Pu-Plant Room 124

During production this room contained our pellet presses, calciner, Harper furnace, pellet grinder, inspection gloveboxes, and outgas furnace. After this equipment was removed, we started removal of the glovebox exhaust system. While removing this glovebox exhaust system, we had a section of this pvc pipe, that was just upstream of the pellet grinder box, fall to the floor. We increased room 124 negative and sealed all anchor holes,cracks,and floor seams immediately after this accident. This accident contaminated the entire room and we spent approximately three months steaming the walls, floor, and ceiling to remove smearable contamination. Levels of fixed contamination were from 500 dpm/100 cm^2 to 2000 dpm/100 cm^2 average on ceiling and walls, with a maximum of 100,000 dpm/100cm^2 on the east wall by the double doors that went to production hall. We removed these doors and framework and some blocks that had high levels of contamination. We then blasted wall and ceiling, removed the floor coating and then blasted the floor. We preformed a scan survey and spot blasted the wall and blasted the entire floor again Before starting our final release survey we took smears in all anchor holes in walls and floor and did a low energy gamma survey. Because of the results of these surveys one floor seam was removed and half of some wall blocks were removed. We also used a core drill to remove the anchors in the floor and then surveyed these holes in the floor.

We used a Ludlum 2220 with a Ludlum 43-17 low energy gamma probe to survey all cracks and seams. A Ludlum 2220 with a Ludlum 43-68, 43-4, or 43-27 was used with P-10 gas for all alpha release surveys. All smears were taken on Whatman smear paper and counted in a Hewlett -Packard 5560A (low background) automatic sample counter.

W. A. Rogers

W. A. Rogers

Pu PLANT RELEASE SURVEY PLAN

1. For initial decontamination all surfaces will be scanned with an Eberline PRM-6 with a Radeco alpha scintillation probe. Background will be maintained at less than 100 CPM(200 dpm). All areas greater than twice background will be marked and reading will be taken with a release survey instrument to document contamination levels and random large area smears will be taken.

2. After these initial areas are decontaminated, all floor surfaces and the base of each wall will be completely surveyed with a digital readout release instrument and a Ludlum large area gas proportional alpha detector and random smear samples will be taken. Release instrumentation shall have a minimum detectable level of at least 50 dpm/100 cm^2.

3. All hot spots greater than or equal to 100 dpm/100 cm^2 identified will be decontaminated.

4. A random survey with a release instrument will be taken on the walls and ceiling to try to identify any other problem areas.

5. If no problems are identified, each room will be gridded off into approximately 2 meter on a side square on the walls and floor and five readings will be taken in each grid. Readings shall be taken in the center and at the midpoint from the center to each corner.

6. Each ceiling has closely spaced rafters that will not be easily divided into 2 meter squares. Because of this, we will take readings on the bottom of each rafter at 2 meter intervals and one reading centered on the ceiling between rafters. Readings on each rafter will be staggered one meter.

7. These release readings will be documented on a map that is drawn to approximately scale measurements in meters.

8. Data provided on each map:

    1. Survey block numbers, identifiable on a scale drawings.

        a. room or area name or number.
        b. surface surveyed.
        c. type of measurement and units.

    2. Name of surveyor taking measurements, date of survey, and location.

3. Type, model number, calibration data, sensitivity limit, background, and source response of instruments used in survey.

4. When a block surveyed is below the sensitivity of the instrument, the fact that such a measurement was made should be included as significant data.

9. All release survey smears will be taken on Whatman smear paper and counted in the automatic sample counters. Each smear will cover approximately 100 cm^2.

10. There will be at least 30 survey blocks in each area to be released.

11. Piping and ductwork will be surveyed on all accessable sides at 2 meter intervals. If more than one line is running parallel in a pipe rack, readings shall be staggered at one meter intervals.

12. All readings taken that only cover part of a probe area will be corrected to dpm/100 cm^2.

13. No survey block will measure less than one meter on a side.

14. No survey block will measure more than 3 meters on a side.

15. All portable release survey instruments will be calibrated quarterly and all instruments in use will be source checked daily.

Table I-1. Acceptable surface contamination levels

Nuclides[a]	Average[b,c,f]	Maximum[b,d,f]	Removable[b,e,f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm²	15,000 dpm α/100 cm²	1,000 dpm α/100 cm²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm²	300 dpm/100 cm²	20 dpm/100 cm²
Th-nat, Th-232, Sr-90 Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm²	3,000 dpm/100 cm²	200 dpm/100 cm²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and other noted above.	5,000 dpm βγ/100 cm²	15,000 dpm βγ/100 cm²	1,000 dpm βγ/100 cm²

[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 cm².

[e] The amount of removable radioactive material per 100 cm² 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.

AREA ROOM 124 SCAN

TYPE OF SURVEY ∝ DIRECT + SMEAR

TYPE OF INSTRUMENT LUDLUM 2220 / DET. 43-68 (43-27)

SERIAL NUMBER 58302 - 32800

COMPLETION DATE 1-19-89

H.P. SIGNATURE W. G. Rogers

SURVEY UNITS

AUTO. SAMPLE COUNTER #:

1.5cm = 1 Meter

F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D-DIRECT
S-SMEAR

SOURCE #: 7841 VALUE: 273 ± 6816 DPM

INSTRUMENT		
DATE	SOURCE C/M RESPONSE	BKGD C/M
1-18-89	110-118	0 AM
1-18-89	109-122	3 PM
1-18-89	230-249	2 AM
1-18-89	223-233	3 PM
1-19-89	104-117	1
1-19-89	104-100	1
1-19-89	215-230	2
1-19-89	256-242	1

FLOOR SCAN

FLOOR

SUPPORT BEAM

BEAM

AIR DUCT

BEAM

CEILING

AREA ROOM 124 FINAL GRID

TYPE OF SURVEY ∝ DIRECT & SMEAR

TYPE OF INSTRUMENT Ludlum 2220/DET. 43-68

SERIAL NUMBER 37807 & 37800

COMPLETION DATE 7-21-89

H.P. SIGNATURE W.O. Rogers

SURVEY UNITS DPM/100cm²

AUTO. SAMPLE COUNTER #: / 83600115

N / W E / S

1.5cm = 1 Meter

F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D-DIRECT
S-SMEAR

MDA 19.2 DPM/100cm² FIXED

SOURCE #: 6816 VALUE: 1078 DPM

INSTRUMENT			
	DATE	SOURCE C/M RESPONSE	BKGD C/M
37807	4-17-89	264-257	1 AM
37807	" " "	250-244	2 PM
37807	4-18-89	256-266	3 (AM)
37807	4-18-89	272-256	2(PM)
37807	4-26-89	247-250	1(PM)
37807	4-27-89	247-227	1(AM)
	4-27-89	260-233	3(AM)
		HSC#1	
	4-27-89	30	12

	A	B	C	D	E	SUPPORT BEAM F	G	H	I	J	
1	D-20 S-0	D-20 S-9	D-12 S-0	D-20 S-0	D-0 S-3	D-0 S-3	D-0 S-0	D-12 S-3	D-12 S-3	D-16 S-0	
2	D-8 S-0	D-8 S-9	D-4 S-0	D-4 S-6	D-4 S-0	D-4 S-9	D-8 S-6	D-4 S-6	D-4 S-6	D-4 S-3	
3	D-76 S-0	D-8 S-0	D-4 S-0	D-32 S-3	D-12 S-0	D-20 S-0	D-8 S-0	D-0 S-3	D-12 S-3	D-28 S-0	D-0 S-3
4	D-24 S-0	D-12 S-3	D-20 S-0	D-8 S-0	D-8 S-0	D-20 S-9	D-0 S-0	D-20 S-0	D-0 S-0	D-4 S-0	
5	D-45-6	D-125-3	D-245-0	D-125-0	D-45-0	D-5-3	D-245-9	D-125-3	D-165-0	D-5-3	

FLOOR

CEILING

	D-20 S-0	D-24 S-0	D-28 S-3	D-28 S-0	D-12 S-3	D-84 S-0	D-24 S-3	D-16 S-6	D-40 S-3	D-16 S-3	D-24 S-0	D-20 S-3	D-12 S-6	D-16 S-6	D-12 S-3	D-20 S-9	D-16 S-0	D-16 S-3	D-20 S-3	D-20 S-3	
N	① D-4 S-0		② D-12 S-6		③ D-24 S-9		④ D-16 S-0		⑤ D-20 S-0		⑥ D-16 S-3		⑦ D-32 S-3		⑧ D-28 S-0		⑨ D-36 S-6		⑩ D-28 S-6		
	D-8 S-3	D-12 S-3	D-4 S-6	D-24 S-6	D-20 S-0	D-16 S-0	D-20 S-3	D-28 S-9	D-20 S-6	D-24 S-0	D-12 S-3	D-24 S-0	D-20 S-3	D-16 S-3	D-32 S-0	D-24 S-0	D-24 S-0	D-36 S-0	D-36 S-6	D-24 S-0	S
	D-11 S-3	D-16 S-0	D-4 S-3	D-4 S-3	D-4 S-3	D-20 S-0	D-12 S-3	D-72 S-3	D-12 S-3	D-28 S-6	D-4 S-0	D-16 S-3	D-8 S-0	D-4 S-0	D-16 S-0	D-20 S-9	D-0 S-6	D-12 S-0	D-8 S-3	D-8 S-3	
	⑪ D-12 S-0		⑫ D-4 S-3		⑬ D-24 S-0		⑭ D-8 S-6		⑮ D-36 S-3		⑯ D-4 S-3		⑰ D-40 S-3		⑱ D-20 S-3		⑲ D-24 S-0		⑳ D-4 S-0		
	D-8 S-0	D-8 S-0	D-0 S-0	D-8 S-0	D-16 S-9	D-24 S-3	D-12 S-0	D-12 S-3	D-0 S-3	D-8 S-3	D-20 S-0	D-4 S-3	D-24 S-3	D-12 S-6	D-12 S-0	D-16 S-3	D-0 S-0	D-4 S-0	D-4 S-3	D-20 S-3	

	DIRECT	SMEAR
TOTAL DPM	2884	450
# READINGS	192	192
AVG DPM/100cm²	15.02	2.34
MAX DPM/100cm²	84	9

A B C D E

AREA KOOM 124 FINAL GRID

TYPE OF SURVEY δ DIRECT & SMEAR

TYPE OF INSTRUMENT LUDLUM 2220 / DET. 43-68

SERIAL NUMBER 37807 & 37800

COMPLETION DATE 4-26-89

H.P. SIGNATURE W. A. Rogers

SURVEY UNITS DPM/100cm²

AUTO. SAMPLE COUNTER #:

N / W / E / S

1.5cm = 1 Meter

F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D-DIRECT
S-SMEAR

mDA 15.68
DPM/100cm²
FIXED

SOURCE #: 6811 VALUE: 10780PM

INSTRUMENT		
DATE	SOURCE C/M	BKGD C/M
37807 4-20-89	244-238	1 (AM)
37807 4-20-89	243-241	2 (PM)
37807 4-21-89	275-267	1 (AM)
37807 4-21-89	237-241	1 (PM)
37800 4-24-89	236-243	2 (AM)
37800 4-24-89	238-260	1 (PM)
37807 4-26-89	255-247	2 (AM)
37807 4-25-89	235-243	2 (AM)
37807 4-25-89	245-261	2 (PM)
	ASC#1	
4-21-89	37	.3
	ASC#2	
4-25-89	28	.3
4-27-89	30	.3
	DIRECT	SMEAR
TOTAL DPM	5546	501
#READINGS	295	295
DPM/100cm² AVG	18.78	1.70
MAX DPM/100cm²	140	9

EAST WALL

	D-4 S-3	D-8 S-0	D-24 S-3	D-36 S-6	D-20 S-0	D-8 S-0	D-12 S-3	D-16 S-3	D-8 S-3	D-12 S-3	D-20 S-0	D-32 S-0	D-20 S-0	D-16 S-0	D-16 S-0	D-24 S-0	D-32 S-0	D-24 S-0	D-32 S-0	D-16 S-3	
	① D-12 S-0		② D-20 S-0		③ D-24 S-0		④ D-24 S-3		⑤ D-28 S-6		⑥ D-24 S-3		⑦ D-8 S-0		⑧ D-12 S-3		⑨ D-20 S-0		⑩ D-8 S-3		A B C D E
	D-16 S-3	D-24 S-0	D-40 S-0	D-24 S-0	D-4 S-0	D-12 S-0	D-16 S-6	D-20 S-6	D-32 S-3	D-8 S-0	D-20 S-3	D-32 S-3	D-28 S-9	D-24 S-3	D-28 S-0	D-12 S-3	D-0 S-0	D-20 S-0	D-24 S-0	D-32 S-0	
	D-4 S-0	D-28 S-0	D-4 S-0	D-16 S-0	D-24 S-0	D-30 S-0	D-28 S-0	D-48 S-0	D-28 S-6	D-36 S-0	D-36 S-0	D-72 S-9	D-16 S-0	D-20 S-3	D-24 S-0	D-24 S-3	D-32 S-0	D-8 S-0	D-24 S-0	D-16 S-0	
	⑪ D-20 S-3		⑫ D-8 S-3		⑬ D-52 S-0		⑭ D-4 S-3		⑮ D-16 S-9		⑯ D-160 S-0		⑰ D-20 S-6		⑱ D-48 S-0		⑲ D-28 S-0		⑳ D-20 S-0		
	D-8 S-0	D-4 S-0	D-32 S-3	D-16 S-6	D-12 S-3	D-20 S-0	D-60 S-3	D-16 S-3	D-52 S-0	D-12 S-0	D-20 S-0	D-76 S-6	D-72 S-0	D-80 S-0	D-20 S-0	D-48 S-0	D-36 S-0	D-36 S-0	D-40 S-0	D-8 S-0	
	D-12 S-3	D-0 S-0	D-16 S-6	D-24 S-0	D-24 S-0	D-60 S-6			D-52 S-0	D-48 S-0	D-44 S-3	D-92 S-0	D-16 S-9	D-88 S-6	D-0 S-0	D-16 S-0	D-8 S-9	D-20 S-3	D-8 S-0	D-12 S-0	
	㉑ D-24 S-3		㉒ D-4 S-0		㉓ D-24 S-3				㉔ D-8 S-0		㉕ D-48 S-3		㉖ D-8 S-0		㉗ D-12 S-0		㉘ D-16 S-0		㉙ D-16 S-3		
	D-8 S-3	D-12 S-3	D-12 S-0	D-24 S-0	D-4 S-0	D-76 S-6			D-4 S-6	D-8 S-3	D-16 S-6	D-24 S-0	D-16 S-3	D-8 S-0	D-8 S-0	D-12 S-3	D-24 S-0	D-4 S-0	D-12 S-0	D-4 S-0	

WEST WALL

	D-20 S-0	D-0 S-0	D-4 S-0	D-4 S-0	D-0 S-3	D-20 S-3	D-8 S-0	D-0 S-0	D-12 S-3	D-16 S-3	D-8 S-0	D-12 S-0	D-8 S-0	D-12 S-3	D-0 S-0	D-0 S-3	D-16 S-3	D-12 S-0	D-8 S-0	D-8 S-0	
	① D-8 S-3		② D-5 S-0		③ D-0 S-3		④ D-0 S-0		⑤ D-12 S-6		⑥ D-8 S-0		⑦ D-12 S-0		⑧ D-12 S-0		⑨ D-12 S-3		⑩ D-12 S-0		
	D-4 S-3	D-8 S-0	D-20 S-0	D-0 S-0	D-8 S-3	D-28 S-3	D-8 S-3	D-24 S-0	D-60 S-0	D-16 S-0	D-24 S-3	D-16 S-0	D-8 S-0	D-20 S-0	D-8 S-0	D-16 S-0	D-12 S-6	D-0 S-3	D-20 S-0	D-12 S-0	
	D-6 S-3	D-20 S-3	D-4 S-3	D-0 S-3	D-8 S-3	D-8 S-3	D-8 S-0	D-16 S-0	D-40 S-3	D-4 S-0	D-16 S-0	D-20 S-0	D-72 S-6	D-20 S-9	D-8 S-0	D-24 S-3	D-12 S-0	D-16 S-3	D-8 S-0	D-12 S-6	
	⑪ D-0 S-0		⑫ D-16 S-0		⑬ D-28 S-0		⑭ D-40 S-3		⑮ D-16 S-6		⑯ D-16 S-3		⑰ D-20 S-0		⑱ D-24 S-0		⑲ D-0 S-0		⑳ D-20 S-3		
	D-24 S-0	D-12 S-0	D-24 S-0	D-16 S-0	D-24 S-3	D-24 S-0	D-8 S-0	D-16 S-0	D-0 S-0	D-8 S-6	D-32 S-0	D-16 S-3	D-12 S-0	D-16 S-0	D-16 S-3	D-8 S-0	D-12 S-0	D-0 S-0	D-8 S-0	D-0 S-3	
	D-4 S-3	D-12 S-3	D-20 S-3	D-16 S-0	D-12 S-0	D-12 S-6	D-20 S-9	D-32 S-0	D-4 S-0	D-12 S-0	D-16 S-6	D-12 S-0	D-16 S-0	D-16 S-0	D-44 S-0	D-16 S-0	D-20 S-0	D-12 S-6	D-0 S-0	D-8 S-0	
	㉑ D-4 S-0		㉒ D-28 S-0		㉓ D-0 S-0		㉔ D-12 S-3		㉕ D-16 S-6		㉖ D-4 S-6		㉗ D-12 S-6		㉘ D-0 S-6		㉙ D-8 S-0		㉚ D-32 S-0		
	D-12 S-0	D-24 S-0	D-4 S-0	D-4 S-6	D-16 S-3	D-16 S-3	D-28 S-0	D-12 S-3	D-28 S-0	D-20 S-6	D-32 S-0	D-0 S-3	D-140 S-0	D-0 S-6	D-12 S-3	D-0 S-6	D-24 S-0	D-12 S-3	D-28 S-6	D-0 S-3	

AREA ROOM 124 FINAL GRID

TYPE OF SURVEY ∠ DIRECT + SMEAR

TYPE OF INSTRUMENT LUDLUM 2220 / DET. 43-68

SERIAL NUMBER

COMPLETION DATE 10-25-89

H.P. SIGNATURE Claude M Thompson

SURVEY UNITS DPM/100cm²

AUTO. SAMPLE COUNTER #:

N
W E
S

1.5cm = 1 Meter

F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D - DIRECT
S - SMEAR

SOURCE #: VALUE: DPM

INSTRUMENT		
DATE	SOURCE C/M RESPONSE	BKGD C/M

AREA Room 124 — Final Grid

TYPE OF SURVEY Direct + Smear

TYPE OF INSTRUMENT Ludlum 2220 / Det. 43-68

SERIAL NUMBER 37807

COMPLETION DATE 4-25-89

H.P. SIGNATURE W. O. Kay

SURVEY UNITS DPM/100cm²

AUTO. SAMPLE COUNTER #:

N / W / E / S

1.5cm = 1 Meter

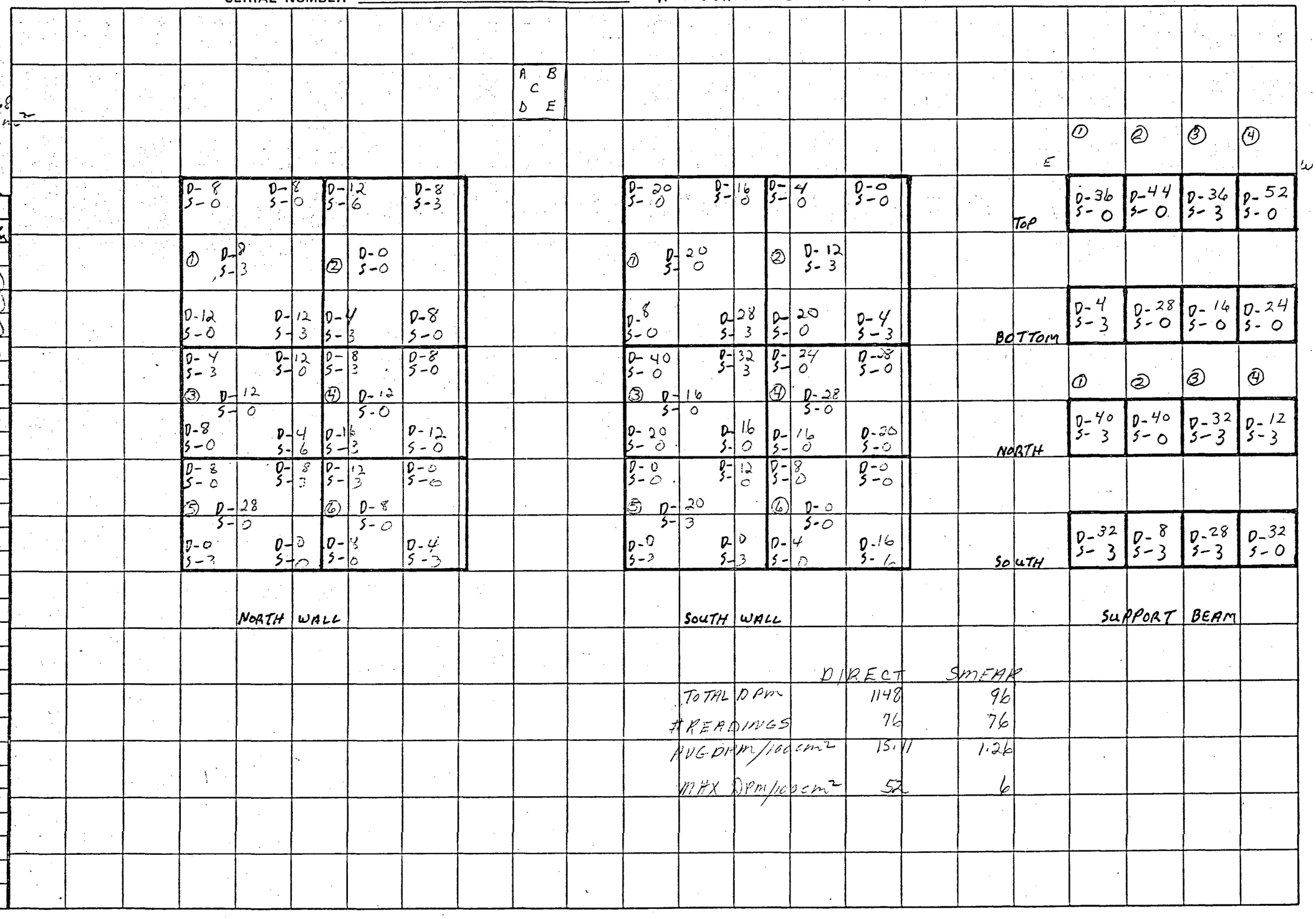
F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D-DIRECT
S-SMEAR

MDA 15.68 DPM/100cm²
FIXED

SOURCE #: 6816 VALUE: 1078 DPM

INSTRUMENT		
DATE	SOURCE RESPONSE C/M	BKGD C/M
37807 4-18-89	272-256	2(PM)
37807 4-20-89	244-238	1 (AM)
37807 4-20-89	243-241	2 (PM)
37807 4-25-89	235-243	2(AM)
37807 4-25-89	245-261	2(PM)
	ASC #1	
4-21-85	37	.3
	ASC #2	
4-25-89	28	.3
4-27-89	30	.3



	DIRECT	SMEAR
TOTAL DPM	1148	96
# READINGS	76	76
AVG DPM/100cm²	15.11	1.26
MAX DPM/100cm²	52	6

Ceiling + Beams Exposed by Duct Removal

PLANT: PU	AREA: RM 124
SURVEYED BY: [illegible] / V. McLain	
INST. [illegible]	# 50069 DET. 43-68
SOURCE CK 182/184	BKG. 1
DATE: 5/16/89	Source #7272 value 850 cpm
ACC # 83600115	
CTD. BY [illegible]	
SOURCE CK. AVG. 32	
BKG. .2	
DATE: 5-17-99	

READINGS IN DPM/100 cm^2

SAMPLE # OR DESCRIPTION	DIRECT CPM	DIRECT DPM	SMEAR
East Face of Beam #2			
2 meters	3	12	3
4 "	0	0	0
6 "	0	0	3
8 "	3	12	0
10 "	0	0	0
12 "	1	4	6
14 "	5	20	3
16 "	1	4	0
Ceiling #2			
2 meters	1	4	6
4 "	4	16	0
6 "	0	0	3
8 "	2	8	0
10 "	2	8	0
12 "	0	0	3
14 "	0	0	0
16 "	0	0	9
West Face of Beam #3			
2 meters	1	4	0
4 "	0	0	0
6 "	2	8	0
8 "	1	4	3
10 "	0	0	0
12 "	3	12	0
14 "	1	4	3
16 "	0	0	0

Ceiling + Beams Exposed by duct Removal

PLANT: PU	AREA: Rm 124
SURVEYED BY: [illegible] / V. McLain	
INST. [illegible]	# 50069 DET. 43-68
SOURCE CK 182/184	BKG. 1
DATE: 5/16/89	Source #7272 value 850 cpm
ACC #	
CTD. BY	
SOURCE CK. AVG.	
BKG.	
DATE:	

READINGS IN DPM/100 cm^2

SAMPLE # OR DESCRIPTION	DIRECT CPM	DIRECT DPM	SMEAR
Top of Support Beam Between Beams 2+3			
E	0	0	0
W	0	0	0
Open End of Air Duct (inside)			
T	0	0	0
B	4	16	3
E	1	4	0
W	0	0	6

N / W / E / S

1.5cm = 1 Meter

AREA KOOM 124 — FINAL GRID — AFTER SUPPLY AIR DUCT REMOVED

TYPE OF SURVEY ∝ DIRECT + SMEAR

TYPE OF INSTRUMENT Ludlum 2220/DET. 43-68

SERIAL NUMBER 50069

COMPLETION DATE 5/16/89

H.P. SIGNATURE Claude M Thompson

SURVEY UNITS DPM/100cm²

AUTO. SAMPLE COUNTER #: #1 83600115

F – FLOOR
C – CEILING
N – NORTH WALL
S – SOUTH WALL
E – EAST WALL
W – WEST WALL

D-DIRECT
S-SMEAR

MDA 11.09 DPM/100cm² FIXED

SOURCE #: 7272 VALUE: 850 DPM

INSTRUMENT		
DATE	SOURCE C/M RESPONSE	BKGD C/M
5/16/89	182/184	1
	ASC #1	
5-17-89	32	2

FLOOR

DIRECT
140 TOTAL DPM
30 READINGS
4.67 DPM/100cm² AVG
20 MAX DPM/100cm²

SMEAR
51 TOTAL DPM
30 SMEARS
1.7 DPM/100cm² AVG
9 MAX DPM/100cm²

SUPPORT BEAM

BEAM

BEAMS

AIR DUCT Removed

Readings on Ceiling + Beams

BEAM 2

BEAM

CEILING – DUCT REMOVED

Room 124 PIPE SURVEY PAGE 1 OF 6

LINE NUMBER 551 DATE 5-2-89

INSTRUMENT 2220 SERIAL NUMBER 52834

DETECTOR 43-4 OPERATOR SV

SOURCE NUMBER AND VALUE 6498 - 890

SOURCE RESPONSE AND BACKGROUND AM 203 - 201 Bkg - 2

SOURCE RESPONSE AND BACKGROUND PM 241 - 221 Bkg - 1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East Wall	Conduit	3/4"	0 meter	T	1	12	3
				B	4	48	
			2 meter	T	4	48	0
				B	3	36	
			4 meter	T	7	84	0
				B	2	24	
			END	T	5	60	0
				B	5	60	
					Direct	Smear	
Tot. DPM					2,508	33	
Readings					44	23	
DPM/100cm² AVG					57.0	1.43	
Max DPM/100cm²					96	6	
			MDA 40.74				
			DPM/100cm² FIXED				

Room 124 PIPE SURVEY PAGE 2 OF 6

LINE NUMBER 552 DATE 5-2-89

INSTRUMENT 2220 SERIAL NUMBER 52834

DETECTOR 43-4 OPERATOR SV

SOURCE NUMBER AND VALUE 6499 890

SOURCE RESPONSE AND BACKGROUND AM 203-201 Bkg 2

SOURCE RESPONSE AND BACKGROUND PM 241-221 Bkg 1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East Wall	Conduit	3/4"	0 meters	T	2	24	6
				B	1	12	
			2 meter	T	8	96	0
				B	6	72	
			4 meter	T	4	48	3
				B	3	36	
			END	T	7	84	0
				B	7	84	

LINE NUMBER 553 DATE 5-2-89

INSTRUMENT 2220 SERIAL NUMBER 52834

DETECTOR 43-4 OPERATOR SV

SOURCE NUMBER AND VALUE 6498 890

SOURCE RESPONSE AND BACKGROUND AM 203-201 Bkg 2

SOURCE RESPONSE AND BACKGROUND PM 241-221 Bkg 1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East Wall	Conduit	3/4"	0 meters	T	6	72	3
				B	3	36	
			2 meters	T	5	60	6
				B	8	96	
			4 meters	T	4	48	0
				B	5	60	
			END	T	8	96	0
				B	6	72	

LINE NUMBER 554 DATE 5-2-89

INSTRUMENT 2220 SERIAL NUMBER 52834

DETECTOR 43-4 OPERATOR SV

SOURCE NUMBER AND VALUE 6498 - 890

SOURCE RESPONSE AND BACKGROUND AM 203-201 Bkg 2

SOURCE RESPONSE AND BACKGROUND PM 241-221 Bkg 1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East Wall	Conduit	1/2"	0 meters	T	7	84	0
				B	5	60	
			END	N	2	24	0
				S	2	24	

Rm 124 PIPE SURVEY PAGE 5 OF 6

LINE NUMBER 555 DATE 5-2-89
INSTRUMENT 2220 SERIAL NUMBER 52837
DETECTOR 43-4 OPERATOR SV
SOURCE NUMBER AND VALUE 6498 890
SOURCE RESPONSE AND BACKGROUND AM 203-201 Bkg-2
SOURCE RESPONSE AND BACKGROUND PM 241-221 Bkg-1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East Wall	Conduit	½"	0 meters	T	7	84	0
				B	4	48	
			2 Meter	T	7	84	0
				B	3	36	
			4 meter	T	3	36	0
				B	7	84	
			END	T	1	12	0
				B	5	60	

Rm 124 PIPE SURVEY PAGE 6 OF 6

LINE NUMBER 556 DATE 5-2-89
INSTRUMENT 2220 SERIAL NUMBER 52836
DETECTOR 42-4 OPERATOR SV
SOURCE NUMBER AND VALUE 6498 890
SOURCE RESPONSE AND BACKGROUND AM 203-201 Bkg 2
SOURCE RESPONSE AND BACKGROUND PM 241 221 Bkg 1

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct cpm	Direct dpm/100cm²	Smearable dpm/100cm²
East wall	Conduit	½"	0 meter	T	7	84	6
				B	6	72	
			2 meters	T	3	36	6
				B	7	84	
			4 meters	T	4	48	0
				B	5	60	
			END	T	4	42	0
				B	6	72	

RM 124

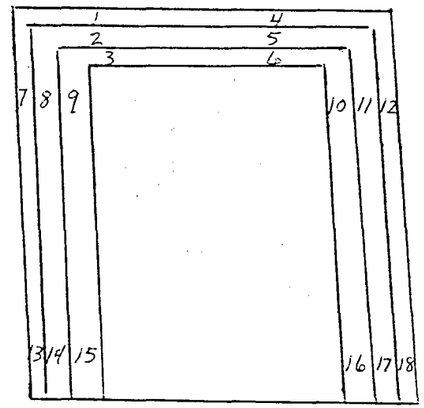
7-19-89

DOOR #1

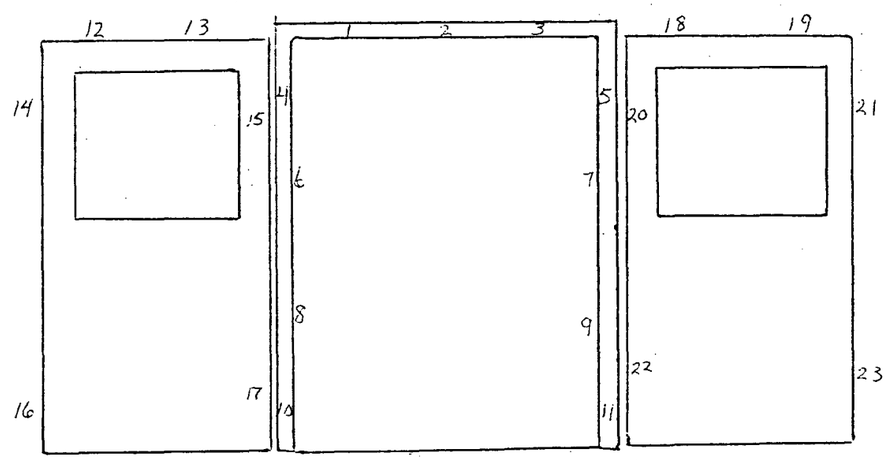
LOCATION OF COUNTS

ILP

FRAME



DOOR



PLANT PU AREA 124
SURVEYED BY ILP
INST. LUDLUM 2220 * # 52834 DET. 43-4
SOURCE CK 289-282 BKG. 3(PM)
DATE: 7-19-89 SOURCE #: 112 VALUE: 1113 DPM

ASC # 83600115
CTD. BY A Blank
SOURCE CK. AVG. 26
BKG. .3
DATE: 7-20-89

READINGS IN DPM/100 cm^2

SAMPLE # OR DESCRIPTION		DIRECT CPM	DIRECT DPM	SMEAR
DOOR #1 IN RM. 124	DOOR			
	D-1	3	18	3
	D-2	1	6	3
	D-3	14	84	0
	D-4	4	24	0
	D-5	1	6	3
	6	4	24	6
	7	3	18	3
	8	11	66	3
	9	2	12	3
	10	0	0	3
	11	2	12	0
	12	9	54	0
	13	7	42	0
	14	0	0	3
	15	1	6	0
	16	0	0	0
	17	0	0	0
	18	1	6	0
	19	7	42	3
	20	1	6	9
	21	13	78	6
	22	3	18	6
	23	7	42	0
		Direct	Smear	
Total DPM		924	114	
# Readings		41	41	
AVG DPM/100cm²		22.54	2.78	
MAX DPM/100cm²		84	9	
MDA				
28.81 DPM/100cm²				

PLANT PU AREA 124
SURVEYED BY ILP
INST. LUDLUM 2220 * # 52834 DET. 43-4
SOURCE CK 289-282 BKG. 3(PM)
DATE: 7-19-89 SOURCE #: 112 VALUE: 1113 DPM

ASC # 83600115
CTD. BY A Blank
SOURCE CK. AVG. 26
BKG. .3
DATE: 7-20-89

READINGS IN DPM/100 cm^2

SAMPLE # OR DESCRIPTION		DIRECT CPM	DIRECT DPM	SMEAR
DOOR #1 IN RM 124	DOOR FRAME			
	F-1	5	30	3
	F-2	9	54	9
	F-3	1	6	3
	F-4	2	12	3
	F-5	2	12	3
	6	6	36	3
	7	6	36	0
	8	1	6	3
	9	4	24	9
	10	1	6	3
	11	1	6	0
	12	4	24	0
	13	3	18	3
	14	5	30	0
	15	3	18	6
	16	1	6	3
	17	1	6	3
	18	0	0	6

RM 124 DOOR#2

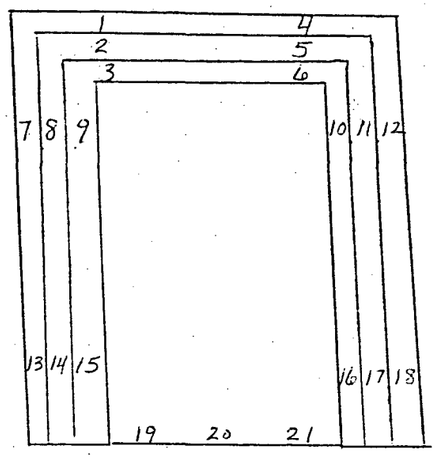
NORTH DOOR

LOCATION OF COUNTS

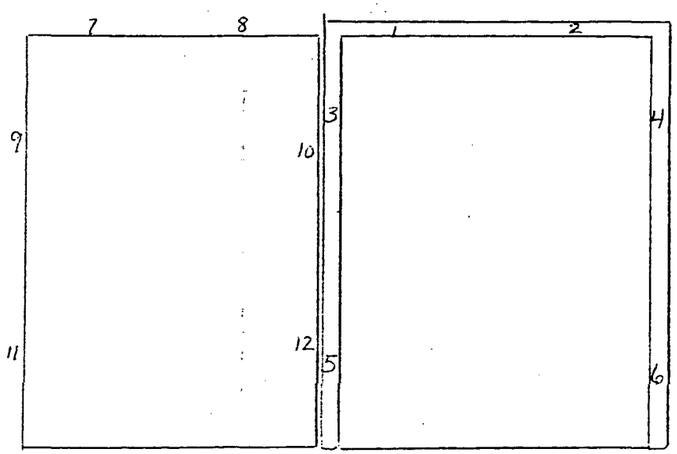
7-27-89

ILP

FRAME



DOOR



PLANT PU AREA RM 124
SURVEYED BY ILP
INST. LUDLUM 2220 # 152834 DET. 43-4
SOURCE CK 302-299 BKG. 1(PM)
DATE: 7-27-89 SOURCE #: 112 VALUE: 1113 DPM

ASC # 1 83600115
CTD. BY J Black
SOURCE CK. AVG. 27
BKG. .3
DATE: 7-28-89

READINGS IN DPM/100 cm²

SAMPLE # OR DESCRIPTION		DIRECT CPM	DIRECT DPM	SMEAR
RM 124 DOOR#2	DOOR			
(NORTH DOOR)	D-1	3	18	3
EM. EXIT	D-2	1	6	0
	D-3	1	6	0
	4	7	42	0
	5	2	12	0
	6	4	24	0
	7	7	42	0
	8	6	36	3
	9	7	42	0
	10	1	1.	6
	11	6	36	0
	12	3.	18	3

	DIRECT	SMEAR
TOTAL DPM	984	30
# READINGS	33	33
AVG. DPM/100 cm²	29.82	0.91
MAX. DPM/100 cm²	84	6
MDA	16.63 DPM/100 cm²	

PLANT Pu AREA RM 124
SURVEYED BY ILP
INST. LUDLUM 2220 # 52834 DET. 43-4
SOURCE CK 302-299 BKG. 1 (PM)
DATE: 7-27-89 SOURCE #: 112 VALUE: 1113 DPM

ASC # 1 83600115
CTD. BY J. Black
SOURCE CK. AVG. 27
BKG. 3
DATE: 7-28-89

READINGS IN DPM/100 cm²

SAMPLE # OR DESCRIPTION		DIRECT CPM	DIRECT DPM	SMEAR
RM 124 DOOR#2	FRAME			
(NORTH DOOR)	F-1	0	0	0
EM. EXIT	F-2	12	72	0
	F-3	4	24	6
	F-4	4	24	0
	F-5	6	36	0
	6	3	18	3
	7	4	24	0
	8	13	78	0
	9	2	12	0
	10	3	18	0
	11	7	42	0
	12	9	48	3
	13	1	6	3
	14	10	60	0
	15	4	24	0
	16	3	18	0
	17	4	24	0
	18	2	12	0
	19	5	30	0
	20	4	24	0
	21	[illegible]	12	0

PLANT Pu AREA Room 124
SURVEYED BY J. Handley
INST. LUDLUM 2220 # 50064 DET. 43-4
SOURCE CK 291/298 BKG. 0
DATE: 8-3-89 SOURCE #: 6816 VALUE: 1078 DPM

ASC # 83600108
CTD. BY J. Black
SOURCE CK. AVG. 26
BKG. .1
DATE: 8-3-89

READINGS IN DPM/100 cm²

SAMPLE # OR DESCRIPTION		DIRECT CPM	DIRECT DPM	SMEAR
Lights				
	1	4	48	0
	2	4	48	0
	3	7	84	0
	4	4	48	0
	5	5	60	3
	6	5	60	6
	7	3	36	9
	8	3	36	6
	9	6	72	9
	10	3	36	3
	11	0	0	3
	12	0	0	6

	Direct	Smear
Total DPM	528	45
# Readings	12	12
Avg. DPM/100 cm²	44.0	3.75
Max. DPM/100 cm²	84	9

MDA = 23.52 dpm/100 cm²