

LAB ATTIC SURVEY

When decommissioning started in the Laboratory area the laboratory attic was isolated from the laboratory rooms by a sheetrock ceiling. This attic area contained three contaminated systems plus numerous electrical, plumbing and duct systems.

The contaminated systems were:

1. Hood and slotbox exhaust system:

Approximately 500 dpm/100 cm² smearable maximum internal contamination that was processed as LSA waste.

2. Glovebox exhaust system:

Approximately 20,000 dpm/100 cm² smearable maximum internal contamination that was processed as TRU waste.

3. Vacuum transfer system:

Approximately 100,000 dpm/100 cm² smearable maximum internal contamination that was processed as TRU waste.

After these systems were removed and all the equipment was removed from the rooms below, we removed the sheetrock ceiling and steam cleaned the entire attic area. After steam cleaning, we surveyed the attic area with an Eberline PRM-6 and removed all hot spots that were found. We followed our PRM-6 survey with a spot release instrument survey (PRS-2-Ludlum 43-5 detector) and removed all hot spots that were found. Before the final release survey was started we used a water hose and wet vac and washed down the entire laboratory.

This survey includes the Laboratory Attic walls, and ceiling. All readings are recorded in disintegrations per minute above background. The walls were grid into approximately 2 meter squares and five reading per grid were taken with Ludlum 2220's and Ludlum 43-68 alpha detectors. No readings greater than 100 dpm/100 cm² smearable were detected during this survey. The Laboratory attic grating survey was included in each room survey for the Laboratory area.

W.A. Rogers

1. : cm = 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
100 CM²

SOURCE # 6816 VALUE: 1078 DPM

INSTRUMENT		
DATE	SOURCE RESPONSE %M	BKGD. %M
8-23-88	259 37807	1
8-23-88	267 37807	2
8-24-88	253 37800	1
8-24-88	258 37807	1
8-24-88	255 37800	2
8-24-88	260 37807	1
	ASC #1	
8-24-88	34	.3
8-25-88	37	.3
	ASC #2	
8-24-88	34	.3
8-25-88	34	.1

0-12 5-3	0-32 5-0	0-16 5-6	0-8 5-3	0-12 5-0	0-16 5-0	0-0 5-0	0-8 5-0	0-16 5-0	0-8 5-0	0-4 5-3	0-16 5-0	0-8 5-3	0-24 5-0	0-4 5-6	0-12 5-0	0-0 5-0	0-0 5-3	0-24 5-3	0-8 5-0	0-16 5-0	0-8 5-0	0-0 5-3	0-8 5-0	0-12 5-3	0-4 5-0	0-8 5-0	0-4 5-6	0-8 5-0	0-0 5-0	0-0 5-0	0-0 5-3			
EAST WALL																																		
0-0 5-0	0-0 5-3	0-4 5-0	0-0 5-0	0-8 5-6	0-0 5-0	0-8 5-3	0-0 5-0	0-0 5-0	0-8 5-0	0-8 5-0	0-8 5-6	0-0 5-0	0-8 5-0	0-0 5-0	0-4 5-0	0-12 5-0	0-12 5-0	0-0 5-6	0-0 5-0	0-12 5-3	0-0 5-0	0-4 5-3	NOT ACCESSIBLE						0-0 5-3	0-0 5-0	0-16 5-3	0-0 5-3	0-0 5-6	0-16 5-0
WEST WALL																																		
NORTH WALL																																		
0-0 5-9	0-8 5-3	0-8 5-6	0-10 5-0	0-8 5-3	0-0 5-3	0-4 5-3	0-0 5-3	0-24 5-0	0-16 5-0	0-4 5-3	0-4 5-3	0-4 5-3	0-16 5-0													0-4 5-0	0-16 5-0							
SOUTH WALL																																		

DIRECT

1532 TOTAL DPM

224 READINGS

6.84 DPM/100 CM² AVERAGE

SMEAR

366 TOTAL DPM

224 SMEARS

1.63 DPM/100 CM² AVERAGE

37800

CHI² LIMIT

95% C.L.

4453 - 1.6464

X + sigma =

X =

X - sigma =

37807

CHI² LIMIT

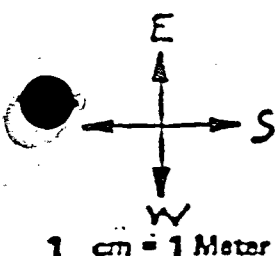
95% C.L.

4453 - 1.6464

X + sigma = 292

X = 260

X - sigma = 228



AREA LAB ATTIC CEILING
FINAL GRID

TYPE OF SURVEY & DIRECT & SMEAR
TYPE OF INSTRUMENT Luolumi 2220/DET. 43-68
SERIAL NUMBER _____

COMPLETION DATE 9-20-88
H.P. SIGNATURE W.G. Bowers
AUTO. SAMPLE COUNTER #:

SURVEY UNITS
DPM/100cm²

1 cm = 1 Meter
F - FLOOR
C - CEILING
N - NORTH WALL
S - SOUTH WALL
E - EAST WALL
W - WEST WALL

C - CEILING
B - BEAM
SB - SUPPORT BEAM

SECTION #1

SECTION #2

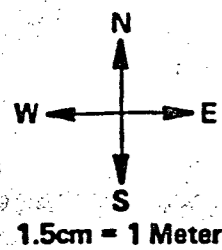
SECTION #3

SOURCE #: _____ VALUE: _____ DPM

INSTRUMENT		
DATE	SOURCE RESPONSE %	BKGDC %

METERS	SECTION #1							SECTION #2					SECTION #3										METERS							
	0	1	2	3	4	5	6	7	SB-1	1	2	3	4	5	SB-2	C15	C14	C13	C12	C11	C10	C9		C8	C7	C6	C5	C4	C3	C2
C1																														
B1																														
C2																														
B2																														
C3																														
B3																														
C4																														
B4																														
C5																														
B5																														
C6																														
B6																														
C7																														
B7																														
C8																														
B8																														
C9																														
B9																														
C10																														
B10																														
C11																														
B11																														
C12																														
B12																														
C13																														

B15 B14 B13 B12 B11 B10 B9 B8 B7 B6 B5 B4 B3 B2 B1



AREA L-3 ATTIC CEILING
 FINAL GRID
 SECTION #1

TYPE OF SURVEY DIRECT & SMEAR
 TYPE OF INSTRUMENT Ludlum 2220/DET. 43-68
 SERIAL NUMBER 37807-58308-37800

COMPLETION DATE 9-20-88
 H.P. SIGNATURE Clarence Thompson
 AUTO. SAMPLE COUNTER #:
 #1 83600115
 #2 83600108

SURVEY UNITS
DPM/100cm²

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

D - DIRECT
 S - SMEAR

MPA = 15.69
 DPM/100cm²

Source #1: 6816 VALUE: DPM

DATE	SOURCE RESPONSE %	BKGD %
8-26-88	259 37807	2
8-26-88	267 37807	1
8-26-88	269 37807	2
ASC #1		
8-26-88	29	.3
8-27-88	27	.3
9-16-88	221 58308	2
9-16-88	248 37800	1
ASC #2		
9-20-88	30	.3

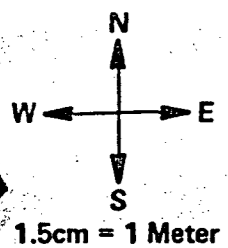
C-1	1m	3m	5m	7m												SUPPORT BEAM #1					
																NORTH TOP	BOTTOM	NORTH	SOUTH	SOUTH TOP	
	D-0	D-0	D-8	D-28																	
C-1	S-6	S-3	S-0	S-0						B-1	D-12	D-4	D-12	D-8	D-12	0M	D-12	D-0	D-12	D-8	D-4
	D-8	D-0	D-0	D-0																	
C-2	S-0	S-3	S-0	S-0						B-2	D-4	D-20	D-12	D-12	D-12	2M	D-16	D-8	D-4	D-0	D-4
	D-28	D-4	D-16	D-4																	
C-3	S-0	S-0	S-0	S-0						B-3	D-12	D-16	D-8	D-12	D-4	4M	D-0	D-16	D-4	D-0	D-0
	D-8	D-12	D-4	D-8																	
C-4	S-3	S-6	S-0	S-0						B-4	D-8	D-8	D-4	D-4	D-16	6M	D-12	D-0	D-4	D-4	D-12
	D-0	D-12	D-0	D-8																	
C-5	S-3	S-0	S-3	S-0						B-5	D-0	D-4	D-16	D-0	D-24	8M	D-4	D-0	D-4	D-0	D-0
	D-0	D-4	D-12	D-4																	
C-6	S-0	S-0	S-3	S-0						B-6	D-8	D-20	D-0	D-0	D-4	10M	D-20	D-0	D-4	D-8	D-16
	D-8	D-0	D-0	D-8																	
C-7	S-6	S-3	S-0	S-0						B-7	D-0	D-0	D-0	D-16	D-4	12M	D-16	D-12	D-0	D-4	D-28
	D-12	D-8	D-0	D-4																	
C-8	S-6	S-3	S-6	S-3						B-8	D-8	D-4	D-0	D-12	D-24	14M	D-0	D-12	D-4	D-4	D-4
	D-*	D-*	D-0	D-16																	
C-9	S-*	S-*	S-3	S-0						B-9	D-12	D-16	D-20	D-12	D-0						
	D-16	D-20	D-0	D-0																	
C-10	S-0	S-9	S-3	S-0						B-10	D-4	D-8	D-0	D-16	D-20						
	D-20	D-12	D-8	D-0																	
C-11	S-0	S-6	S-0	S-0						B-11	D-4	D-0	D-8	D-8	D-8						
	D-*	D-*	D-12	D-16																	
C-12	S-*	S-*	S-3	S-3						B-12	D-8	D-8	D-8	D-12	D-8						
	D-8	D-4	D-20	D-20																	
C-13	S-0	S-3	S-3	S-0																	
										<u>DIRECT</u>					<u>SMEAR</u>						
										1164	TOTAL DPM		303		TOTAL DPM						
										148	READINGS		148		SMEARS						
* - INACCESSIBLE BECAUSE OF DUCTWORK										7.86 DPM/100cm ² AVERAGE					2.05 DPM/100cm ² AVERAGE						

37807
 CHI² LIMIT
 95% C.L.
 .4453 - 1.6464
 $\bar{x} + \sigma = 292$
 $\bar{x} = 260$
 $\bar{x} - \sigma = 228$

AREA LAB ATTIC CEILING
 FINAL GRID
 SECTION #2

TYPE OF SURVEY ✓ DIRECT & SMEAR
 TYPE OF INSTRUMENT LUOLUM 2220 / DET. 43-68
 SERIAL NUMBER 37800, 37807

COMPLETION DATE 9-20-88 SURVEY UNITS DPM/100cm²
 H.P. SIGNATURE Claude M. Thompson
 AUTO. SAMPLE COUNTER # 83600108 #2



D - DIRECT
S - SMEAR
 F - FLOOR
 C - CEILING
 N - NORTH WALL
 S - SOUTH WALL
 E - EAST WALL
 W - WEST WALL

MDR = 15.68
 DPM/100cm²

Source # 6816 VALUE: 1078 DPM

INSTRUMENT		
DATE	SOURCE RESPONSE C/M	BKGD C/M
8-29-88	253 37800	1
8-29-88	258 37807	2
9-19-88	257 37800	1
	ASC #2	
8-30-88	30	.2
9-1-88	27	.2
9-20-88	30	.3

37800

CHI² LIMIT
 95% C.L.
 .4453 - 1.6464

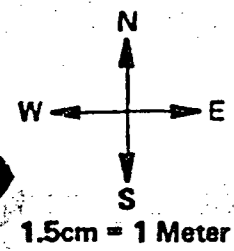
$\bar{x} + \sigma = 281$
 $\bar{x} = 250$
 $\bar{x} - \sigma = 219$

37807

CHI² LIMIT
 95% C.L.
 .4453 - 1.6464

$\bar{x} + \sigma = 292$
 $\bar{x} = 260$
 $\bar{x} - \sigma = 228$

Grid	1M				2M				3M				4M				5M				Support Beam #2				
	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	TOP	BOTTOM	NORTH	SOUTH	TOP	BOTTOM	NORTH	SOUTH	
C-1	D-4	S-0	D-4	S-0	D-4	S-0	D-4	S-0	D-4	S-0	D-4	S-0	D-4	S-0	D-4	S-0	0M	D-40	D-0	D-16	D-4	D-40	D-0	D-16	D-4
C-2	D-0	S-0	D-8	S-3	D-0	S-0	D-8	S-3	D-0	S-0	D-8	S-3	D-0	S-0	D-8	S-3	2M	D-0	NOT ACCESSIBLE	D-16	D-8	D-0	NOT ACCESSIBLE	D-16	D-8
C-3	D-8	S-9	D-4	S-0	D-8	S-9	D-4	S-0	D-8	S-9	D-4	S-0	D-8	S-9	D-4	S-0	4M	D-12	D-8	D-12	D-0	D-12	D-8	D-12	D-0
C-4	D-8	S-3	D-12	S-3	D-8	S-3	D-12	S-3	D-8	S-3	D-12	S-3	D-8	S-3	D-12	S-3	6M	D-8	NOT ACCESSIBLE	D-12	D-16	D-8	NOT ACCESSIBLE	D-12	D-16
C-5	D-0	S-3	D-0	S-0	D-0	S-3	D-0	S-0	D-0	S-3	D-0	S-0	D-0	S-3	D-0	S-0	8M	D-24	D-8	D-0	D-0	D-24	D-8	D-0	D-0
C-6	D-4	S-0	D-16	S-3	D-4	S-0	D-16	S-3	D-4	S-0	D-16	S-3	D-4	S-0	D-16	S-3	10M	D-24	NOT ACCESSIBLE	D-12	D-16	D-24	NOT ACCESSIBLE	D-12	D-16
C-7	D-0	S-0	D-12	S-3	D-0	S-0	D-12	S-3	D-0	S-0	D-12	S-3	D-0	S-0	D-12	S-3	12M	D-20	D-8	D-4	D-16	D-20	D-8	D-4	D-16
C-8	D-4	S-0	D-4	S-3	D-4	S-0	D-4	S-3	D-4	S-0	D-4	S-3	D-4	S-0	D-4	S-3	14M	D-8	NOT ACCESSIBLE	D-12	D-8	D-8	NOT ACCESSIBLE	D-12	D-8
C-9	D-8	S-3	D-4	S-0	D-8	S-3	D-4	S-0	D-8	S-3	D-4	S-0	D-8	S-3	D-4	S-0									
C-10	D-0	S-0	D-20	S-3	D-0	S-0	D-20	S-3	D-0	S-0	D-20	S-3	D-0	S-0	D-20	S-3									
C-11	D-4	S-3	D-0	S-0	D-4	S-3	D-0	S-0	D-4	S-3	D-0	S-0	D-4	S-3	D-0	S-0									
C-12	D-16	S-0	D-0	S-0	D-16	S-0	D-0	S-0	D-16	S-0	D-0	S-0	D-16	S-0	D-0	S-0									
C-13	D-0	S-3	D-4	S-0	D-0	S-3	D-4	S-0	D-0	S-3	D-4	S-0	D-0	S-3	D-4	S-0									
																DIRECT				SMEAR					
																788 TOTAL DPM				216 TOTAL DPM					
																115 READINGS				115 SMEARS					
																6.85 DPM/100cm ² AVERAGE				1.88 DPM/100cm ² AVERAGE					



AREA LF ATTIC CEILING
 FINAL GRID
 SECTION #3

TYPE OF SURVEY & DIRECT & SMEAR
 TYPE OF INSTRUMENT LADLUM 2220 / DET. 43-68
 SERIAL NUMBER 50068

COMPLETION DATE 9-16-88 SURVEY UNITS DPM/100cm²
 H.P. SIGNATURE Charles W. Thompson
 AUTO. SAMPLE COUNTER # 83600108, 83600115

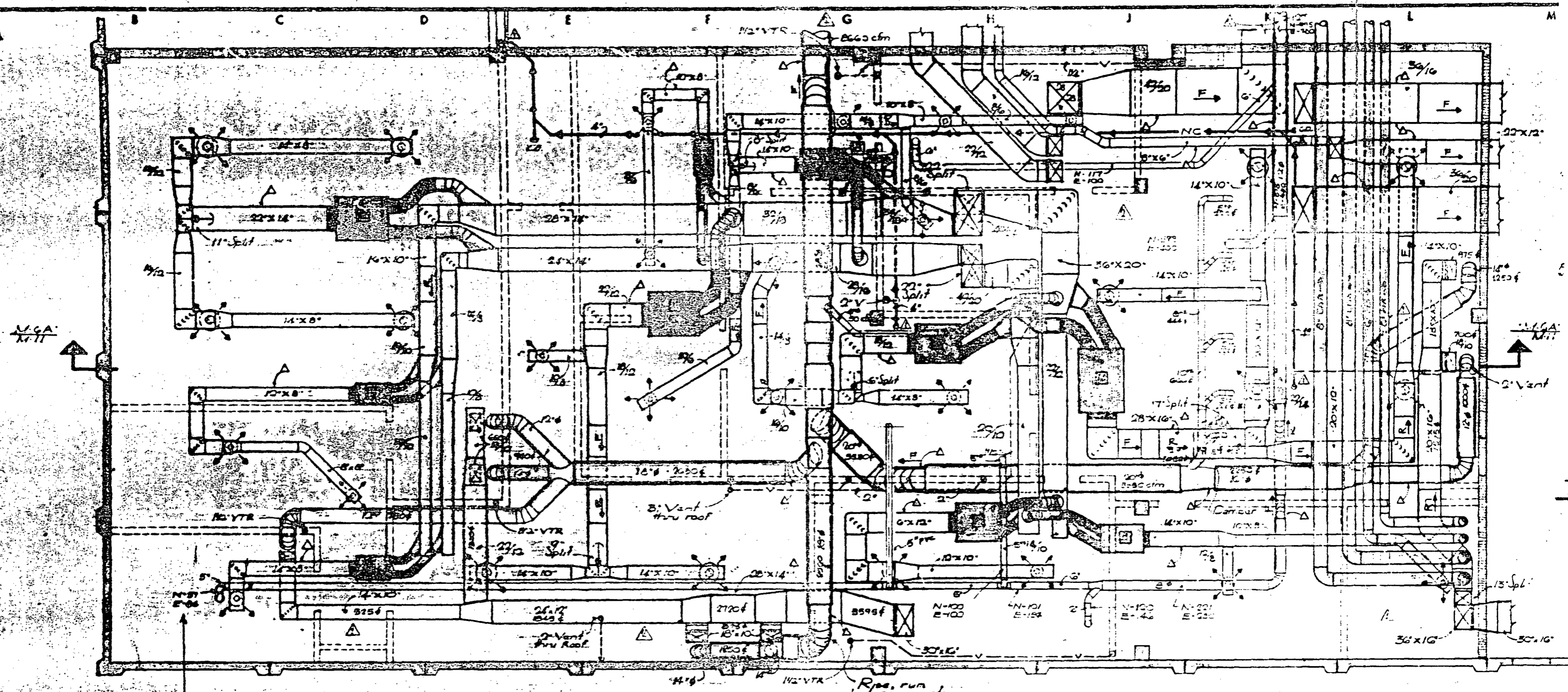
D-DIRECT
S-SMEAR
 F - FLOOR
 C - CEILING
 N - NORTH WALL
 S - SOUTH WALL
 E - EAST WALL
 W - WEST WALL
 MDA = 15.68
 DPM/100cm²

SOURCE # 6868 VALUE: 1055 DPM

INSTRUMENT		
DATE	SOURCE RESPONSE $\frac{c}{m}$	BKGD $\frac{c}{m}$
8-25-88	302	2
8-25-88	313	2
8-26-88	309	0
8-26-88	304	0
8-29-88	273	2
ASC #1		
8-25-88	37	.3
8-26-88	29	.3
9-16-88	27	0
ASC #2		
8-26-88	29	.3
9-2-88	33	.3
9-16-88	27	0

50068
 CHI LIMIT
 95% C.L.
 .4453 - 1.6464
 $\bar{x} + \sigma = 334$
 $\bar{x} = 300$
 $\bar{x} - \sigma = 266$

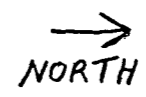
	1m	3m	5m	7m	9m	11m	13m				0m	2m	4m	6m	8m	10m	12m	14m	DIRECT		
C-1	D-0 S-3	D-4 S-3	D-4 S-3	D-12 S-3	D-8 S-0	D-12 S-0	D-12 S-0				B-1	D-0 S-0	D-0 S-3	D-16 S-0	D-4 S-0	D-8 S-3	D-8 S-0	D-4 S-3	D-20 S-3	2412 232	TOTAL DPM READINGS
C-2	D-4 S-6	D-0 S-3	D-4 S-3	D-0 S-3	D-12 S-3	D-4 S-0	D-4 S-0				B-2	D-0 S-0	D-8 S-0	D-8 S-0	D-0 S-0	D-0 S-0	D-4 S-0	D-16 S-3	D-4 S-0	10.40	DPM/100cm ² AVERAGE
C-3	D-4 S-0	D-4 S-6	D-36 S-0	D-20 S-0	D-4 S-0	D-44 S-0	D-8 S-0				B-3	D-0 S-0	D-0 S-0	D-4 S-0	D-8 S-3	D-0 S-0	D-12 S-0	D-0 S-0	D-20 S-3		
C-4	D-8 S-3	D-16 S-3	D-8 S-6	D-0 S-3	D-8 S-3	D-4 S-9	D-16 S-12				B-4	D-8 S-9	D-12 S-0	D-8 S-0	D-4 S-0	D-16 S-0	D-12 S-0	D-4 S-0	D-20 S-3		SMEAR
C-5	D-16 S-0	D-12 S-3	D-4 S-3	D-0 S-0	D-16 S-0	D-0 S-0	D-0 S-0				B-5	D-4 S-3	D-16 S-0	D-8 S-0	D-12 S-0	D-16 S-0	D-4 S-0	D-28 S-3	D-4 S-3	462 232	TOTAL DPM SMEARS
C-6	D-4 S-3	D-12 S-6	D-8 S-0	D-0 S-3	D-0 S-6	D-8 S-0	D-12 S-0				B-6	D-8 S-0	D-36 S-0	D-12 S-3	D-8 S-6	D-0 S-0	D-0 S-0	D-0 S-0	D-4 S-3	1.99	DPM/100cm ² AVERAGE
C-7	D-44 S-0	D-0 S-0	D-24 S-0	D-24 S-0	D-16 S-0	D-36 S-0	D-16 S-3				B-7	D-44 S-0	D-12 S-0	D-12 S-0	D-36 S-3	D-12 S-0	D-32 S-0	D-8 S-6	D-28 S-0		
C-8	D-8 S-0	D-20 S-0	D-24 S-0	D-28 S-3	D-8 S-0	D-16 S-0	D-16 S-3				B-8	D-28 S-0	D-16 S-0	D-20 S-3	D-16 S-0	D-16 S-0	D-28 S-0	D-12 S-0	D-16 S-3		
C-9	D-8 S-0	D-8 S-0	D-8 S-0	D-20 S-3	D-4 S-0	D-16 S-3	D-20 S-3				B-9	D-36 S-0	D-8 S-3	D-12 S-0	D-12 S-3	D-20 S-9	D-8 S-3	D-36 S-3	D-16 S-0		
C-10	D-8 S-3	D-8 S-3	D-20 S-0	D-20 S-3	D-16 S-0	D-0 S-6	D-4 S-0				B-10	D-12 S-3	D-16 S-0	D-4 S-0	D-8 S-0	D-12 S-0	D-12 S-6	D-12 S-0	D-12 S-3		
C-11	D-12 S-0	D-8 S-3	D-8 S-3	D-16 S-0	D-0 S-0	D-8 S-6	D-16 S-3				B-11	D-16 S-0	D-12 S-0	D-4 S-0	D-28 S-3	D-0 S-0	D-12 S-0	D-12 S-0	D-20 S-0		
C-12	D-12 S-6	D-8 S-0	D-8 S-0	D-0 S-3	D-8 S-0	D-4 S-6	D-0 S-3				B-12	D-8 S-0	D-20 S-3	D-4 S-3	D-4 S-0	D-12 S-3	D-12 S-0	D-8 S-3	D-12 S-0		
C-13	D-8 S-0	D-8 S-0	D-8 S-0	D-8 S-0	D-0 S-3	D-12 S-9	D-0 S-0				B-13	D-8 S-0	D-44 S-0	D-4 S-0	D-0 S-0	D-0 S-6	D-8 S-3	D-4 S-3	D-8 S-0		
C-14	D-20 S-0	D-4 S-3	D-4 S-0	D-4 S-6	D-0 S-0	D-12 S-0	D-16 S-0				B-14	D-0 S-0	D-8 S-3	D-0 S-6	D-0 S-0	D-4 S-3	D-20 S-0	D-0 S-0	D-8 S-3		
C-15	D-8 S-0	D-12 S-0	D-4 S-0	D-0 S-0	D-0 S-0	D-12 S-0	D-0 S-0														
C-16	D-16 S-0	D-0 S-0	D-12 S-0	D-0 S-3	D-8 S-0	D-4 S-3	D-0 S-0				B-15	D-8 S-0	D-28 S-0	D-12 S-3	D-4 S-0	D-12 S-3	D-0 S-3	D-0 S-3	D-8 S-0		



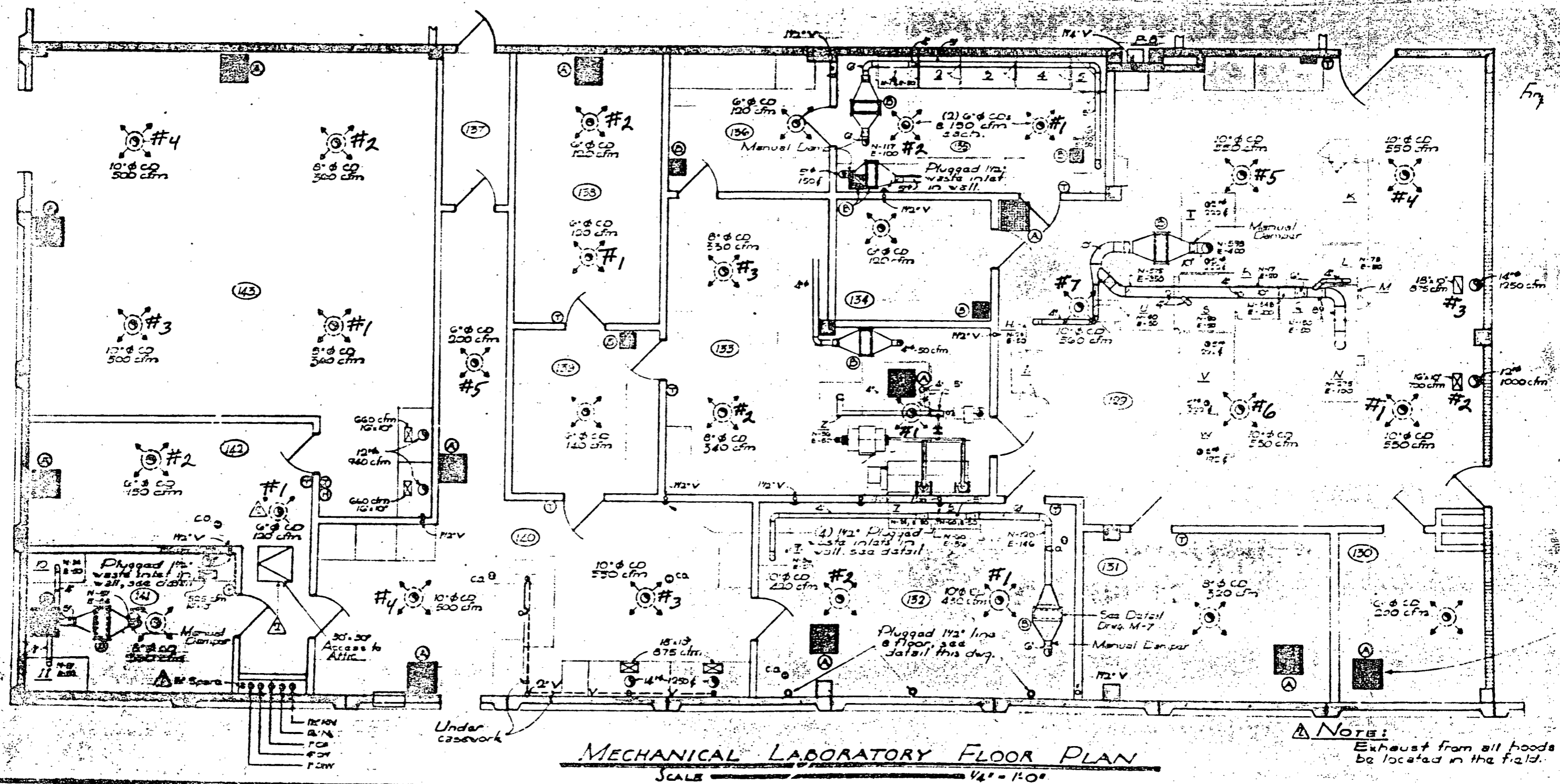
Designates Normal & Emergency
cfm flow. Ducts sized for highest
figure.

MECHANICAL LABORATORY ATTIC PLAN
SCALE $\frac{1}{4"} = 1'-0"$

Note:
All "Hot", "Cold" and mixed
air ducts on this plan shall have
 $\frac{1}{2}"$ acoustical lining, duct sizes
shown are actual sheet metal
sizes.

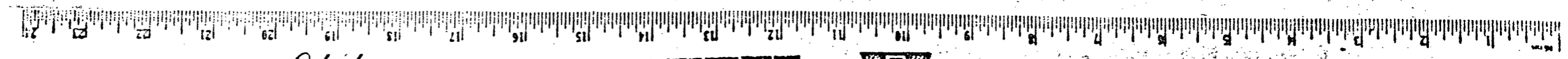


NORTH
→



MECHANICAL LABORATORY FLOOR PLAN
SCALE 1/4" = 1'-0"

NOTE:
Exhaust from all hoods
be located in the field.

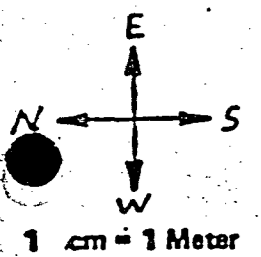


1973
JULY

TRIANGLE / A/E, Inc.
200 NORTH BROADWAY - 28201
DURHAM, NORTH CAROLINA 27601
TELEPHONE 252-321-1111



MICRO-MASTER



AREA LAE ITTIC
SUPPLY AIR DUCTS

TYPE: SURVEY α DIRECT + SMEAR

COMPLETION DATE 9-12-88

SURVEY UNITS

TYPE OF INSTRUMENT LUDLUM 2220/DET. 43-4 PROPANE

H.P. SIGNATURE Claude M. Thompson

DPM/100cm²

SERIAL NUMBER 50058-50064

AUTO. SAMPLE COUNTER# 83600108 #2

50058

50064

CHI² LIMIT

CHI² LIMIT

95% C.L.

95% C.L.

.4453 - 1.6464

.4453 - 1.6464

$\bar{X} + \sigma = 318$

$\bar{X} + \sigma = 305$

$\bar{X} = 285$

$\bar{X} = 273$

$\bar{X} - \sigma = 252$

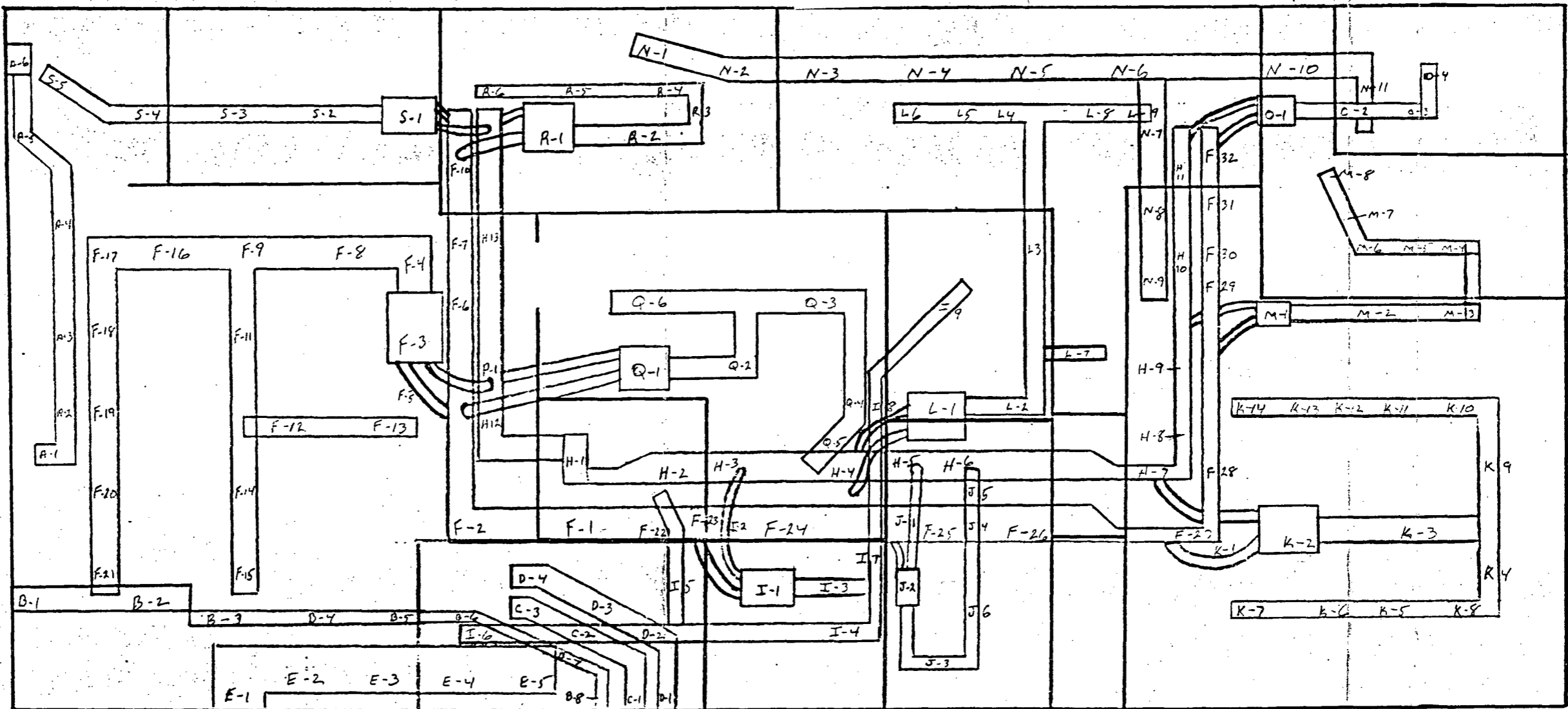
$\bar{X} - \sigma = 241$

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

MDA = $\frac{23.52 \text{ DPM}}{100 \text{ cm}^2}$

SOURCE# 11K VALUE: 1113 DPM

INSTRUMENT			
DATE	SOURCE RESPONSE/M	BKGD%/M	
8-16-88	242 50064	2	
8-16-88	294 50058	1	
8-16-88	252 50064	1	
8-16-88	280 50058	1	
8-17-88	249 50064	2	
8-17-88	261 50058	2	
8-17-88	276 50064	1	
8-17-88	277 50058	1	
ASC # 2			
8-18-88	33	.3	
8-19-88	35	0	
8-20-88	34	0	
9-12-88	26	.3	



Outside Duct Survey

Laboratory Attic Supply Duct Survey

After our initial cleanup and surveys in the laboratory attic we used a Ludlum 2220 with a Ludlum 43-4 probe and propane gas to take four readings every 2 meters along the outside of this supply duct system. We have included a maps of this supply duct system indicating the survey points. Of the 562 survey points we found one reading greater than 100 dpm/100 cm² direct and no reading greater than 20 dpm/100 cm² smearable on the outside of this supply duct. We scanned the area around this reading and deconed to less than 100 dpm/100 cm².

After completion of our outside survey of this supply duct, we used the same instrument and took 2 reading inside the outlets into each lab room from this supply. We have included a map with these outlets marked. Of the 66 survey points we found no reading greater than 100 dpm/100 cm² direct and no reading greater than 20 dpm/100 cm² smearable

W. A. Rogers

W. A. Rogers

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	C.P.M.	D.P.M./100cm ²	D.P.M./100cm ²
A-1			
TOP	1	6	0
BOTTOM	2	12	3
EAST	0	0	3
WEST	3	18	0
A-2			
TOP	2	12	0
BOTTOM	0	0	0
NORTH	1	6	3
SOUTH	0	0	3
A-3			
TOP	5	30	0
BOTTOM	1	6	0
NORTH	2	12	3
SOUTH	0	0	0
A-4			
TOP	3	18	3
BOTTOM	0	0	3
NORTH	2	12	0
SOUTH	1	6	0
A-5			
TOP	4	24	0
BOTTOM	3	18	0
NORTH	2	12	3
SOUTH	0	0	0
A-6			
WEST	0	0	0
NORTH	0	0	0
SOUTH	0	0	3
EAST	0	0	0

Lab Attic supply air Ducts survey

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
B-1			
TOP	6	36	3
BOTTOM	0	0	0
WEST	0	0	0
EAST	1	6	3
B-2			
TOP	4	24	0
BOTTOM	0	0	0
WEST	0	0	0
EAST	4	24	6
B-3			
NORTH	6	36	0
SOUTH	1	6	0
WEST	1	6	6
EAST	0	0	3
B-4			
TOP	1	6	3
BOTTOM	2	12	0
WEST	1	6	0
EAST	1	6	6
B-5			
TOP	1	6	3
BOTTOM	1	6	3
WEST	4	24	3
EAST	0	0	0
B-6			
TOP	3	18	0
BOTTOM	2	12	3
WEST	1	6	0
EAST	0	0	0

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
B-7			
TOP	1	6	0
BOTTOM PROBE TOO LARGE	—	—	0
EAST	2	12	0
WEST	2	12	3
B-8			
TOP	1	6	3
NORTH	1	6	0
SOUTH	2	12	3
BOTTOM PROBE TOO LARGE	—	—	—

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
F-1			
TOP	4	24	0
BOTTOM	6	36	3
EAST	3	18	0
WEST	0	0	6
F-2			
TOP	1	6	3
BOTTOM	0	0	3
WEST	0	0	0
NORTH	2	12	6
F-3			
TOP	7	42	0
BOTTOM	3	18	6
NORTH	3	18	0
F-4			
TOP	16	96	3
BOTTOM	4	24	0
SOUTH	1	6	9
NORTH	11	66	3
F-5			
TOP	1	6	0
BOTTOM	5	30	0
EAST	6	36	3
WEST	0	0	0
F-6			
TOP	6	36	0
BOTTOM	1	6	3
NORTH	6	36	0
F-7			
TOP	4	24	3
BOTTOM	0	0	0
NORTH PROBE TOO LARGE	—	—	—
SOUTH	3	18	3

Lab Attic Supply air Ducts Survey PAGE 8 OF 28

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²	
F-8				
TOP	2	12	0	
BOTTOM	0	0	0	
EAST	2	12	0	
WEST	2	12	3	
F-9				
TOP	6	36	3	
BOTTOM	1	6	0	
NORTH	0	0	0	
EAST	0	0	0	
F-10				
TOP	5	30	0	
NORTH	5	30	0	
BOTTOM	2	12	0	
SOUTH	2	12	3	
F-11				
TOP	5	30	0	
BOTTOM	2	12	0	
NORTH	2	12	6	
SOUTH	18	108	9	RESURVEY DIRECT - 3 18
F-12				
TOP	3	18	3	
BOTTOM	—	—	0	
PROBE TOO LARGE				
WEST	2	12	3	
EAST	6	36	0	
F-13				
TOP	1	6	0	
BOTTOM	2	12	0	
WEST	2	12	3	
EAST	1	6	0	
F-14				
TOP	4	24	0	
BOTTOM	2	12	3	
NORTH	5	30	0	
SOUTH	1	6	0	

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	C.P.M.	D.P.M./100cm ²	D.P.M./100cm ²
F-15			
TOP	1	6	0
BOTTOM	5	30	6
NORTH	2	12	3
SOUTH	0	0	3
F-16			
TOP	1	6	0
BOTTOM	3	18	0
EAST	2	12	0
WEST	0	0	0
F-17			
TOP	5	30	0
BOTTOM	1	6	3
NORTH	2	12	3
EAST	1	6	0
F-18			
TOP	3	18	0
BOTTOM	3	18	0
NORTH	2	12	0
SOUTH	0	0	0
F-19			
TOP	8	48	6
BOTTOM	1	6	0
NORTH	6	36	0
SOUTH	6	36	3
F-20			
TOP	0	0	0
BOTTOM	1	6	3
NORTH	0	0	3
SOUTH	0	0	0
F-21			
TOP	3	18	0
BOTTOM	2	12	0
NORTH	8	48	3
SOUTH	1	6	0

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	C.P.M.	DPM/100cm ²	DPM/100cm ²
F-22			
TOP	12	72	0
BOTTOM	1	6	0
EAST	3	18	0
WEST	4	24	6
F-23			
TOP	2	12	0
BOTTOM	1	6	0
EAST	2	12	0
WEST	3	18	0
F-24			
TOP	2	12	3
BOTTOM	0	0	3
EAST	4	24	0
WEST	2	12	0
F-25			
TOP	3	18	0
BOTTOM	3	18	0
WEST	3	18	3
EAST	0	0	0
F-26			
TOP	0	0	0
BOTTOM	0	0	0
EAST	5	30	3
WEST	0	0	0
F-27			
TOP	3	18	0
BOTTOM	0	0	0
EAST	1	6	3
WEST	0	0	0
F-28			
TOP	2	12	3
BOTTOM	5	30	0
WEST	0	0	0
SOUTH	0	0	0

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
F-29			
TOP	3	18	0
BOTTOM	0	0	0
NORTH	5	30	0
SOUTH	6	36	0
F-30			
TOP	2	12	6
BOTTOM	6	36	3
NORTH	2	12	0
SOUTH	2	12	0
F-31			
TOP	0	0	0
BOTTOM	3	18	0
NORTH	1	6	0
SOUTH	4	24	3
F-32			
TOP	2	12	0
BOTTOM	3	18	0
EAST	3	18	0
NORTH	0	0	3

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
"G" SERIES			
SKIPPED			
H-1			
TOP	0	0	3
BOTTOM	2	12	0
WEST	3	18	9
EAST	2	12	0
H-2			
TOP	6	36	0
BOTTOM	3	18	0
NORTH	3	18	0
SOUTH	1	6	0
H-3			
TOP	4	24	6
BOTTOM	2	12	0
EAST	0	0	0
WEST	2	12	0
H-4			
TOP	0	0	0
BOTTOM	0	0	3
EAST	0	0	3
WEST	5	30	0
H-5			
TOP	0	0	3
BOTTOM	0	0	3
EAST	0	0	0
WEST	0	0	0
H-6			
TOP	0	0	0
BOTTOM	5	30	6
EAST	1	6	3
WEST	0	0	0

Direct Linearable

Survey #	CPM	DPM/100cc ²	DPM/100cc ²
H-7			
TOP	5	30	0
BOTTOM	0	0	3
EAST	0	0	0
WEST	4	24	0
H-8			
TOP	1	6	0
BOTTOM	1	6	0
NORTH	0	0	3
SOUTH	4	24	6
H-9			
TOP	4	24	0
BOTTOM	2	12	0
NORTH	6	36	3
SOUTH	2	12	0
H-10			
TOP	0	0	0
BOTTOM	2	12	0
SOUTH	0	0	0
H-11			
TOP	3	18	3
BOTTOM	0	0	3
SOUTH	1	6	0
H-12			
TOP	2	12	6
BOTTOM	0	0	0
SOUTH	0	0	0
H-13			
TOP	2	12	3
BOTTOM	2	12	0
SOUTH	1	6	0
H-14			
TOP	0	0	0
BOTTOM	2	12	0
EAST	0	0	0
NORTH	2	12	0

Direct Amenable

Survey #	CPM	PPM/100ccm ²	PPM/100ccm ²
I-1			
TOP	2	12	0
BOTTOM	2	12	0
EAST	1	6	3
WEST	2	12	0
I-2			
TOP	0	0	0
BOTTOM	1	6	0
WEST	0	0	0
EAST	2	12	0
I-3			
TOP	8	48	0
BOTTOM	0	0	3
WEST	0	0	0
EAST	0	0	0
I-4			
TOP	3	18	0
BOTTOM	0	0	3
WEST	3	18	0
EAST	1	6	3
I-5			
TOP	2	12	0
BOTTOM	1	6	0
NORTH	1	6	0
SOUTH	1	6	0
I-6			
TOP	1	6	0
BOTTOM	8	48	3
EAST	1	6	3
WEST	5	30	3
I-7			
TOP	2	12	3
BOTTOM	3	18	0
SOUTH	0	0	0
NORTH	1	6	0

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
J-1			
TOP	4	24	6
BOTTOM	1	6	0
SOUTH	0	0	3
NORTH	6	36	0
J-2			
TOP	1	6	0
BOTTOM	0	0	0
NORTH	6	36	0
SOUTH	2	12	6
J-3			
TOP	3	18	0
BOTTOM	—	—	3
PROBE TOO LARGE			
SOUTH	1	6	3
WEST	2	12	0
J-4			
TOP	0	0	0
BOTTOM	3	18	0
NORTH	0	0	0
SOUTH	3	18	0
J-5			
EAST	4	24	0
WEST	3	18	0
J-6			
WEST	1	6	0
EAST	0	0	0

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
K-1			
TOP	3	18	0
BOTTOM	2	12	3
EAST	1	6	3
WEST	1	6	0
K-2			
TOP	8	48	0
BOTTOM	2	12	0
WEST	2	12	0
EAST	1	6	0
K-3			
TOP	1	6	0
BOTTOM	0	0	0
EAST	1	6	0
WEST	4	24	0
K-4			
TOP	6	36	12
BOTTOM	3	18	0
NORTH	6	36	3
SOUTH	1	6	0
K-5			
TOP	3	18	0
BOTTOM	6	36	0
WEST	0	0	0
EAST	1	6	3
K-6			
TOP	5	30	3
BOTTOM	5	30	0
EAST	1	6	3
WEST	2	12	6
K-7			
EAST	2	12	3
WEST	1	6	3
K-8			
WEST	1	6	0
EAST	2	12	0

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	GPM	DEM. loss cm ²	DEM. loss cm ²
K-9			
TOP	5	30	6
BOTTOM	3	18	0
NORTH	3	18	3
SOUTH	0	0	0
K-10			
EAST	4	24	0
WEST	4	24	0
K-11			
TOP	9	54	3
BOTTOM	5	30	3
EAST	2	12	0
WEST	2	12	0
K-12			
TOP	4	24	0
BOTTOM	1	6	0
EAST	2	12	0
WEST	2	12	3
K-13			
TOP	3	18	0
NORTH	4	24	0
WEST	3	18	0
EAST	2	12	0
K-14			
EAST	2	12	3
WEST	0	0	0

Direct Amenable

Survey #	CPM	DPM/100cm ²	DPM/1000cm ²
L-1			
TOP	1	6	0
BOTTOM	1	6	0
NORTH	2	12	0
SOUTH	0	0	0
L-2			
TOP	4	24	0
BOTTOM	0	0	0
EAST	3	18	0
WEST	2	12	0
L-3			
TOP	1	6	3
BOTTOM	0	0	0
NORTH	0	0	0
SOUTH	2	12	3
L-4			
TOP	4	24	0
BOTTOM	1	6	0
WEST	4	24	0
EAST	1	6	3
L-5			
TOP	2	12	3
BOTTOM	3	18	6
EAST	0	0	0
WEST	1	6	3
L-6			
NORTH	0	0	6
EAST	1	6	3
SOUTH	5	30	0
WEST	5	30	3

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
M-1			
TOP	0	0	0
BOTTOM	4	24	0
EAST	3	18	0
WEST	7	42	0
M-2			
TOP	0	0	0
BOTTOM	0	0	3
WEST	3	18	0
EAST	2	12	3
M-3			
TOP	6	36	6
BOTTOM	3	18	0
WEST	3	18	0
SOUTH	3	18	0
M-4			
WEST	3	18	0
EAST	0	0	0
M-5			
TOP	3	18	0
BOTTOM	1	6	0
EAST	6	36	6
WEST	4	24	0
M-6			
TOP	0	0	3
BOTTOM	0	0	3
N.W.	4	24	0
S.E.	1	6	0
M-7			
TOP	1	6	3
BOTTOM	0	0	0
NORTH	2	12	3
SOUTH	1	6	0
M-8			
EAST	0	0	3
WEST	1	6	0

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cm ²
N-1			
TOP	0	0	3
BOTTOM	0	0	0
EAST	3	18	3
WEST	3	18	3
N-2			
TOP	1	6	0
BOTTOM	3	18	0
EAST	0	0	0
WEST	5	30	0
N-3			
WEST	1	6	3
EAST	1	6	9
N-4			
EAST	5	30	3
WEST	3	18	0
N-5			
TOP	0	0	3
BOTTOM	4	24	0
EAST	1	6	3
WEST	5	30	6
N-6			
TOP	1	6	0
BOTTOM	2	12	0
EAST	4	24	3
WEST	1	6	0
N-7			
TOP	0	0	0
BOTTOM	1	6	0
NORTH	0	0	0
SOUTH	0	0	3
N-8			
TOP	2	12	0
BOTTOM	2	12	6
NORTH	0	0	0

Lab Attic supply air Ducts Survey

Direct Smearable

Survey #	CPM	DPM/100cm ²	DPM/100cc ²
S-1			
TOP	2	12	6
BOTTOM	3	18	3
EAST	5	30	0
WEST	4	24	3
S-2			
TOP	3	18	3
BOTTOM	5	30	0
EAST	2	12	3
WEST	4	24	0
S-3			
EAST	2	12	0
WEST	1	6	0
S-4			
TOP	1	6	0
BOTTOM	3	18	6
EAST	4	24	6
WEST	2	12	3
S-5			
TOP	5	30	6
BOTTOM	4	24	3
EAST	5	30	0
WEST	3	18	0
S-6			
TOP	2	12	0
END	4	24	3
EAST	1	6	0
NORTH	2	12	0
S-7			
EAST	1	6	0
WEST	1	6	6

Inside Duct Survey

LINE NUMBER Supply air Duct outlet

DATE 9-16-88

INSTRUMENT Yellum 2220 ^{Prepares}

SERIAL NUMBER SN 50058

DETECTOR Probe 43-4

OPERATOR Dennis Paul M. Darity

SOURCE NUMBER AND VALUE

SN 112 113 d/m 477

SOURCE RESPONSE AND BACKGROUND AM

268-295 Bkg. 0 c/m

SOURCE RESPONSE AND BACKGROUND PM

276-280 " 0 c/m

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION	Direct cpm	Direct dpm/100cm ²	Smearable dpm/100cm ²
Rm 129	all 10" air duct					
#1 is in Northeast corner of Rm 129			Rm 129 #1 N	2	12	0
			S	0	0	6
#2 is at north back wall up in attic of 129	N-E	(attic)	#2 N	0	0	3
			S	1	6	3
#3 is at north back wall up in attic of Rm 129	N-W	(attic)	#3 N	0	0	0
			S	0	0	3
#4 is at north west corner of Rm 129			#4 N	0	0	9
			S	0	0	3
#5 is at west side about center of Rm 129			#5 N	0	0	3
			S	0	0	0
#6 is at East side of lab Rm 129 about center of room.			#6 N	0	0	0
			S	1	6	3
#7 is at south west corner of Rm 129			#7 N	0	0	0
			S	0	0	6
<p>Direct & direct Readings taken at bottom of duct and extend up inside the length of probe on north & south side.</p>						

LINE NUMBER Supply Air Duct outlet DATE 9-16-88
 INSTRUMENT Mullin 2230 Propane SERIAL NUMBER SN 50058
 DETECTOR Probe 43-4 OPERATOR Henri Paul, Margie Sarty
 SOURCE NUMBER AND VALUE SN 112 9/13 d/m 472
 SOURCE RESPONSE AND BACKGROUND AM 295-268 Bkg 0 c/m
 SOURCE RESPONSE AND BACKGROUND PM 276-280 " 0 c/m

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION	Direct		Smearable
				cpm	dpm/100cm ²	
<u>Rm 130</u> <u>air duct is in center of north end of room</u>	<u>duct</u>	<u>9"</u>	<u>Rm 130 #1 N</u>	<u>0</u>	<u>0</u>	<u>3</u>
			<u>S</u>	<u>1</u>	<u>6</u>	<u>12</u>
<u>Rm 131</u> <u>air duct is in center of Rm 131</u>	<u>duct</u>	<u>10"</u>	<u>Rm 131 #1 N</u>	<u>1</u>	<u>6</u>	<u>0</u>
			<u>S</u>	<u>2</u>	<u>12</u>	<u>0</u>
<u>Rm 132</u> <u>#1 air duct is at north end of Rm 132 in center</u> <u>#2 air duct is at south end of Rm 132 in center</u>	<u>duct</u>	<u>10"</u>	<u>Rm 132 #1 N</u>	<u>2</u>	<u>12</u>	<u>0</u>
			<u>S</u>	<u>1</u>	<u>6</u>	<u>0</u>
			<u>#2 N</u>	<u>3</u>	<u>18</u>	<u>3</u>
			<u>S</u>	<u>0</u>	<u>0</u>	<u>3</u>
<u>Rm 133</u> <u>#1 air duct is at north end of Rm 133</u> <u>#2 air duct is at south end of Rm 133</u> <u>#3 air duct is at west side of Rm 133</u>	<u>duct</u>	<u>10"</u>	<u>Rm 133 #1 N</u>	<u>0</u>	<u>0</u>	<u>3</u>
			<u>S</u>	<u>1</u>	<u>6</u>	<u>9</u>
			<u>#2 N</u>	<u>3</u>	<u>18</u>	<u>0</u>
			<u>S</u>	<u>0</u>	<u>0</u>	<u>0</u>
			<u>#3 N</u>	<u>0</u>	<u>0</u>	<u>6</u>
			<u>S</u>	<u>0</u>	<u>0</u>	<u>0</u>

LINE NUMBER Supply air duct outlet DATE 9-16-88
 INSTRUMENT Ludlum 2220 Propan Gas SERIAL NUMBER SN 50058
 DETECTOR 43-4 Probe OPERATOR Dennis Ford & Margie J
 SOURCE NUMBER AND VALUE SN 112 1113 d/m 4TT
 SOURCE RESPONSE AND BACKGROUND AM 268-295 Bkg 0 cpm
 SOURCE RESPONSE AND BACKGROUND PM 276-208 Bkg 0 cpm

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION	Direct		Smearable dpm/100cm ²
				cpm	dpm/100cm ²	
Rm 134 #1 duct is a south west corner of 134	air duct	6"	Room 134 #1 N	1	6	6
			#1 S	0	0	0
Rm 135 #1 air duct is at North ^{end} of 135 #2 is at south end of Rm 135		9"	Room 135 N	1	6	0
			#1 S	1	6	9
			#2 N	1	6	0
			#2 S	0	0	0

Room 140 2 Pipe in attic

LAB ATTIC PIPE SURVEY (Rooms 136, 138, 139, 140)

PAGE 4 OF 5

LINE NUMBER Supply air duct outlet DATE 9-19-88
 INSTRUMENT Ludlum 2220 Geiger Has SERIAL NUMBER ^{SN}50058
 DETECTOR 43-4 OPERATOR Bob H + Manjiv H.
 SOURCE NUMBER AND VALUE ^{SN}112 -1113 d/m 477
 SOURCE RESPONSE AND BACKGROUND AM 257-264 Bkg of 2 c/m
 SOURCE RESPONSE AND BACKGROUND PM

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION		Direct		Smearable
					cpm	dpm/100cm ²	dpm/100cm ²
Room 136 air duct is at North end of Room.	Supply air duct	9"	#1	N	0	0	0
				S	0	0	0
} { No air duct in } } { 137 Air Lock }							
Room 138 air duct is at East end and one at West end of Room 138	" " "	6"	#1	N	0	0	0
				S	1	6	0
			#2	N	1	6	3
				S	0	0	0
Room 139 air duct is in center of Room 139	" " "	9"		N	0	0	0
				S	0	0	0
40 } 2 of supply air ducts in Room 140 one at East side at North end of Room, in attic. One air duct is at North end of 140. One is at South end of Room 140. One air duct is at West side of 140.	" " "	10"		N	2	12	0
				S	0	0	3
				N	0	0	0
				S	0	0	0
			#3	N	1	6	3
				S	0	0	3
			#4	N	1	6	3
				S	0	0	0
			#5	N	0	0	0
				S	1	6	6

LINE NUMBER Supply air duct outlet DATE 9-19-88
 INSTRUMENT Ludlum 2220 portable SERIAL NUMBER SN 50058
 DETECTOR 43-4 OPERATOR Bob H. + Margie A
 SOURCE NUMBER AND VALUE SN 112 - 1113 d/m * π
 SOURCE RESPONSE AND BACKGROUND AM 257-264 Bkg of 2 @/m
 SOURCE RESPONSE AND BACKGROUND PM

START OF SURVEY	TYPE OF LINE	DIA.	READING LOCATION	Direct cpm	Direct dpm/100cm ²	Smearable dpm/100cm ²
Room 141 air duct is at center of Room 141	Supply air duct	10"	N	0	0	0
			S	0	0	0
Room 142 air duct is at North End of Room #1		6"	N	0	0	3
			S	0	0	3
And One at South West of Room 142 #2		6"	N	0	0	0
			S	0	0	0
Rm. 143 there is One air duct at North East end (#1 duct)		10"	N	0	0	3
			S	0	0	0
One at North West end (#2 duct)		10"	N	1	6	0
			S	0	0	6
One at South east end (#3 duct) and One at South West end of Room 143 (#4 duct)		10"	N	0	0	0
			S	1	6	0
			N	1	6	0
			S	1	6	3