a longterm average on the order of a year more representative of the average concentration. Nevertheless, based upon the available data, the lifetime cancer mortality risk for occupational exposure is

$$(0.028 - 0.211)\ \frac{1.8 \times 10^{-2}}{0.1\ \mathrm{WL}} = 0.5 - 3.8 \times 10^{-2}$$

The risk for males is 1.5 times the general population risk while the female risk is 0.4 times the general population risk under equal exposure conditions. Therefore,

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Lifetime Cancer Mortality Risk for Lifetime Occupational Exposure

Males	$0.75 - 5.7 \times 10^{-2}$
Females	$0.2 - 1.5 \times 10^{-2}$

5.0 Extent of Migration or Release

The thorium materials appear to be contained in flooring and structural members of the building. Much of this appears to be soluble materials that have been trapped in the wood. Smears taken at contaminated locations have been negative. Except for radon gases which are emitted from contaminated areas, it appears that the radioactive materials are fixed and should be expected to remain in place unless solubilized. Daughter products from radon gas decay are present throughout the ambient air in the building.

6.0 Conclusions

Calculations of the net annual dose received by an individual exposed for expected working occupancy times in thirteen areas of the building showed a range of 2- 120 millirem.

Calculations of the lifetime risk of fatality from all forms of cancer due to workday gamma-ray exposure (ages 18-65) were made for these same 13 areas and ranged from $0.03\text{-}2 \times 10^{-3}$ for males and $0.04\text{-}2 \times 10^{-3}$ for females.

Grab samples for radon-220 daughters showed a range of 0.028 - 0.211 working levels. Calculations for the lifetime fatal cancer risk showed a range of $0.75 - 5.7 \times 10^{-2}$ for males and $0.2 - 1.5 \times 10^{-2}$ for females.

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The gamma exposure risk and the thoron exposure risk are independent so that the total individual risk is the sum of the risks associated with each type of exposure

	Lifetime Cancer Mortality Risk for Lifetime Occupational Exposure	
	Males	Females
Gamma-ray Exposure Risk	$0.03 - 2 \times 10^{-3}$	$0.04 - 2 \times 10^{-3}$
Thoron-Daughter Esposure Risk	$0.8 - 5.7 \times 10^{-2}$	$0.2 - 1.5 \times 10^{-2}$
Total Exposure Risk	$0.8 - 5.9 \times 10^{-2}$	$0.2 - 1.7 \times 10^{-2}$

TABLE 1: Lifetime Gama-ray Exposure Risks

	GROSS		NET			Lifetime Risk of Fatal Cancer for Occupational Exposure (ages 18-65)	
	Average Micro-R Meter Reading	Average Pressurized Ion Chamber Reading	Equivalent Average Pressurized Ion Chamber Reading	Occupancy	Net Annual Dose	Male	Female
	(uR/hr)	(ur/hr)	(uR/hr)	(hr/wk)	(mrem/year)	(fatal cancers / 10^6 person-rem)	(fatal cancers / 10^6 person-rem)
BASEMENT							
Room 8	272		125	1	6	9×10^{-5}	11×10^{-5}
1st FLOOR							
Room A	70		25	20	25	4×10^{-4}	5×10^{-4}
Room B	120		50	40	100	1×10^{-3}	2×10^{-3}
Room C	100		40	40	80	1×10^{-3}	2×10^{-3}
2nd FLOOR							
Rooms 201/202		60	50	40	100	1×10^{-3}	2×10^{-3}
Hallway		90	80	5	20	3×10^{-4}	4×10^{-4}
3rd FLOOR							
Area A	117		50	1	2	3×10^{-5}	4×10^{-5}
Area A'	130		55	30	82	1×10^{-3}	2×10^{-3}
Area B	65		20	10	10	1×10^{-4}	2×10^{-4}
Area C	65		20	40	40	6×10^{-4}	8×10^{-4}
4th FLOOR			90	1	4	6×10^{-5}	8×10^{-5}
Area A	195		40	20	40	6×10^{-4}	8×10^{-4}
Area A'	100		50	40	120	2×10^{-3}	2×10^{-3}
Area B	120						

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Thorium Series (4n)*

Nuclide	Historical name	Half-life	Major radiation energies (MeV) and intensities† α	β	γ
$^{232}_{90}Th$	Thorium	1.41×10^{10} y	3.95 (24%) 4.01 (76%)	---	---
$^{228}_{88}Ra$	Mesothorium I	6.7y	---	0.055 (100%)	---
$^{228}_{89}Ac$	Mesothorium II	6.13h	---	1.18 (35%) 1.75 (12%) 2.09 (12%)	0.34c‡ (15%) 0.908 (25%) 0.96c (20%)
$^{228}_{90}Th$	Radiothorium	1.910v	5.34 (28%) 5.43 (71%)	---	0.084 (1.6%) 0.214 (0.3%)
$^{224}_{88}Ra$	Thorium X	3.64d	5.45 (6%) 5.68 (94%)	---	0.241 (3.7%)
$^{220}_{86}Rn$	Emanation Thoron (Tn)	55s	6.29 (100%)	---	0.55 (0.07%)
$^{216}_{84}Po$	Thorium A	0.15s	6.78 (100%)	---	---
$^{212}_{82}Pb$	Thorium B	10.64h	---	0.346 (81%) 0.586 (14%)	0.239 (47%) 0.300 (3.2%)
$^{212}_{83}Bi$	Thorium C	60.6m	6.05 (25%) 6.09 (10%)	1.55 (5%) 2.26 (55%)	0.040 (2%) 0.727 (7%) 1.620 (1.8%)
64.0% / 36.0%					
$^{212}_{84}Po$	Thorium C'	304ns	8.78 (100%)	---	---
$^{208}_{81}Tl$	Thorium C''	3.10m	---	1.28 (25%) 1.52 (21%) 1.80 (50%)	0.511 (23%) 0.583 (86%) 0.860 (12%) 2.614 (100%)
$^{208}_{82}Pb$	Thorium D	Stable	---	---	---

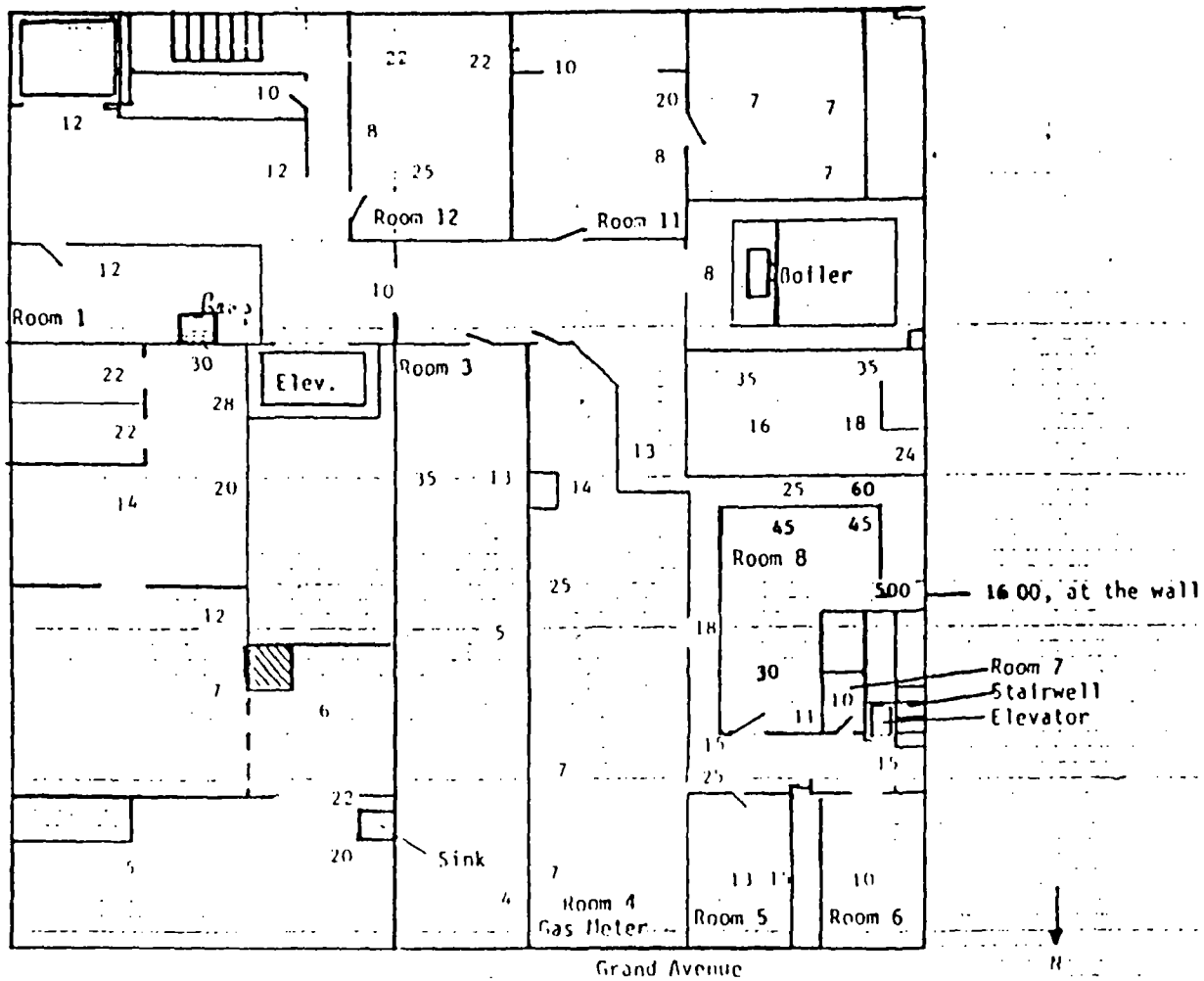
*This expression describes the mass number of any member in this series, where n is an integer.
Example: $^{232}_{90}Th$ (4n).....4(58) = 232

†Intensities refer to percentage of disintegrations of the nuclide itself, not to original parent of series.

‡Complex energy peak which would be incompletely resolved by instruments of moderately low resolving power such as scintillators.

Data taken from: Lederer, C. M., Hollander, J. M., and Perlman, I., Table of Isotopes (6th ed.; New York: John Wiley & Sons, Inc., 1967) and Hogan, O. H., Zigman, P. E., and Mackin, J. L., Beta Spectra (USNRDL-TR-802 [Washington, D.C. U.S. Atomic Energy Commission, 1964]).

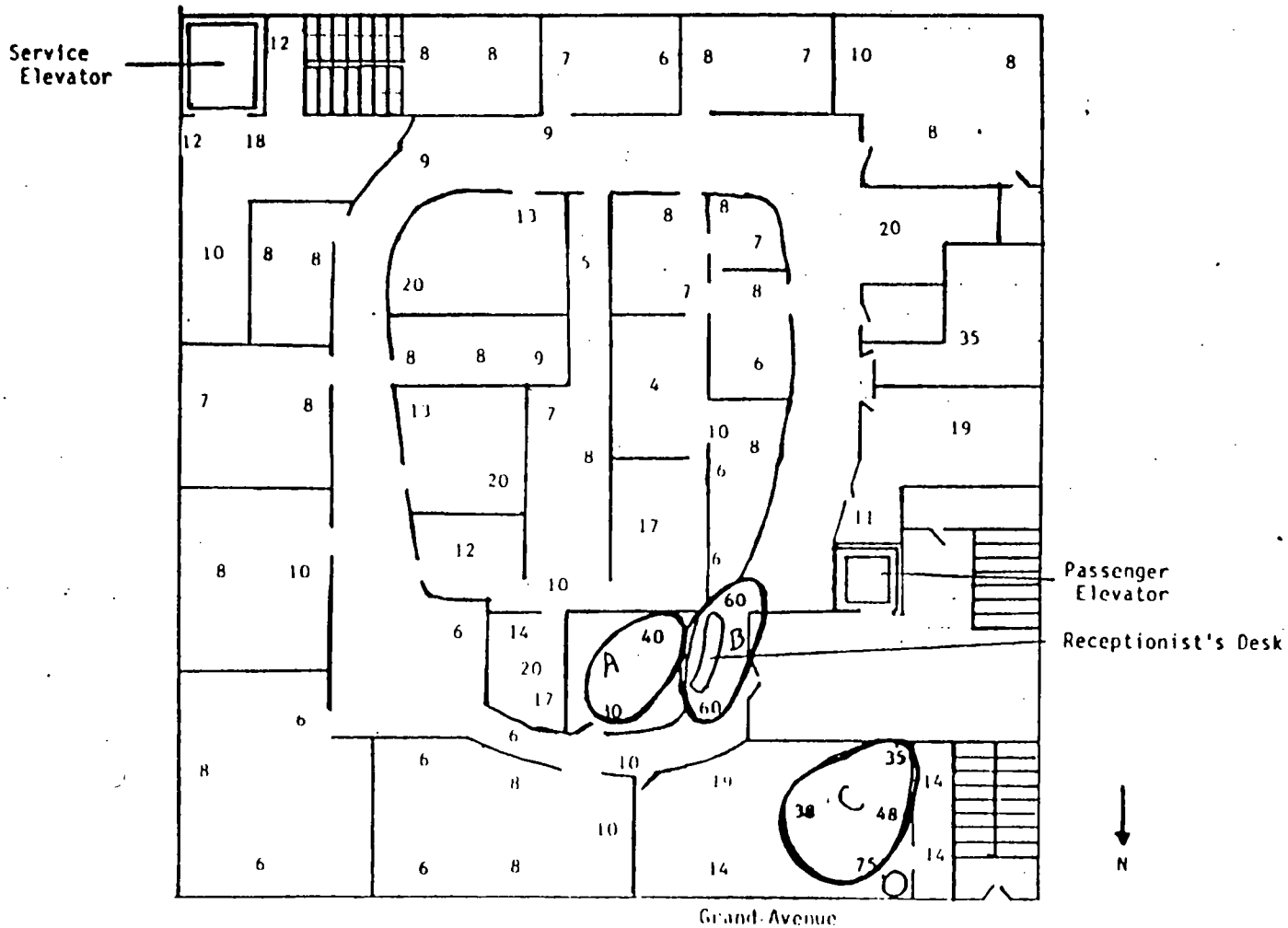
FIGURE 1: Thorium Decay Series
(Source: Radiological Health Handbook, U.S. Department of Health, Education, and Welfare, Revised January 1970)



Basement

FIGURE 2: Gross Gamma-ray Exposure Rate Readings [illegible] Basement
(All readings in m[illegible]roentgen per hour, uR/hr, converted fr[illegible] Micro-R
[illegible] corrected for chamber readings.

FOI EXEMPT



First Floor

FIGURE 3: Gross Gamma-ray Exposure Rate Readings on 1st Floor
(All readings [illegible] Microroentgen per hour, uR/hr, converte[illegible] [illegible]m Micro R
Meter readings [illegible] equivalent pressurized (on chamber readings)

FOI EXEMPT

Sanctity of Contract
STEWART TITLE
GUARANTY COMPANY
"Quality Since 1893"

Midwest Region Office
30 North LaSalle, Suite 2100
Chicago, Illinois 60602
(312) 849-4400
(800) 261-9800
FAX: (312) 849-4410

OWNERSHIP SEARCH
FILE NUMBER 96030036

Mr. Scott Drane
Hopkins & Sutter
3 First National Plaza Suite 4100
Chicago, IL 60602
Tel. (312) 558-6587 / Fax (312) 558-7764

Mr. Drane:

The following is a listing of the chain of ownership from the vesting of Lindsay Light Company to the effective date of March 03, 1996 for the following legal description. This search should not be construed as passing on the validity of the instruments as listed.

LEGAL

LOTS 1 AND 2 IN BLOCK 18 IN KINZIE'S ADDITION TO CHICAGO (EXCEPT THE WESTERLY PORTION OF LOT 2, BEING 11 3/4 INCHES WIDE ON GRAND AVENUE EXTENDING TO ALLEY AND GRADUALLY DIMINISHING TO 9 5/8 INCHES WIDE) IN SECTION 10, TOWNSHIP 39 NORTH, RANGE 14 EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS. PIN # 17-10-126-009

Deed # 4285197 Book 10574 Page 181 Recorded: November 06, 1908

Grantor: Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife
Grantee: Lindsay Light Company
Legal: Lots 1 & 2 in Block 18 Kinzie's Add.

Deed # 4303594 Book 10726 Page 19 Recorded: December 18, 1908

Grantor: Lindsay Light Company
Grantee: Nelson Landon Hoyt
Legal: Excepts out westerly portion of Lot 2

Deed # 13408045 Book 39591 Page 498 Recorded: December 04, 1944

Grantor: Lindsay Light and Chemical Company
Grantee: Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Legal: Current Property

Deed # 16836910 Book 54553 Page 118 Recorded: February 28, 1957

Grantor. Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Grantee: 161 East Grand Corp.
Legal: Current Property

Deed # 20496067 Recorded: May 21, 1968

Grantor: 161 East Grand Corp.
Grantee: Chicago Home for the Friendless
Legal: Current Property

Deed # 24473879 Recorded: June 02, 1978

Grantor: Chicago Home for the Friendless
Grantee: Thomas E. Woefle, a bachelor
Legal: Current Property

Deed # 24473880 Recorded: June 02, 1978

Grantor: Thomas E. Woefle, a bachelor
Grantee: LaSalle National Bank, as Trustee under the provisions of a trust agreement dated the 14th day of March 1978 known as Trust Number 53962.
Legal: Current Property

Copies of the Deeds are included with this letter. If you have any questions, or if I can be of further service, please call me.

Sincerely,

Timothy Lowe
Commercial Title Officer

made and executed in accordance with power and authority given under and by virtue of the last Will and Testament of Charles H. Quinlan, deceased.

Dated this fourth day of November A. D. 1908.

Ruth E. Quinlan (SEAL)

Charles S. Quinlan (SEAL)

Edward B. Quinlan (SEAL)

Trustees under the last Will and Testament of Charles H. Quinlan, deceased.

State of Illinois,)
: SS.
County of Cook) I, H. N. Tyson a Notary Public in and for said County, in the State aforesaid, Do Hereby Certify That Ruth E. Quinlan, Charles S. Quinlan and Edward B. Quinlan, Trustees under the last Will and Testament of Charles H. Quinlan, deceased, personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said Instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal this Sixth day of November A. D. 1908.

H. N. Tyson
Notary Public.

H. N. Tyson
Notary Public
Cook County, Ill. Commission expires June 30th, A. D. 1912.

4—No.4285175.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Grantors Gift

The Grantors Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife of the Village of Wilmetka in the County of Cook and State of Illinois, for and in consideration of the sum of One Hundred Thousand ($100,00.) Dollars in hand paid Convey and Warrant to Lindsay Light Company a corporation created and existing under the Laws of the State of Illinois, of the City of Chicago County of Cook and State of Illinois the following described Real Estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, situated in the City of Chicago in the County of Cook in the State of Illinois, hereby releasing all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois. Subject to all taxes and assessments levied after the year 1908.

Dated this twenty-ninth day of September A. D. 1908

Nelson Landon Hoyt (SEAL)

Blanche Tompkins Hoyt (SEAL)

State of Illinois,)
: SS.
County of Cook) I Ellis Geiger a Notary Public in and for said County in the

State aforesaid Do hereby certify that Nelson Landon Hoyt and Blanche Tomlins Hoyt his wife personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial seal this 2nd day of November A.D.1908.

Ellis Geiger
Notary Public.

Ellis Geiger
Notary Public
Cook County, Ill. Commission expires July 23rd A.D.1911

4—No.4285197.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Release 11-11-04

Know All Men by these Presents That I, William Heinemann of Cook County, Illinois, the Trustee named in a Certain Trust Deed bearing date the Tenth day of May A. D. 1906, and recorded in the Recorder's Office of Cook County in the State of Illinois, as Document No.3861409 in Book 9531 of Records on page 218 in consideration of the entire payment to the holder thereof of the notes secured by said Deed of Trust, and of the sum of one dollar to me in hand paid do hereby remise, release convey and quit-claim unto Ella Wangeman and Hugo Wangeman of the same place, all the right, title, interest claim and demand which I may have acquired under and by virtue of said Deed of Trust in and to all those lands and tenements, situated in said Cook County, and described as as follows, to-wit:

The South Forty-five (45) feet of Lot Six (6) in Block Six (6) in Skinner and Judd's Subdivision of a part of the North East Quarter of Section Twenty-one (21) Township Thirty-Eight (38) North, Range Fourteen (14) East of the Third Principal Meridian.

Witness my hand and seal this Sixth day of November A.D.1908.

William Heinemann (SEAL)
Trustee.

State of Illinois,)
: SS.
Cook County)

I, Arvene S. Hyde a Notary Public in and for the said County, in the State afiresaid, Do Hereby Certify that William Heinemann Trustee who is personally known to me to be the same person whose name is subscribed to the foregoing instrument appeared before me this day in person and acknowledged that he signed sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set

Dated, this Nin day of December A.D.1908.

Walter D.Peck (seal)

Mabel F.Peck (seal)

State of Illinois)
) ss
County of Cook)

I, Joseph Pearson, a Notary Public in and for said County in the State aforesaid, do hereby certify that Walter D. Peck and Mabel F.Peck, his wife, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal, this eleventh day of December A.D.1908

Joseph Pearson

Notary Public

Cook County, Ill.

Joseph Pearson,

Notary Public

7--- No. 4301238

Filed for Record Dec. 11 A.D.1908 at 4.47 P.M.

ABEL DAVIS , RECORDER.

This Indenture Witnesseth, that the Grantor, Lindsay Light Company, a corporation organized under the laws of the State of Illinois, of the City of Chicago, in the County of Cook and State of Illinois, for the consideration of one dollar ($1.00) and other good and valuable considerations Conveys and Quit Claims to Nelson Landon Hoyt, of the Village of Winnetka, County of Cook and State of Illinois, all interest in the following described Real Estate, to wit:

The Westerly portion of Lot Two (2) being eleven and three quarters inches (113/4") wide on Indiana Street extending to alley and gradually diminishing to Nine and five eights inches (9.5/8") wide , in Block Eighteen (18) in Kinzie's Addition to Chicago., situated in the County of Cook in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of this State of Illinois.

Dated, this fifth (5th) day of November A.D.1908.

Lindsay Light Co (seal)

Chas.R.Lindsay Jr. (seal)

C.R.K eeler (seal)

Secy.

State of Illinois)
) ss
County of Cook)

I, Ellis Geiger, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Chas.R.Lindsay Jr

personally known to me to be the President of the Lindsay Light Company, a Corporation and C.R.Wheeler personally known to me to be the Secretary of said Corporation , whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary , they signed, the said instrument of writing as President and Secretary of said Corporation and caused the Corporate Seal of said Corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said Corporation as their free and voluntary act and as the free and voluntary act and deed of said Corporation , for the uses and purposes therein set forth.

Given under my hand and Notarial Seal, this 16th day of December A.D.1908.

Ellis Geiger
Notary Public
Cook County, Ill

Ellis Geiger,
Notary Public.

5---No. 4303594

Filed for Record Dec. 18 A.D.1908 at 10.16 A.M.

ABEL DAVIS , RECORDER.

This Indenture, Made the fourteenth day of December 1908, between Frank J.Wattenpaugh and Agnes Wattenpaugh, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the first part , and John K.Klein and Edith C.Klein , his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the second part:

Witnesseth, That the parties of the first part , for and in consideration of the sum of Twenty one Hundred and fifty and no/100 Dollars, in hand paid, Convey and Warrant to the said parties of the second part , not in tenancy in common,butin joint tenancy', the following described Real Estate, to wit:

Lots Thirty (30) and Thirty one (31) in Block Thirty (30) in D.W.Eldred's Re Subdivision of Blocks Twenty seven (27) to Thirty (30) both inclusive and Thirty five (35) to Thirty eight (38) both inclusive in the Village of Jefferson of Section Nine (9) Township Forty (40) North, Range Thirteen (13) East of the Third (3rd) Principal Meridian.

Situated in the City of Chicago, County of Cook, in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

To have and to hold the above granted premises unto the said parties of the second part forever, not in tenancy in common , but in joint tenancy.

Subject to taxes for the year 1908, also subject to two certain Trust Deeds dated April 18, 1905, made by Frank J.Wattenpaugh and wife, to William F.Tempel, Trustee, aggregating in the sum of Eleven Hundred Dollars.

In Witness Whereof, the said parties of the first part have

THIS INDENTURE, WITNESSETH: THAT the Grantor, LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation created and existing under and by virtue of the laws of the State of Illinois, for the consideration of EIGHTY THOUSAND DOLLARS ($80,000.00), and pursuant to authority given by THE BOARD OF DIRECTORS of said corporation, CONVEYS and WARRANTS unto HOWARD L. STORCH, as Trustee under a Trust Agreement dated December 21, 1942, and known as TRUST NUMBER TWO (2), the following described real estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot Two (2), being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at North line of said alley, said strip being that part of said Lot Two (2) conveyed by said Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908, and recorded as Document Number 4303594,

situated in the County of Cook in the State of Illinois.

TO HAVE AND TO HOLD the same upon all the powers, rights and privileges set forth in said Trust Agreement.

THIS CONVEYANCE is made subject to party-wall agreement recorded as Document No. 4303596; grade set forth in the instrument recorded as Document No. 6786580; taxes for the year 1944; and the purchase money mortgage of even date herewith from the Grantee to the Chicago Title and Trust Company, securing $55,000.00, the unpaid portion of the purchase price.

IN WITNESS WHEREOF, the Grantor has caused its corporate seal to be hereto affixed, and has caused its

BOOK 3959 PAGE 45

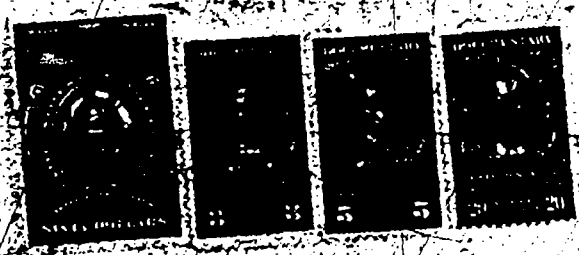
name to be signed to these presents by its President, and attested by its Secretary, this First (1st) day of DECEMBER, A. D. 1944.

LINDSAY LIGHT AND CHEMICAL COMPANY,

By Chas R Lindsay III
President.

ATTEST:

Secretary.



BOOK 39591 PAGE 500

STATE OF ILLINOIS,)
COUNTY OF DU PAGE,) SS.

I, L. H. Hansen,

a Notary Public, in and for said County, in the State aforesaid, DO HEREBY CERTIFY that Chas. R. Lindsay, III _____ personally known to me to be the President of LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation, and Mark W. Eichelberger, personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the BOARD OF DIRECTORS of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this First (1st) day of DECEMBER, A. D. 1944.

[signature]
Notary Public

18408045
STATE OF ILLINOIS } SS. NO.
BOOK COUNTY
FILED FOR RECORD
1944 DEC 4 PM 1 33
AND RECORDED IN
BOOK PAGE
RECORDER

A

16 836 910

THIS INDENTURE, made this 20th day of February, 1957, between Howard L. Storch, not personally but as Trustee under the provisions of a deed or deeds in trust duly recorded and delivered to him in pursuance of a certain Trust Agreement, dated the 23rd day of December, 1943, and Known as Trust Number 2, party of the first part, and 161 East Grand Corp., an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00), and other good and valuable considerations in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and two (2), in Block eighteen (18), in Kinzie's Addition to Chicago except a strip of land off the west end of said lot two (2) being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at N. line of said alley, said strip being that part of said lot two (2) conveyed by Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908 and recorded as Document No. 4303594, located in section ten (10), Township thirty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois.

together with the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the same unto said party of the second part, and to the proper use, benefit and behoof, forever, of said party of the second part.

This deed is executed by the party of the first part, as Trustee, as aforesaid, pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed or Deeds in Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling, free and clear of any lien of said Trustee, SUBJECT, HOWEVER, to: every lien, encumbrance, restriction or charge upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be valid claims against said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

Howard L. Storch

STATE OF ILLINOIS } SS. Howard L. Storch, not personally but as said Trustee.
COUNTY OF COOK }

I, Harriet L. Armstrong, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me [illegible] in person and acknowledged that he signed and delivered the [illegible] instrument as his free and voluntary act, not personally but as [illegible] for the uses and purposes therein set forth.

GIVEN under my hand and Notarial Seal this 26 day of [illegible] 1957.

Harriet L. Armstrong
Notary Public

[illegible] expires [illegible] 27 1957

16 836 910

THIS DOCUMENT WAS MICROFILMED EXACTLY AS IT APPEARED IN THE ORIGINAL BOUND VOLUME.

No. 801

COOK COUNTY, ILLINOIS
FILED FOR RECORD

MAY 21 '68 2 06 PM 20 496 067 *20496067

WARRANTY DEED—Statutory
(ILLINOIS)
(CORPORATION TO CORPORATION)

Approved by (Chicago Title and Trust Co. / Chicago Real Estate Board)

MAY 21 57-01-678 C

(The Above Space For Recorder's Use Only)

THE GRANTOR - - - - - 161 East Grand Corporation - - - - - - - - - - - - - -

a corporation created and existing under and by virtue of the laws of the State of Illinois - - - - and duly authorized to transact business in the State of - - - Illinois - - - - , for and in consideration of Ten Dollars and other valuable considerations - - - - - - - DOLLARS, the stockholders and

in hand paid, and pursuant to authority given by the Board of Directors - - - of said corporation CONVEYS and WARRANTS unto CHICAGO HOME FOR THE FRIENDLESS, - - - - not for profit

a corporation organized and existing under and by virtue of the laws of the State of Illinois - - - having its principal office in the -- City -- of-- Chicago --- County of Cook - - - - - - and State of Illinois - - - - - - - - the following described Real Estate situated in the County of Cook - - - - - - and State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot 2 being 11-3/4 inches wide at East Grand Avenue and extending to alley on South diminishing gradually to 9-5/8 inches wide at the North line of said alley, said strip being that part of said Lot 2 conveyed by said Lindsay Light Company to Nelson Landon Hoyt by Deed dated November 5, 1908 and Recorded as Document 4303594, in Cook County, Illinois, commonly known as 161 East Grand Avenue, Chicago, Illinois.

Subject to: General Taxes for Year 1968 and subsequent, Party wall rights and agreements; building, building line and use or occupancy conditions, restrictions and covenants of record, if any; recorded and unrecorded public utility easements, if any.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its - - - - - - - - - - President, and attested by its Secretary, this 16th day of May - - - - - , 1968 .

161 EAST GRAND CORPORATION
(NAME OF CORPORATION)

BY Howard L. Storch
ATTEST Marion Caldwell
SECRETARY

4.00

AFFIX "RIDE"

State of Illinois, County of Cook, ss., I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch - - - - - personally known to me to be the - - - - President of the 161 East Grand Corporation, - - an Illinois - - - corporation, and Marion Caldwell - - personally known to me to be the - - - - - - - Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such - - - - - President and - - - - - Secretary, they signed and delivered the said instrument as - - - - - - President and - - - - - Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors - - - - of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 16th day of May 1968

Commission expires My Commission Expires Feb. 8, 1972 19 Helen Silverman
NOTARY PUBLIC

DOCUMENT NUMBER 20 496 067

MAIL TO: NAME attn. J. Lodney McDermott Will & Emery
ADDRESS 111 W. Monroe
CITY AND STATE Chicago, Ill.

ADDRESS OF PROPERTY:
161 E. Grand Avenue
Chicago, Ill.

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED

OR RECORDER'S OFFICE BOX NO. 533

Cicero & Cook
Lock Period

September, 1975

WARRANTY DEED

Statutory Form

24 473 879

(Corporation to Individual)

(Use Above Space For Recorder's Use Only)

THE GRANTOR CHICAGO HOME FOR THE FRIENDLESS, a not-for-profit corporation

created and existing under and by virtue of the laws of the State of Illinois and duly authorized to transact business in the State of Illinois, for and in consideration of the sum of TEN and No/100 ($10.00) DOLLARS, and other good and valuable consideration

in hand paid, and pursuant to authority given by the Board of Directors of said corporation CONVEYS and WARRANTS to THOMAS E. STOPPE, a bachelor, Chicago, Illinois 60

(NAME AND ADDRESS OF GRANTEE)

135 South LaSalle Street, Chicago, Illinois

the following described Real Estate situated in the County of Cook in the State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Easterly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

10.00

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated MAY 31, 1978, to Chicago Home For The Friendless; and
f) general taxes for the year 1977 and subsequent years.

17-10-126-007

In Witness Whereof, said Grantor has caused its corporate seal to be hereunto affixed, and has caused its name to be signed to these presents by its President, and attested by its Secretary, this 31st day of MAY, 1978.

CHICAGO HOME FOR THE FRIENDLESS

By: Joseph E. Stone
President

Attest: John B. Murphy
Secretary

State of Illinois, County of Cook, ss. I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that JOSEPH E. STONE personally known to me to be the President of the CHICAGO HOME FOR THE FRIENDLESS corporation, and JOHN B. MURPHY personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 31st day of MAY, 1978.

Commission expires 6-1, 1980

Notary Public

This instrument was prepared by Thomas E. Kinney, Schwartz, Hall & Perry, 111 West Monroe, Chicago, Illinois 60603 (NAME AND ADDRESS)

IRA A. KIPNIS
400 E. RANDOLPH ST.
CHICAGO, ILL. 60601

ADDRESS OF PROPERTY:
161 E. Grand Avenue
Chicago, Illinois

REAL ESTATE TRANSFER TAX
CITY OF CHICAGO
REVENUE STAMP
875

24 473 879
DOCUMENT NUMBER

J33

COOK COUNTY, ILLINOIS
FILED FOR RECORD

Jan 2 '78 2 45 P.

4473879

WARRANTY DEED

Corporation to Individual

GEORGE E. COLE
LEGAL FORMS

24 473 860

This Indenture Witnesseth, That the Grantor THOMAS E. WOEFLE, A bachelor

of the County of Cook and the State of Illinois for and in consideration of

TEN and No/100 ($10.00) Dollars,

and other good and valuable consideration in hand paid, Convey & Quit-Claims unto LASALLE NATIONAL

BANK, a national banking association of 135 South La Salle Street, Chicago, Illinois, its successor or successors as Trustee under the

provisions of a trust agreement dated the 14th day of March 19 78 known as Trust Number

53962 the following described real estate in the County of Cook and State of

Illinois, to-wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated May 31, 1978, to Chicago Home For The Friendless;

10.00

Exempt under provisions of Paragraph ___, Section 4, Real Estate Transfer Tax Act.

Date ___ Buyer, Seller or Representative

Permanent Real Estate Index No. 17-10-126-007-

17-10-126-007

24 473 860

TO HAVE AND TO HOLD the said premises with the appurtenances upon the trusts and for uses and purposes herein and in said trust agreement set forth.

Full power and authority is hereby granted to said Trustee to improve, manage, protect and subdivide said premises or any part thereof, to dedicate parks, streets, highways or alleys and to vacate any subdivision or part thereof, and to resubdivide said property as often as desired, to contract to sell, to grant options to purchase, to sell on any terms, to convey, either with or without consideration, to convey said premises or any part thereof to a successor or successors in trust and to grant to such successor or successors in trust all of the title, estate, powers and authorities vested in said trustee, to donate, to dedicate, to mortgage, pledge or otherwise encumber, said property, or any part thereof, to lease said property, or any part thereof, from time to time, in possession or reversion, by leases to commence in presenti or in futuro, and upon any terms and for any period or periods of time, not exceeding in the case of any single demise the term of 198 years, and to renew or extend leases upon any terms and for any period or periods of time and to amend, change or modify leases and the terms and provisions thereof at any time or times hereafter, to contract to make leases and to grant options to lease and options to renew leases and options to purchase the whole or any part of the reversion and to contract respecting the manner of fixing the amount of present or future rentals, to partition or to exchange said property, or any part thereof, for other real or personal property, to grant easements or charges of any kind, to release, convey or assign any right, title or interest in or about or easement appurtenant to said premises or any part thereof, and to deal with said property and every part thereof in all other ways and for such other considerations as it would be lawful for any person owning the same to deal with the same, whether similar to or different from the ways above specified, at any time or times hereafter.

In no case shall any party dealing with said trustee in relation to said premises, or to whom said premises or any part thereof shall be conveyed, contracted to be sold, leased or mortgaged by said trustee, be obliged to see to the application of any purchase money, rent, or money borrowed or advanced on said premises, or be obliged to see that the terms of this trust have been complied with, or be obliged to inquire into the necessity or expediency of any act of said trustee, or be obliged or privileged to inquire into any of the terms of said trust agreement; and every deed, trust deed, mortgage, lease or other instrument executed by said trustee in relation to said real estate shall be conclusive evidence in favor of every person relying upon or claiming under any such conveyance, lease or other instrument, (a) that at the time of the delivery thereof the trust created by this indenture and by said trust agreement was in full force and effect, (b) that such conveyance or other instrument was executed in accordance with the trusts, conditions and limitations contained in this indenture and in said trust agreement or in some amendment thereof and binding upon all beneficiaries thereunder, (c) that said trustee was duly authorized and empowered to execute and deliver every such deed, trust deed, lease, mortgage or other instrument, and (d) if the conveyance is made to a successor or successors in trust, that such successor or successors in trust have been properly appointed and are fully vested with all the title, estate, rights, powers, authorities, duties and obligations of its, his or their predecessor in trust.

The interest of each and every beneficiary hereunder and of all persons claiming under them or any of them shall be only in the earnings, avails and proceeds arising from the sale or other disposition of said real estate, and such interest is hereby declared to be personal property, and no beneficiary hereunder shall have any title or interest, legal or equitable, in or to said real estate in such, but only an interest in the earnings, avails and proceeds thereof as aforesaid.

If the title to any of the above lands is now or hereafter registered, the Registrar of Titles is hereby directed not to register or note on the certificate of title or duplicate thereof, or memorial, the words "in trust" or "upon condition," or "with limitations," or words of similar import, in accordance with the statute in such cases made and provided.

And the said grantor hereby expressly waives and releases any and all rights or benefits under and by virtue of any and all statutes of the State of Illinois, providing for the exemption of homesteads from sale on execution or otherwise.

In Witness Whereof, the grantor aforesaid has hereunto set his hand and seal this

31st day of May 19 78

This Instrument Prepared By:
James E. Lentz, McDermott, Will & Emery
111 West Monroe, Chicago, Illinois 60603

THOMAS E. WOEFLE

COOK COUNTY, ILLINOIS
FILED FOR RECORD

JUN 2 10 2 45 P

24473880

STATE OF ILLINOIS
COUNTY OF COOK SS

Notary Public in and for said County, in the State aforesaid, do hereby certify that THOMAS E. WOEFLE, a bachelor

personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

GIVEN under my hand and notarial seal this 1st day of June AD 1978

VICKI KERRIGAN
NOTARY PUBLIC
COOK

BOX 350

Deed in Trust

WARRANTY DEED

ADDRESS OF PROPERTY

TO

LaSalle National Bank

TRUSTEE

0027 AP

Sanctity of Contract
STEWART TITLE
GUARANTY COMPANY
"Quality Since 1893"

Midwest Region Office
30 North LaSalle, Suite 2100
Chicago, Illinois 60602
(312) 849-4400
(800) 261-9800
FAX: (312) 849-4410

OWNERSHIP SEARCH
FILE NUMBER 96030036

Mr. Scott Drane
Hopkins & Sutter
3 First National Plaza Suite 4100
Chicago, IL 60602
Tel. (312) 558-6587 / Fax (312) 558-7764

Mr. Drane:

The following is a listing of the chain of ownership from the vesting of Lindsay Light Company to the effective date of March 03, 1996 for the following legal description. This search should not be construed as passing on the validity of the instruments as listed.

LEGAL

[redacted] (EXCEPT THE WESTERLY PORTION OF LOT 2, BEING 11 3/4 INCHES WIDE ON GRAND AVENUE EXTENDING TO ALLEY AND GRADUALLY DIMINISHING TO 9 5/8 INCHES WIDE) IN SECTION 10, TOWNSHIP 39 NORTH, RANGE 14 EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS. PIN # 17-10-126-009

Deed # 4285197 Book 10574 Page 181 Recorded: November 06, 1908

Grantor: Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife
Grantee: [redacted]
Legal: Lots 1 & 2 in Block 18 Kinzie's Add.

Deed # 4303594 Book 10726 Page 19 Recorded: December 18, 1908 36 yrs.

Grantor: Lindsay Light Company
Grantee: Nelson Landon Hoyt
Legal: Excepts out westerly portion of Lot 2

Deed # 13408045 Book 39591 Page 498 Recorded: December 04, 1944

Grantor: Lindsay Light and Chemical Company
Grantee: [redacted]
Legal: Current Property

Deed # 16836910 Book 54553 Page 118 Recorded: February 28, 1957

Grantor. Howard L. Storch, as Trustee under a Trust Agreement dated December 23, 1943, and known as Trust Number Two (2)
Grantee: 161 East Grand Corp.
Legal: *Current Property*

Deed # 20496067 Recorded: May 21, 1968

Grantor: 161 East Grand Corp.
Grantee: Chicago Home for the Friendless
Legal: Current Property

Deed # 24473879 Recorded: June 02, 1978

Grantor: Chicago Home for the Friendless
Grantee: Thomas E. Woefle, a bachelor
Legal: Current Property

1996

Deed # 24473880 Recorded: June 02, 1978

18 yrs

Grantor: Thomas E. Woefle, a bachelor
Grantee: [redacted]
Legal: Current Property

Copies of the Deeds are included with this letter. If you have any questions, or if I can be of further service, please call me.

Sincerely,

Timothy Lowe
Commercial Title Officer

made and executed in accordance with power and authority given under and by virtue of the last Will and Testament of Charles H. Quinlan, deceased.

Dated this fourth day of November A. D. 1908.

Ruth E. Quinlan (SEAL)

Charles S. Quinlan (SEAL)

Edward B. Quinlan (SEAL)

Trustees under the last Will and Testament of Charles H. Quinlan, deceased.

State of Illinois,)
: SS.
County of Cook) I, H. N. Tyson a Notary Public in and for said County, in the State aforesaid, Do Hereby Certify That Ruth E. Quinlan, Charles S. Quirlan and Edward B. Quinlan, Trustees under the last Will and Testament of Charles H. Quinlan, deceased, personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said Instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal this Sixth day of November A. D. 1908.

H. N. Tyson
Notary Public.

H. N. Tyson
Notary Public
Cook County, Ill. Commission expires June 30th, A. D. 1912.

4—No.4285175.

Filed for Record Nov. 5, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Gift

The Grantors Nelson Landon Hoyt and Blanche Tompkins Hoyt, his wife of the Village of Winnetka in the County of Cook and State of Illinois, for and in consideration of the sum of One Hundred Thousand ($100,000.) Dollars in hand paid [redacted] the City of Chicago County of Cook and State of Illinois the following described Real Estate, to-wit: [redacted] hereby releasing all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois. Subject to all taxes and assessments levied after the year 1908.

Dated this twenty-ninth day of September A. D. 1908

Nelson Landon Hoyt (SEAL)

Blanche Tompkins Hoyt (SEAL)

State of Illinois,)
: SS.
County of Cook) I Ellis Geiger a Notary Public in and for said County in the

State aforesaid Do hereby certify that Nelson London Hoyt and Blanche Tomlins Hoyt his wife personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person and acknowledged that they signed sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial seal this 2nd day of November A.D.1908.

Ellis Geiger
Notary Public.

Ellis Geiger
Notary Public
Cook County, Ill. Commission expires July 23rd A.D.1911

4—No.4285197.

Filed for Record Nov. 6, A. D. 1908, at 2 P. M.

ABEL DAVIS, RECORDER.

Release
11-11-09

Know All Men by those Presents That I, William Heinemann of Cook County, Illinois, the Trustee named in a Certain Trust Deed bearing date the Tenth day of May A. D. 1906, and recorded in the Recorder's Office of Cook County in the State of Illinois, as Document No.3861409 in Book 9531 of Records on page 218 in consideration of the entire payment to the holder thereof of the notes secured by said Deed of Trust, and of the sum of one dollar to me in hand paid do hereby remise, release convey and quit-claim unto Ella Wangeman and Hugo Wangeman of the same place, all the right, title, interest claim and demand which I may have acquired under and by virtue of said Deed of Trust in and to all those lands and tenements, situated in said Cook County, and described as as follows, to-wit:

The South Forty-five (45) feet of Lot Six (6) in Block Six (6) in Skinner and Judd's Subdivision of a part of the North East Quarter of Section Twenty-one (21) Township Thirty-Eight (38) North, Range Fourteen (14) East of the Third Principal Meridian.

Witness my hand and seal this Sixth day of November A.D.1908.

William Heinemann (SEAL)
Trustee.

State of Illinois,)
: SS.
Cook County)

I, Arvene S. Hyde a Notary Public in and for the said County, in the State afiresaid, Do Hereby Certify that William Heinemann Trustee who is personally known to me to be the same person whose name is subscribed to the foregoing instrument appeared before me this day in person and acknowledged that he signed sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set

Dated, this Ninth day of December A.D.1908.

Walter D.Peck (seal)

Mabel F.Peck (seal)

State of Illinois)
) ss
County of Cook)

I, Joseph Pearson, a Notary Public in and for said County in the State aforesaid, do hereby certify that Walter D. Peck and Mabel F.Peck, his wife, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and Notarial Seal, this eleventh day of December A.D.1908

Joseph Pearson,
Notary Public

Joseph Pearson
Notary Public
Cook County, Ill.

7--- No. 4301238

Filed for Record Dec. 11 A.D.1908 at 4.47 P.M.

ABEL DAVIS , RECORDER.

This Indenture Witnesseth, that the Grantor, Lindsay Light Company, a corporation organized under the laws of the State of Illinois, of the City of Chicago, in the County of Cook and State of Illinois, for the consideration of one dollar ($1.00) and other good and valuable considerations Conveys and Quit Claims to Nelson Landon Hoyt, of the Village of Winnetka, County of Cook and State of Illinois, all interest in the following described Real Estate, to wit:

The Westerly portion of Lot Two (2) being eleven and three quarters inches (113/4") wide on Indiana Street extending to alley and gradually diminishing to Nine and five eights inches (9.5/8") wide , in Block Eighteen (18) in Kinzie's Addition to Chicago., situated in the County of Cook in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of this State of Illinois.

Dated, this fifth (5th) day of November A.D.1908.

Lindsay Light Co (seal)

Chas.R.Lindsay Jr. (seal)

C.R.W Seler (seal)

Secy.

State of Illinois)
) ss
County of Cook)

I, Ellis Geiger, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Chas.R.Lirdsay Jr

personally known to me to be the President of the Lindsay Light Company, a Corporation and C.R.Wheeler personally known to me to be the Secretary of said Corporation, whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed, the said instrument of writing as President and Secretary of said Corporation and caused the Corporate Seal of said Corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said Corporation as their free and voluntary act and as the free and voluntary act and deed of said Corporation, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal, this 16th day of December A.D.1908.

Ellis Geiger
Notary Public
Cook County, Ill

Ellis Geiger,
Notary Public.

5---No. 4303594

Filed for Record Dec. 18 A.D.1908 at 10.16 A.M.

ABEL DAVIS, RECORDER.

This Indenture, Made the fourteenth day of December 1908, between Frank J.Wattenpaugh and Agnes Wattenpaugh, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the first part, and John K.Klein and Edith C.Klein, his wife, of the City of Chicago, in the County of Cook and State of Illinois, parties of the second part:

Witnesseth, That the parties of the first part, for and in consideration of the sum of Twenty one Hundred and fifty and no/100 Dollars, in hand paid, Convey and Warrant to the said parties of the second part, not in tenancy in common, but in joint tenancy, the following described Real Estate, to wit:

Lots Thirty (30) and Thirty one (31) in Block Thirty (30) in D.W.Eldred's Re Subdivision of Blocks Twenty seven (27) to Thirty (30) both inclusive and Thirty five (35) to Thirty eight (38) both inclusive in the Village of Jefferson of Section Nine (9) Township Forty (40) North, Range Thirteen (13) East of the Third (3rd) Principal Meridian.

Situated in the City of Chicago, County of Cook, in the State of Illinois, hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

To have and to hold the above granted premises unto the said parties of the second part forever, not in tenancy in common, but in joint tenancy.

Subject to taxes for the year 1908, also subject to two certain Trust Deeds dated April 18, 1905, made by Frank J.Wattenpaugh and wife, to William F.Tempel, Trustee, aggregating in the sum of Eleven Hundred Dollars.

In Witness Whereof, the said parties of the first part have

BOOK 3959 PAGE 498

THIS INDENTURE, WITNESSETH: THAT the Grantor, LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation created and existing under and by virtue of the laws of the State of Illinois, for the consideration of EIGHTY THOUSAND DOLLARS ($80,000.00), and pursuant to authority given by THE BOARD OF DIRECTORS of said corporation, CONVEYS and WARRANTS unto HOWARD L. STORCH, as Trustee under a Trust Agreement dated December 23, 1943, and known as TRUST NUMBER TWO (2), the following described real estate, to-wit:

Lots One (1) and Two (2) in Block Eighteen (18) in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot Two (2), being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at North line of said alley, said strip being that part of said Lot Two (2) conveyed by said Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908, and recorded as Document Number 4303594;

situated in the County of Cook in the State of Illinois.

TO HAVE AND TO HOLD the same upon all the powers, rights and privileges set forth in said Trust Agreement.

THIS CONVEYANCE is made subject to party-wall agreement recorded as Document No. 4303596; grant set forth in the instrument recorded as Document No. 6786580; taxes for the year 1944; and the purchase money mortgage of even date herewith from the Grantee to the Chicago Title and Trust Company, securing $55,000.00, the unpaid portion of the purchase price.

IN WITNESS WHEREOF, the Grantor has caused its corporate seal to be hereto affixed, and has caused its

name to be signed to these presents by its President, and attested by its Secretary, this first (1st) day of DECEMBER, A. D. 1944.

LINDSAY LIGHT AND CHEMICAL COMPANY,

By Chas R. Lindsay II
President.

ATTEST:

Secretary.

BOOK 39591 PAGE 500

STATE OF ILLINOIS,)
COUNTY OF DU PAGE,) SS.

I, L. H. Hansen,

a Notary Public, in and for said County, in the State aforesaid, DO HEREBY CERTIFY that Chas. R. Lindsay, III _____ personally known to me to be the President of LINDSAY LIGHT AND CHEMICAL COMPANY, a corporation, and Mark W. Eichelberger, personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the BOARD OF DIRECTORS of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

GIVEN under my hand and notarial seal this First (1st) day of DECEMBER, A. D. 1944.

[signature]
Notary Public

18408045
STATE OF ILLINOIS
DOOK COUNTY } SS. NO.
FILED FOR RECORD
1944 DEC 4 PM 1 33
AND RECORDED IN
BOOK PAGE
RECORDER

16 836 910

THIS INDENTURE, made this 20th day of February, 1957, between Howard L. Storch, not personally but as Trustee under the provisions of a deed or deeds in trust duly recorded and delivered to him in pursuance of a certain Trust Agreement, dated the 23rd day of December, 1943, and known as Trust Number 2, party of the first part, and 161 East Grand Corp., an Illinois corporation, party of the second part.

WITNESSETH, that said party of the first part, in consideration of the sum of Ten Dollars ($10.00), and other good and valuable considerations in hand paid, does hereby grant, sell and convey unto said party of the second part, the following described real estate, situated in Cook County, Illinois, to-wit:

Lots one (1) and two (2), in Block eighteen (18), in Kinzie's Addition to Chicago except a strip of land off the west end of said lot two (2) being 11-3/4 inches wide at East Grand Avenue and extending to the alley on South diminishing gradually to 9-5/8 inches wide at N. line of said alley, said strip being that part of said lot two (2) conveyed by Lindsay Light Company to Nelson Landon Hoyt by deed dated November 5, 1908 and recorded as Document No. 4303594, located in section ten (10), Township thirty-nine (39) North, Range fourteen (14), East of the Third Principal Meridian, Cook County, Illinois.

together with the tenements and appurtenances thereunto belonging.

TO HAVE AND TO HOLD the same unto said party of the second part, and to the proper use, benefit and behoof, forever, of said party of the second part.

This deed is executed by the party of the first part, as Trustee, as aforesaid, pursuant to and in the exercise of the power and authority granted to and vested in him by the terms of said Deed or Deeds in Trust and the provisions of said Trust Agreement above mentioned, and of every other power and authority thereunto enabling, free and clear of any lien of said Trustee; SUBJECT, HOWEVER, to: every lien, encumbrance, restriction or charge upon said real estate, or any interest therein, of record in Cook County, Illinois; any pending litigation affecting said real estate; all unpaid general taxes and special assessments; mechanic's lien claims, if any, which may be valid claims against said real estate; Zoning and Building Laws and Ordinances; building and liquor restrictions of record, if any; party walls, party wall rights and agreements, if any; easements and other matters of record, if any; rights and claims of parties in possession, if any.

IN WITNESS WHEREOF, said party of the first part has hereunto set his hand and seal the day and year first above written.

Howard L. Storch

STATE OF ILLINOIS } Howard L. Storch not personally but
} SS. as said Trustee.
COUNTY OF C O O K }

I, [illegible], a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his free and voluntary act, not personally but as Trustee, for the uses and purposes therein set forth.

GIVEN under my hand and Notarial Seal this 26 day of [illegible]

[illegible] Notary Public

My Commission expires [illegible]

16 836 910

THIS DOCUMENT WAS MICROFILMED EXACTLY AS IT
APPEARED IN THE ORIGINAL BOUND VOLUME.

No. 801

WARRANTY DEED—Statutory

(CORPORATION TO CORPORATION)

COOK COUNTY, ILLINOIS
FILED FOR RECORD
MAY 21 '68 2 06 PM 20 496 067 *20496067

Approved by (Chicago Real Estate Board)

57-01-6:8 C

(The Above Space For Recorder's Use Only)

THE GRANTOR - - - - - 161 East Grand Corporation - - - - - - - - - - - - - -

a corporation created and existing under and by virtue of the laws of the State of Illinois - - - - and duly authorized to transact business in the State of - - - Illinois - - - - , for and in consideration of Ten Dollars and other valuable considerations - - - - - - - DOLLARS, in hand paid, and pursuant to authority given by the Board of Directors - - - of said corporation CONVEYS and WARRANTS unto CHICAGO HOME FOR THE FRIENDLESS, - - - - not for profit

a corporation organized and existing under and by virtue of the laws of the State of Illinois - - - having its principal office in the - - City - - of - - Chicago - - - County of Cook - - - - - - and State of Illinois - - - - - - - - the following described Real Estate situated in the County of Cook - - - - - - and State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago, except a strip of land off the West end of said Lot 2 being 11-3/4 inches wide at East Grand Avenue and extending to alley on South diminishing gradually to 9-5/8 inches wide at the North line of said alley, said strip being that part of said Lot 2 conveyed by said Lindsay Light Company to Nelson Landon Hoyt by Deed dated November 5, 1908 and Recorded as Document 4303594, in Cook County, Illinois, commonly known as 161 East Grand Avenue, Chicago, Illinois.

Subject to: General Taxes for Year 1968 and subsequent, Party wall rights and agreements; building, building line and use or occupancy conditions, restrictions and covenants of record, if any; recorded and unrecorded public utility easements, if any.

In Witness Whereof, said Grantor has caused its corporate seal to be hereto affixed, and has caused its name to be signed to these presents by its - - - - - - - - - - - President, and attested by its - - - - - Secretary, this 16th day of May - - - - - , 1968 .

161 EAST GRAND CORPORATION

(NAME OF GRANTOR)

BY Howard L. Storch

ATTEST Marion Caldwell

4.00

State of Illinois, County of Cook, ss., I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that Howard L. Storch - - - - - personally known to me to be the - - - - President of the 161 East Grand Corporation, - - an Illinois - - - corporation, and Marion Caldwell - - personally known to me to be the - - - - - - - Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such - - - - - President and - - - - - Secretary, they signed and delivered the said instrument as - - - - - - President and - - - - - Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority, given by the Board of Directors - - - - of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 16th day of May 1968

Commission expires My Commission Expires Feb. 8, 1972 19 Helena Silverstein

NOTARY PUBLIC

MAIL TO: NAME attn. J. Lodney McDermott Will & Emery
ADDRESS 111 W. Monroe
CITY AND STATE Chicago, Ill.

OR RECORDER'S OFFICE BOX NO. 533

ADDRESS OF PROPERTY:
161 E. Grand Avenue
Chicago, Ill.

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED

AFFIX "RIDE"

DOCUMENT NUMBER 20 496 067

24 473 860

This Indenture Witnesseth, That the Grantor THOMAS E. MOEFLE, a bachelor

of the County of Cook and the State of Illinois for and in consideration of

TEN and No/100 ($10.00) Dollars

and other good and valuable consideration in hand paid, Convey and Quit-Claim unto LASALLE NATIONAL BANK, a national banking association of 135 South La Salle Street, Chicago, Illinois, its successor or successors as Trustee under the provisions of a trust agreement dated the 14th day of March 19 78 known as Trust Number 53962 the following described real estate in the County of Cook and State of Illinois, to-wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Westerly portion of Lot 2, being 11 3/4 inches wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 inches wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

Subject [redacted]

10 00

Exempt under provisions of Paragraph Section 4, Real Estate Transfer Tax Act.

Permanent Real Estate Index No. 17-10-126-007-

17-10-126-007

24 473 860

TO HAVE AND TO HOLD the said premises with the appurtenances, upon the trusts and for uses and purposes herein and in said trust agreement set forth.

Full power and authority is hereby granted to said trustee to improve, manage, protect and subdivide said premises or any part thereof, to dedicate parks, streets, highways or alleys and to vacate any subdivision or part thereof, and to resubdivide said property as often as desired, to contract to sell, to grant options to purchase, to sell on any terms, to convey, either with or without consideration, to convey said premises or any part thereof to a successor or successors in trust and to grant to such successor or successors in trust all of the title, estate, powers and authorities vested in said trustee, to donate, to dedicate, to mortgage, pledge or otherwise encumber, said property, or any part thereof, to lease said property, or any part thereof, from time to time, in possession or reversion, by leases to commence in presenti or in futuro, and upon any terms and for any period or periods of time, and regardless of the fact of any single demise the term of 198 years, and to renew or extend leases upon any terms and for any period or periods of time and to amend, change or modify leases and the terms and provisions thereof at any time or times hereafter, to contract to make leases and to grant options to lease and options to renew leases and options to purchase the whole or any part of the reversion and to contract respecting the manner of fixing the amount of present or future rentals, to partition or to exchange said property, or any part thereof, for other real or personal property, to grant easements or charges of any kind, to release, convey or assign any right, title or interest in or about or easement appurtenant to said premises or any part thereof, and to deal with said property and every part thereof in all other ways and for such other considerations as it would be lawful for any person owning the same to deal with the same, whether similar to or different from the ways above specified, at any time or times hereafter.

In no case shall any party dealing with said trustee in relation to said premises, or to whom said premises or any part thereof shall be conveyed, contracted to be sold, leased or mortgaged by said trustee, be obliged to see to the application of any purchase money, rent, or money borrowed or advanced on said premises, or be obliged to see that the terms of this trust have been complied with, or be obliged to inquire into the necessity or expediency of any act of said trustee, or be obliged or privileged to inquire into any of the terms of said trust agreement; and every deed, trust deed, mortgage, lease or other instrument executed by said trustee in relation to said real estate shall be conclusive evidence in favor of every person relying upon or claiming under any such conveyance, lease or other instrument, (a) that at the time of the delivery thereof the trust created by this indenture and by said trust agreement was in full force and effect, (b) that such conveyance or other instrument was executed in accordance with the trusts, conditions and limitations contained in this indenture and in said trust agreement or in some amendment thereof and binding upon all beneficiaries thereunder, (c) that said trustee was duly authorized and empowered to execute and deliver every such deed, trust deed, lease, mortgage or other instrument, and (d) if the conveyance is made to a successor or successors in trust, that such successor or successors in trust have been properly appointed and are fully vested with all the title, estate, rights, powers, authorities, duties and obligations of its, his or their predecessor in trust.

The interest of each and every beneficiary hereunder and of all persons claiming under them or any of them shall be only as to the earnings, avails and proceeds arising from the sale or other disposition of said real estate, and such interest is hereby declared to be personal property, and no beneficiary hereunder shall have any title or interest, legal or equitable, in or to said real estate as such, but only an interest in the earnings, avails and proceeds thereof as aforesaid.

If the title to any of the above lands is now or hereafter registered, the Registrar of Titles is hereby directed not to register or note on the certificate of title or duplicate thereof, or memorial, the words "in trust" or "upon condition," or "with limitations," or words of similar import, in accordance with the statute in such cases made and provided.

And the said grantor hereby expressly waives and releases any and all right or benefit under and by virtue of any and all statutes of the State of Illinois, providing for the exemption of homesteads from sale on execution or otherwise.

In Witness Whereof, the grantor aforesaid has hereunto set his hand and seal this 31st day of May 19 78.

This Instrument Prepared By:
James E. Lentz, McDermott, Will & Emery
111 West Monroe, Chicago, Illinois 60603

THOMAS E. MOEFLE

COOK COUNTY, ILLINOIS
FILED FOR RECORD

JUN 2 10 2 45 P

24473880

BOX 350

Deed in Trust

WARRANTY DEED

ADDRESS OF PROPERTY

TO

LaSalle National Bank

TRUSTEE

8027 AP

STATE OF ILLINOIS
COUNTY OF COOK

Notary Public in and for said County, in the State aforesaid, do hereby certify that TROMAS E. MOEFLE, a bachelor

personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

GIVEN under my hand and notarial seal this 1st day of June AD 1978

VICKI KERRIGAN
NOTARY PUBLIC
COOK COUNTY

Chicago Title and Trust Company
Form 2000 Revised September, 1975

WARRANTY DEED

Statutory (Illinois)

(Corporation to Individual)

24 473 879

(The Above Space For Recorder's Use Only)

THE GRANTOR CHICAGO HOME FOR THE FRIENDLESS, a not-for-profit corporation

~~the grantor~~ a corporation created and existing under and by virtue of the laws of the State of Illinois and duly authorized to transact business in the State of Illinois, for and in consideration of the sum of TEN and No/100 ($10.00) DOLLARS, and other good and valuable consideration

in hand paid, and pursuant to authority given by the Board of Directors of said corporation CONVEYS and WARRANTS to THOMAS E. KOZYRE, a bachelor, whose address is

(NAME AND ADDRESS OF GRANTEE)

135 South LaSalle Street, Chicago, Illinois

the following described Real Estate situated in the County of Cook in the State of Illinois, to wit:

Lots 1 and 2 in Block 18 in Kinzie's Addition to Chicago (except the Easterly portion of Lot 2, being 11 3/4 feetes wide on Grand Avenue extending to alley and gradually diminishing to 9 5/8 feetes wide) in Section 10, Township 39 North, Range 14 East of the Third Principal Meridian, in Cook County, Illinois.

Subject to:

a) covenants, conditions and restrictions of record;
b) public and utility easements and roads and highways, if any;
c) party wall rights and agreements;
d) existing leases;
e) Mortgage and Assignment of Rents dated MAY 31, 1978, to Chicago Home For The Friendless; and
f) general taxes for the year 1977 and subsequent years.

In Witness Whereof, said Grantor has caused its corporate seal to be hereunto affixed, and has caused its name to be signed to these presents by its President, and attested by its Secretary, this 31st day of MAY, 1978.

CHICAGO HOME FOR THE FRIENDLESS

By: Joseph L. Stone
President

Attest: John B. Murnaghan
Secretary

State of Illinois, County of Cook, ss. I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY, that JOSEPH L. STONE President of the CHICAGO HOME FOR THE FRIENDLESS and JOHN B. MURNAGHAN personally known to me to be the Secretary of said corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument as President and Secretary of said corporation, and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority given by the Board of DIRECTORS of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and official seal, this 31st day of MAY, 1978.

Commission expires 6-1, 1980

This instrument was prepared by Thomas E. Kozyre, Esquire, Hill & Barry, 111 West Monroe, Chicago, Illinois 60603 (NAME AND ADDRESS)

IRA A. KIPNIS
400 E. RANDOLPH ST.
CHICAGO, ILL. 60601

161 E. Grand Avenue
Chicago, Illinois

33

24 473 879
INSTRUMENT NUMBER

CITY OF CHICAGO
REAL ESTATE TRANSACTION
TAX EXEMPT
REAL ESTATE TRANSFER TAX
DATE 6-8-80
$10.00

17-10-126-017

66-227-992

COOK COUNTY, ILLINOIS
FILED FOR RECORD

JUN 2 '78 2 45 P.

9473879

WARRANTY DEED

Corporation to Individual

GEORGE E. COLE
LEGAL FORMS