Rocky Flats Environmental Technology Site

Building 776/777 Area V Final Survey Report

Survey Units:
776001 (ASRF)

Copy

RECEIVED
MAR - 2 2005

ADMIN RECORD

129

Vaughn, Terry
To: FILE
Subject: Advanced Size Reduction Facility in Building 776

The Advanced Size Reduction Facility (ASRF) was originally built in B776 to dismantle highly contaminated equipment inside this well shielded room. Due to it's construction made the ASRF a difficult challenge to decontaminate and nearly impossible to dismantle inside the building prior to the final demolition of building 776/777. KH management targeted the ASRF as the first survey unit in B776 and used the ASRF as a test for different types of decontamination techniques. As the first survey unit, the ASRF survey package data was generated differently than other survey units due to the special evaluations and survey assessments performed for the ASRF. Through the consultative process with CDPHE, DOE, and KH the ASRF was recognized as a special survey unit requiring special controls during demolition based upon it's construction, location within the building, and it's final contamination levels. KH management's evaluation has concluded that the ASRF has been decontaminated to ALARA levels through best available technology and decontamination efforts and can be safely dismantled during the final demolition of building 776/777.

SURVEY PACKAGE COVER SHEET

Survey Area:	5	**Survey Unit:**	776001	**Building/Structure:**	B776/777

Survey Unit/Area Description: ASRF

Building Information:

Survey Type: Reconnaissance Level Characterization Survey ☐ Pre-Demolition Survey ☑

Building Type: Type 1 ☐ Type 2 ☐ Type 3 ☑

Classification: Class 1 ☐ Class 2 ☐ Class 3 ☐ N/A ☑

Contaminants of Concern: Plutonium ☑ Uranium ☐ Other ☐

Types of Surveys Required: Alpha ☑ Beta ☐ Gamma ☐

Special Support Requirements:

Special Safety Requirements:

Isolation Controls: Isolation controls shall be established after encapsulation

LEVEL 1 ☑ LEVEL 2 ☐ N/A ☐

Comments: This package has been developed to perform a pre-demolition survey of B776/777 for waste characterization and modeling for airborne contamination releases. It is not for unrestricted release.

Labeling Requirements:

N/A

Survey Package Implementation:

[redacted] 12/17/03

Date

Comments:

Survey Package Closure:

[redacted] 12/17/03

Date

12/17/03

Date

3

CALCULATION COVER SHEET

Title ASRF SAMPLING PLAN

Calculation No. 03-RS-776-0004 Revision No. 0 Date 9/8/03

Originator K Ronzen Peer Reviewed Gruber Date 9/10/03

Project B776/777 Bldg. 776

Analyzed System ASRF Supersedes Calc. No. N/A

Other Documents Supported by this Calculation NONE

Calculation Summary THIS CALCULATION SERVES AS A BASIS FOR A SAMPLING PLAN OF THE ASRF FOR DEMOLITION CONSIDERATION.

Originator: K Ronzen		[redacted]	9/8/03
Name (print)	Signature		Date
Peer Reviewer: Gruber		[redacted]	9/10/03
Name (print)	Signature		Date
Approval: Terry Vaughn		[redacted]	9/10/03
Name (print)	Signature		Date

Creating Reference Grid and Determining Survey Locations (cont.)

Floor surface area = 1200 ft^2
Wall surface area = 2(60' x 28') + 4(20' x 28') – (12' x 16')- 2(12' x 21') = 4904 ft^2
Ceiling surface area = 60'x20' = 1200 ft^2

Total surface area = 7304 ft^2

Therefore $L = \sqrt{\frac{7304\,ft^2}{33}} = 14.9\,ft$

This is rounded down to nearest whole number to ensure enough data points are captured on the survey grid when using a random-start; resulting in 14 feet distance between survey measurement locations.

An excel spreadsheet was generated to choose random numbers for both x and y coordinates using the dimension of the ASRF on the reference grid. The first coordinates of 18,37 (i.e., 18, AK) fell outside the ASRF drawing and were not used. The second set of coordinates 51,39 (i.e., 51, AM) fell within the ASRF drawing and were used.

Upon plotting all the sample locations on the ASRF Grid Map, there were 42 survey locations in total. This meets the minimum requirement of 33 sample points. The ASRF Grid Map does not include the wall dividing the RDA and Cutting Room. Five additional sample points will be included on this wall consistent with the sample identification process if the walls were overlaid in their respective vicinity on the grid map. This will provide a total of 47 data points for survey measurement collection.

Attachments:

ASRF Grid Map Showing Random Start Point
Random Start Data Sheet
ASRF Grid Map expanded to identify all survey locations
Survey Package
ASRF Survey Diagram

References:

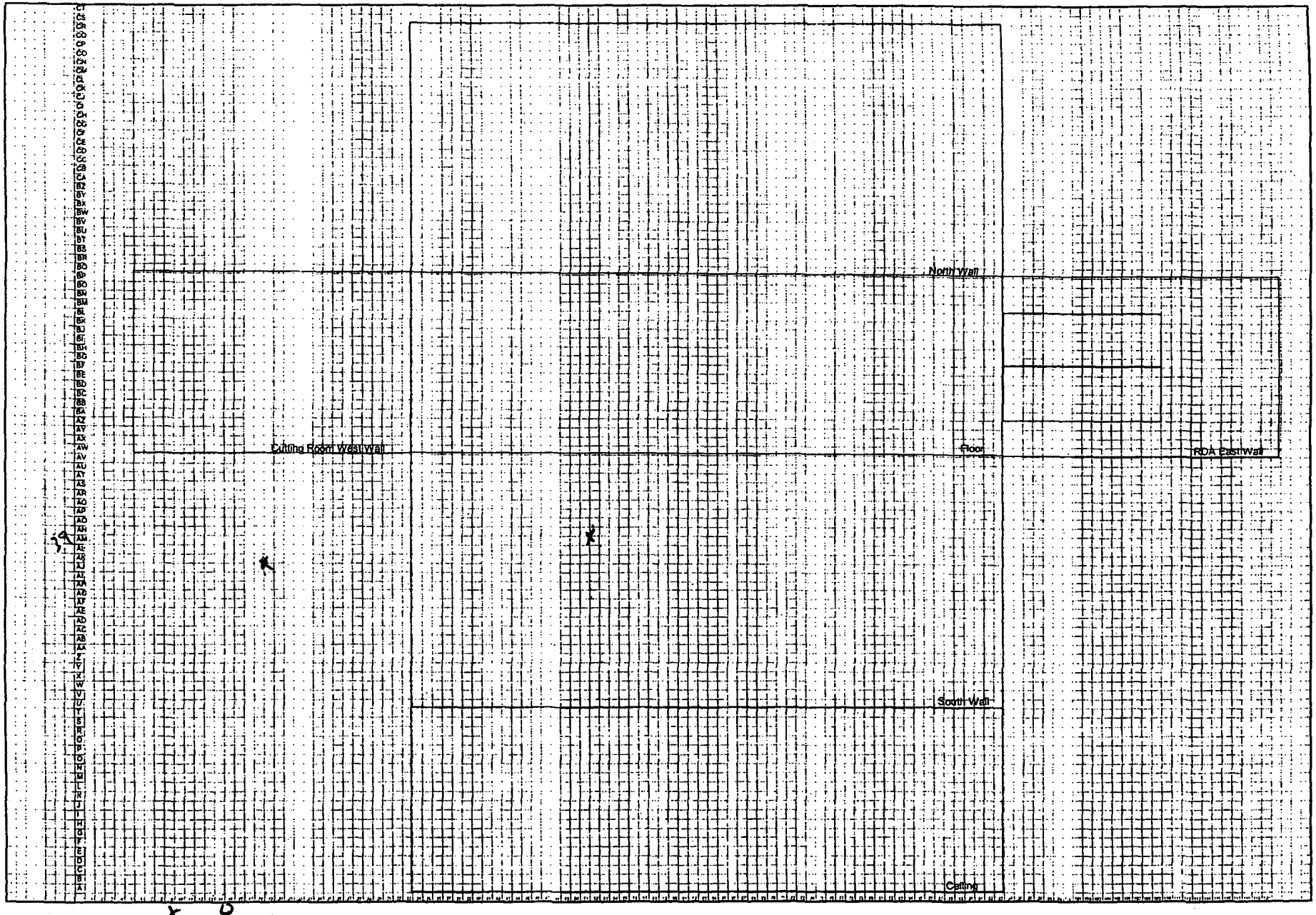
Radiological Safety Procedures
Radiological Pre-Demolition Survey Plan for Building 776/777

Originator: K. Konzen Date: 9/8/03

Reviewer: Grube Date: 9/10/03

5

ASRF [illegible] MAP



START: 51, 39

PEER REVIEW CRITERIA SHEET

Title ASRF Sampling Plan

Calculation No. 03-RS-776-0004 Revision No. Ø Date 9/8/03

Originator K Klonzen Peer Reviewed G Cuba Date 9/10/03

Calculation Checklist	Yes	No	N/A	Comments
1. Are analytical methods documented and appropriate?	✓			
2. Are assumptions documented and appropriate?	✓			
3. Is calculation complete?	✓			
4. Is calculation mathematically correct?	✓			
5. Do calculational parameters comply with design criteria/dimensions?	✓			
6. Were input data appropriate?	✓			
7. Does the calculation reference or list applicable assumptions and major equation sources?	✓			
8. If computer software is used, has it been V&Ved IAW COEM?			✓	
9. Does the calculation establish basis For Policy/Procedure Change, then Management Review is required.		✓		

Additional Comments:

ENGINEER CALCULATION SHEET
(Calculation # 03-RS-776-0004)

Title: **ASRF Sampling Plan**

Background:

Building 776/777 will characterize the Advanced Size Reduction Facility (ASRF) using standards developed for structure characterization in accordance with the Site Radiological Safety Procedures, and the Radiological Pre-Demolition Survey Plan (PDSP) for Building 776/777.

Discussion:

The ASRF includes the RDA and the Cutting Room. Both rooms have a similar contamination potential as demonstrated on previous surveys. The RDA and Cutting Room has a floor surface area of 800 ft^2, and 400 ft^2, respectively. This gives a combined floor surface area of 1200 ft^2 or 111 m^2. Therefore, the survey unit will include the RDA and Cutting Room; however, the number of survey points will be increased by 111% to accommodate the additional area, since the typical survey unit floor area for a Class 1 structure is approximately 100 m^2.

Determining the number of survey measurements:

The standard minimum survey measurements required for a survey unit is defined as 30 per the PDSP. Since the ASRF has a floor surface area larger than a typical survey unit, the minimum survey measurements will be increased by 111%, resulting in a minimum of 33 survey measurements being required.

Creating Reference Grid and Determining Survey Locations

The reference grid is established for identifying the locations of the measurements. It consists of two sets of grid lines running at right angles to each other. The origin will be in the south west corner of the diagram. The survey diagram is designed in a two dimensional format, showing the dimensions of the walls and ceiling.

Survey points will be identified with two alpha-numeric coordinates (e.g., 30 N, 25 E). A rectangular grid will be used in determining survey locations. The first measurement is chosen randomly using a random number generator in excel. This will determine the starting point on which the other survey locations will be based.

The distance between survey measurement locations is determined by using the following formula for a rectangular grid:

$$L = \sqrt{\frac{A_{su}}{n}}$$

L: The distance between survey measurement locations
A_{su}: The area of the survey unit (this includes surface area of walls and ceiling)
n: The number of required measurements

SURVEY UNIT ASRF
RANDOM START DATA SHEET

Measurement Location	X-Coordinate	Y-Coordinate	Measurement Location	X-Coordinate	Y-Coordinate
N/A	18	37		84	68
1st Point	51	39		54	61
	4	79		39	34
	10	69		80	24
	37	67		115	57
	86	16		64	69
	111	6		74	15
	44	33		40	95
	96	81		55	9
	95	64		95	79
	82	55		71	59
	86	92		56	59
	60	2		68	90
	74	42		80	65
	59	7		62	43
	51	60		107	57
	22	67		55	11
	89	66		84	85
	103	34		18	81
	73	56		3	86
	20	72		50	22
	1	96		15	65
	33	73		62	55
	9	35		109	66
	113	64		63	63
	54	43		31	10
	37	39		65	42
	17	57		24	88
	85	89		30	66
	104	63		98	32
	69	27		10	66
	112	94		52	77
	65	49		17	13
	50	48		12	57
	80	91		105	60
	0	57		58	6
	23	8		64	66
	71	94		5	28
	97	52		89	45
	67	89		14	32

LEGEND:

MG 9/5/03

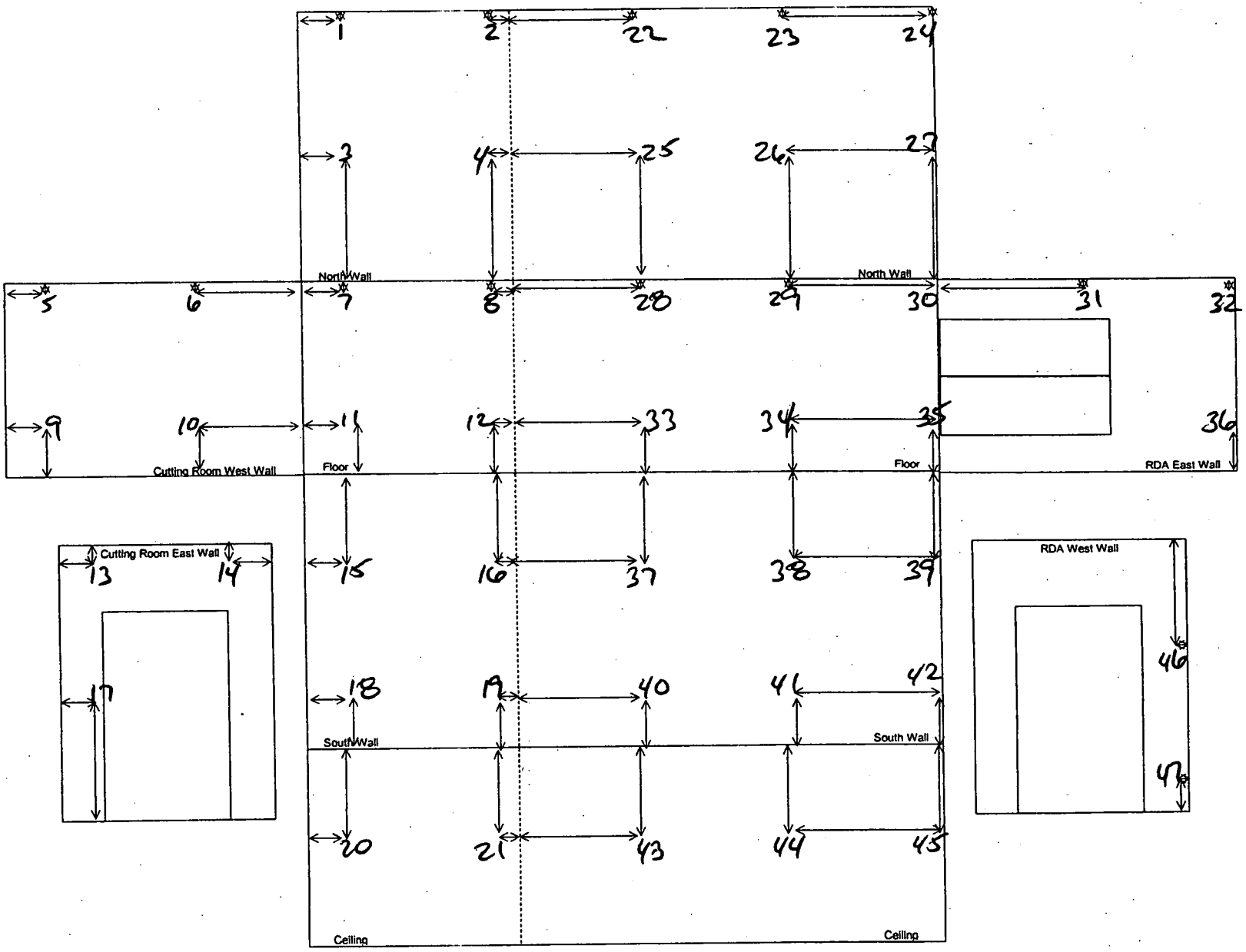
C-N/A = UNPAINTED CEILING
X-N/A = > NUMBER OF SAMPLES REQUIRED

REVIEWED BY SIGNATURE:

MG
9/5/03

9

ASRF Survey Diagram

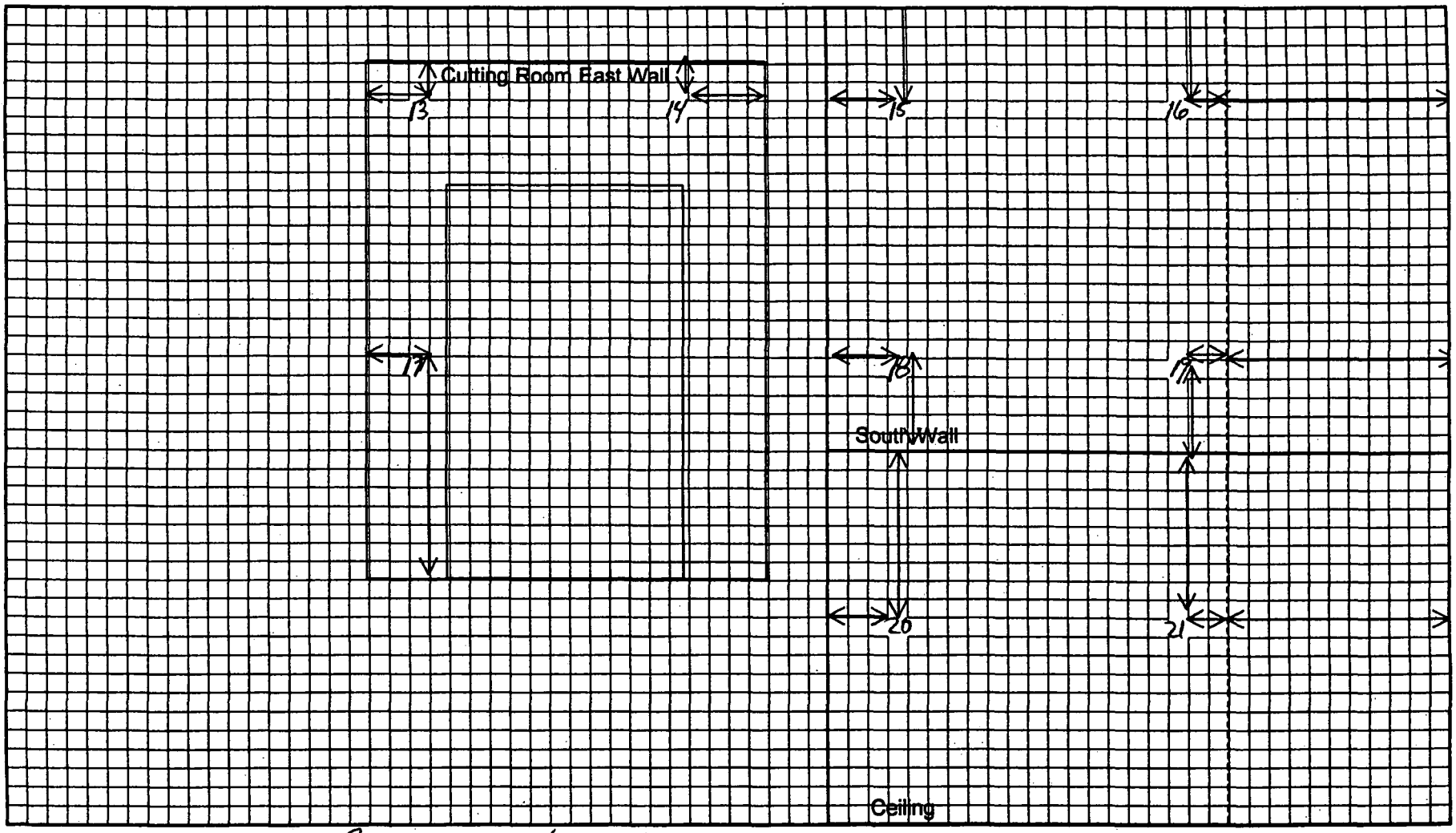


ASRF Survey Diagram

* EACH GRID SPACE REPRESENTS 1 foot

2

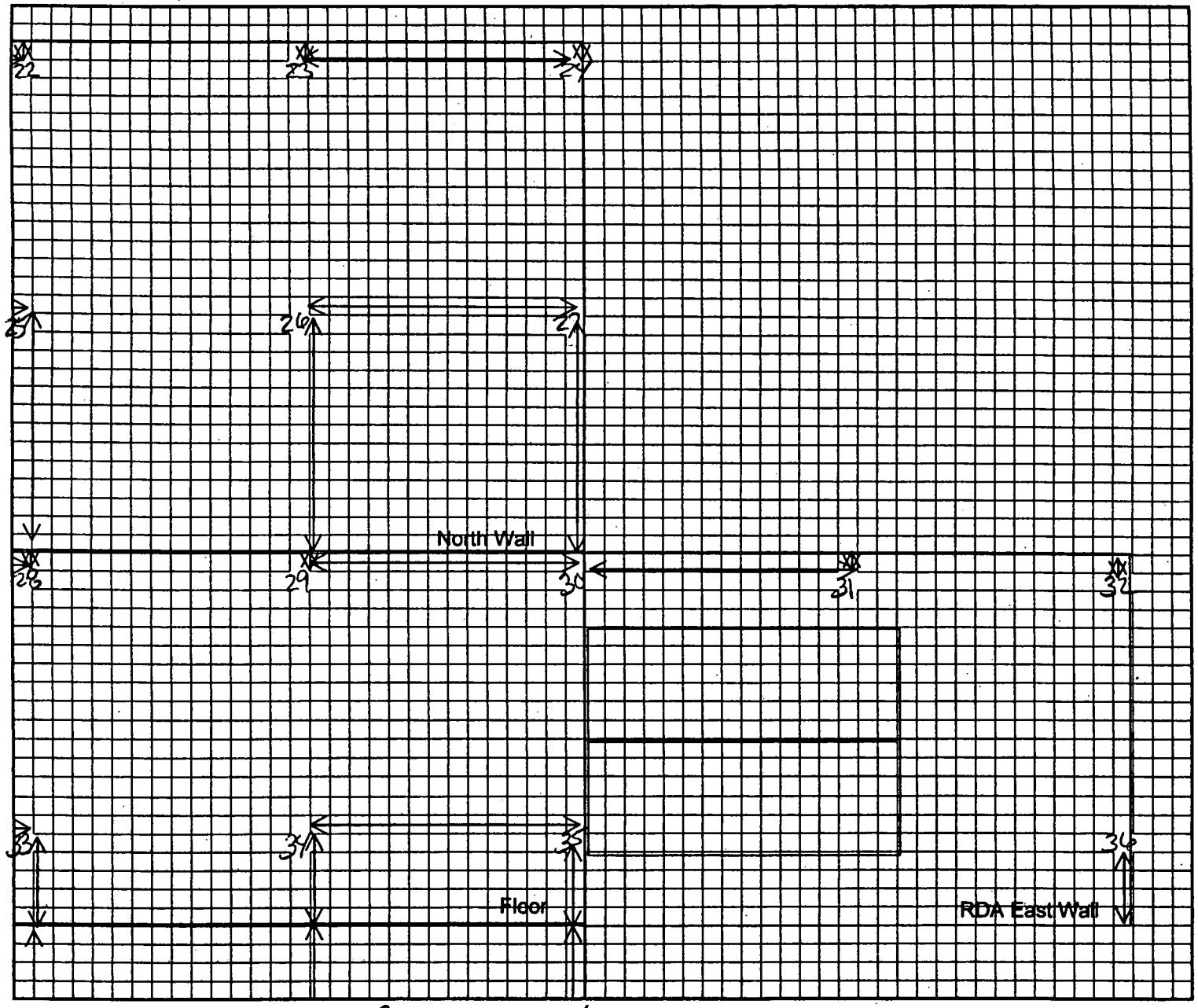
ASRF Survey Diagram



*EACH GRID SPACE REPRESENTS 1 foot

13

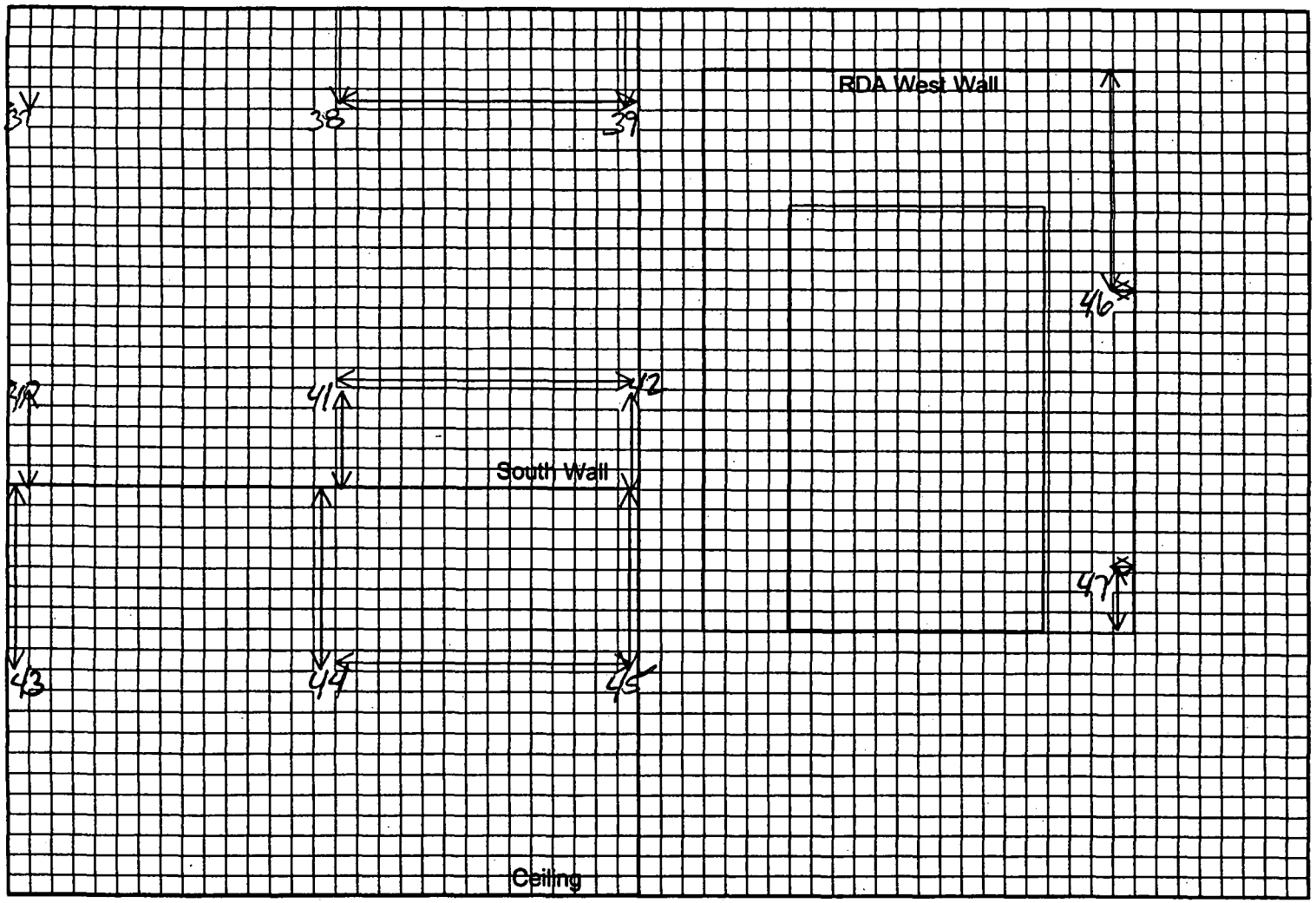
ASRF Survey Diagram



* EACH GRID SPACE REPRESENTS 1 foot

14

ASRF Survey Diagram



* EACH GRID SPACE REPRESENTS 1 foot

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg.	Mfg.
Model 195	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA	MDA
Mfg.	Mfg.	Mfg.
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA	MDA	MDA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: ASRF Sampling Plan

RWP #:

Date: Time:

RCT: / /
Print name Signature Emp. #

RCT: / /
Print name Signature Emp. #

PRN/REN # : N/A

Comments: RCT to perform total and removable surveys on survey locations provided by Radiological Engineering. All survey locations are to be taken on accessible flat surfaces where 100% of survey probe is within 1/4" of surface being measured.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	= Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	- Background	= Net	Smear (dpm/100cm²)

Reviewed: **RS Supervision:** / /
Print Name Signature Emp. #

15

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm^2 Total	- Background	= Net	Smear dpm/100 cm^2	Location	DIRECT million dpm/100cm^2 Total	- Background	= Net	Smear dpm/100 cm^2

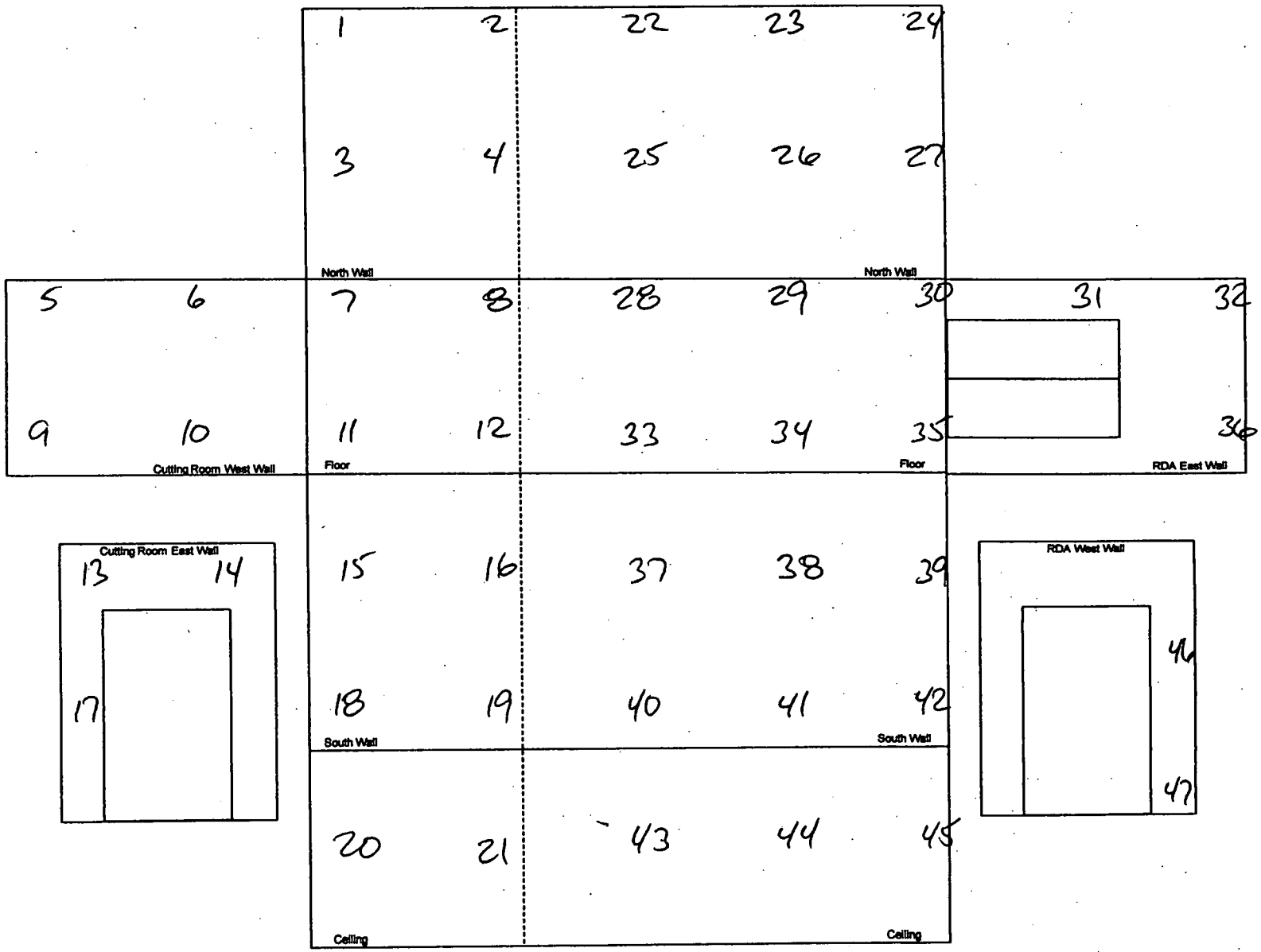
Performance Test Log

Date	Time	Probe Serial#	Range Low High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
			--		--				
			--		--				
			--		--				
			--		--				
			--		--				
			--		--				
			--		--				

17

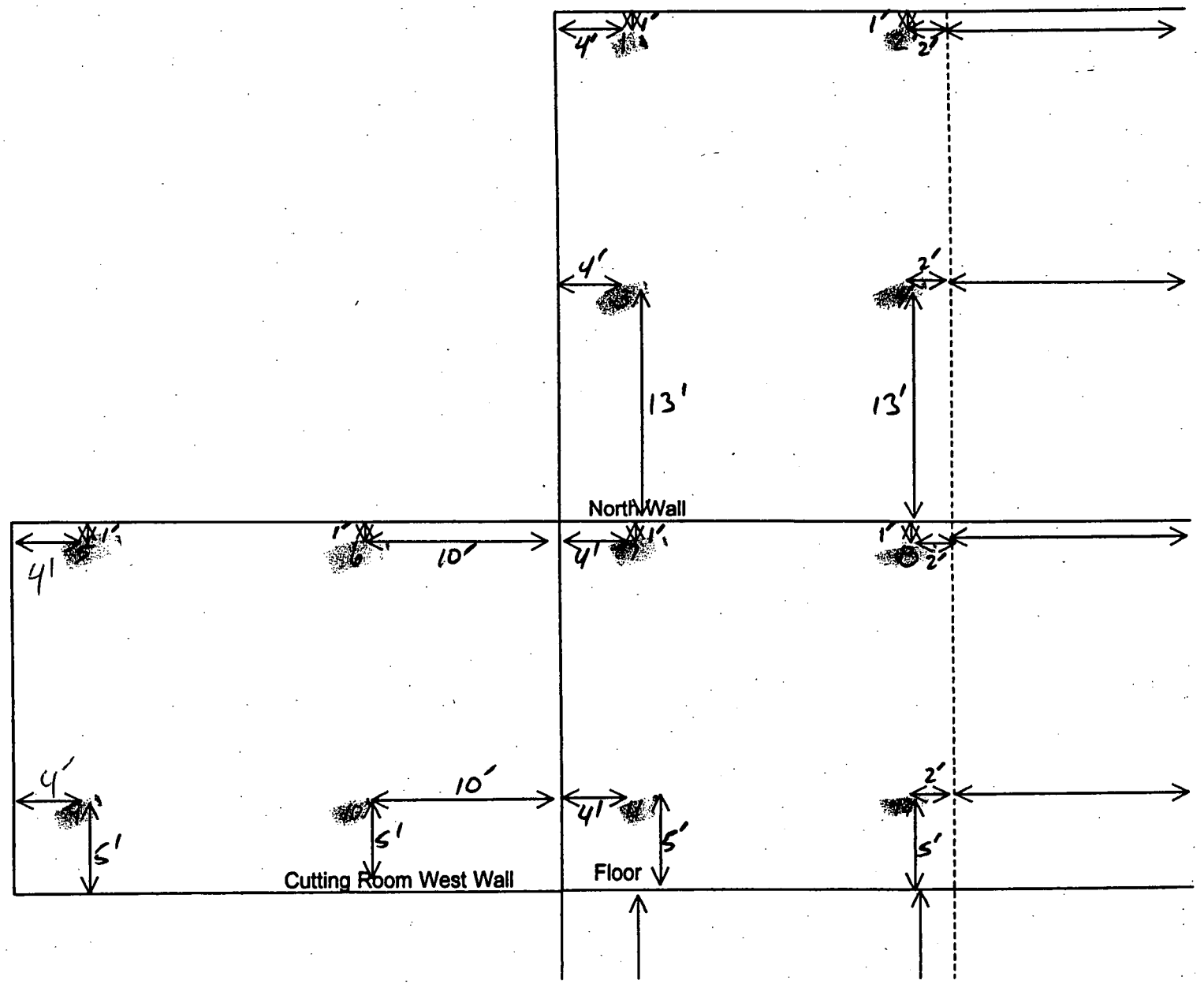
18

ASRF Survey Diagram



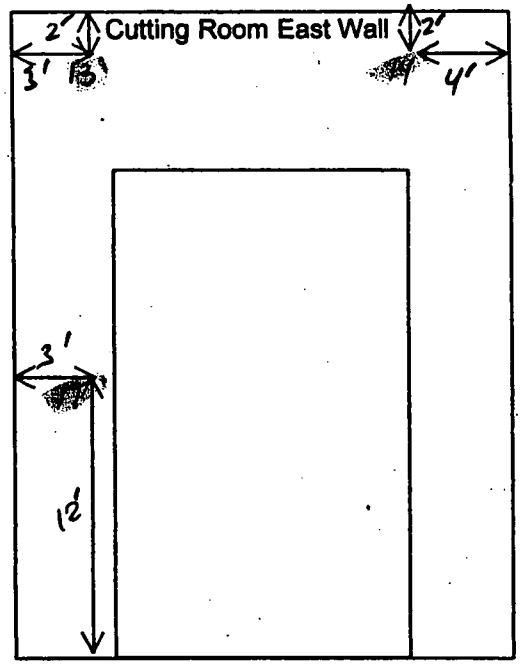
19

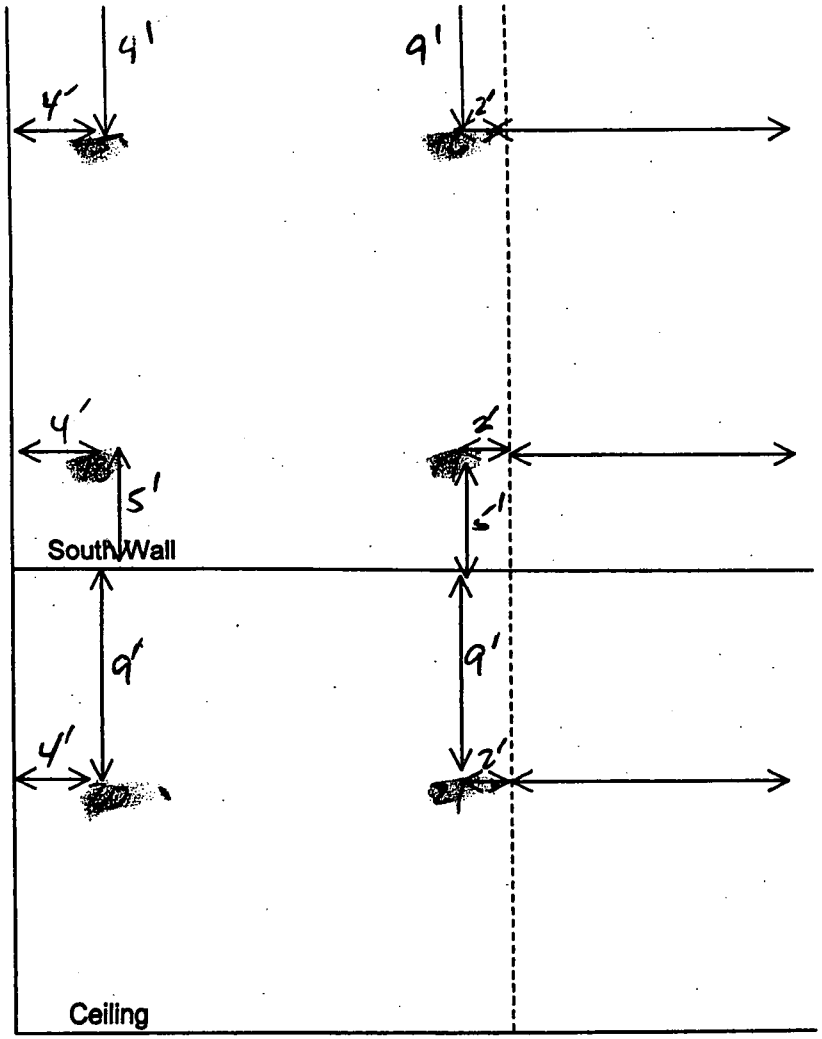
ASRF Survey Diagram



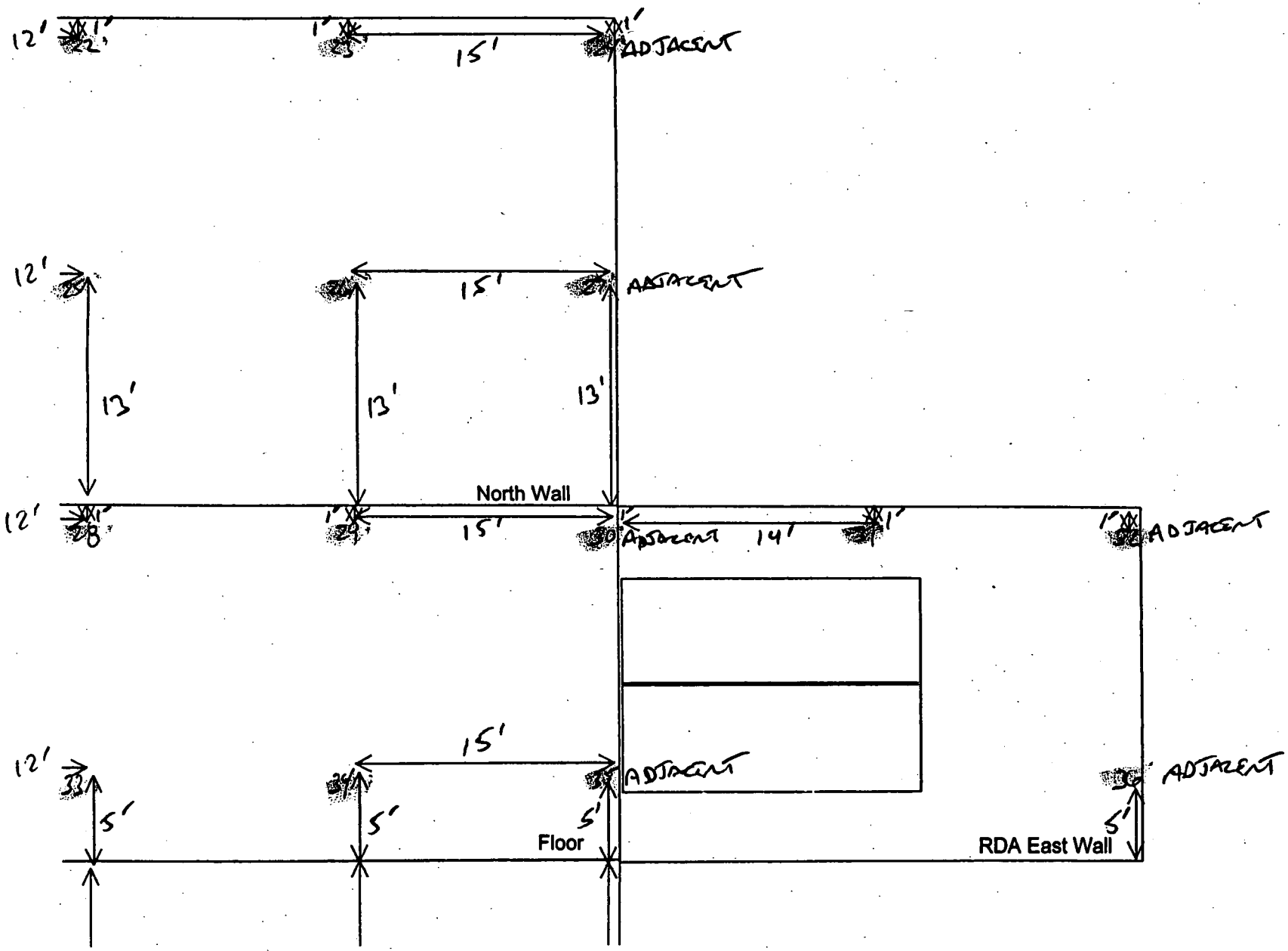
20

ASRF Survey Diagram



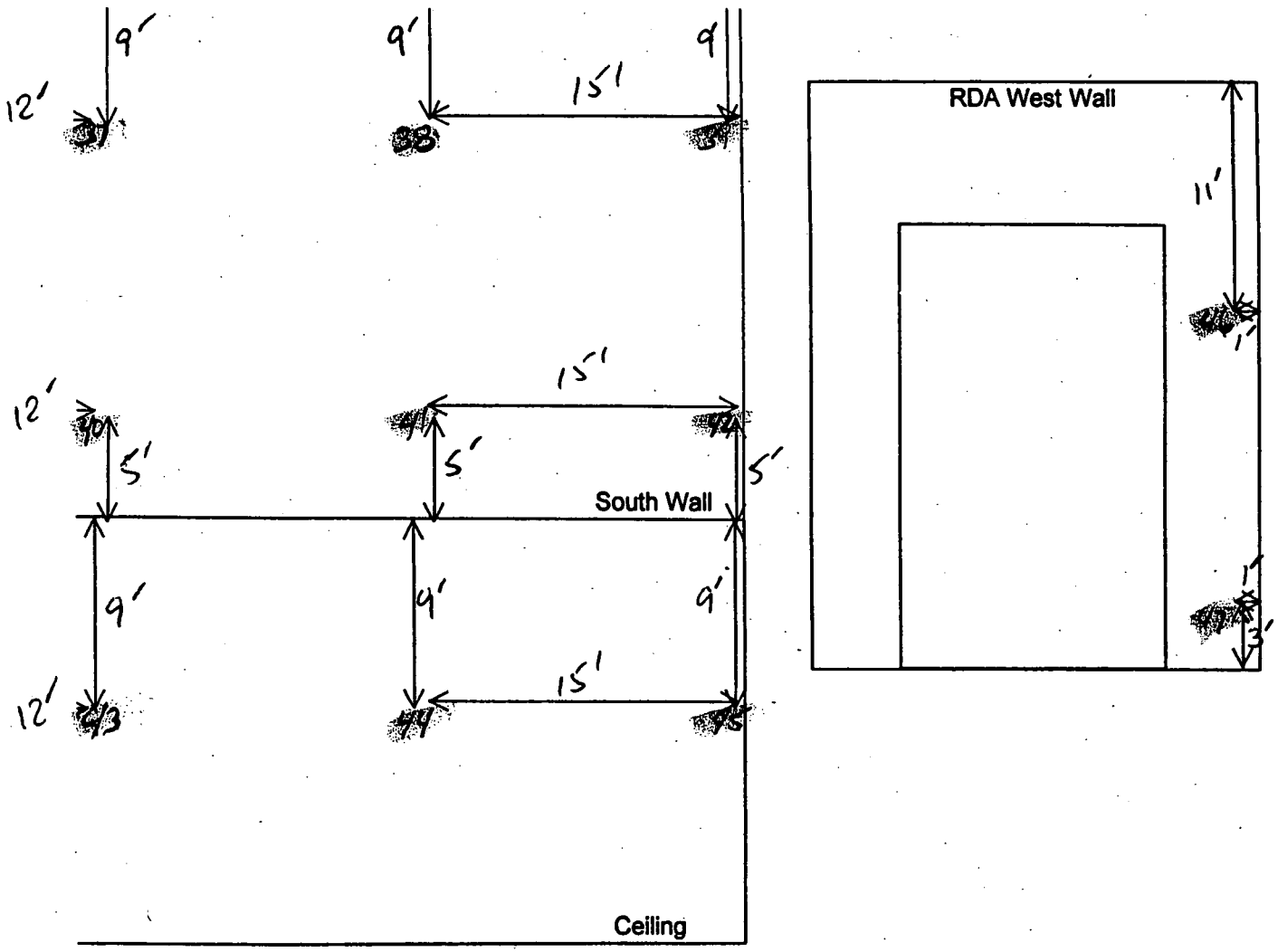


ASRF Survey Diagram



22

ASRF Survey Diagram



ASRF Evaluation

Background:

The Advanced Size Reduction Facility (ASRF) in Building 776/777 is in the process of being deconned to levels that are acceptable for allowing for demolition when the building structure is torn down. Building 776 has performed multiple decon efforts with some success. The first complete characterization effort was done on 6/13/03. An interim characterization was performed on 7/11/03 on several areas where the highest contamination levels were originally noted on the 6/13/03 survey. Recently, another complete characterization was performed on 9/3/03. This evaluation will discuss these survey characterizations in some detail.

Discussion:

Survey 6/13/03: This characterization included 135 survey points that ranged from 8,000 to 750 Million dpm/100 cm2. (Note: The 750 Million dpm/100 cm2 was invalid since it exceeded the maximum capable range of the instrument). The average resulted in 10,800,000 dpm/100 cm2 and the UCL95 was 20,500,000 dpm/100 cm2.

Survey 7/11/03: This characterization included 11 survey points, concentrating on the highest contamination areas identified on the 6/13/03 survey. When these survey points were substituted into the survey data from 6/13/03, the average was reduced to 1,960,000 dpm/100 cm2, and the UCL95 was reduced to 2,600,000 dpm/100 cm2.

Due to the success of the decontamination effort demonstrated on the 7/11/03 survey, a complete decon was performed on the ASRF surfaces and the entire structure was resurveyed on 9/3/03. The survey was performed with a different instrument, the Ludlum 195 instead of the modified Ludlum 12-1A instrument. The RCTs were instructed to use judgement on obtaining surveys where there was a higher contamination potential on the surfaces being measured. This characterization included 134 survey points that ranged from 10,000 to 159 Million dpm/100 cm2. The average resulted in 13,700,000 dpm/100 cm2 with a UCL95 of 18,400,000 dpm/100 cm2.

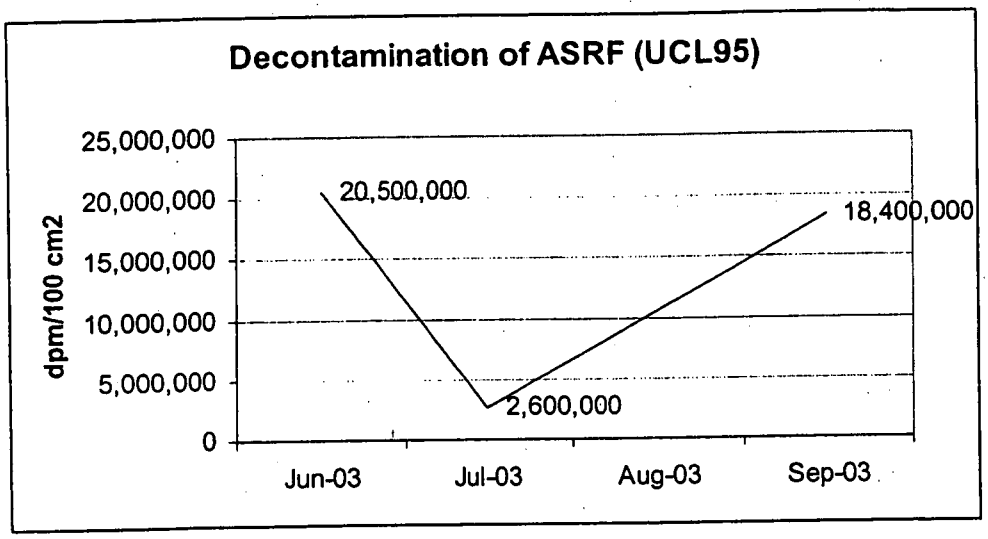
Some of the reasons for this characterization failing to achieve desired results were based on several factors: On the 6/13/03 survey, the project RCTs were surveying to get a general idea of the structure contamination levels and didn't focus on higher potential areas; a different instrument was used than on previous surveys; On the 9/03/03 survey, the RCTs were specifically instructed to identify problematic areas where higher contamination may be present; and the RCTs took several survey measurements on the overhead beams that biased high the overall results.

Evaluation:

The following table identifies the results of the above mentioned surveys:

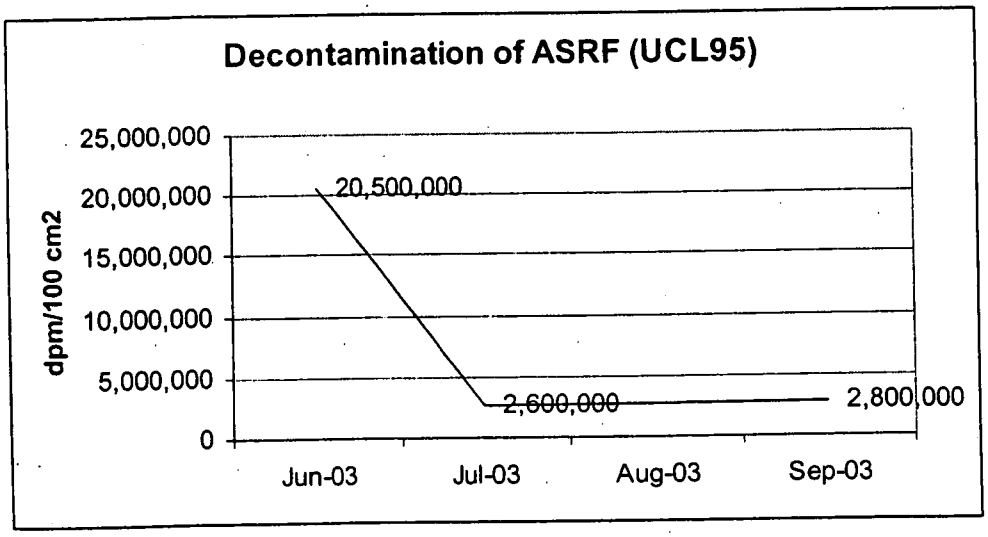
Survey Date	Maximum	Average	UCL95
6/13/03	750,000,000	10,800,000	20,500,000
7/11/03	33,000,000	1,960,000	2,600,000
9/03/03	159,000,000	13,700,000	18,400,000

The following chart demonstrates this decon effort.



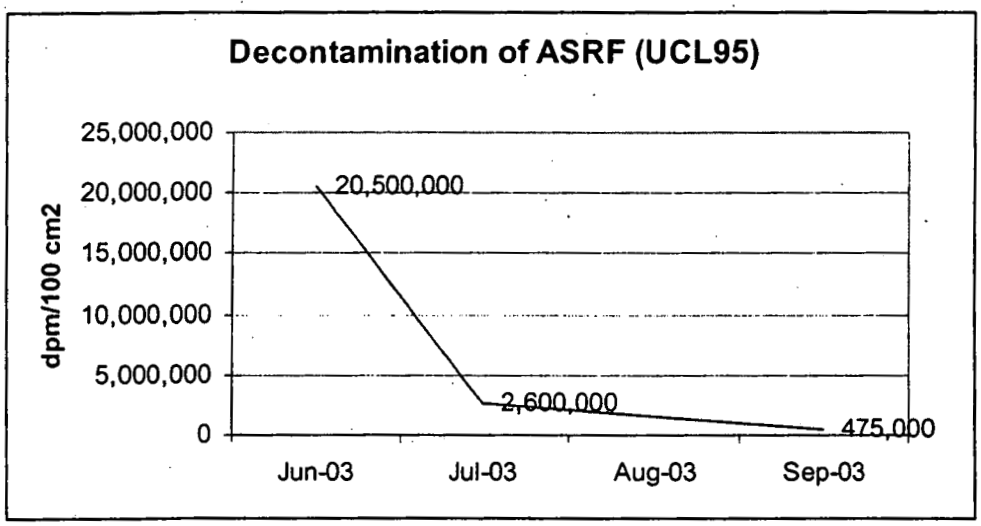
Removal of Beams

The overhead beams were characterized with several points above 100 Million dpm/100 cm2. With the removal of these survey points, the resultant average contamination value would be 1,830,000 dpm/100 cm2 with a UCL95 of 2,800,000 dpm/100 cm2. (Note: All survey locations were replaced with 500,000 dpm/100 cm2).



Removal/Decon of Specific Areas

If an additional 11 survey locations having greater than 2 Million dpm/100 cm2 were removed, the resultant average contamination value would be 420,000 dpm/100 cm2 with a UCL95 of 475,000 dpm/100 cm2. These survey locations include gloveports, electrical box, robotic arm supports, and an old glovebox penetration. (Note: All survey locations were replaced with 500,000 dpm/100 cm2).



Radiological Engineering Evaluation

on the

Demolition of the

Advanced Size Reduction Facility (ASRF)

26

ASRF Assessment

Background:

The ASRF has been deconned and intermittently surveyed following area specific decon. Preliminary decon attempts performed on 7/11/03 have demonstrated a 90% reduction from the initial decon performed on 6/13/03. This should result in an average total surface contamination of 500,000 dpm/100 cm^2.

Discussion:

The ASRF will be re-characterized after final decon and receiving a pressure wash. The ASRF interior will be encapsulated after final characterization, in preparation for demolition by method of shearing.

Building 776 contained Zone 1 plenums, which were deconned, encapsulated and size reduced for packaging. Some of these plenums are comparable to the ASRF regarding the levels of contamination. However, the plenums were size reduced with sawzalls and nibblers. Sawzall and nibbler cutting is considered an aggressive work activity. No Federal Guidance /NUREGS can be found regarding the resuspension of using different mechanical devices for size-reducing; however, shearing should generate an order of magnitude less airborne radioactivity, based on process knowledge.

Initial Assessment:

The potential airborne radioactivity released based on the above characterization can be estimated by looking at the plenum size reduction airborne release data and by resuspension calculations.

Experiential Estimate (based on history)

Plenums 203 and 204 have similar surface contamination to the ASRF. Each with an average of 500,000 and 1,000,000 dpm/100 cm^2 total alpha contamination, respectively. The average airborne radioactivity released during size reduction, using sawzalls and nibblers, was 20 DAC and 121 DAC, for Plenums 203 and 204 respectively. If the shearing method was used, the airborne released would have potentially resulted in a factor of 10 less based on having a lower resuspension (2 DAC and 12.1 DAC respectively). Since the expected ASRF average contamination values should be approximately 500,000 dpm/100 cm^2after final decon, then an estimate of the average potential airborne released during demolition would be approximately 6 DAC (taken from Plenum 204 data with the ASRF having one-half the average contamination after final decon).

The above plenums were size reduced when Building 776 project employed Class W for WGPu. However, when the ASRF is expected to be demolished, Class Y for WGPu would be utilized; thereby, lowering the estimated potential airborne from 6 DAC to 2.4 DAC.

Calculational Estimate

Radiological Engineering TBD 00070, "Resuspension of Plutonium Contamination During Decommissioning Work at the Rocky Flats Environmental Technology Site" dated July 1996, provides a resuspension factor of $5X10^{-5}$ m^{-1} to be used during decommissioning. NUREG 1720 (draft) dated June 2002 provides more conservative resuspension values ranging from 10^{-4} m^{-1} for aggressive work activities to 10^{-6} m^{-1} for benign work activities. The shearing method should have a resuspension value around 10^{-5} m^{-1}. A potential average airborne radioactivity of 100 DAC may be released based on an expected average total contamination of approximately 500,000 dpm/100 cm^2, taking no credit for encapsulation. Using the release fraction values provided by NUREG 1400, encapsulation can reduce the airborne release to 0; however, since the encapsulated material is being sheared, a more realistic approach would be to reduce it by a factor of 100. This would result in a potential average airborne release of 1 DAC.

ALARA Consideration

There are two scenarios to consider for ALARA comparison of worker exposure: Size Reducing prior to Building Demolition; and Size Reducing during Building Demolition.

Scenario #1 (Size Reduce ASRF prior to Building Demolition)

If the ASRF is size reduced prior to building demolition, the work would involve 15 workers taking 4 months using sawzall and nibbler tools. The estimated DAC would increase to an average potential airborne release of 60 DAC based on the experiential estimate above. Total DAC hours per worker working 25 hours per week for 4 months is 25,000 DAC hours. Based on having 15 workers, this would result in 375,000 DAC hours, and a dose of 940 rem, using a dose conversion of 2.5 mrem per DAC-hour. Workers would be wearing PAPRs during the work with a protection factor of 1000, thus resulting in a total dose of 940 mrem for the work crew.

Note: The above dose estimate was figured using Class W WGPu. The collective dose would change to 376 rem without respiratory protection and 376 mrem with respiratory protection when applying class Y WGPu.

Another ALARA consideration worth mentioning is the industrial-hazard risk to the workers. There is a potential that workers could receive contaminated punctures or cuts during the manual size reduction of the ASRF over a 4 month period. And there is a possibility of inhalation due to respirator failure, or improper doffing techniques. The numbers above do not reflect any doses received from these potential accidents or failures.

Scenario #2 (Size Reduce ASRF during Building Demolition)

If the ASRF is size reduced during the building demolition, the work would involve a heavy equipment operator dismantling the ASRF by shearing techniques.

This would result in the heavy equipment operator receiving a total dose of 62 mrem at 10 meters (see Patrick Haines email dated 7/25/03). Assuming this individual would be wearing an APR, this dose could be reduced to 1.2 mrem, based on a protection factor of 50.

[Note concerning the estimate provided by Patrick Haines: The resuspension factor used for calculational purposes assumed 10^{-3} m^{-1}; however, this is approximately 100 times more conservative than expected (see discussion under Calculational Estimate discussing resuspension factors).]

The ALARA comparison indicates the following:

	Scenario 1	**Scenario 2**
Collective Dose without Respirator	940 rem	0.062 rem
Collective Dose with Respirator (PAPR/APR)	940 mrem*	1.2 mrem

* Note: This is collective exposure for a work crew of 15 using Class W WGPu in the calculation. When Class Y is applied, the numbers would decrease by 60%, resulting in 376 rem/mrem respectively. The individual dose expected is 25 mrem.

Experience has shown that the protection afforded by PAPRs is much higher than 1000; however, the Site standard is to employ conservative protection factors based from ANSI Z88.2 (see Occupational Safety and Industrial Hygiene Program Manual, Chapter 31, "Respiratory Protection Practices"). In comparison the APR is provided a protection factor of 50 based from NIOSH, when ANSI Z88.2, and 10CFR20 recommends 100 for full face APRs. Also, according to 29CFR1910.134, "Respiratory Protection Standard," a minimum fit-factor of 500 is required for full face respirators. Therefore the dose estimates reported above are conservative.

Attachments:

Patrick Haines Email dated 7/25/03

References:

Radiological Engineering TBD 00070, "Resuspension of Plutonium Contamination During Decommissioning Work at the Rocky Flats Environmental Technology Site," dated July 1996

NUREG 1720 (draft), "Re-evaluation of the Indoor Resuspension Factor for the Screening Analysis of the Building Occupancy Scenario for NRC's License Termination Rule," dated June 2002

NUREG 1400, "Air Sampling in the Workplace," dated September 1993

Occupational Safety and Industrial Hygiene Program Manual, Chapter 31, "Respiratory Protection Practices"

Attachment A

Konzen, Kevin
From: Haines, Patrick
Sent: Friday, July 25, 2003 1:12 PM
To: Konzen, Kevin
Cc: Vaughn, Terry; Druckman, Howard; Michael Putney; Martha Hyder
Subject: RE: B776 ASRF Assessment

We calculated the total residual holdup based on your area estimate and 500,000 dpm/100 cm2 average contamination as being 1.23E-2 Ci of WGPu. We modeled this as a gradual 1-year release using CAP88 and as a quick 1-hour release using HOTSPOT with both typical met conditions (HOTSPOT-1) and 95th percentile met conditions (HOTSPOT-2). For all scenarios, a release fraction of 10^{-3} was assumed and all released material was assumed to be respirable. Here are the results:

Model	Release Time	Distance to Public MEI	Dose to MEI
CAP88	365 days3.5 km		1.5E-4 mrem
HOTSPOT-1	60 minutes	2.3 km	8.2E-3 mrem
HOTSPOT-2	60 minutes	2.3 km	7.9E-2 mrem

The HOTSPOT results are attached. Please let me know if you have questions.

ASRF hotspot.txt ASRF hotspot-2.txt

Patrick Haines
URS Environmental Monitoring
Rocky Flats Environmental Technology Site
phone (303) 966-7240
Nextel (303) 994-1901

"Take into account that great love and great achievements involve great risk." - The Dalai Lama

-----Original Message-----
From: Konzen, Kevin
Sent: Friday, July 25, 2003 7:14 AM
To: Haines, Patrick
Cc: Vaughn, Terry
Subject: B776 ASRF Assessment

Hi Patrick,

Per our discussion I am including the parameters for performing worker exposure regarding the demolition of the ASRF during the building demolition (outside):
We expect an average contamination of 500,000 dpm/100 cm2 of WGPu aged 35 years (CY2004)
The interior surface area is approximately 5900 sq. ft.
The interior surface is made of stainless steel and will be encapsulated prior to demolition.
The demolition of the ASRF will involve shearing with heavy equipment.
Thankyou for your assistance,

Kevin Konzen
Radiological Engineer
(303) 966-3769

(File: ASRF hotspot.txt)

Hotspot Version 2.01 General Plume
Jul 25, 2003 12:51 PM

Source Material : Pu-239 Y 24065y
Source Term : 1.2300E-02 Ci
Airborne Fraction : 1.00E-03
Respirable Fraction : 1.00E+00
Respirable Release Fraction: 1.00E-03
Vertical Height : 3.00E+00 m
Horizontal Width : 8.00E+00 m
Effective Release Height : 0.00 m
Wind Speed (h=10 m) : 4.0 m/s
Distance Coordinates : All distances are on the Plume Centerline
Stability Class : D
Respirable Dep. Vel. : 0.00E+00 cm/s
Non-respirable Dep. Vel. : 0.00E+00 cm/s
Receptor Height : 1.5 m
Inversion Layer Height : None
Sample Time : 60.000 min
Breathing Rate : 3.33E-04 m3/sec
Maximum Dose Distance : 0.010 km
MAXIMUM CEDE : 0.012 rem
FGR-11 Dose Conversion Data

DISTANCE km	C E D E (rem)	TIME-INTEGRATED AIR CONCENTRATION (Ci-sec)/m3	ARRIVAL TIME (hour:min)
0.010	1.2E-02	1.2E-07	<00:01
0.200	4.3E-04	4.1E-09	00:01
2.286	8.2E-06	8.0E-11	00:12
2.515	7.1E-06	6.9E-11	00:13
2.857	5.9E-06	5.7E-11	00:15
3.372	4.6E-06	4.5E-11	00:17
3.086	5.2E-06	5.1E-11	00:16
3.315	4.7E-06	4.6E-11	00:17
3.429	4.5E-06	4.4E-11	00:18
2.629	6.6E-06	6.5E-11	00:13
2.457	7.3E-06	7.1E-11	00:13
2.686	6.4E-06	6.3E-11	00:14
2.400	7.6E-06	7.4E-11	00:12
2.343	7.9E-06	7.7E-11	00:12
2.972	5.5E-06	5.4E-11	00:15
3.200	5.0E-06	4.8E-11	00:16
2.629	6.6E-06	6.5E-11	00:13
2.515	7.1E-06	6.9E-11	00:13
2.793	6.1E-06	5.9E-11	00:14
0.030	5.7E-03	5.6E-08	<00:01

(File: ASRF hotspot-2.txt)

Hotspot Version 2.01 General Plume
Jul 25, 2003 01:06 PM

Source Material : Pu-239 Y 24065y
Source Term : 1.2300E-02 Ci
Airborne Fraction : 1.00E-03
Respirable Fraction : 1.00E+00
Respirable Release Fraction: 1.00E-03
Vertical Height : 3.00E+00 m
Horizontal Width : 8.00E+00 m
Effective Release Height : 0.00 m
Wind Speed (h=10 m) : 1.2 m/s
Distance Coordinates : All distances are on the Plume Centerline
Stability Class : E
Respirable Dep. Vel. : 0.00E+00 cm/s
Non-respirable Dep. Vel. : 0.00E+00 cm/s
Receptor Height : 1.5 m
Inversion Layer Height : None
Sample Time : 60.000 min
Breathing Rate : 3.33E-04 m3/sec
Maximum Dose Distance : 0.010 km
MAXIMUM CEDE : 0.062 rem
FGR-11 Dose Conversion Data

DISTANCE km	C E D E (rem)	TIME-INTEGRATED AIR CONCENTRATION (Ci-sec)/m3	ARRIVAL TIME (hour:min)
0.010	6.2E-02	6.1E-07	<00:01
0.200	4.1E-03	4.0E-08	00:04
2.286	7.9E-05	7.7E-10	00:55
2.515	6.9E-05	6.7E-10	01:01
2.857	5.8E-05	5.6E-10	01:09
3.372	4.6E-05	4.5E-10	01:22
3.086	5.2E-05	5.1E-10	01:15
3.315	4.7E-05	4.6E-10	01:20
3.429	4.5E-05	4.4E-10	01:23
2.629	6.5E-05	6.3E-10	01:04
2.457	7.2E-05	7.0E-10	00:59
2.686	6.3E-05	6.1E-10	01:05
2.400	7.4E-05	7.2E-10	00:58
2.343	7.7E-05	7.5E-10	00:57
2.972	5.5E-05	5.3E-10	01:12
3.200	4.9E-05	4.8E-10	01:18
2.629	6.5E-05	6.3E-10	01:04
2.515	6.9E-05	6.7E-10	01:01
2.793	6.0E-05	5.8E-10	01:08
0.030	3.7E-02	3.7E-07	<00:01

Supporting Spreadsheets / Calcs.

Location	Survey Date	Activity - Million (dpm/100cm2)
1	7/10/02	89
2		59
3		14.8
4		62
5		7.41
6		14.8
7		18
8		270
9		740
10		740
11		210
12		590
13		29.6
14		29.6
15		59
16		157
17		44.1
18		126
19		126
20		31.5
21		380
22		315
23		19
24		470
25		173
26		646
27		280
28		15.7
29		126
30		47
	Ave	196.317
		740

$$\frac{16{,}000\ mCi}{0.0823\ Ci} \times \frac{8}{10^6\ mCi} = 0.194 \cong 0.2\ \mu Ci$$

35

36

Comparison of 7/11/03 survey points to present

Location	Survey Date	Direct	Removable	Instrument	Activity (dpm/100cm2)	Removable	Survey Date	Instrument	Activity (dpm/100cm2)
60	6/13/03	27,000,000	140,000	7/11/03	2,400,000	400,000	9/4/03	Ludlum 12-1A	2,400,000
63		13,000,000	1,200,000		160,000	12,000		Ludlum 12-1A	36,000
64		17,000,000	1,600,000		300,000	16,000		Ludlum 12-1A	200,000
66		2,400,000	200,000		600,000	200,000		Ludlum 12-1A	600,000
128		750,000,000	40,000		1,200,000	160,000		Ludlum SCO	27,400,000
129		250,000,000	40,000		100,000	12,000		Ludlum 12-1A	120,000
130		130,000,000	240,000		2,400,000	300,000		Ludlum SCO	11,000,000
131		1,400,000	600,000		20,000	8,000		Ludlum 12-1A	600,000
134		6,700,000	400,000		24,000	8,000		Ludlum 12-1A	160,000
74		17,000,000	600,000		3,800,000	100,000		Ludlum 12-1A	20,000
123		2,600,000	120,000		400,000	16,000		Ludlum 12-1A	100,000
		110,645,455	**470,909**		**1,036,727**	**112,000**			

"Nooks and Crannies" Potential

Location	Survey Date	Activity (dpm/100cm2)
1A	9/3/03	96,000,000
2A		142,000,000
4A		17,200,000
8A		99,000,000
9A		67,000,000
13A		14,150,000
15A		78,850,000
17A		135,850,000
19A		151,850,000
20A		5,260,000
22A		36,850,000
23A		12,150,000
27A		100,850,000
28A		5,060,000
32A		21,000,000
35A		7,300,000
36A		120,000,000
37A		159,000,000
38A		62,000,000
42A		61,000,000
43A		49,000,000
47A		44,830,000
48A		78,830,000
52A		400,000
201A		1,060,000
205A		47,970,000
206A		70,000
210A		14,530,000
211A		3,910,000
212A		37,970,000
213A		6,400,000
34B		18,440,000
55B		66,000,000
58B		25,000,000
		52,552,353

Unbiased Survey

Location	Survey Date	Activity (dpm/100cm2)
3A	9/3/03	140,000
5A		110,000
6A		100,000
7A		60,000
10A		2,310,000
11A		160,000
12A		840,000
14A		160,000
16A		680,000
18A		220,000
21A		210,000
24A		380,000
25A		560,000
26A		1,280,000
29A		140,000
31A		850,000
33A		2,630,000
34A		220,000
39A		190,000
40A		210,000
41A		220,000
44A		1,630,000
45A		140,000
46A		190,000
49A		160,000
50A		120,000
51A		180,000
202A		60,000
203A		81,000
204A		530,000
207A		90,000
208A		60,000
209A		50,000
1B		10,000
2B		380,000
3B		22,000
4B		40,000
5B		140,000
6B		40,000
7B		1,880,000
8B		330,000
9B		100,000
10B		30,000
11B		30,000
12B		30,000
13B		30,000
14B		360,000
15B		780,000
16B		430,000
17B		4,240,000
18B		490,000
19B		580,000
20B		800,000
21B		720,000
22B		150,000
23B		250,000

37

"Nooks and Crannies" Potential		
Location	Survey Date	Activity (dpm/100cm2)

Unbiased Survey		
Location	Survey Date	Activity (dpm/100cm2)
24B		130,000
25B		120,000
26B		120,000
27B		340,000
28B		230,000
29B		290,000
30B		230,000
31B		20,000
32B		140,000
33B		2,570,000
35B		10,000
36B		60,000
37B		40,000
38B		20,000
39B		20,000
40B		200,000
41B		30,000
42B		60,000
43B		1,130,000
44B		220,000
45B		20,000
46B		570,000
47B		110,000
48B		220,000
49B		130,000
50B		60,000
51B		650,000
52B		730,000
53B		480,000
54B		440,000
56B		1,450,000
57B		970,000
59B		220,000
60B		210,000
61B		530,000
62B		1,630,000
63B		130,000
64B		1,250,000
65B		1,190,000
66B		1,980,000
67B		12,010,000
68B		4,260,000
69B		1,380,000
70B		2,150,000
		655,730

38

39

Nooks & Crannies.

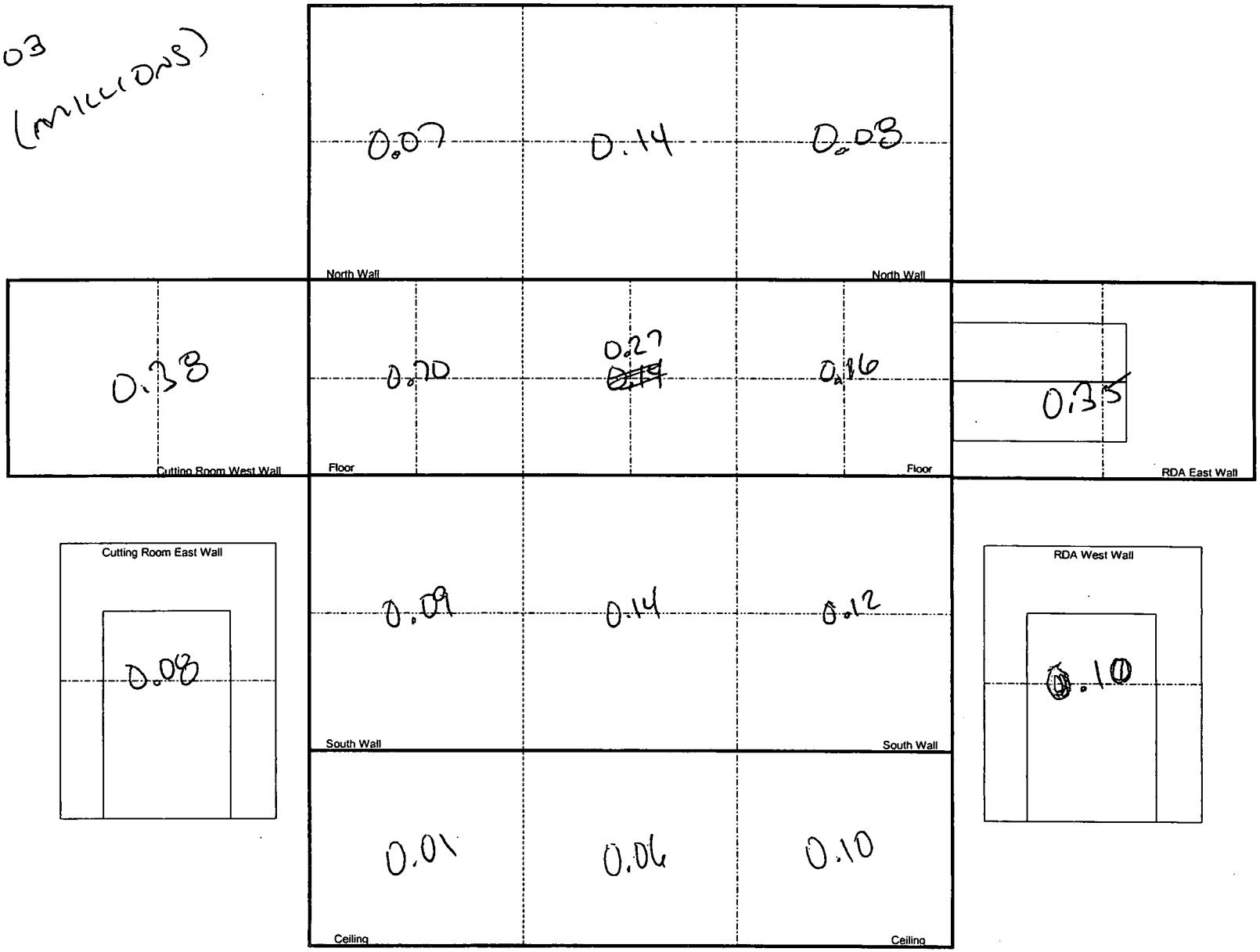
Concentrated Decon Effort

Survey Date	ID	Location	Instrument	Direct (Million) Before Decon (dpm/100cm2)	Direct (Million) After Decon (dpm/100cm2)	Removable (Million) Before Decon (dpm/100cm2)	Removable (Million) After Decon (dpm/100cm2)	Direct DF	Rem. DF	
9/8/03	1	Beam	Ludlum 195	57	0.47	2.34	0.1	99%	96%	
	2	Beam	Ludlum 195	103	2.87	2.94	0.21	97%	93%	
	3	Beam	Ludlum 195	138	0.75	6.23	0.06	99%	99%	
	4	Beam	Ludlum 195	99	1.16	4.93	0.13	99%	97%	
	5	Glovebox Cut	Ludlum 195	7	N/A	0.35	N/A	N/A	N/A	
	6	Beam	Ludlum 195	75	1.54	7.66	0.23	98%	97%	
	7	Beam	Ludlum 195	64	0.32	6.79	0.07	99%	99%	
	8	Beam	Ludlum 195	41	6.45	1.44	0.14	84%	90%	
	9	Beam	Ludlum 195	84	7.5	4.02	0.32	91%	92%	
	34B	Glovebox Cut	Ludlum 195	16	4.24	0.93	0.22	73%	76%	BKGD
9/9/03	9	Plenum Box	Ludlum 195	11	4.75	1.03	0.23	57%	78%	0
	10	Beam	Ludlum 195	95.9	0.81	2.47	0.2	99%	92%	0.1
	11	Beam	Ludlum 195	55.83	0.16	2.93	0.14	100%	95%	0.17
	12	Beam	Ludlum 195	65.83	1.06	2.93	0.02	98%	99%	0.17
	13	Beam	Ludlum 195	125.83	0.77	4.12	0.04	99%	99%	0.17
	14	Beam	Ludlum 195	114.83	0.78	4.03	0.05	99%	99%	0.17
	15	Beam	Ludlum 195	77.83	0.74	3.66	0.04	99%	99%	0.17
	16	Beam	Ludlum 195	39.83	4.07	0.79	0.13	90%	84%	0.17
	17	Beam	Ludlum 195	40.83	0.82	0.53	0.03	98%	94%	0.17
	18	Steam Box	Ludlum 195	66.93	3.75	2.76	0.24	94%	91%	0.07
	19	Window	Ludlum 195	N/A	N/A	0.26	0.15	N/A	42%	0.07
	20	Window	Ludlum 195	N/A	N/A	0.37	0.25	N/A	32%	0.07
	7B	Glovebox Cut	Ludlum 195	61.8	18.32	0.62	0.12	70%	81%	0.2
	33B	Glovebox Cut	Ludlum 195	23.83	6.66	2.65	0.12	72%	95%	0.17
9/10/03	21	Beam	Ludlum 195	51.87	1.14	1.32	0.11	98%	92%	
	22	Beam	Ludlum 195	47.87	1.26	0.97	0.05	97%	95%	
	23	Beam	Ludlum 195	27.87	1.46	0.39	0.06	95%	85%	
	24	Beam	Ludlum 195	55.87	8.79	1.12	0.15	84%	87%	
9/11/03	25	Beam	Ludlum 195	44.8	6.85	0.46	0.05	85%	89%	
	26	Beam	Ludlum 195	65.8	3.12	1.12	0.1	95%	91%	
	27	Beam	Ludlum 195	37.82	19.82	0.64	0.43	48%	33%	
	28	Beam	Ludlum 195	43.8	0.74	0.86	0.07	98%	92%	
	29	Beam	Ludlum 195	32.8	7.6	0.29	0.05	77%	83%	
				60.40	**3.96**	**2.24**	**0.13**			
			n		**30.00**					
			Tinv		**1.70**					
			Std Dev		**4.86**					
			mean		**3.96**					
			UCL95		**5.47**					

Final Survey

Location	Survey Date	Direct Lud 12-1A (dpm/100 cm2)	Removable (dpm/100 cm2)
1	9/16/03	12,000	2,000
2		80,000	30,000
3		40,000	20,000
4		40,000	10,000
5		120,000	15,000
6		800,000	70,000
7		1,600,000	30,000
8		600,000	70,000
9		18,000	15,000
10		220,000	30,000
11		1,000,000	40,000
12		80,000	18,000
13		40,000	5,000
14		380,000	60,000
15		300,000	40,000
16		120,000	30,000
17		40,000	6,000
18		60,000	30,000
19		220,000	60,000
20		100,000	8,000
21		8,000	2,000
22		24,000	10,000
23		60,000	12,000
24		40,000	20,000
25		60,000	14,000
26		100,000	15,000
27		100,000	9,000
28		400,000	20,000
29		80,000	2,000
30		600,000	5,000
31		80,000	8,000
32		40,000	6,000
33		400,000	19,000
34		360,000	20,000
35		1,000,000	5,000
36		32,000	5,000
37		40,000	14,000
38		40,000	20,000
39		40,000	7,000
40		32,000	30,000
41		600,000	50,000
42		80,000	20,000
43		8,000	4,000
44		14,000	3,000
45		8,000	4,000
46		20,000	20,000
47		180,000	11,000
		219,489	**20,085**

LAW
9/10/03
(MILLIONS)

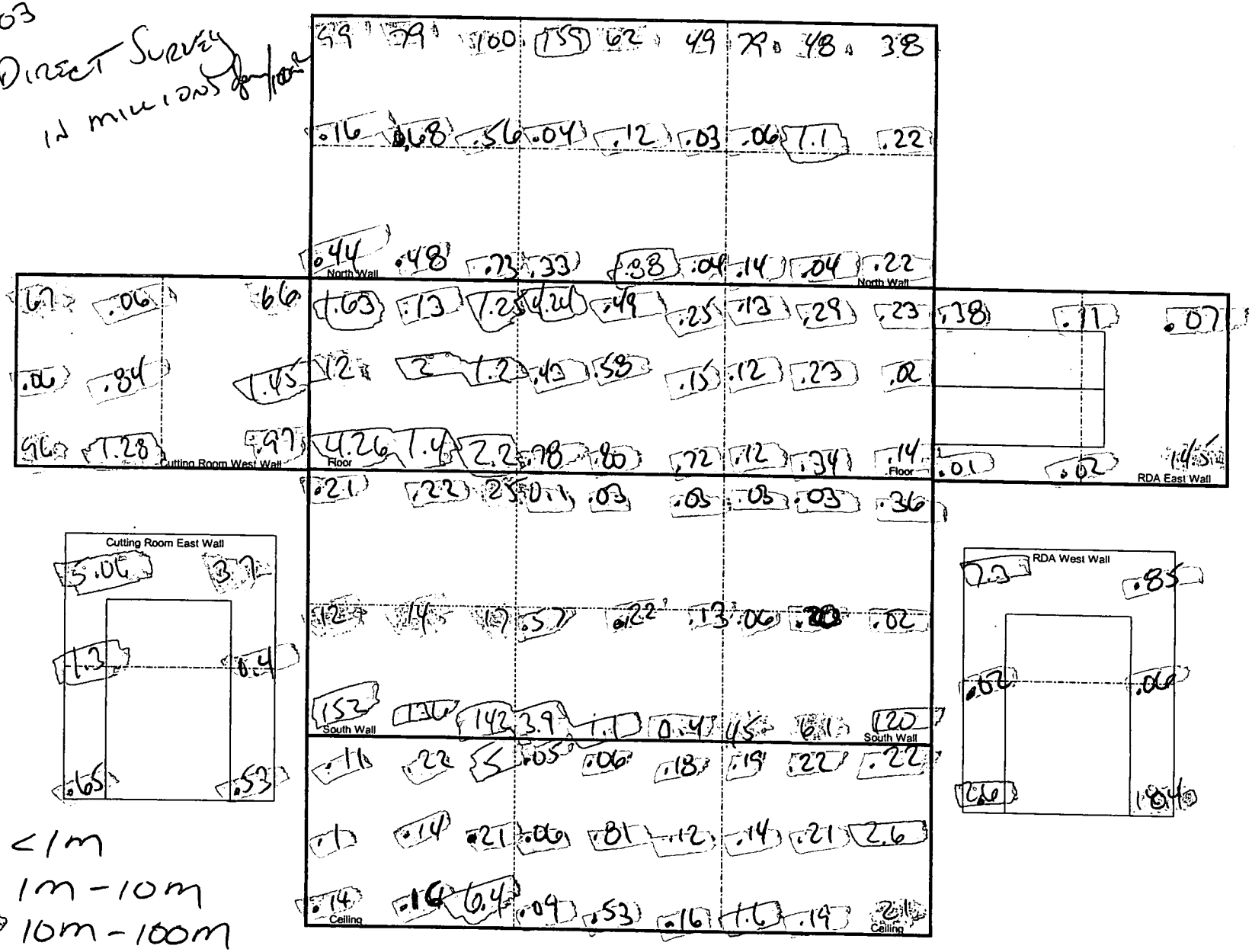


* NOTE: EACH WIPE ~ 1 m². AVERAGE dpm/100cm² MAY BE OBTAINED BY DIVIDING BY 100.

42

9/3/03

Direct Survey
in millions/100 cm²

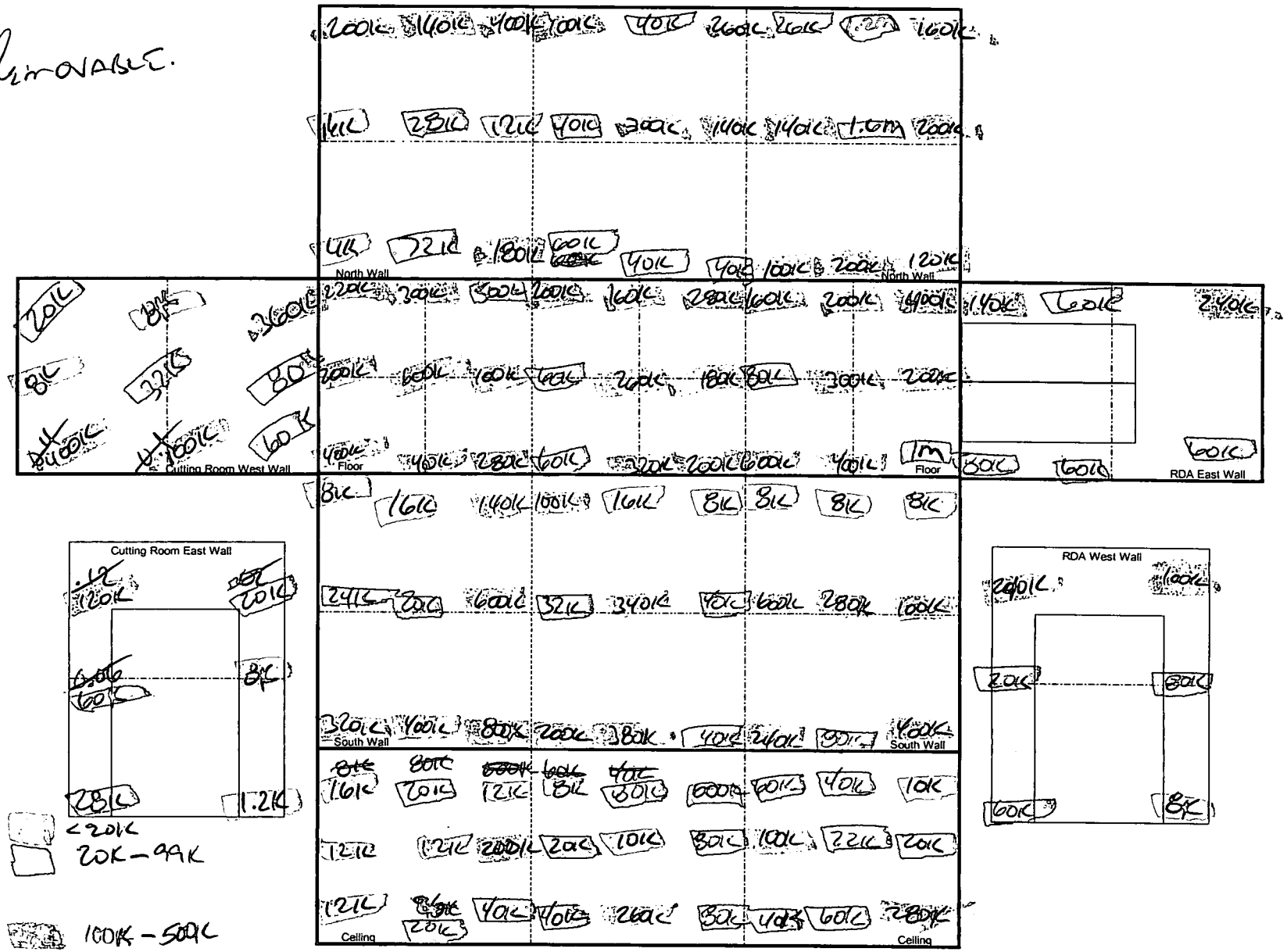


<1m
1m-10m
10m-100m
>100m

43

6/13/03

Removable.



<20K

20K – 99K

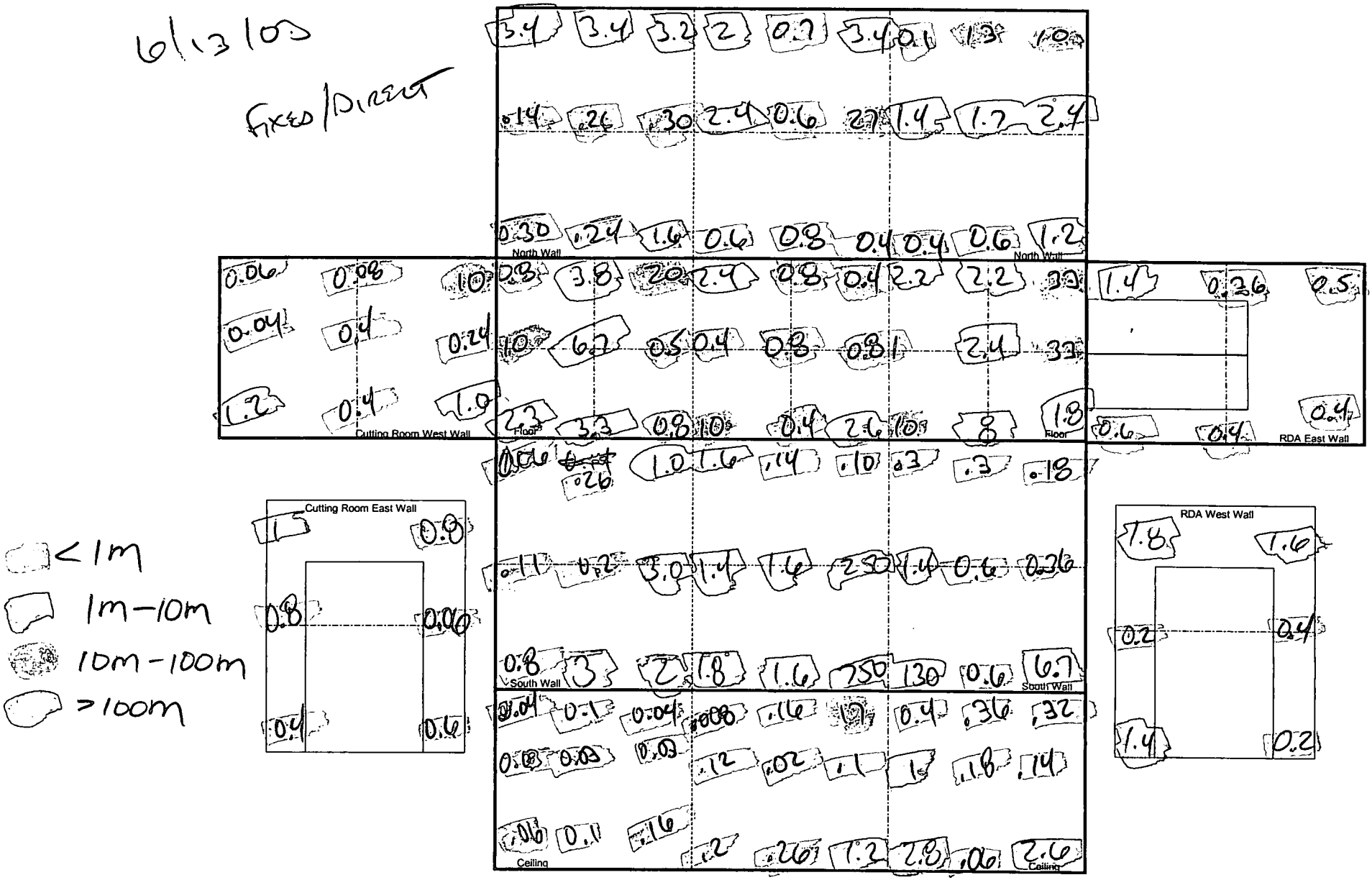
100K – 500K

>500K

44

6/13/05

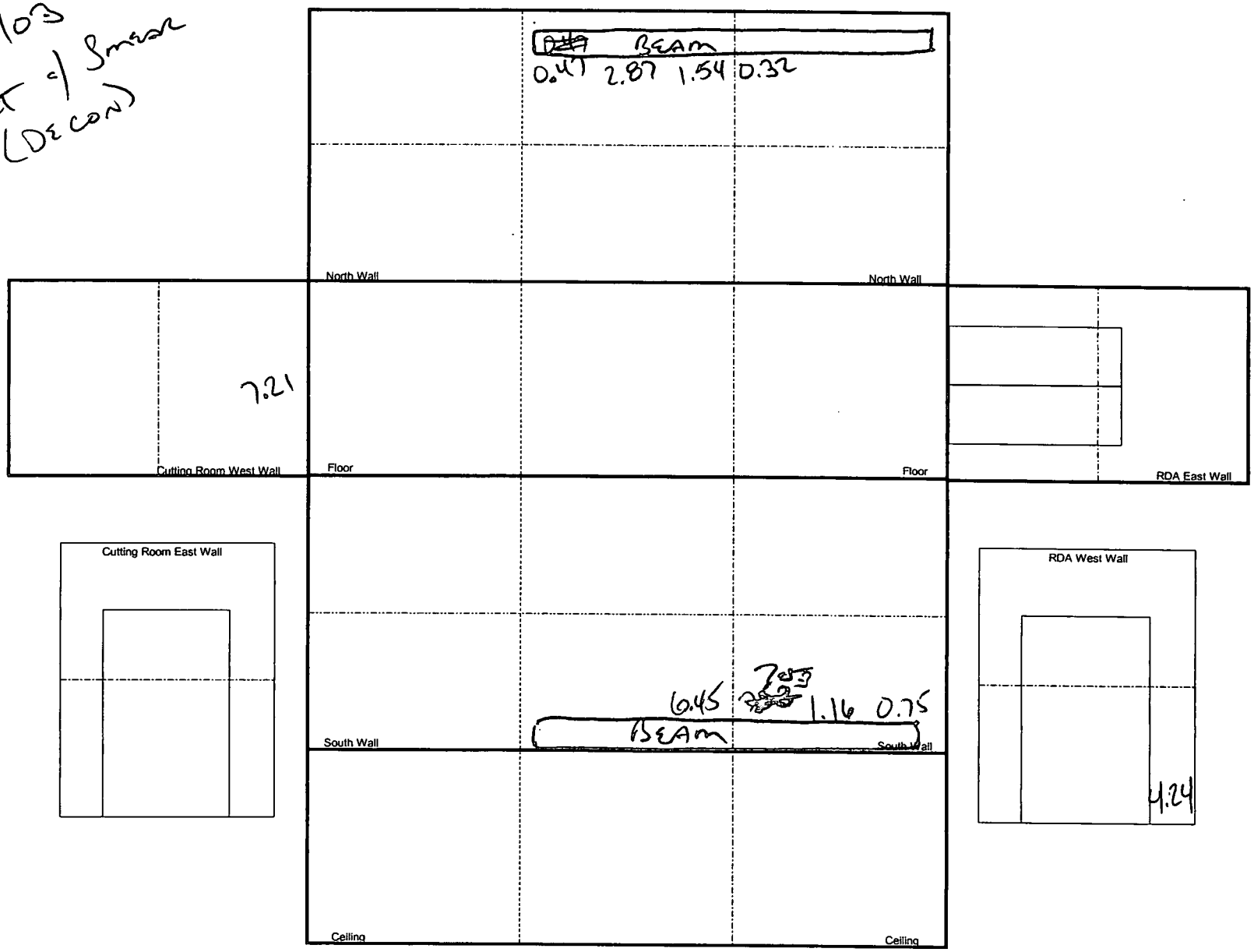
Fixed/Direct



45

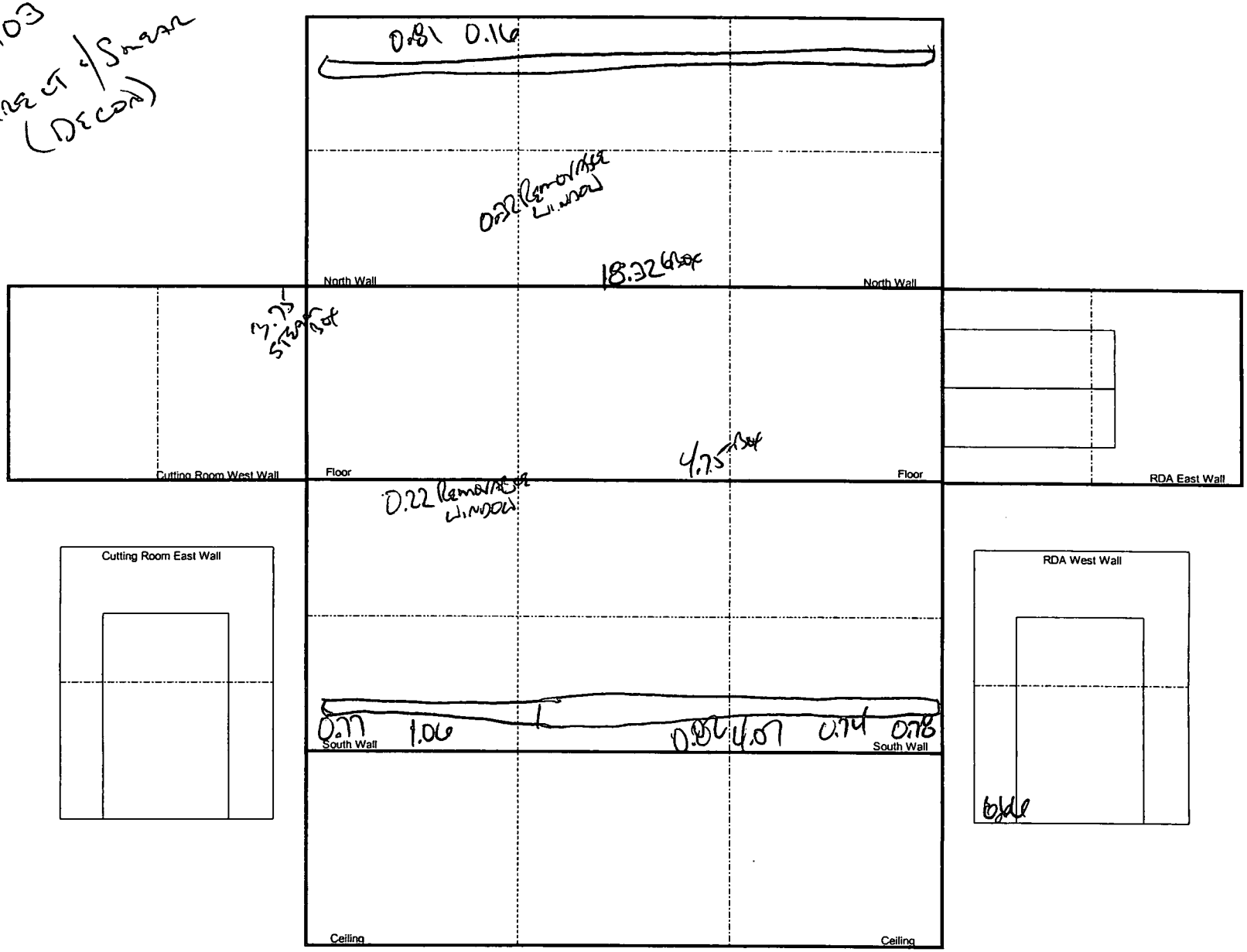
5/4/03
DRAFT

5/8/03
Direct of Smear
(Decon)



44

9/9/03
Direct/Smear
(Decon)



9/3/03

Direct Survey
in millions dpm/100 cm²

99	79	100	159	62	49	79	48	38
.16	.68	.56	.04	.12	.03	.06	1.1	.22
.44	.48	.73	.33	1.88	.04	.14	.04	.22
North Wall								North Wall

67	.06	66
.06	.84	1.45
96	1.28	.97
Cutting Room West Wall		

1.63	.13	1.25	4.24	.49	.25	.13	.29	.23
12	2	1.2	.43	.58	.15	.12	.23	.02
4.26	1.4	2.2	.78	.80	.72	.12	.34	.14
Floor								Floor

.38	.11	.07
.01	.02	14.5
RDA East Wall		

.21	.22	25	0.1	.03	.03	.03	.03	.36
12	14	17	.57	.22	.13	.06	[illegible]	.02
152	136	142	3.9	1.1	0.4	45	61	120
South Wall								South Wall

.11	.22	5	.05	.06	.18	.19	.22	.22
.1	.14	.21	.06	.81	.12	.14	.21	2.6
.14	.16	6.4	.09	.53	.16	1.6	.19	21
Ceiling								Ceiling

Cutting Room East Wall

5.06		37
1.3		0.4
.65		.53

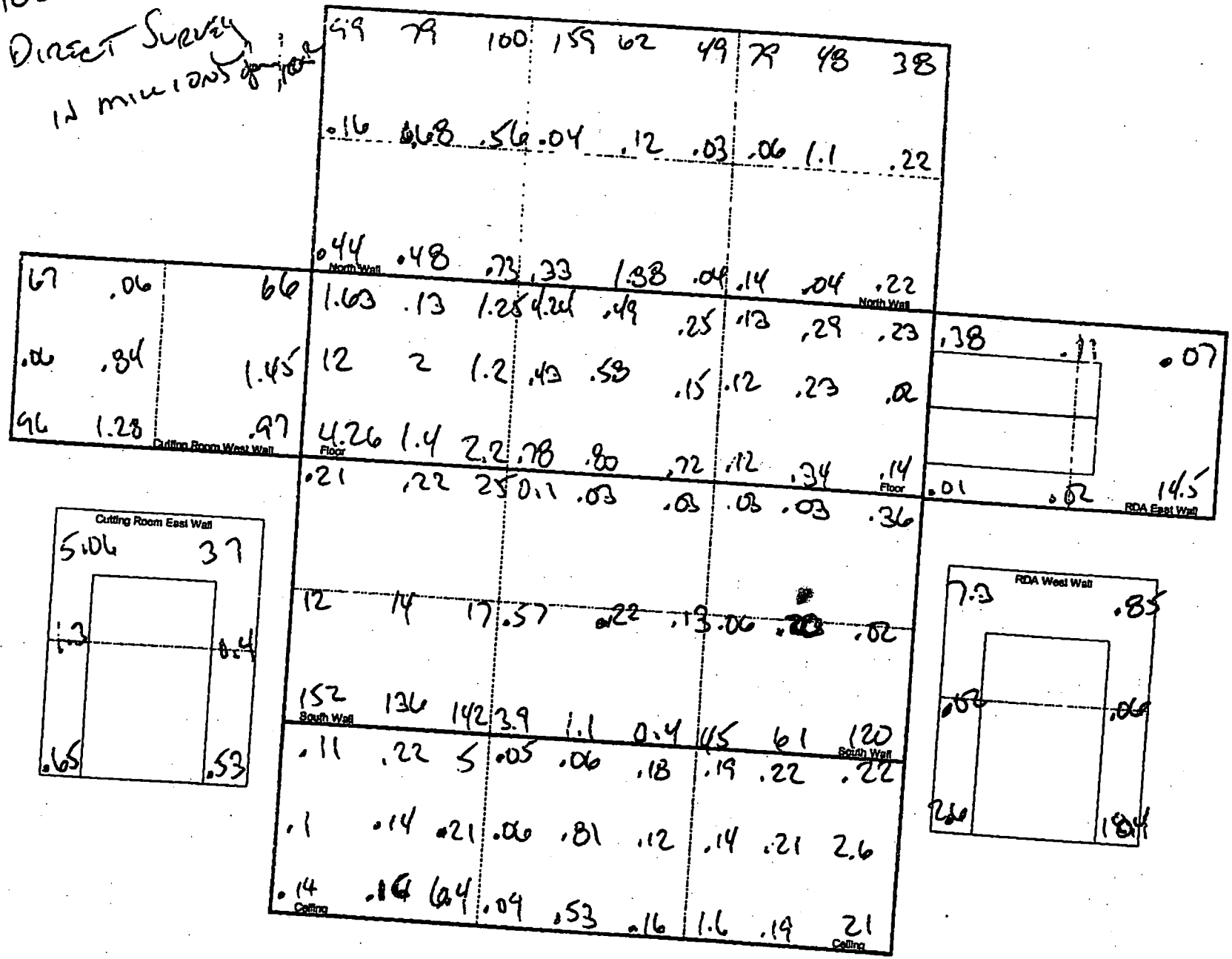
RDA West Wall

7.3		.85
.02		.06
2.6		18.4

49

9/3/03

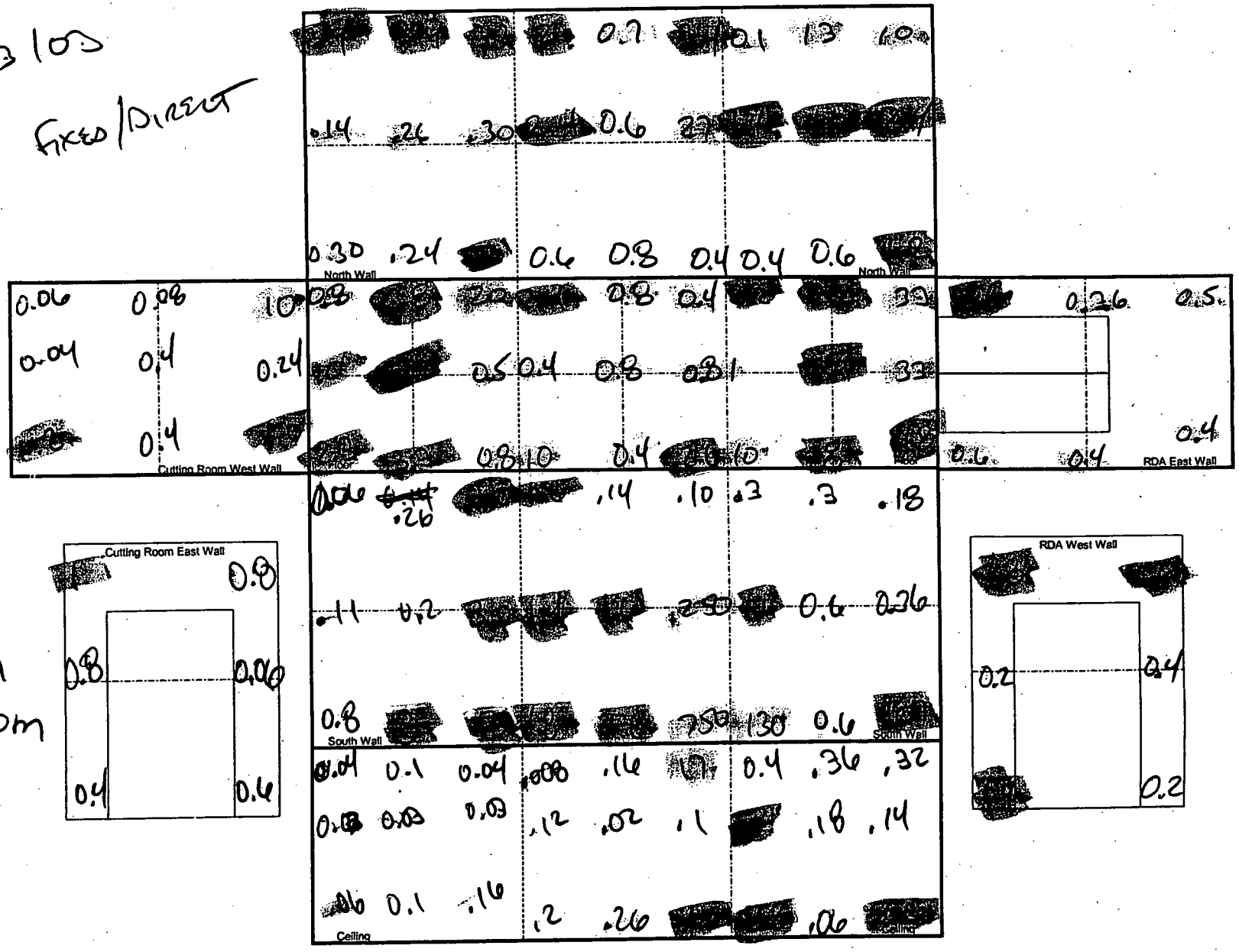
Direct Survey
in millions per year



50

6/13/05

Fixed/Direct



<1m

1m-10m

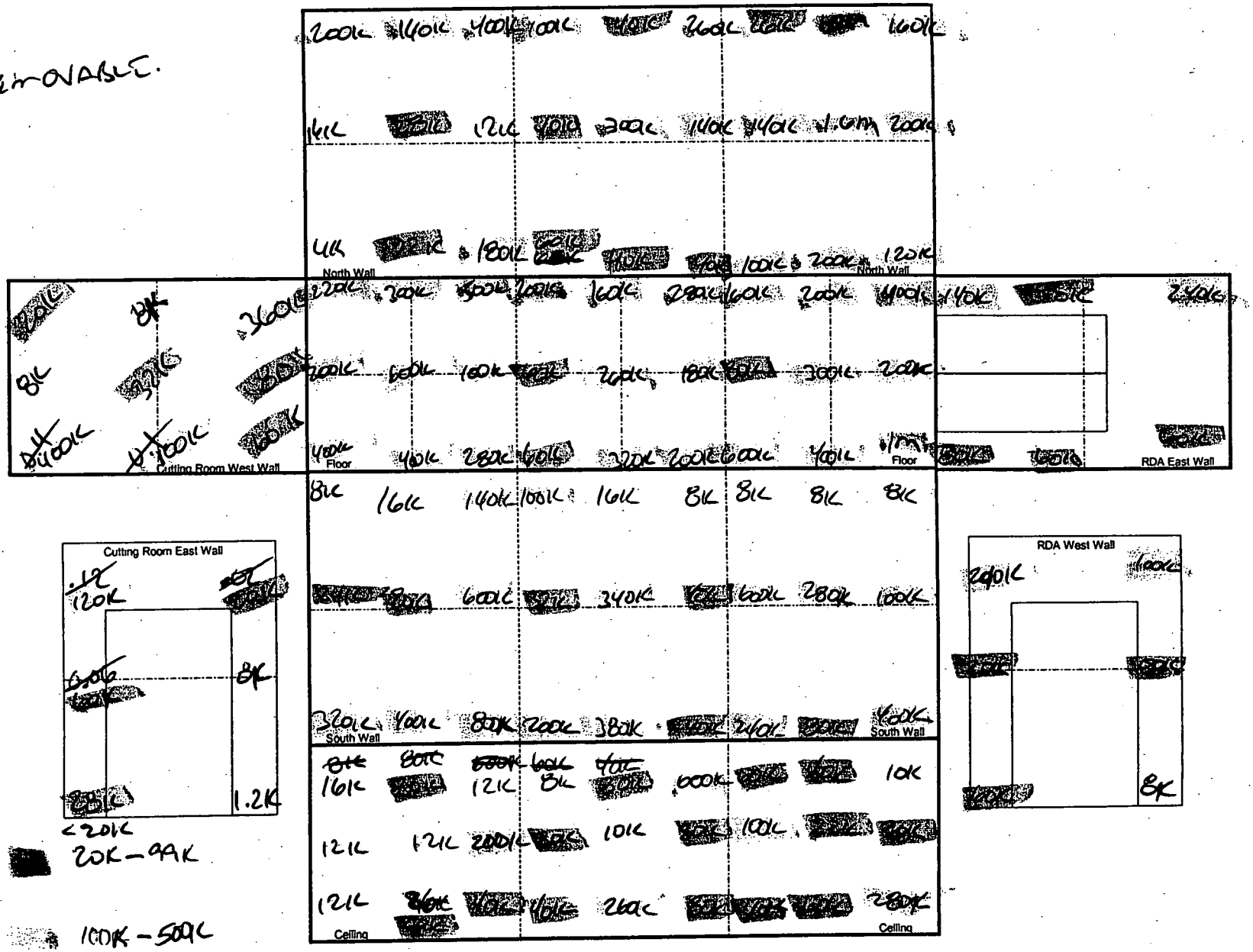
10m-100m

>100m

15

6/12/03

Removable.



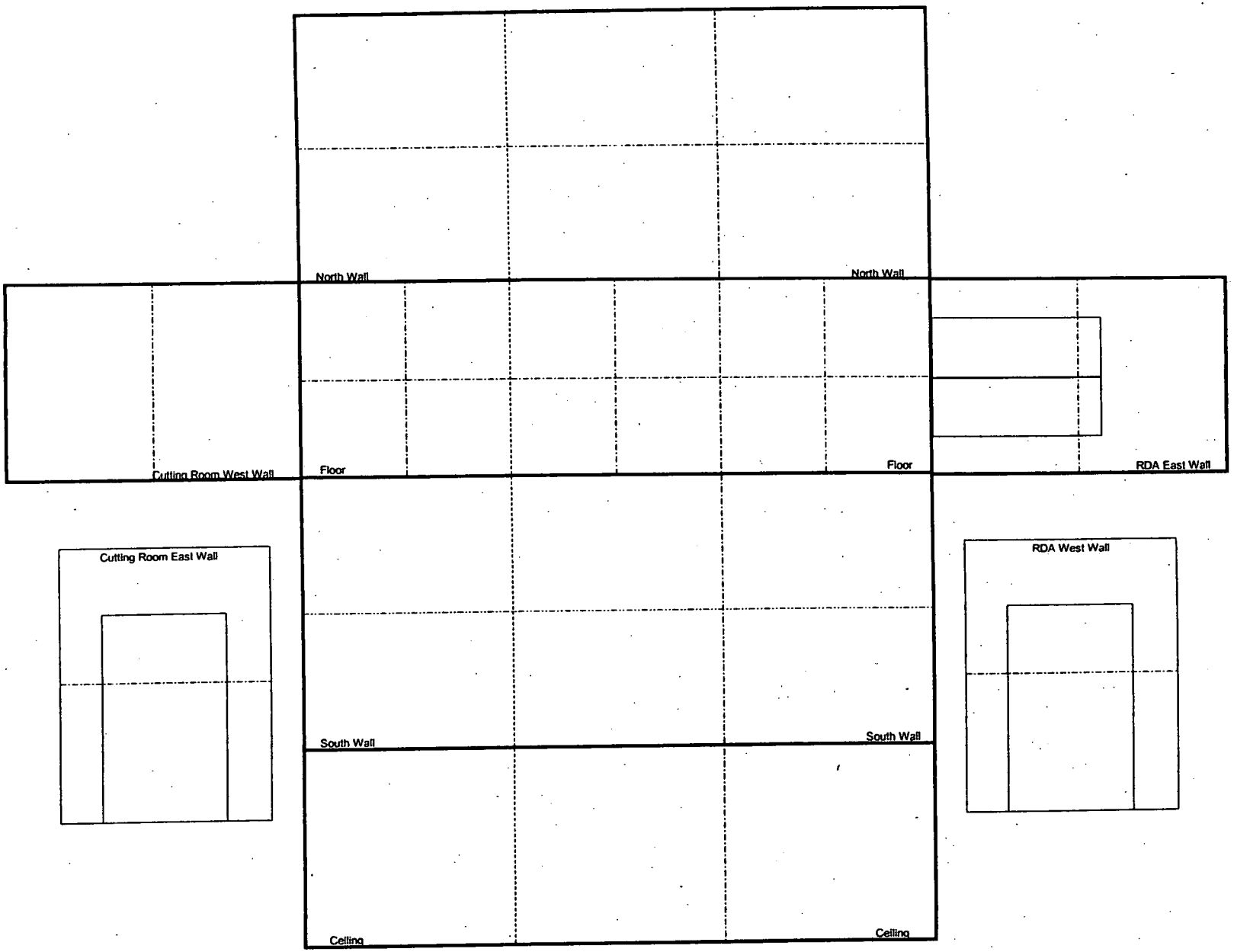
<20K

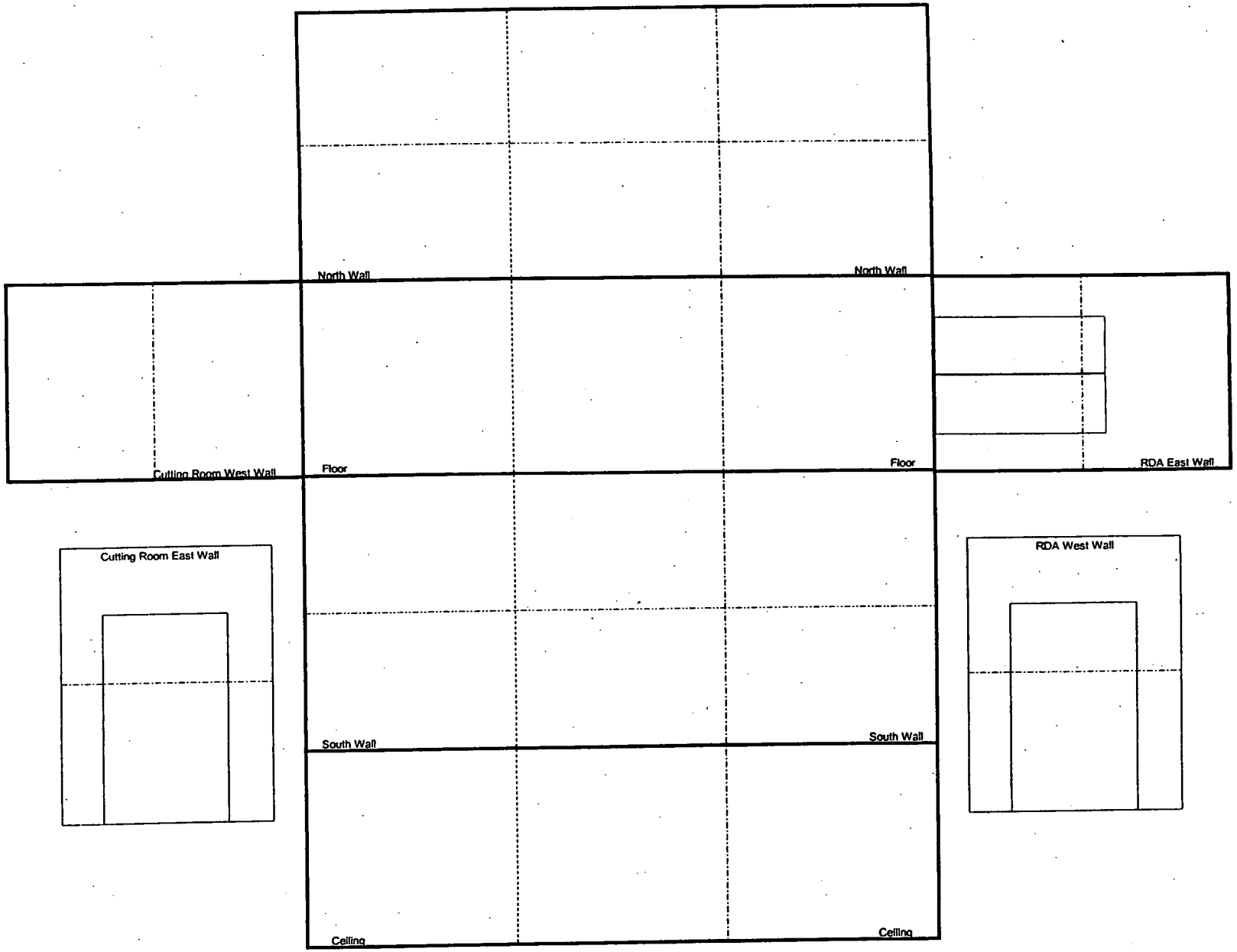
20K–99K

100K–500K

>500K

52


North Wall
North Wall
Cutting Room West Wall
Floor
Floor
RDA East Wall
Cutting Room East Wall
RDA West Wall
South Wall
South Wall
Ceiling
Ceiling


North Wall
North Wall
Cutting Room West Wall
Floor
Floor
RDA East Wall
Cutting Room East Wall
RDA West Wall
South Wall
South Wall
Ceiling
Ceiling

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. #	A	B	C	D	E	F
Mfg.	Ludlum	Ludlum	NA	NA	NA	NA
Model	12-1A	12-1A				
Serial #	56183	~~8-2002~~ Stolen				
Cal Due	11-13-02	8-2002				
Bkg.	0 cpm	0 cpm	cpm	cpm	cpm	cpm
Efficiency	0.135%	0.127%	%	%	%	%
MDA (dpm)	14,815	15,749	NA	NA	NA	NA

Survey Type: TOTAL ACTIVITY

Building: 777

Location: Room 134W Set 66-(Interior)

Purpose: SCO –00776-055-Rev 0

RWP #: 02-776-3201

Date: 7/10-02 Time: 0730

[redacted]

PRN/REN # : N/A

Comments: Restricted use instrument – SCO use only – maximum allowed cpm: 250,000

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys.

A Southside Box (ASRF) B Northside Box (ASRF) *points >250,000 cpm (9, 10, 12, 24, 26)

SET 66 INTERIOR TOTAL ACTIVITY SURVEY RESULTS (Note 1)

Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]
A	Table 1	60K	8.9E7	B	Table 16	100K	1.57E8
A	Tool 2	40K	5.9E7	B	Gun 17	28K	4.41E7
A	Tool 3	10K	1.48E7	B	TBox 18	80K	1.26E8
A	Below window 4	42K	6.2E7	B	wall 19	80K	1.26E8
A	window 5	5K	7.41E6	B	wall 20	20K	3.15E7
A	wall 6	10K	1.48E7	B	Table 21	240K	3.8E8
A	wall 7	12K	1.8E7	B	Table 22	200K	3.15E8
A	Floor 8	180K	2.7E8	B	wall 23	12K	1.9E7
A	Floor 9	>500K *	7.4E8	B	Floor 24	300K *	4.7E8
A	Floor 10	>500K *	7.4E8	B	Block 25	110K	1.73E8
A	Table 11	140K	2.1E8	B	Floor 26	410K *	6.46E8
A	Bottom Table 12	400K *	5.9E8	B	Locker 27	180K	2.8E8
A	Arm 13	20K	2.96E7	B	window 28	10K	1.57E7
A	Arm 14	20K	2.96E7	B	Arm 29	80K	1.26E8
A	Arm 15	40K	5.9E7	B	Arm 30	30K	4.7E7
NA				NA			

Date Reviewed: 7/10/02 RS Supervision: Mattson (Print Name) Matts (Signature) [redacted]

54

SET 66 INTERIOR TOTAL ACTIVITY SURVEY RESULTS

Inst. #	Location	cpm	dpm/100 cm^2 [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm^2 [=(cpm/efficiency)*2]

55

RADIOLOGICAL SAFETY

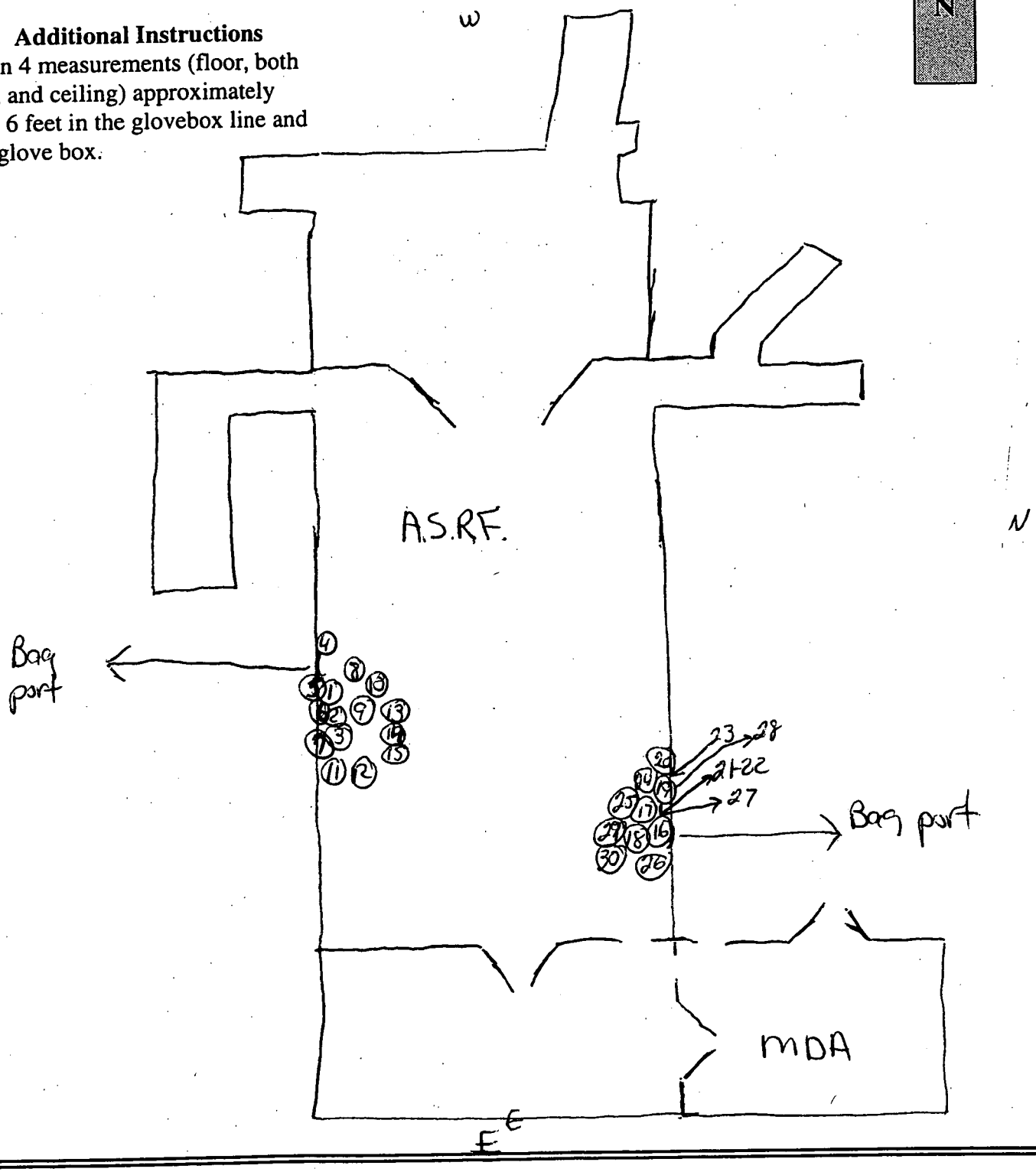
Drawing Showing Survey Points

SCO-00776-055-Rev 0

Set 66 - Room 134W

Additional Instructions

Obtain 4 measurements (floor, both sides, and ceiling) approximately every 6 feet in the glovebox line and each glove box.



56

PORTABLE CONTAMINATION INSTRUMENT PERFORMANCE TEST LOG

RSFORMS-02.01-02

INST. TYPE/SERIAL #: SPECIAL SCO Ludlum 12/1A/ 56183 CAL. DUE DATE: 11-13-02 INSTRUMENT EFFICIENCY: 0.135 % BLDG. 776/777

This form is used to record parameters noted during daily performance checks. Instruments that require additional repair or service are returned to Instrumentation Repair Facility.

TIME/DATE	RCT NAME EMP #	BATT Yes	BATT No	COUNT TYPE Alpha/ Beta	BKG (cpm)	INSTRUMENT READING (Net cpm) X1 Range	X10 Range	X100 Range	X1K Range	PROBE S/N	% ERROR ±20% IN TOL (Initials)	RCT SIGNATURE
0710 7-10-02	Patti Grosetta 516371		Y	α	0	NA	1590	NA	NA	84 / 4254		
						NA		NA	NA			

MDA 14,815 dpm
α 16,200 cpm

Rev 02/01 [redacted] Page [redacted] * Guidance for use of this form is located on the back of the form [redacted]

Note: The width of the columns and the number of rows can be adjusted provided all of the information requested on the form is retained

57

SOURCE BOARD CERTIFICATION DUE DATE (Alpha/Beta): N/A SOURCE ISOTOPE (Alpha/Beta): PU239

ALPHA SOURCE/ SOURCE BOARD

	S/N	Source (dpm)	Range (cpm) ± 20%
X1/CLS	N/A	N/A	N/A
X10/CLS	N/A	N/A	N/A
X100/CLS	N/A	N/A	N/A
X1K/CLS	601983	1,278,184	1,022,543–1,533,820

BETA SOURCE/SOURCE BOARD

	S/N	Source (dpm)	Range (cpm)± 20%
X1/CLS	N/A	N/A	N/A
X10/CLS	N/A	N/A	N/A
X100/CLS	N/A	N/A	N/A
X1K/CLS	N/A	N/A	N/A

Approved by:
RS Supervision: Mattson / Matt / [redacted] / 7/10/02
Name (print) Signature Date

$$\%Error = \frac{(Net\ cpm + eff) - Source\ dpm}{Source\ dpm} \times (100)$$

Where Net cpm = Source cpm - Background cpm

GUIDANCE:

- The appropriate instrument data and building location is recorded on RSFORMS-02.01-02.
- Obtain an appropriate certified source or source block for the instrument being tested.
- A general inspection is performed on the instrument for the following:
  - * Physical condition of the detector, cables, and instrument
  - * Instrument battery/power supply check is satisfactory
  - * Instrument audio check is satisfactory, as applicable
  - * Instrument light leak check is satisfactory, as applicable
  - * Instrument background response check is within tolerances of expected values
  - * Instrument corrected source count reading (15 second average reading) falls within an acceptable range (± 20% of source value)
- Performance test data is recorded (as applicable) to each portable contamination survey instrument with signature upon completion.
- For Ludlum 12-1A use the following guidelines when setting the selector switch:
  - * For X1000, press HV Test button, ensure reading is between 1.7 and 1.9 on the bottom scale (or as specified on the calibration tag).
  - * For X1000 and Fast Response mode, place detector on highest value source on source board.
  - * For X100 and Fast Response mode, place detector on 2nd highest value source on source board.
  - * For X10 and Slow Response mode, place detector on 3rd highest value source on source board. (X10 & X10 scales are averaged over 30 seconds)
  - * For X1 and Slow Response mode, place detector on lowest value source on source board.
- For Ludlum Model 31 use the following guidelines:
  - * Ensure background is < 100 cpm with the range selector switch set to X1 and Fast/Slow Response Mode set to "S" for slow. Record background on RSFORMS-02.01-02.
  - * High Voltage (HV) test with instrument on the X1000 scale (Acceptable is between 1.7 and 1.9 on the bottom scales, or as specified on the calibration tag).
  - * Verify the certification tag on the Certified Source Board to ensure that the due date of the certification has not expired.
  - * Select X1000 on instrument and Fast response. Source check on highest value source.
  - * Select X100 on instrument and Fast response. Source check on next lower value source.
  - * Select X10 on instrument and Slow response. Source check on next lower value source.
  - * Select X1 on instrument and Slow response. Source check on the lowest value source.
  - * Verify instrument readings on all scales are ±20% of source standard values.

58

NS B

PORTABLE CONTAMINATION INSTRUMENT PERFORMANCE TEST LOG

RSFORMS-02.01-02

INST. TYPE/SERIAL #: SPECIAL SCO Ludlum 12/1A/ 56166 CAL. DUE DATE: 8-20-02 INSTRUMENT EFFICIENCY: 0.127 % BLDG. 776/777

This form is used to record parameters noted during daily performance checks. Instruments that require additional repair or service are returned to Instrumentation Repair Facility.

TIME/DATE	[redacted]	BATT Yes No	BAS ATT COUNT TYPE Alpha/ Beta	BKG (cpm)	INSTRUMENT READING (Net cpm) X1 Range	X10 Range	X100 Range	X1K Range	PROBE S/N	% ERROR ± 20% IN TOL (Initials)	[redacted]
0208 7-10-02	[redacted]	Y	α	0	NA	1400	NA	NA	84 114142	D	[redacted]
					NA		NA	NA			

15,749 dpm
15,240 cpm

Note: The width of the columns and the number of rows can be adjusted provided all of the information requested on the form is retained

59

SOURCE BOARD CERTIFICATION DUE DATE (Alpha/Beta): N/A SOURCE ISOTOPE (Alpha/Beta): PU239

ALPHA SOURCE/ SOURCE BOARD

	S/N	Source (dpm)	Range (cpm) ± 20%
X1/CLS	N/A	N/A	N/A
X10/CLS	N/A	N/A	N/A
X100/CLS	N/A	N/A	N/A
X1K/CLS	601983	1,278,184	1,022,543–1,533,820

BETA SOURCE/SOURCE BOARD

	S/N	Source (dpm)	Range (cpm)± 20%
X1/CLS	N/A	N/A	N/A
X10/CLS	N/A	N/A	N/A
X100/CLS	N/A	N/A	N/A
X1K/CLS	N/A	N/A	N/A

Approved by:
RS Supervision: Mattson / [signature] / [redacted] / 7/10/02
Name (print) Signature [redacted] Date

$$\%Error = \frac{(Net\ cpm + eff) - Source\ dpm}{Source\ dpm} \times (100)$$

Where Net cpm = Source cpm - Background cpm

GUIDANCE:

- The appropriate instrument data and building location is recorded on RSFORMS-02.01-02.
- Obtain an appropriate certified source or source block for the instrument being tested.
- A general inspection is performed on the instrument for the following:
  - * Physical condition of the detector, cables, and instrument
  - * Instrument battery/power supply check is satisfactory
  - * Instrument audio check is satisfactory, as applicable
  - * Instrument light leak check is satisfactory, as applicable
  - * Instrument background response check is within tolerances of expected values
  - * Instrument corrected source count reading (15 second average reading) falls within an acceptable range (± 20% of source value)
- Performance test data is recorded (as applicable) to each portable contamination survey instrument with signature upon completion.
- For Ludlum 12-1A use the following guidelines when setting the selector switch:
  - * For X1000, press HV Test button, ensure reading is between 1.7 and 1.9 on the bottom scale (or as specified on the calibration tag).
  - * For X1000 and Fast Response mode, place detector on highest value source on source board.
  - * For X100 and Fast Response mode, place detector on 2nd highest value source on source board.
  - * For X10 and Slow Response mode, place detector on 3rd highest value source on source board. (X10 & X10 scales are averaged over 30 seconds)
  - * For X1 and Slow Response mode, place detector on lowest value source on source board.
- For Ludlum Model 31 use the following guidelines:
  - * Ensure background is < 100 cpm with the range selector switch set to X1 and Fast/Slow Response Mode set to "S" for slow. Record background on RSFORMS-02.01-02.
  - * High Voltage (HV) test with instrument on the X1000 scale (Acceptable is between 1.7 and 1.9 on the bottom scales, or as specified on the calibration tag).
  - * Verify the certification tag on the Certified Source Board to ensure that the due date of the certification has not expired.
  - * Select X1000 on instrument and Fast response. Source check on highest value source.
  - * Select X100 on instrument and Fast response. Source check on next lower value source.
  - * Select X10 on instrument and Slow response. Source check on next lower value source.
  - * Select X1 on instrument and Slow response. Source check on the lowest value source.
  - * Verify instrument readings on all scales are ±20% of source standard values.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. #	A	B	C	D	E	F
Mfg.	Ludlum	Ludlum	NA	NA	NA	NA
Model	12-1A	12-1A				
Serial #	62744	56136				
Cal Due	7-26-03	11-22-03				
Bkg.	0 cpm	0 cpm	cpm	cpm	cpm	cpm
Efficiency	50%	0.152%	%	%	%	%
MDA (dpm)	500	13,158	NA	NA	NA	NA

Survey Type: TOTAL ACTIVITY

Building: 776/777

Location: Set 66 ASRF Glovebox (RDA, Cutting Room)

Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 6-06-03 Time: 0830

[redacted]

PRN/REN # : N/A

Comments: Restricted use instrument – SCO use only – maximum allowed cpm: 250,000

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys. (Note: The restricted use instrument is only required if the contamination levels exceed the standard Ludlum 12-1A). Note: Record contamination values in accordance with RSP 07.02. Point 18 and 28-30 SCO 12-1A. All other points taken with standard ludlum 12-1A these levels are in CPM & DPM

ASRF GLOVEBOX INTERIOR TOTAL ACTIVITY SURVEY RESULTS

Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]
A	1	350,000	700,000 dpm	A	21	35,000	70,000 dpm
A	2	700,000	1.4E6 dpm	A	22	100,000	200,000 dpm
A	3	50,000	100,000 dpm	A	23	90,000	180,000 dpm
A	4	200,000	400,000 dpm	A	24	35,000	70,000 dpm
A	5	300,000	600,000 dpm	A	25	15,000	30,000 dpm
A	6	500,000	1.0E6 dpm	A	26	250,000	500,000 dpm
A	7	250,000	500,000 dpm	A	27	25,000	50,000 dpm
A	8	250,000	500,000 dpm	B	28 SCO	2,500	9.9E6
A	9	250,000	500,000 dpm	B	29 SCO	5,000	6.6E6
A	10	15,000	30,000 dpm	B	30 SCO	30,000	3.9E7
A	11	60,000	120,000 dpm	NA			
A	12	300,000	600,000 dpm				
A	13	300,000	600,000 dpm				
A	14	45,000	90,000 dpm				
A	15	300,000	600,000 dpm				
A	16	200,000	400,000 dpm				
A	17	500,000	1.0E6				
B	18 SCO	~~7,500~~ 1,000	1.32E6				
A	19	35,000	70,000 dpm				
B	20 SCO	~~100,000~~ 10,000	1.32E7				

NA

Date Reviewed: 6/6/03 RS Supervision: Mattson (Print Name) [redacted] (Signature)

61

SCO-00776-074-REV 0: ASRF GLOVEBOX INTERIOR TOTAL ACTIVITY SURVEY RESULTS

Inst. #	Location	cpm	dpm/100 cm^2 [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm^2 [=(cpm/efficiency)*2]

N A

62

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

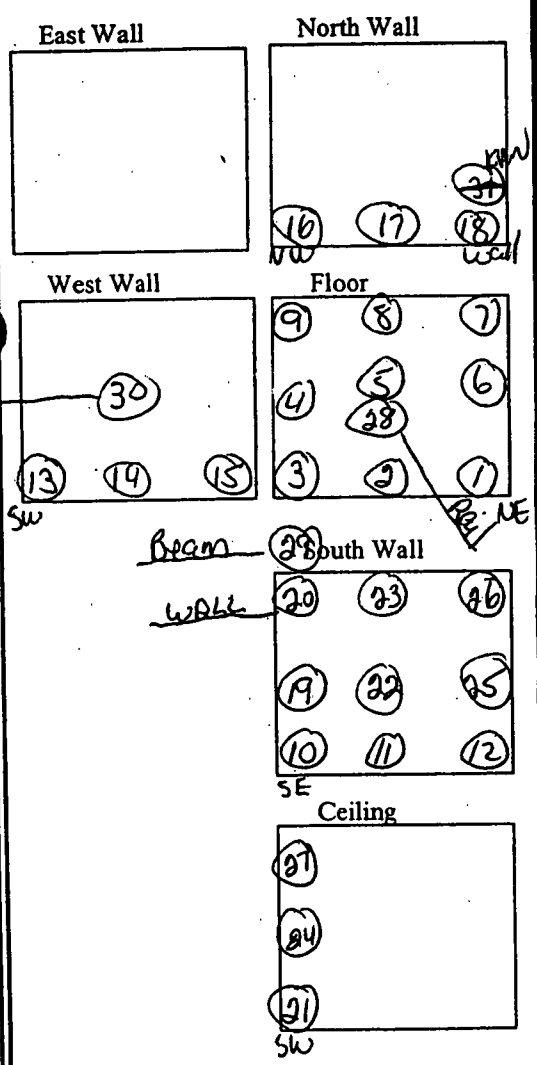
Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

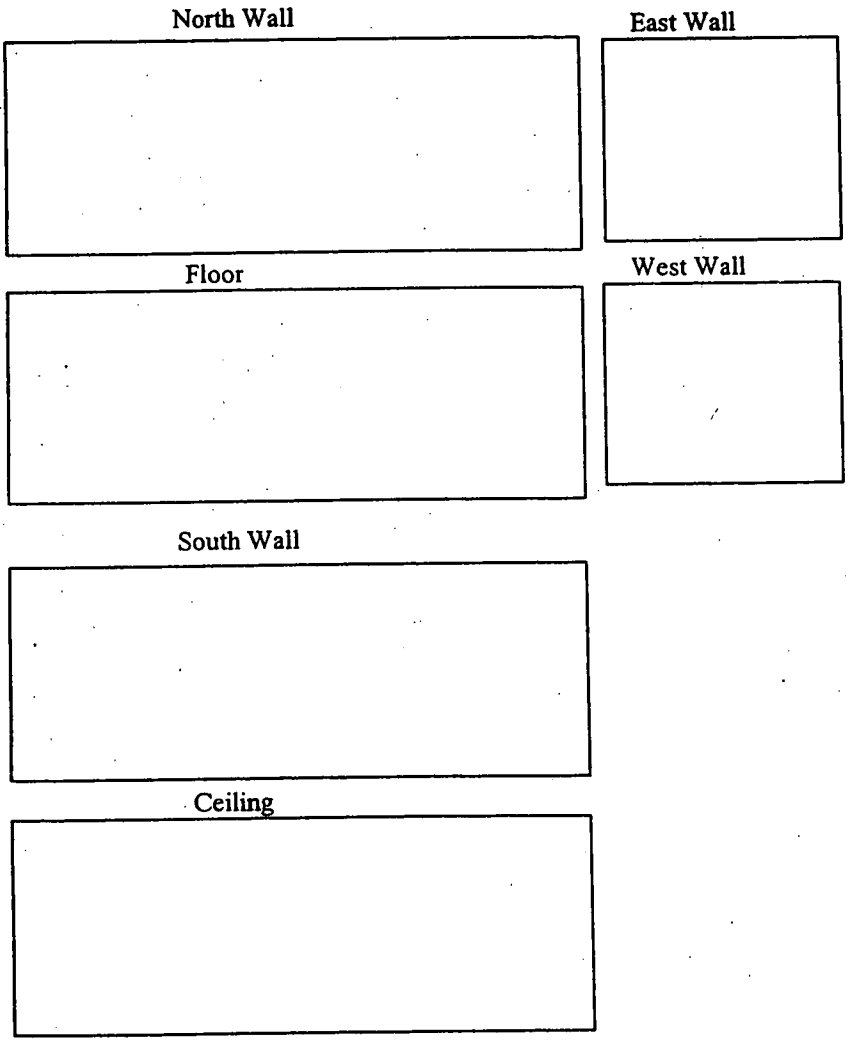
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling.

Cutting Room



RDA



63

PORTABLE CONTAMINATION INSTRUM[redacted] PERFORMANCE TEST LOG

RSFORMS-02[redacted]02

ST. TYPE/SERIAL #: SPECIAL SCO Ludlum 12/1A/56136 CAL. DUE DATE: 11-22-03 INSTRUMENT EFFICIENCY: 0.152% BLDG. 776/777

s form is used to record parameters noted during daily performance checks. Instruments that require additional repair or service are returned to Instrumentation Repair Facility.

ME/DATE	[redacted]	BAS TAT Yes No	COUNT TYPE Alpha/ Beta	BKG (cpm)	INSTRUMENT READING (Net cpm) X1 Range	X10 Range	X100 Range	X1K Range	PROBE S/N	% ERROR ±20% IN TOL (Initials)	[redacted]
5-6-03		Y	α	0	NA	21000	NA	NA	84 14259	P	
					NA		NA	NA			

MDA - 13 158 dpm
SCOI - 18 240 cpm
SCNT - 364 [illegible] cpm

ev 02/01

Page 1 * Guidance for use of this form is located on the back of the form

Note: The width of the columns and the number of rows can be adjusted provided all of the information requested on the form is retained.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum (A)	Mfg. Ludlum (B)	Mfg. N/A
Model 195	Model 195	Model
Serial # 187513	Serial # 187503	Serial #
Cal Due 10-24-03	Cal Due 9-12-03	Cal Due
Bkg. N/A	Bkg. n/a	Bkg.
Efficiency N/A%	Efficiency n/a %	Efficiency ↓ %
MDA 0.01 (million dpm/100cm²)	MDA 0.01 MILLION dpm/100cm²	MDA N/A

Mfg. N/A	Mfg. N/A	Mfg. N/A
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency ↓ %	Efficiency ↓ %	Efficiency ↓
MDA N/A	MDA N/A	MDA N/A

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF. (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0
RWP #: 03-776-3228

Date: 9-3-03 Time: 0945

[redacted]

PRN/REN # : N/A
Comments: ALL (A) SURVEY POINTS WITH A INST. AND (B) POINTS W/ B INS.
Note: ~~Record contamination values in accordance with RSP 07.02.~~ SRF 9-3-03
SURVEY POINTS MARKED ON INTERIOR OF ASRF

SRF 9-3-03

ASRF INTERIOR TOTAL / ~~REMOVABLE~~ ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
1 (A)	96	0	96	N/A	27 (A)	101	.15	100.85	N/A
2	142	0	142		28	5.21	.15	5.06	
3	.14	0	.14		29	.29	.15	.14	
4	17.2	0	17.2		31	.85	0	.85	
5	.11	0	.11		32	21	0	21	
6	.10	0	.10		33	2.63	0	2.63	
7	.06	0	.06		34	.22	0	.22	
8	99	0	99		35	7.30	0	7.30	
9	67	0	67		36	120	0	120	
10	2.31	0	2.31		37	159	0	159	
11	.16	0	.16		38	62	0	62	
12	.84	0	.84		39	.19	0	.19	
13	14.3	.15	14.15		40	.21	0	.21	
14	.31	.15	.16		41	.22	0	.22	
15	79	.15	78.85		42	61	0	61	
16	.83	.15	.68		43	49	0	49	
17	136	.15	135.85		44	1.80	.17	1.63	
18	.37	.15	.22		45	.31	~~.3~~ .17	.14	
19	152	.15	151.85		46	.36	.17	.19	
20	5.41	.15	5.26		47	45	.17	44.83	
21	.36	.15	.21		48	79	.17	78.83	
22	.37	.15	36.85		49	.33	.17	.16	
23	12.30	.15	12.15		50	.29	.17	.12	
24	.53	.15	.38		51	.35	.17	.18	
25	.71	.15	.56		52A	.57	.17	0.40	N/A
26 (A)	1.43	.15	1.28	N/A	201 A	1.24	.18	1.06	

Date Reviewed: 9-3-03 **RS Supervision:** S.R. Fridell (Print Name) / S.R. Fridell (Signature) [redacted]

65

SCO-00776-074-REV 0: ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	- Background	= Net	Smear dpm/100 cm²
213A	6.55	.15	6.40	N/A
202A	.24	.18	.06	
202 A	.84	.03	.81	
204 A	.71	.18	.53	
205A	48.0	.03	47.97	
206A	.25	.18	.07	
207A	.12	.03	.09	
208A	.09	.03	.06	
209A	.08	.03	.05	
211A	3.94	.03	3.91	
212A	38.0	.03	37.97	NA
1 B	.01	0	.01	n/A
2 B	.38	0	.38	
3 B	.22	0	.22	
4 B	.04	0	.04	
5 B	.14	0	.14	
6 B	.04	0	.04	
7 B	1.88	0	1.88	
8 B	.33	0	.33	
9 B	.10	0	.10	
10 B	.03	0	.03	
11 B	.03	0	.03	
12 B	.03	0	.03	
13 B	.03	0	.03	
14 B	.36	0	.36	
15 B	.28	0	.28	
16 B	.43	0	.43	
17 B	4.24	0	4.24	
18 B	.49	0	.49	
19 B	.58	0	.58	
20 B	.80	0	.80	n/A
21 B	.72	0	.72	
22 B	.15	0	.15	
23 B	.25	0	.25	
24 B	.13	0	.13	
25 B	.12	0	.12	
26 B	.12	0	.12	
27 B	.34	0	.34	
28 B	.23	0	.23	
29 B	.29	0	.29	
30 B	.23	0	.23	
31 B	.02	0	.02	
32 B	.14	0	.14	
33 B	2.57	0	2.57	
34 B	18.44	0	18.44	
35 B	.01	0	.01	
36 B	.06	0	.06	
37 B	.04	0	.04	
38 B	.02	0	.02	
39 B	.02	0	.02	
40 B	.20	0	.20	n/A
41 B	.03	0	.03	
42 B	.06	0	.06	
43 B	1.13	0	1.13	
44 B	.22	0	.22	
45 B	.02	0	.02	
46 B	.57	0	.57	n/A

Location	DIRECT million dpm/100cm² Total	- Background	= Net	Smear dpm/100 cm²
210 A	14.56	.03	14.53	N/A
47B	.11	0	.11	n/A
48 B	.22	0	.22	
49 B	.13	0	.13	
50 B	.06	0	.06	
51 B	.65	0	.65	
52 B	.73	0	.73	
53 B	.48	0	.48	
54 B	.44	0	.44	
55 B	66.0	0	66.0	
56 B	1.45	0	1.45	
57 B	.97	0	.97	
58 B	25.0	0	25.0	
59 B	.22	0	.22	
60 B	.21	0	.21	n/A
61 B	.53	0	.53	
62 B	1.63	0	1.63	
63 B	.13	0	.13	
64 B	1.25	0	1.25	
65 B	1.19	0	1.19	
66 B	1.98	0	1.98	
67 B	12.01	0	12.01	
68 B	4.26	0	4.26	
69 B	1.38	0	1.38	
70 B	2.15	0	2.15	n/A
n/A	n/A	n/A	n/A	n/A
n/A	n/A	n/A	n/A	n/A

66

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. # A	Inst. # B	Inst. # C
Mfg. Ludlum	Mfg. Ludlum	Mfg. Ludlum
Model 12-1A SCO	Model 12-1A	Model 12-1A
Serial # 75991	Serial # 75906	Serial # 62744
Cal Due 7-22-03	Cal Due 6-21-03	Cal Due 7-26-03
Bkg. 0 cpm	Bkg. 0 cpm	Bkg. 0 cpm
Efficiency 0.120%	Efficiency 50 %	Efficiency 50 %
MDA 16,667 (dpm)	MDA 500 (dpm)	MDA 500 (dpm)

Inst. # D	Inst. # E	Inst. # F
Mfg. N/A	Mfg. N/A	Mfg. N/A
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg. cpm	Bkg. cpm	Bkg. cpm
Efficiency %	Efficiency %	Efficiency %
MDA N/A (dpm)	MDA N/A (dpm)	MDA N/A (dpm)

Survey Type: TOTAL / REMOVABLE ACTIVITY

Building: 776/777

Location: Set 66 ASRF (RDA, Cutting Room)

Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 6-13-03 Time: 1331

[redacted]

PRN/REN # : N/A

Comments: **Restricted use instrument – SCO use only – maximum allowed cpm: 250,000**

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys. (Note: The restricted use instrument is only required if the contamination levels exceed the standard Ludlum 12-1A). **Note: Record contamination values in accordance with RSP 07.02.**

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Inst. #	Location	Total (cpm)	Total (dpm/100 cm²) [=(cpm/efficiency)*2]	Smear (cpm)	Smear (dpm/100cm²)	Inst. #	Location	Total (cpm)	Total (dpm/100 cm²) [=(cpm/efficiency)*2]	Smear (cpm)	Smear (dpm/100cm²)
A	1 Floor	1.1K	1.83E6	25K	1.0E6	A	21 Floor	12K	2.0E7	125K	5.0E5
A	2	20K	3.3E7	50K	2.0E5	B	22	825K	3.3E6	100K	4.0E5
A	3	20K	3.3E7	100K	4.0E5	A	23	4K	6.7E6	150K	6.0E5
A	4	4.8K	8E6	100K	4.0E5	B	24	950K	3.8E6	75K	3.0E5
B	5	600K	2.4E6	75K	3.0E5	A	25	1.4K	2.3E6	100K	4.0E5
B	6	550K	2.2E6	50K	2.0E5	A	26	6K	1.0E7	50K	2.0E5
A	7	6K	1.0E7	150K	6.0E5	B	27 Floor	200K	8.0E5	55K	2.2E5
B	8	250K	1.0E6	20K	8.0E4	C	28 WALL	100K	4.0E5	7K	2.8E4
B	9	550K	2.2E6	40K	1.6E5	C	29	150K	6.0E5	3K	1.2E4
B	10	650K	2.6E6	50K	2.0E5	C	30	75K	3.0E5	1K	4.0E3
B	11	200K	8.0E5	45K	1.8E5	C	31	60K	2.4E5	18K	7.2E4
B	12	100K	4.0E5	70K	2.8E5	C	32	400K	1.6E6	45K	1.8E5
B	13	100K	4.0E5	80K	3.2E5	C	33	150K	6.0E5	15K	6.0E4
B	14	200K	8.0E5	65K	2.6E5	C	34	200K	8.0E5	10K	4.0E4
B	15	200K	8.0E5	40K	1.6E5	C	35	100K	4.0E5	10K	4.0E4
A	16	6K	1.0E7	15K	6.0E4	C	36	100K	4.0E5	25K	1.0E5
B	17	100K	4.0E5	15K	6.0E4	C	37	150K	6.0E5	50K	2.0E5
B	18	600K	2.4E6	50K	2.0E5	C	38	300K	1.2E6	30K	1.2E5
B	19	200K	8.0E5	70K	2.8E5	C	39	350K	1.4E6	35K	1.4E5
B	20 Floor	125K	5.0E5	25K	1.0E5	C	40	150K	6.0E5	20K	8.0E4

Date Reviewed: 6/13/03 **RS Supervision:** Mattson / Matt [redacted]

Print Name Signature

67

COPY

SCO-00776-074-REV 0: ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Inst #	Location	Total cpm	Total dpm/100 cm² [=(cpm/efficiency)*2]	Smear cpm	Smear dpm/100 cm²	Inst #	Location	Total cpm	Total dpm/100 cm² [=(cpm/efficiency)*2]	Smear cpm	Smear dpm/100 cm²
C	41 Wall	250K	1.0E6	15K	6.0E4	C	98	250K	1.0E6	30K	1.2E5
C	42	60K	2.4E5	20K	8.0E4	C	99	200K	8.0E5	5K	2.0E4
A	43	6K	1.0E7	90K	3.6E5	C	100	15K	6.0E4	2K	8.0E3
C	44	350K	1.4E6	15K	6.0E4	C	101	850K	3.4E6	50K	2.0E5
C	45	50K	2.0E5	2K	8.0E3	C	102	35K	1.4E5	4K	1.6E4
C	46	15K	6.0E4	2K	8.0E3	C	103	850K	3.4E6	35K	1.4E5
C	47	65K	2.6E5	4K	1.6E4	C	104	65K	2.6E5	7K	2.8E4
C	48	250K	1.0E6	35K	1.4E5	C	105	800K	3.2E6	100K	4.0E5
C	49	400K	1.6E6	25K	1.0E5	C	106	75K	3.0E5	3K	1.2E4
C	50	35K	1.4E5	4K	1.6E4	C	107	15K	6.0E4	3K	1.2E4
C	51	25K	1.0E5	2K	8.0E3	C	108	25K	1.0E5	5K	2.0E4
C	52	75K	3.0E5	2K	8.0E3	C	109	40K	1.6E5	10K	4.0E4
C	53	75K	3.0E5	2K	8.0E3	C	110	200K	8.0E5	80K	3.2E5
C	54	45K	1.8E5	2K	8.0E3	C	111	35K	1.4E5	6K	2.4E4
B	55	500K	2.0E6	25K	1.0E5	B	112	100K	4.0E5	15K	6.0E4
B	56	600K	2.4E6	10K	4.0E4	B	113	100K	4.0E5	15K	6.0E4
B	57	175K	7.0E5	10K	4.0E4	B	114	450K	1.8E6	60K	2.4E5
B	58	150K	6.0E5	75K	3.0E5	B	115	50K	2.0E5	5K	2.0E4
B	59	850K	3.4E6	65K	2.6E5	B	116	400K	1.6E6	25K	1.0E5
A	60 Ex Duct	16K	2.7E7	35K	1.4E5	B	117	100K	4.0E5	80K	8.0E4
B	61	25K	1.0E5	65K	2.6E4	B	118	50K	2.0E5	10K	4.0E4
B	62 Window	350K	1.4E6	25K	1.4E5	B	119	65K	2.6E5	65K	2.6E5
A	63	8K	1.3E7	300K	1.2E6	B	120	300K	1.2E6	20K	8.0E4
A	64 Beam	1K	1.7E6	400K	1.6E6	B	121	700K	2.8E6	10K	4.0E4
A	65 Beam	6K	1.0E7	40K	1.6E5	B	122	15K	6.0E4	15K	6.0E4
B	66 window	600K	2.4E6	50K	2.0E5	B	123	650K	2.6E6	30K	1.2E5
B	67	125K	5.0E5	60K	2.4E5	B	124	450K	1.8E6	50K	2.0E5
B	68	90K	3.6E5	15K	6.0E4	B	125	350K	1.4E6	8K	3.2E4
B	69 Ceiling	30K	1.2E5	5K	2.0E4	B	126	400K	1.6E6	85K	3.8E5
B	70	2K	8.0E3	2K	8.0E3	B	127	400K	1.6E6	85K	3.4E5
B	71	5.5K	2.2E4	2.5K	1.0E4	A	128 Mez	450K	7.5E8	10K	4.0E4
B	72	40K	1.6E5	20K	8.0E4	A	129	150K	2.5E8	10K	4.0E4
B	73	25K	1.0E5	20K	8.0E4	A	130	80K	1.3E8	60K	2.4E5
A	74	10K	1.7E7	150K	6.0E5	B	131	350K	1.4E6	150K	6.0E5
B	75	250K	1.0E6	25K	1.0E5	B	132	150K	6.0E5	20K	8.0E4
B	76	100K	4.0E5	15K	6.0E4	B	133	150K	6.0E5	70K	2.8E5
B	77	45K	1.8E5	5.5K	2.2E4	A	134	4K	6.7E6	100K	4.0E5
B	78	90K	3.6E5	10K	4.0E4	B	135	90K	3.6E5	25K	1.0E5
B	79	35K	1.4E5	5K	2.0E4						
B	80	80K	3.2E5	2.5K	1.0E4						
C	81	8K	3.2E4	3K	1.2E4						
C	82	10K	4.0E4	4K	1.6E4						
C	83	8K	3.2E4	3K	1.2E4						
C	84	25K	1.0E5	5K	2.0E4						
C	85	10K	4.0E4	3K	1.2E4						
C	86	8K	3.2E4	50K	2.0E5						
C	87	50K	2.0E5	5K	2.0E4						
C	88	750K	3.0E6	100K	4.0E5						
C	89	500K	2.0E6	200K	8.0E5						
C	90	750K	3.0E6	150K	6.0E5						
C	91	100K	4.0E5	25K	1.0E5						
C	92	300K	1.2E6	100K	4.0E5						
C	93	15K	6.0E4	5K	2.0E4						
C	94	20K	8.0E4	4K	1.6E4						
C	95	10K	4.0E4	2K	8.0E3						
C	96	100K	4.0E5	8K	3.2E4						
C	97	200K	8.0E5	15K	6.0E4						

68

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

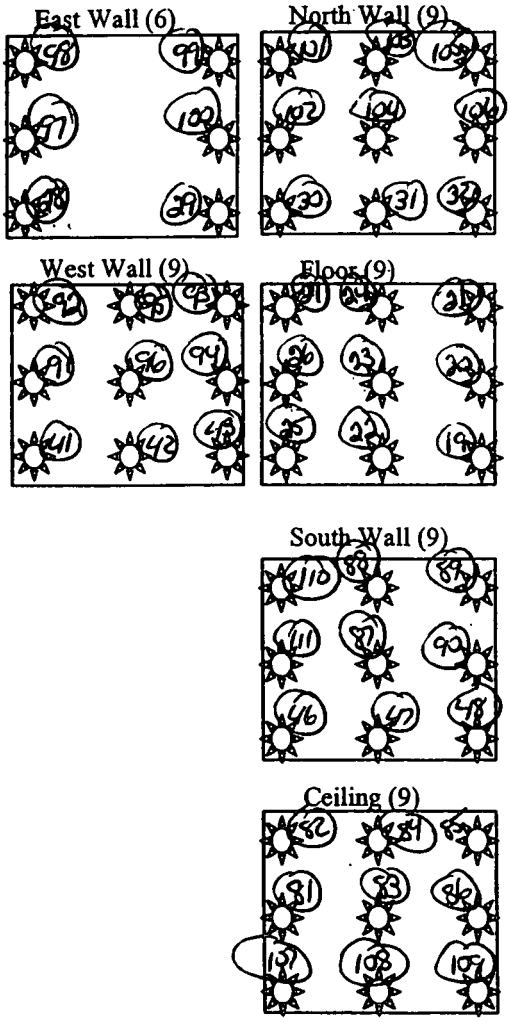
Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

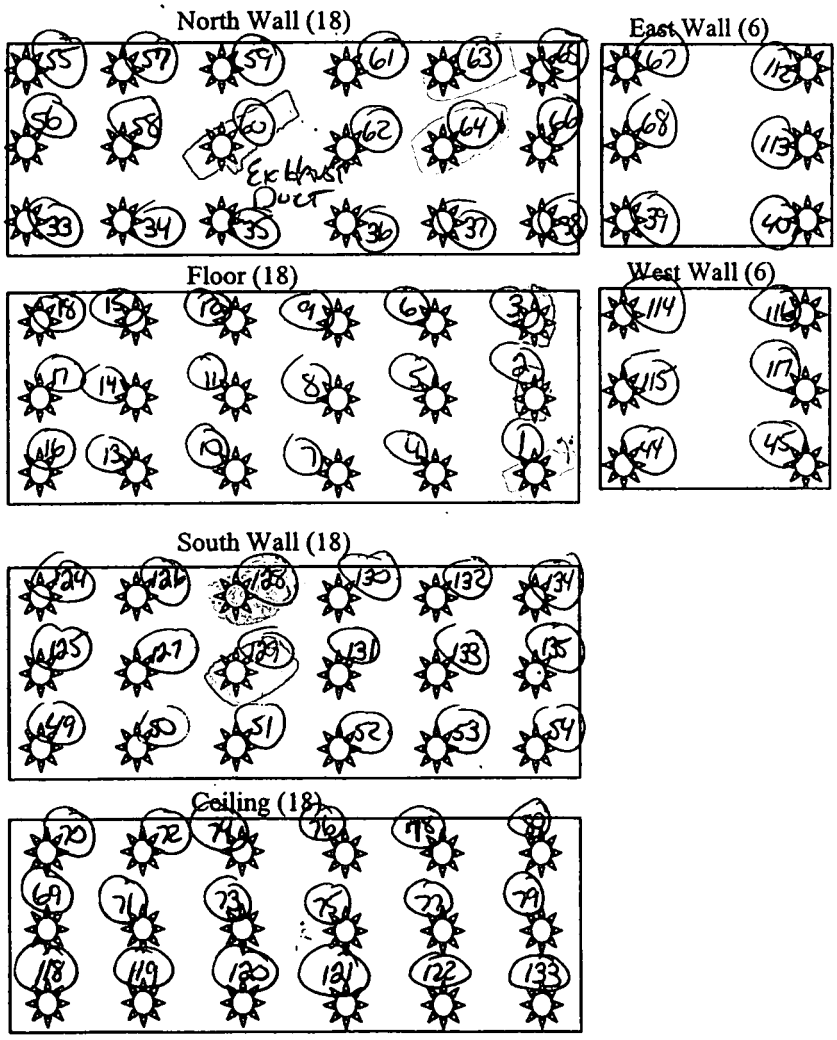
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling.

Cutting Room (51)



RDA (84)



Denotes Sample Location

69

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. # A	Inst. # B	Inst. # C
Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 12-1A	Model	Model
Serial # 56161	Serial #	Serial #
Cal Due 6-24-04	Cal Due	Cal Due
Bkg. 0 cpm	Bkg. cpm	Bkg. cpm
Efficiency 50 %	Efficiency %	Efficiency %
MDA 500 (dpm)	MDA NA (dpm)	MDA NA (dpm)

Inst. # D	Inst. # E	Inst. # F
Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg. cpm	Bkg. cpm	Bkg. cpm
Efficiency %	Efficiency %	Efficiency %
MDA NA (dpm)	MDA NA (dpm)	MDA NA (dpm)

Survey Type: TOTAL / REMOVABLE ACTIVITY

Building: 776/777

Location: Set 66 ASRF (RDA, Cutting Room)

Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 7-11-03 Time: 1435

[redacted]

PRN/REN # : N/A

Comments: **Restricted use instrument – SCO use only – maximum allowed cpm: 250,000**

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys. (Note: The restricted use instrument is only required if the contamination levels exceed the standard Ludlum 12-1A). **Note: Record contamination values in accordance with RSP 07.02.** All survey points

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Inst. #	Location	Total (cpm)	Total (dpm/100 cm²) [=(cpm/efficiency)*2]	Smear (cpm)	Smear (dpm/100cm²)	Inst. #	Location	Total (cpm)	Total (dpm/100 cm²) [=(cpm/efficiency)*2]	Smear (cpm)	Smear (dpm/100cm²)
A	60	600K	2.4E6	100K	4.0E5	NA					
A	63	40K	1.6E5	3K	1.2E4						
A	64	25K	3.0E5	4K	1.6E4						
A	66	150K	6.0E5	50K	2.0E5						
A	128	300K	1.2E6	40K	1.6E5						
A	129	25K	1.0E5	3K	1.2E4						
A	130	600K	2.4E6	75K	3.0E5						
A	131	5K	2.0E4	2K	8.0E3						
A	134	6K	2.4E4	2K	8.0E3						
A	74	950K	3.8E6	25K	1.0E5						
A	123	100K	4.0E5	4K	1.6E4						
NA					NA						NA

Date Reviewed: _____ **RS Supervision:** _____ / _____ /

Print Name Signature Emp. #

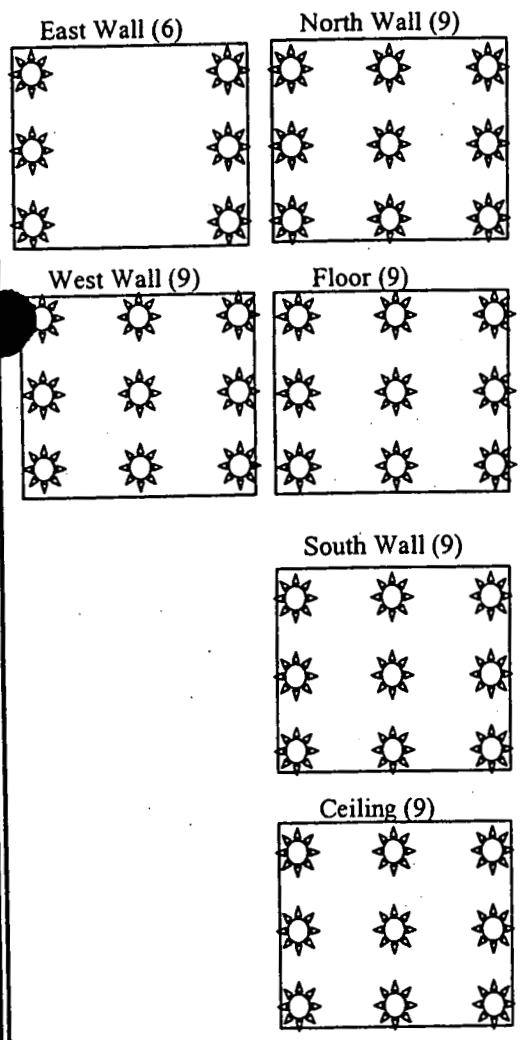
70

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

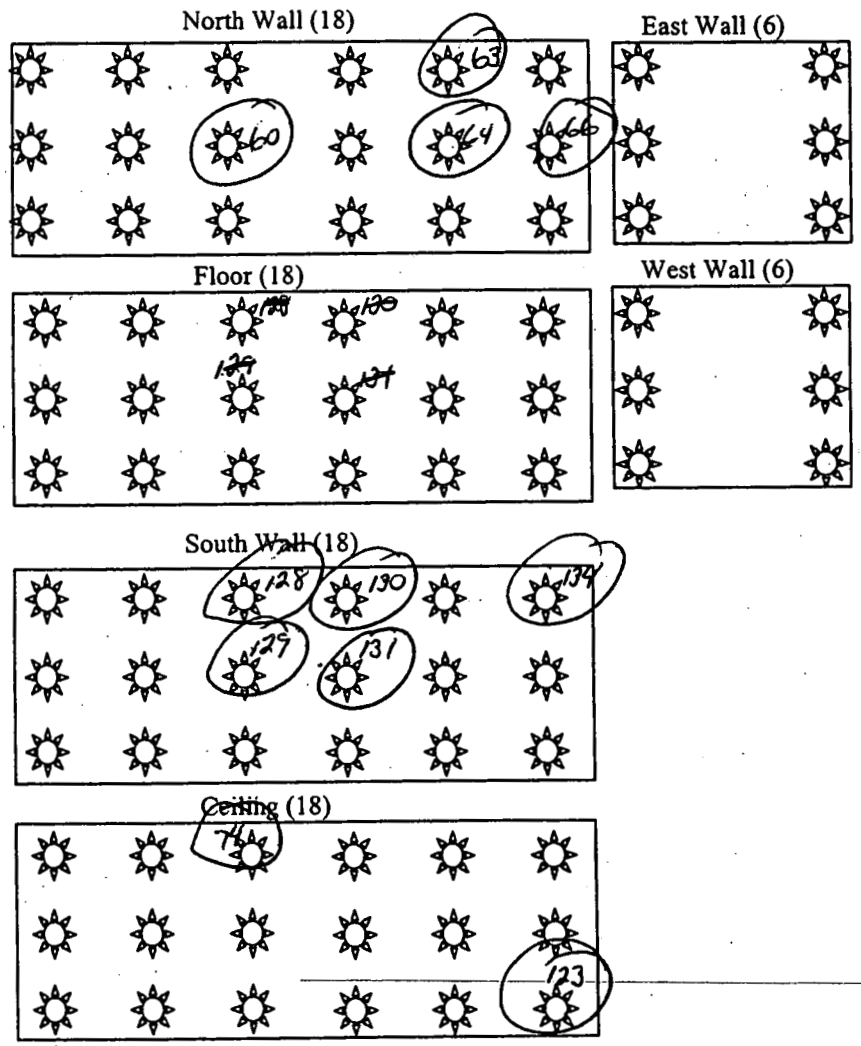
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling.

Cutting Room (51)



RDA (84)



Denotes Sample Location

21

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Eberline	Mfg. Eberline	Mfg.
Model SAC-4	Model SAC-4	Model
Serial #	Serial #	Serial #
Cal Due N/A	Cal Due N/A	Cal Due N/A
Bkg. N/A cpm	Bkg. N/A cpm	Bkg.
Efficiency 0.33	Efficiency 0.33	Efficiency
MDA dpm	MDA dpm	MDA
Mfg. Ludlum	Mfg. Ludlum	Mfg.
Model 12-1A	Model 12-1A	Model
Serial # 56161	Serial # N/A	Serial # N/A
Cal Due 6-24-03 7-24-03	Cal Due N/A	Cal Due
Bkg. 0 cpm 7-18-03	Bkg. cpm	Bkg.
Efficiency 0.5	Efficiency 0.5	Efficiency
MDA 500 dpm	MDA dpm	MDA

Survey Type: JOB SPECIFIC
Building: 776/777
Location: ASRF
Purpose: DECON PROGRESS SURVEY

RWP #: 03-776-3228

Date: 7-18-03 Time: 1000

[redacted]

PRN/REN #: N/A

Comments: Large Area Wipes are approximately N/A sq. All radiation results in mR/Hr or mRem/Hr. All results are for Pu Alpha unless otherwise noted.

SURVEY RESULTS

	Swipe dpm/100cm²	Wipe dpm/100cm²	Total dpm/100cm²	#	Gamma Contact	Neutron Contact	Total Contact	#	Gamma at 30 cm	Neutron at 30 cm	Total at 30 cm
1	SOE	MAP	FOR	1	NA	NA	NA	1	NA	NA	NA
2		RESULTS		2				2			
3				3				3			
4				4				4			
5				5				5			
6				6				6			
7				7				7			
8				8				8			
9				9				9			
10				10				10			
11				11				11			
12				12				12			
13		N/A		13				13			
14				14				14			
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19				19				19			
20				20	NA	NA	NA	20	NA	NA	NA

Date Reviewed: 7/22/03 RS Supervision: Mattson / Matt
Print Name Signature

[redacted]

72

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Drawing Showing Survey Points

CUT ROOM FLOOR

DIRECT 240K - 600K dpm/100cm2

RAILS >10^6 CPM

REMOVABLE

8K - 20K dpm/100cm2

MAX 300K dpm/100cm2 (RAILS)

CUT ROOM WALLS

DIRECT 100K - 200K dpm/100cm2

REMOVABLE 16K - 32K dpm/100cm2

RDA FLOOR

DIRECT 200K - 10^6K dpm/100cm2

DIRECT GENERAL AREA 300K dpm 100cm2

REMOVABLE 8K-20K dpm/100cm2

MAX REMOVABLE (RAILS) 200K dpm/100cm2

RDA WALLS

NORTH (WALL DIRECT) 200K-400K dpm/100cm2

SOUTH (WALL DIRECT) 100K-300K dpm/100cm2

REMOVABLE BOTH WALLS 8K-20K dpm/100cm2

NOTE: WINDOW FRAMES, GLOVE PORTS AND OTHER PROTRUSIONS NOT SURVEYED

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Page 1 of 2

INSTRUMENT DATA

Mfg. Eberline	Mfg. Eberline	Mfg. NE Tech
Model SAC-4	Model SAC-4	Model Electra
Serial # N/A	Serial # N/A	Serial # N/A
Cal Due ↓	Cal Due ↓	Cal Due ↓
Bkg. N/A cpm	Bkg. N/A cpm	Bkg. ↓ cpm
Efficiency 0.33	Efficiency 0.33	Efficiency ↓
MDA N/A dpm	MDA N/A dpm	MDA N/A dpm
Mfg. Ludlum	Mfg. Ludlum	Mfg. N/A
Model 12-1A	Model 12-1A	Model ↓
Serial # 75906	Serial # N/A	Serial # ↓
Cal Due 6-17-04	Cal Due ↓	Cal Due ↓
Bkg. 0 cpm	Bkg. N/A cpm	Bkg. ↓
Efficiency 0.5	Efficiency 0.5	Efficiency ↓
MDA 500 dpm	MDA N/A dpm	MDA N/A

Survey Type: JOB SPECIFIC
Building: 776/777
Location: Cut room of ASRF
Purpose: Post wash survey < 8'

RWP #: 03-776-3228

Date: 8-22-03 Time: 0945

[redacted]

PRN/REN # : N/A

Comments: Pre – During – Post. Large Area Wipes are approximately N/A sq N/A. All radiation results in mR/Hr or mRem/Hr. All results are for Pu Alpha unless otherwise noted.

Total SURVEY RESULTS

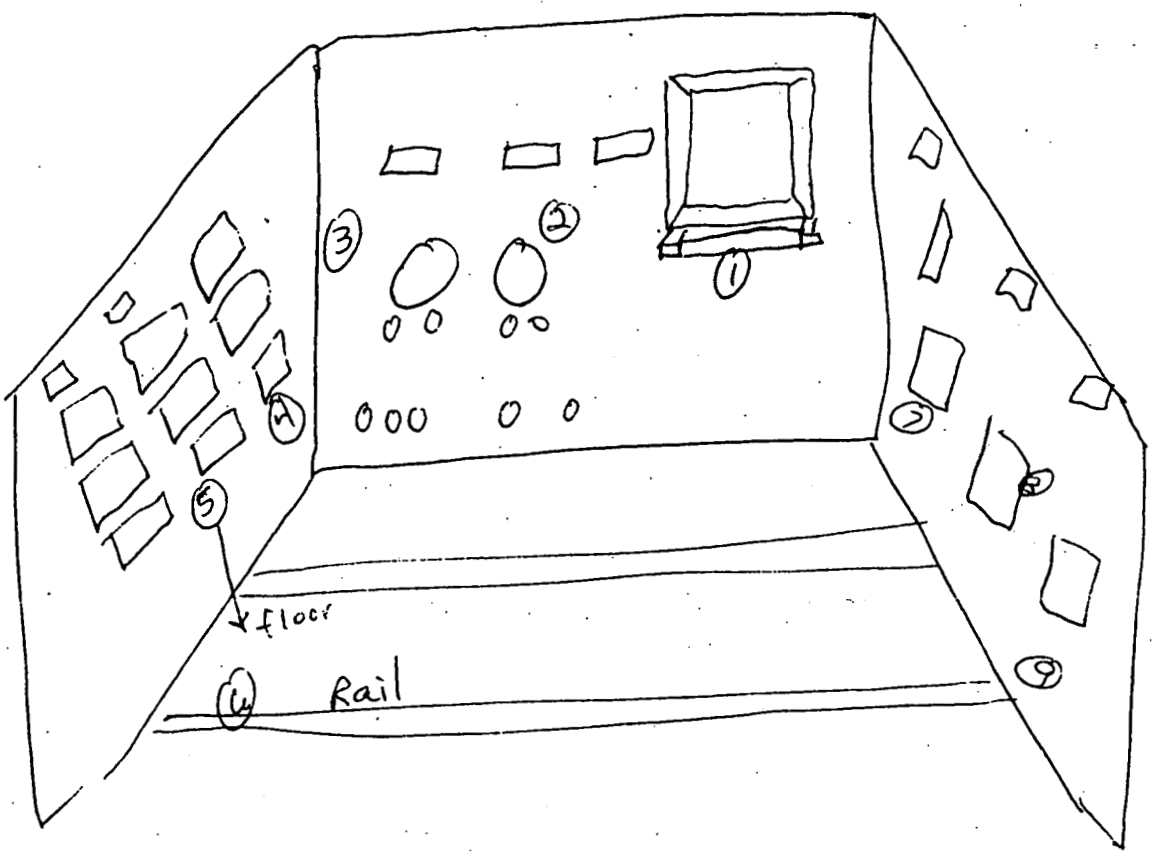
	Swipe dpm/100cm²	Swipe dpm/100cm²	~~Swipe~~ dpm/100cm²	#	Gamma Contact	Neutron Contact	Total Contact	#	Gamma at 30 cm	Neutron at 30 cm	Total at 30 cm
1	1.4E6	N/A	>40E6	1				1			
2	6.0E4	↓	4.0E5	2				2			
3	4.0E5		1.0E6	3				3			
4	3.2E5		2.2E6	4				4			
5	1.4E5		2.0E6	5				5			
6	2.2E5		2.6E6	6				6			
7	1.2E5		6.0E5	7				7			
8	4.0E4		4.0E4	8				8			
9	1.2E5		2.0E5	9				9			
10	N/A		N/A	10				10			
11	↓		↓	11				11			
12				12				12			
13				13				13			
14				14		N/A		14		N/A	
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19	↓	↓	↓	19				19			
20	N/A	N/A	N/A	20				20			

Date Reviewed:_____ RS Supervision:_____ / _____ /
Print Name Signature Emp. #

74

RADIOLOGICAL SAFETY

Drawing Showing Survey Points



ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum (A)	Mfg. Ludlum (B)	Mfg. N/A
Model 195	Model 195	Model
Serial # 187513	Serial # 187503	Serial #
Cal Due 10-24-03	Cal Due 9-12-03	Cal Due
Bkg. N/A	Bkg. n/a	Bkg.
Efficiency N/A%	Efficiency n/a %	Efficiency ↓ %
MDA 0.01 (million dpm/100cm²)	MDA 0.01 MILLION dpm/100cm²	MDA N/A
Mfg. N/A	Mfg. N/A	Mfg. N/A
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency ↓ %	Efficiency ↓ %	Efficiency ↓ %
MDA N/A	MDA N/A	MDA N/A

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF. (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 9-3-03 Time: 0945

[redacted]

PRN/REN # : N/A
Comments: ALL (A) SURVEY POINTS WITH A INST. AND (B) POINTS w/ B INS.
Note: ~~Record contamination values in accordance with RSP 07.02.~~ SZF 9-3-03
SURVEY POINTS MARKED ON INTERIOR OF ASRF

STH 9-3-03

ASRF INTERIOR TOTAL / ~~REMOVABLE~~ ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
1 (A)	96	0	96	N/A	27 (A)	101	.15	100.85	N/A
2	142	0	142		28	5.21	.15	5.06	
3	.14	0	.14		29	.29	.15	.14	
4	17.2	0	17.2		31	.85	0	.85	
5	.11	0	.11		32	21	0	21	
6	.10	0	.10		33	2.63	0	2.63	
7	.06	0	.06		34	.22	0	.22	
8	99	0	99		35	7.30	0	7.30	
9	67	0	67		36	120	0	120	
10	2.31	0	2.31		37	159	0	159	
11	.16	0	.16		38	62	0	62	
12	.84	0	.84		39	.19	0	.19	
13	14.3	.15	14.15		40	.21	0	.21	
14	.31	.15	.16		41	.22	0	.22	
15	79	.15	78.85		42	61	0	61	
16	.83	.15	.68		43	49	0	49	
17	136	.15	135.85		44	1.80	.17	1.63	
18	.37	.15	.22		45	.31	~~.31~~ .17	.14	
19	152	.15	151.85		46	.36	.17	.19	
20	5.41	.15	5.26		47	45	.17	44.83	
21	.36	.15	.21		48	79	.17	78.83	
22	37	.15	36.85		49	.33	.17	.16	
23	12.30	.15	12.15		50	.29	.17	.12	
24	.53	.15	.38		51	.35	.17	.18	
25	.71	.15	.56		52A	.57	.17	0.40	N/A
26 (A)	1.43	.15	1.28	N/A	201 A	1.24	.18	1.06	

Date Reviewed: 9-3-03 RS Supervision: S.R. Fridell (Print Name) S.R. Fridell (Signature) [redacted]

76

SCO-00776-074-REV 0: ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear dpm/100 cm²
213A	6.55	.15	6.40	N/A
202A	.24	.18	.06	
203A	.84	.03	.81	
204A	.71	.18	.53	
205A	48.0	.03	47.97	
206A	.25	.18	.07	
207A	.12	.03	.09	
208A	.09	.03	.06	
209A	.08	.03	.05	
211A	3.94	.03	3.91	
212A	38.0	.03	37.97	NA
1 B	.01	0	.01	n/a
2 B	.38	0	.38	
3 B	.22	0	.22	
4 B	.04	0	.04	
5 B	.14	0	.14	
6 B	.04	0	.04	
7 B	1.88	0	1.88	
8 B	.33	0	.33	
9 B	.10	0	.10	
10 B	.03	0	.03	
11 B	.03	0	.03	
12 B	.03	0	.03	
13 B	.03	0	.03	
14 B	.36	0	.36	
15 B	.28	0	.28	
16 B	.43	0	.43	
17 B	4.24	0	4.24	
18 B	.49	0	.49	
19 B	.58	0	.58	
20 B	.80	0	.80	n/a
21 B	.72	0	.72	
22 B	.15	0	.15	
23 B	.25	0	.25	
24 B	.13	0	.13	
25 B	.12	0	.12	
26 B	.12	0	.12	
27 B	.34	0	.34	
28 B	.23	0	.23	
29 B	.29	0	.29	
30 B	.23	0	.23	
31 B	.02	0	.02	
32 B	.14	0	.14	
33 B	2.57	0	2.57	
34 B	18.44	0	18.44	
35 B	.01	0	.01	
36 B	.06	0	.06	
37 B	.04	0	.04	
38 B	.02	0	.02	
39 B	.02	0	.02	
40 B	.20	0	.20	n/a
41 B	.03	0	.03	
42 B	.06	0	.06	
43 B	1.13	0	1.13	
44 B	.22	0	.22	
45 B	.02	0	.02	
46 B	.57	0	.57	n/a

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear dpm/100 cm²
210A	14.56	.03	14.53	NA
47 B	.11	0	.11	n/a
48 B	.22	0	.22	
49 B	.13	0	.13	
50 B	.06	0	.06	
51 B	.65	0	.65	
52 B	.73	0	.73	
53 B	.48	0	.48	
54 B	.44	0	.44	
55 B	66.0	0	66.0	
56 B	1.45	0	1.45	
57 B	.97	0	.97	
58 B	25.0	0	25.0	
59 B	.22	0	.22	
60 B	.21	0	.21	n/a
61 B	.53	0	.53	
62 B	1.63	0	1.63	
63 B	.13	0	.13	
64 B	1.25	0	1.25	
65 B	1.19	0	1.19	
66 B	1.98	0	1.98	
67 B	12.01	0	12.01	
68 B	4.26	0	4.26	
69 B	1.38	0	1.38	
70 B	2.15	0	2.15	n/a
n/a	n/a	n/a	n/a	n/a

77

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

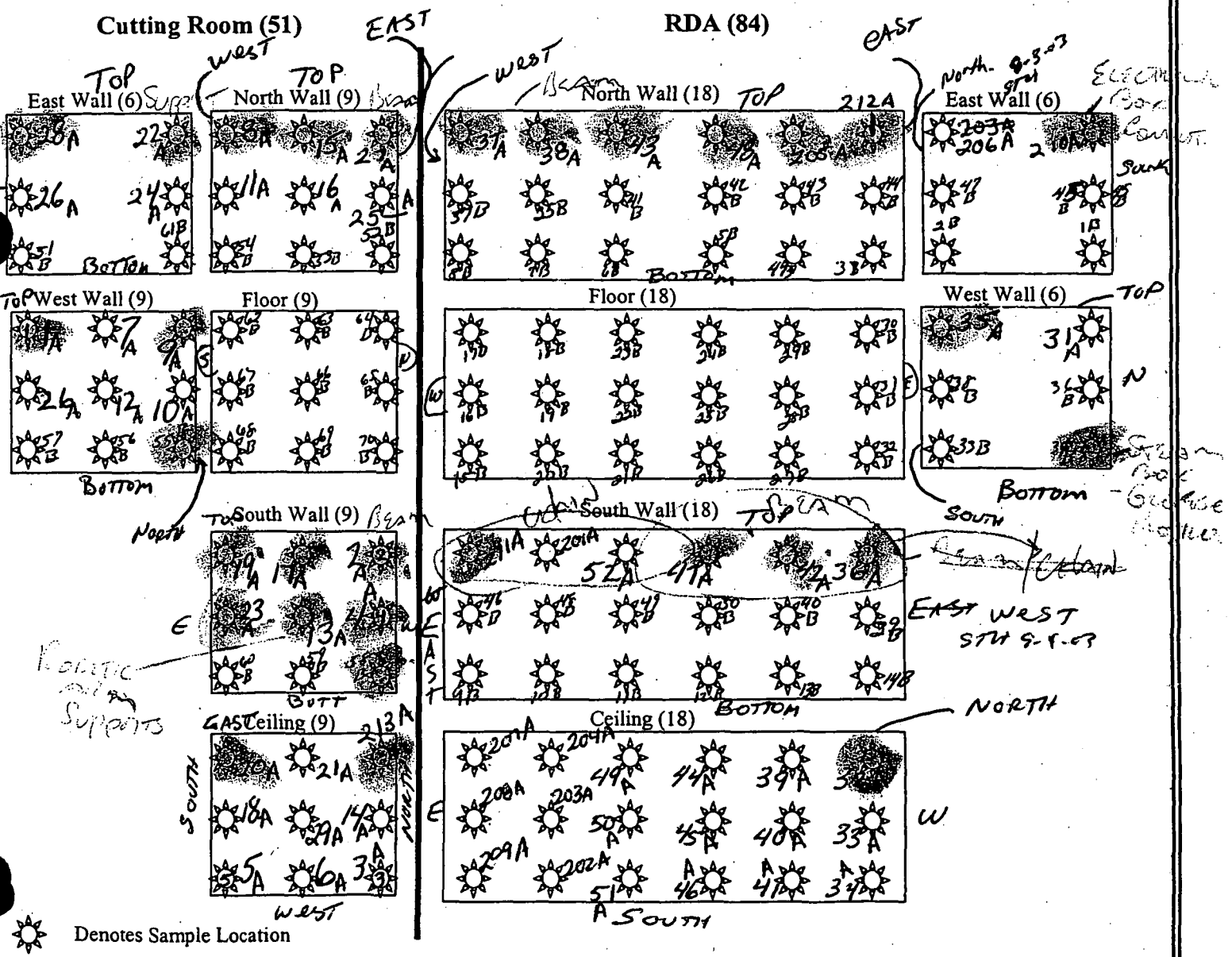
RADIOLOGICAL SAFETY

Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.



ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Performance Test Log

	Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
A	8-27-03	0800	178268	219	287	0	245 – 245	219	287	P	STK
B	8-27-03	0800	178271	216	294	0	242 – 242	216	294	P	STK
A	8-28-03	0800	178268	219	287	0.15	245 – 245	219.15	287.15	P	STK
B	8-28-03	0800	178271	216	294	0	242 – 242	216	294	P	STK
A	9-3-03	0800	178268	219	287	0.18	245 – 245	219.18	287.18	P	STK
A	9-3-03	0830	178271	216	294	0.03	242 – 242	216.03	294.03	P	STK
	N/A										N/A

79

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. # A	Inst. # B	Inst. # C
Mfg. Ludlum	Mfg. LUDLUM	Mfg.
Model 12-1A SCO	Model 12-1-A	Model
Serial # 56245	Serial # 56161	Serial # N/A
Cal Due 12-17-03	Cal Due 6-24-04	Cal Due
Bkg. 0 cpm	Bkg. 0 cpm	Bkg. cpm
Efficiency 0.146%	Efficiency .50%	Efficiency %
MDA 13,699 dpm (dpm)	MDA 500 (dpm)	MDA (dpm)

Survey Type: TOTAL ACTIVITY

Building: 776

Location: Room 134W Set 66 (Equipment – SCO II)

Purpose: SCO –00776-061-Rev 0

RWP #: 03-776-3228

Date: 9-4-03 Time: 1300

Inst. # D	Inst. # E	Inst. # F
Mfg.	Mfg.	Mfg.
Model	Model	Model
Serial # N/A	Serial # N/A	Serial # N/A
Cal Due	Cal Due	Cal Due
Bkg. cpm	Bkg. cpm	Bkg. cpm
Efficiency %	Efficiency %	Efficiency %
MDA (dpm)	MDA (dpm)	MDA (dpm)

[redacted]

PRN/REN # : N/A

Comments: Restricted use instrument – SCO use only – maximum allowed cpm: 250,000

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys. (Note: The restricted use instrument is only required if the contamination levels exceed the standard Ludlum 12-1A). **Note: Record contamination values in accordance with RSP 07.02.**

SET 66 EQUIPMENT (SCO II) FIXED ACTIVITY SURVEY RESULTS

Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]
B	60	20K	80K	ON FLAT WALL SURFACE			
B	60	600K	2400K	INSIDE DUCT REF (43B) 9-3-03			
B	63	9K	36K	ON FLAT WALL SURFACE			
B	64	50K	200K	ON FLAT WALL SURFACE			
B	66	150K	600K	ON FLAT WALL SURFACE			
A	128	20K	27.4E6	ON EAST ANGLE WALL BRACKET			
B	129	30K	120K	ON FLAT WALL SURFACE			
A	130	8K	11.0E6	INSIDE DUCT			
B	131	150K	600K	ON FLAT WALL SURFACE			
B	134	40K	160K	ON FLAT WALL SURFACE			
B	74	5K	20K	ON FLAT WALL SURFACE			
—	—	—	—	REF POINT 41A 9-3-03 SURVEY			
B	123	25K	100K	ON FLAT WALL SURFACE			
—	—	—	—	REF POINT 207A 9-3-03			

N/A

Date Reviewed: 9-4-03 RS Supervision: J.R. Fields [redacted]

Print Name Signature

1 of 2

80

~~Page 1 of 3~~ Page ~~2 of 2~~

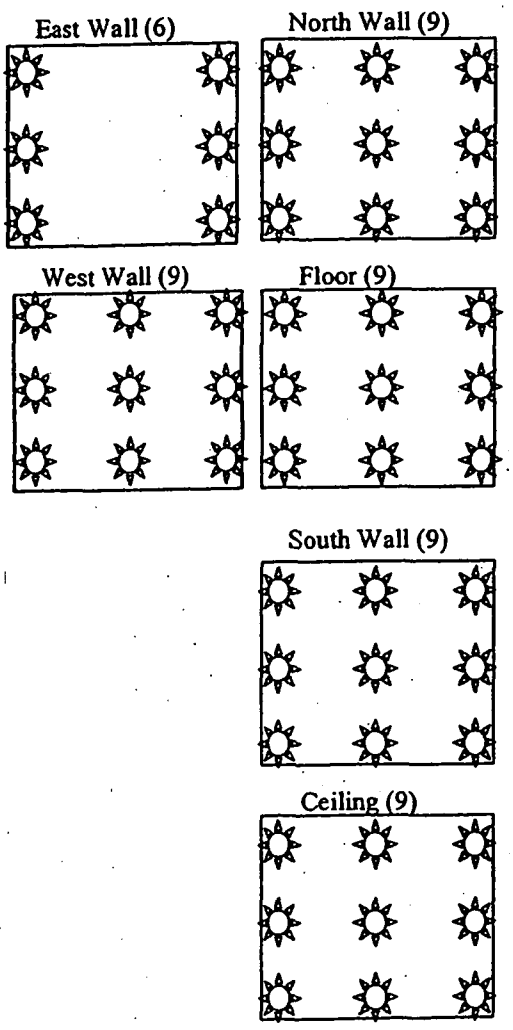
SYH 9-4-03

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

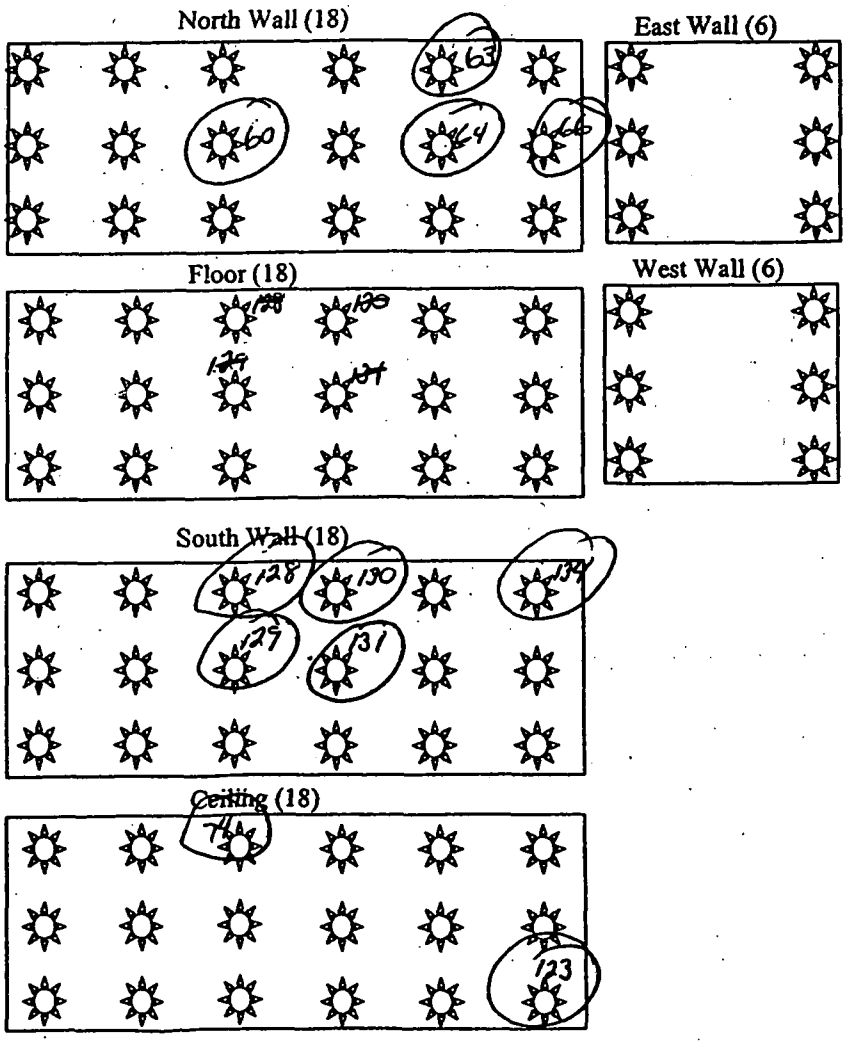
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling.

Cutting Room (51)



RDA (84)



Denotes Sample Location

81

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Inst. # A	Inst. # B	Inst. # C
Mfg. Ludlum	Mfg. Ludlum	Mfg.
Model 12-1A-SCO	Model 12-1-A	Model
Serial # 56245	Serial # 56161	Serial # N/A
Cal Due 12-17-03	Cal Due 6-24-04	Cal Due
Bkg. 0 cpm	Bkg. 0 cpm	Bkg. cpm
Efficiency 0.146%	Efficiency 50 %	Efficiency %
MDA 13,699 dpm (dpm)	MDA 500 (dpm)	MDA (dpm)

Inst. # D	Inst. # E	Inst. # F
Mfg.	Mfg.	Mfg.
Model	Model	Model
Serial # N/A	Serial # N/A	Serial # N/A
Cal Due	Cal Due	Cal Due
Bkg. cpm	Bkg. cpm	Bkg. cpm
Efficiency %	Efficiency %	Efficiency %
MDA (dpm)	MDA (dpm)	MDA (dpm)

Survey Type: TOTAL ACTIVITY

Building: 776

Location: Room 134W Set 66 (Equipment – SCO II)

Purpose: SCO –00776-061-Rev 0

RWP #: 03-776-3228

Date: 9-4-03 Time: 1300

[redacted]

PRN/REN # : N/A

Comments: Restricted use instrument – SCO use only – maximum allowed cpm: 250,000

An MDA of 20 cpm will be used for the Ludlum 12-1A modified for SCO surveys. (Note: The restricted use instrument is only required if the contamination levels exceed the standard Ludlum 12-1A). Note: Record contamination values in accordance with RSP 07.02.

SET 66 EQUIPMENT (SCO II) FIXED ACTIVITY SURVEY RESULTS

Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]	Inst. #	Location	cpm	dpm/100 cm² [=(cpm/efficiency)*2]
B	1B	30K	120K	A	34B	30K	41.1 E6
B	2B	200K	800K	A	55B	60.0K	82.2E6
B	3B	150K	600K	A	57B	2K	2.7 E6
B	4B	50K	200K	A	58B	20K	27.4E6
B	5B	75K	300K	A	65B	1K	1.4 E6
B	6B	35K	140K	A	66B	0.9K	1.2 E6
A	7B	12K	16.4 E6	B	66B	120K	480K
B	8B	120K	480K	A	67B	8.0K	11.0 E6
B	9B	40K	160K	A	68B	3K	4.1 E6
B	12B	20K	80K	A	69B	4K	5.5 E6
B	13B	20K	80K	B	69B	>10⁶	>10⁶
B	14B	200K	800K	A	70B	2.5K	~~10K~~ 3.4 E6
B	15B	350K	1400K				
B	16B	250K	1000K				
A	17B	3K	4.1 E6				
B	18B	400K	1600K				
B	19B	500K	2000K				
B	25B	200K	800K				
B	31B	25K	100K				
A	33B	1.5K	2.1 E6				

N/A

Date Reviewed: 9-4-03 RS Supervision: S.R. Fuller (Print Name) [redacted] (Signature)

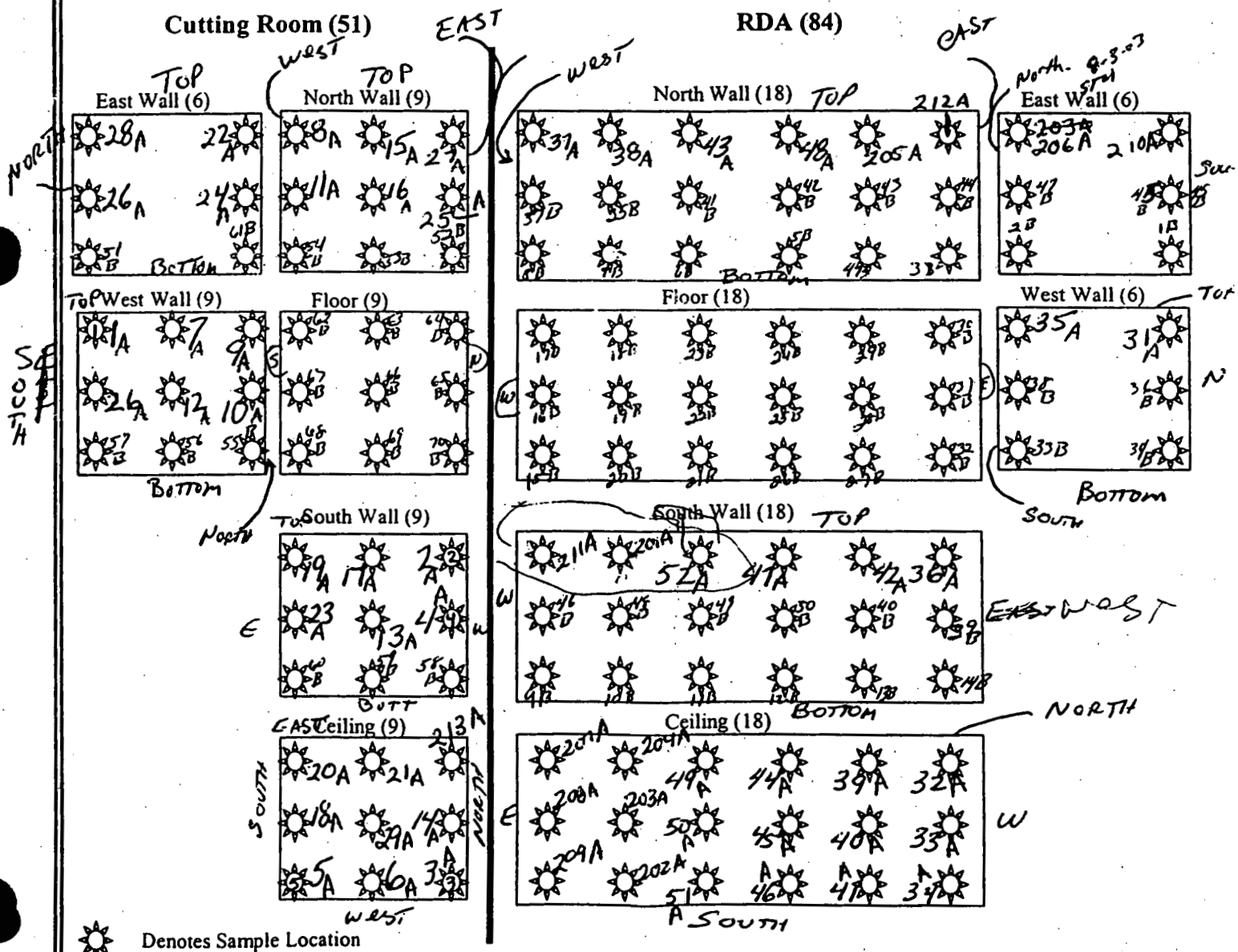
82

2 of 2
Page ~~3 of 4~~

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.



83

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

COPY

INSTRUMENT DATA

Mfg. Eberline	Mfg. Eberline	Mfg. N/A
Model SAC-4	Model SAC-4	Model
Serial # N/A	Serial # N/A	Serial #
Cal Due	Cal Due	Cal Due
Bkg. cpm	Bkg. cpm	Bkg.
Efficiency 0.33	Efficiency 0.33	Efficiency
MDA N/A dpm	MDA N/A dpm	MDA
Mfg. Ludlum	Mfg. Ludlum	Mfg.
Model 12-1A	Model 12-1A	Model
Serial # 56077	Serial # N/A	Serial #
Cal Due 8-25-4	Cal Due	Cal Due
Bkg. 0 cpm	Bkg. cpm	Bkg.
Efficiency 0.50	Efficiency 0.50	Efficiency
MDA 500 dpm	MDA N/A dpm	MDA N/A

Survey Type: JOB SPECIFIC page 1 of 2

Building: 776/777

Location: Room 134

Purpose: See Comments section for details

RWP #: 03-776-3201

Date: 9-6-3 Time: 11:00

[redacted]

PRN/REN # N/A

ASRF gm 9-8-03

Comments: Pre - During - Post. Large Area Wipes are approximately N/A sq. N/A. All radiation results in mR/Hr or mRem/Hr. All results are for PU Alpha unless otherwise noted. Removed boots and bag out bags on 30 plastic sheet on floor, all channel remained < 500 dpm total, an sample taken in walks throughs zone / see page 2 of 2 for further details, all boots and bag out bags were on the north side of ASRF

SURVEY RESULTS

#	Swipe dpm/100cm2	Wipe dpm/wipe	Direct dpm/100cm2	#	Gamma Contact	Neutron Contact	Total Contact	#	Gamma at 30 cm	Neutron at 30 cm	Total at 30 cm
1	N/A	N/A	40,000	1				1			
2	N/A		30,000	2				2			
3	4,000		100,000	3				3			
4	N/A		400,000	4				4			
5	N/A		30,000	5				5			
6	2000		40,000	6				6			
7	N/A		40,000	7				7			
8	N/A		60,000	8				8			
9	4,000	N/A	400,000	9			N/A	9			
10	N/A NO PORT		N/A	10				10			
11	N/A	N/A	40,000	11				11			
12	10,000		80,000	12				12			
13	N/A		120,000	13				13			
14	N/A		24,000	14				14			
15	2000		18,000	15				15			
16	N/A		24,000	16				16			
17	N/A		50,000	17				17			
18	3000		40,000	18				18			
19	N/A		80,000	19				19			
20	N/A	N/A	100,000	20				20			

Date Reviewed: 9-8-03 RS Supervision: Mattson (Print Name) [redacted] (Signature)

RADIOLOGICAL SAFETY

Drawing Showing Survey Points

1. Surveyed port #4 before wet wiping port opening
   A. before 70,000 dpm/100 cm² removable
   B. after 4000 dpm/100 cm² removable

2. Surveyed port #17 before wet wiping port opening
   A. before 60,000 dpm/100 cm² removable
   B. after 2500 dpm/100 cm² removable

3. Surveyed # 20 before wet wiping port opening
   A. before 100,000 dpm/100 cm² removable
   B. after 6000 dpm/100 cm² removable

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

COPY

INSTRUMENT DATA

Mfg. Eberline	Mfg. Eberline	Mfg. N/A
Model SAC-4	Model SAC-4	Model
Serial # N/A	Serial # N/A	Serial #
Cal Due ↓	Cal Due ↓	Cal Due
Bkg. N/A cpm	Bkg. N/A cpm	Bkg.
Efficiency 0.33	Efficiency 0.33	Efficiency ↓
MDA N/A dpm	MDA N/A dpm	MDA N/A
Mfg. Ludlum	Mfg. Ludlum	Mfg. Ludlum
Model 12-1A	Model 12-1A	Model 12-1A
Serial # 75906	Serial # 75957	Serial # 56071
Cal Due 6-17-04	Cal Due 3-4-04	Cal Due 8-6-04
Bkg. 0 cpm	Bkg. 0 cpm	Bkg. 0 cpm
Efficiency 0.50	Efficiency 0.50	Efficiency .5
MDA 500 dpm	MDA 500 dpm	MDA 500 dpm

Survey Type: JOB SPECIFIC

Building: 776/777

Location: ASRF

Purpose: JOB - Coverage.

RWP #: 03 - 776 - 3228

Date: 9-6-03 Time: 1315

[redacted]

PRN/REN #: NA

Comments: Pre - During - Post. Large Area Wipes are approximately 1 sq. FT. All radiation results in mR/Hr or mRem/Hr. All results are for PU Alpha unless otherwise noted. Boot Removal & Installation of Flanges. All Equip, Personnel and Areas Surveyed <MDA. Lo-Vols positioned in Breathing Zones. No Radiological problems encountered. All Results on Back page in dpm/100cm2.

SURVEY RESULTS

#	Swipe dpm/100cm2	Wipe dpm/wipe	Direct dpm/100cm2	#	Gamma Contact	Neutron Contact	Total Contact	#	Gamma at 30 cm	Neutron at 30 cm	Total at 30 cm
1				1				1			
2				2				2			
3				3				3			
4				4				4			
5				5				5			
6				6				6			
7				7				7			
8				8				8			
9				9				9			
10		NA		10		NA		10		NA	
11				11				11			
12				12				12			
13				13				13			
14				14				14			
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19				19				19			
20				20				20			

Date Reviewed: 9-8-03 RS Supervision: Mattson / Matt

Print Name Signature

[redacted]

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Drawing Showing Survey Points

Boot #	Removeable	Fixed
1	NA	100Kdpm
2	NA	100Kdpm
3		20Kdpm
4	10Kdpm	40Kdpm
5	NA	40Kdpm
6	NA	
7	10Kdpm	
8	NA	
9	NA	
26	5Kdpm	20Kdpm
27	5Kdpm	10Kdpm
28	<MDA	20Kdpm
29	<MDA	40Kdpm
38	<MDA	5Kdpm
39	<MDA	5Kdpm
40	<MDA	10Kdpm
41	<MDA	5Kdpm
42	<MDA	5Kdpm
43	<MDA	5Kdpm
44	5Kdpm	100Kdpm
45	5Kdpm	20Kdpm
(14")	By ±44 5Kdpm	25Kdpm
21	80Kdpm	300Kdpm
22	NA	1E6 dpm
63	NA	400Kdpm
64	160Kdpm	400Kdpm
65	NA	320Kdpm
66	NA	1E6 dpm
67	380Kdpm	800Kdpm
68	NA	1E6 dpm
69	NA	1.2E6 dpm
70	140Kdpm	320Kdpm
71	NA	600Kdpm

Boot #	Removeable	Fixed
50	NA	200Kdpm
49	NA	30Kdpm
36	NA	200Kdpm
37	NA	320Kdpm
57	NA	40Kdpm
58	8Kdpm	40Kdpm
47	4Kdpm	120Kdpm
48	10Kdpm	40Kdpm
35	4Kdpm	400Kdpm
~~34~~ 44	NA	300Kdpm
56	NA	100Kdpm
55	NA	120Kdpm
54	NA	40Kdpm
53	2Kdpm	140Kdpm
52	NA	80Kdpm
51	2Kdpm	32Kdpm
GPB427	12Kdpm	400Kdpm

Page ____ of ____

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 187513	Serial #	Serial #
Cal Due 10-24-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO -00776-074-Rev 0
RWP #: 03-776-3228

Date: 9-8-03 Time: 1530

Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

[redacted]

PRN/REN # : N/A
Comments: In Location A - Pre B Post Survey ~~5 smear~~ ~~A direct~~
Note: Record contamination values in accordance with RSP 07.02.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
1A	57	0	57	2.34	NA				
1B	.51	.04	0.47 ~~0.47~~	0.14					
2A	103	.07	102.93	3.01					
2B	2.94	.07	2.87	0.28					
3A	138	.04	137.96	6.27					
3B	.82	.07	0.75	0.13					
4A	99	.04	98.96	4.97					
4B	1.23	.07	1.16	0.20					
5A	7.25	.04	7.21	0.39					
6A	75	.07	74.93	2.63					
6B	1.61	.07	1.54	0.30					
7A	64	.07	63.93	6.86					
7B	0.39	.07	0.32	0.14					
8A	41	.07	40.93	1.51					
8B	6.52	.07	6.45	0.21					
9A	84	.07	~~83.93~~	4.09					
9B	7.6	.07	75.3	0.39 ~~[illegible]~~					
~~33B/A~~				~~NA~~					
~~33B/B~~				~~NA~~					
34B/A	15.7	.07	15.63	1.0					
34B/B	4.31	.07	4.24	0.29					
NA				NA					NA

Date Reviewed: 9-9-03 RS Supervision: Mattson / [illegible] [redacted]
Print Name Signature

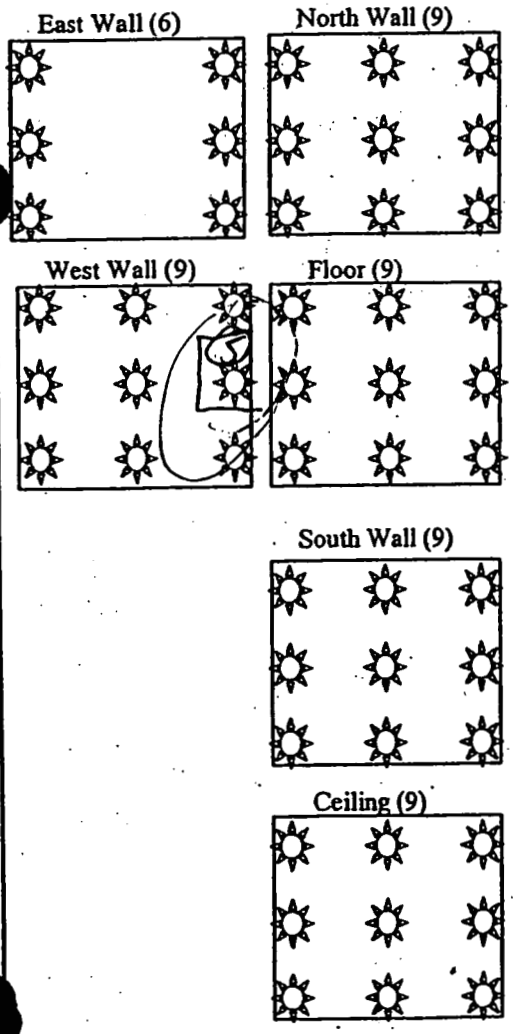
88

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

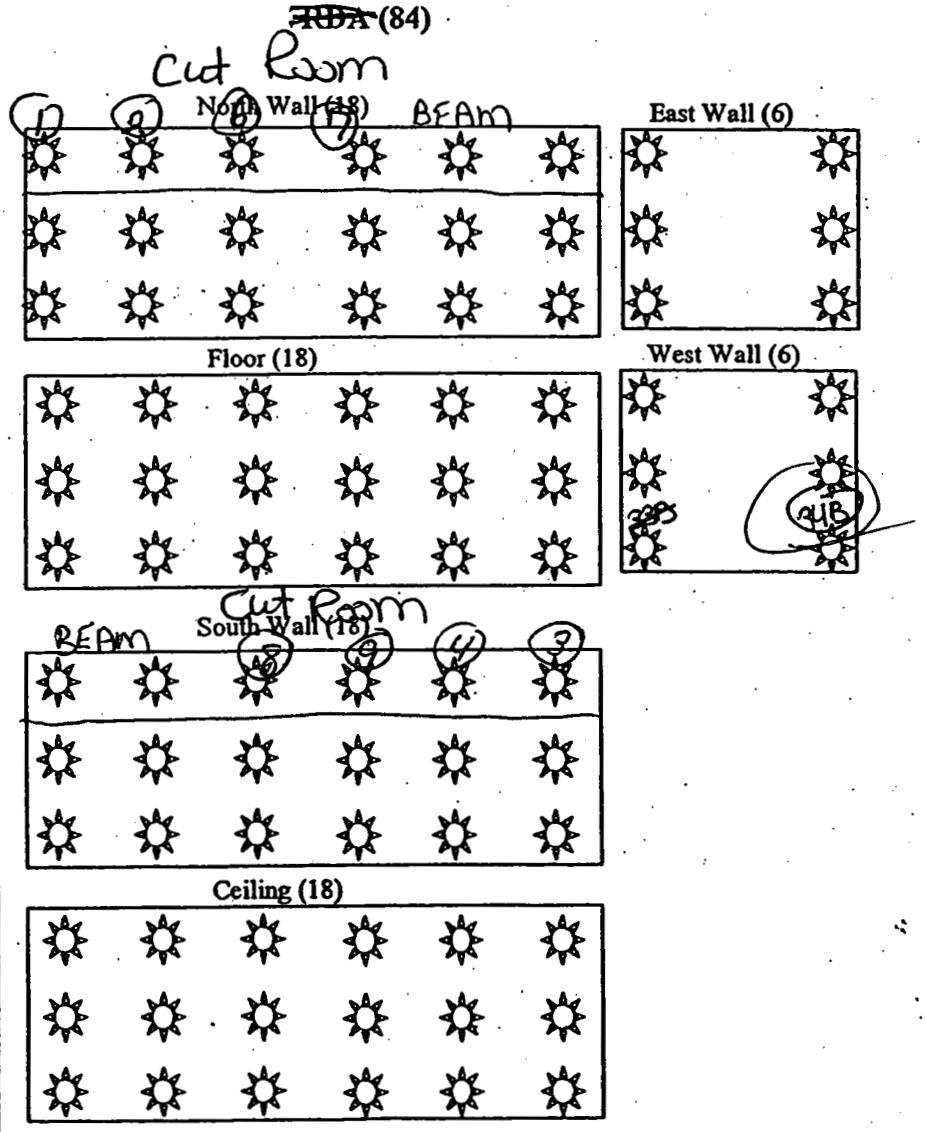
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.

Cutting Room (51)



~~RDA~~ (84)



Denotes Sample Location

89

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 187513	Serial #	Serial #
Cal Due 10-29-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA

Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 9-9-03 Time: 1530

[redacted]

PRN/REN # : N/A
Comments: A pre B post points 19-20 no direct taken
Note: Record contamination values in accordance with RSP 07.02. just smears on windows

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
9A	11.34	.17	11.17	1.2	33B-A	24	.17	23.83	2.82
9B	4.92	.17	4.75	0.4	33B-B	6.83	.17	6.66	.29
10A	96	.10	95.9	2.57	NA				
10B	.91	.10	0.81	.30					
11A	56	.17	55.83	3.10					
11B	.33	.17	0.16	0.31					
12A	66	.17	65.83	3.1					
12B	1.23	.17	1.06	0.19					
13A	126	.17	125.83	4.29					
13B	.94	.17	0.77	0.21					
14A	115	.17	114.83	4.20					
14B	0.95	.17	0.78	0.22					
15A	78	.17	77.83	3.83					
15B	.91	.17	.74	0.21					
16A	40	.17	39.83	0.96					
16B	4.24	.17	4.07	0.30					
17A	41.0	.17	40.83	0.70					
17B	.99	.17	0.82	0.20					
18A	67	~~.07~~ .07	66.93	2.83					
18B	3.82	~~.07~~ .07	3.75	.31					
19A	NA			0.33					
19B				0.22					
20A				0.44					
20B			NA	0.32					
7BA	62	.2	61.8	0.82					
7BB	18.52	.2	18.32	0.32					NA

Date Reviewed: 9-10-03 RS Supervision: Mattson / Matt
Print Name Signature [redacted]

90

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

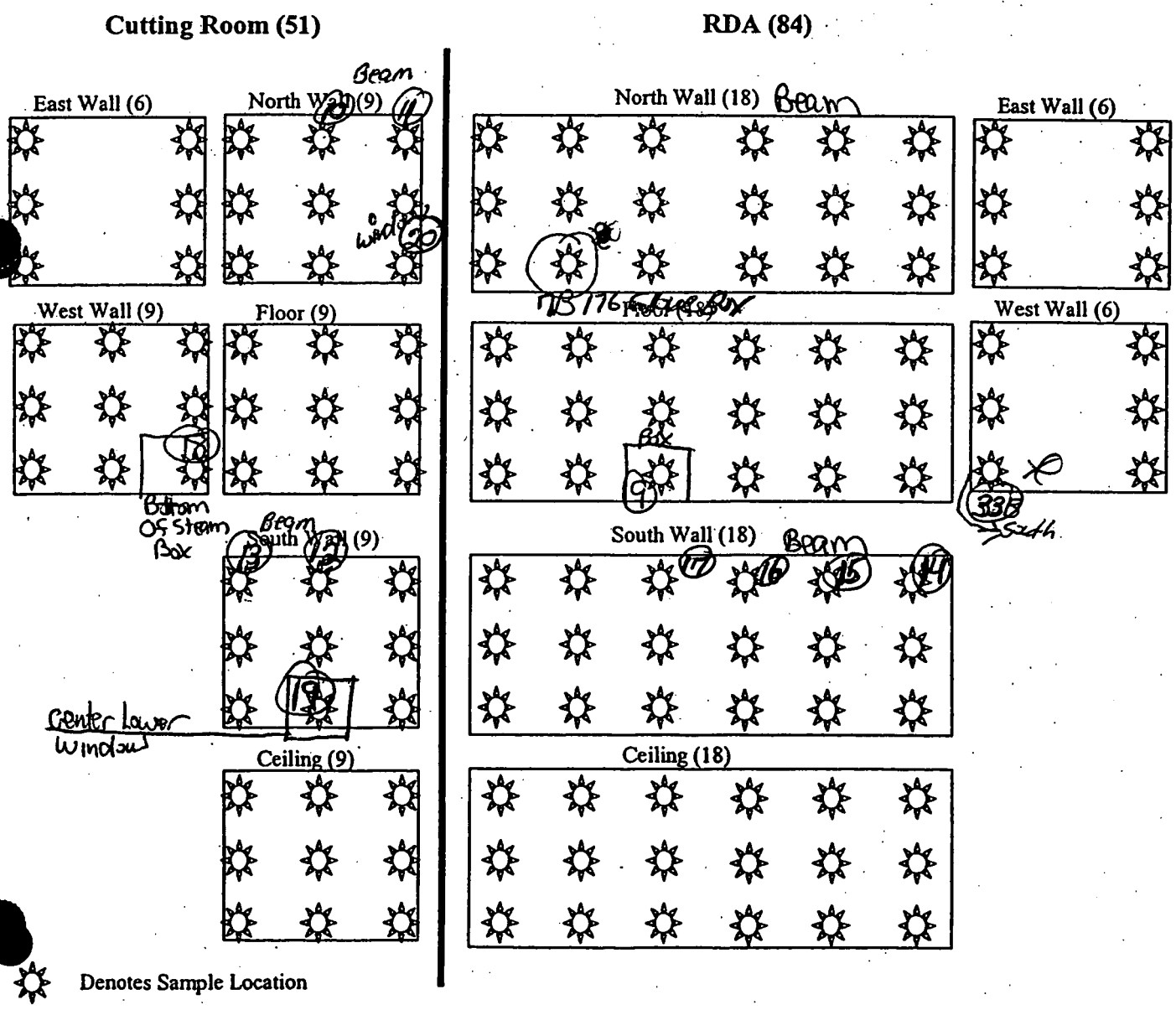
RADIOLOGICAL SAFETY

Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.



91

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 187573	Serial #	Serial #
Cal Due 10-24-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA

Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 9-10-03 Time: 1330

[redacted]

PRN/REN # : N/A
Comments:
Note: Record contamination values in accordance with RSP 07.02.
Large Area Wipes shown Below minus Background. 1 sq meter

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	~~DIRECT million dpm/100cm²~~ Large Area Wipes. RAN Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
1	0.14	0.13	0.01	NA	NA				
2	0.2	0.13	0.07						
3	0.21	0.13	0.08						
4	0.22	0.13	0.09						
5	0.23	0.13	0.10						
6	0.27	0.13	0.14						
7	0.19	0.13	0.06						
8	0.27	0.13	0.14						
9	0.51	0.13	~~0.38~~ 0.38						
10	0.83	0.13	0.70						
11	0.4	0.13	0.27						
12	0.29	0.13	0.16						
13	0.21	0.13	0.08						
14	0.48	0.13	0.35						
15	0.25	0.13	0.12						
16	0.23	0.13	0.10						
NA			NA	NA					NA

Date Reviewed: 9-11-03 RS Supervision: Mattson / Matt
Print Name Signature

[redacted]

92

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

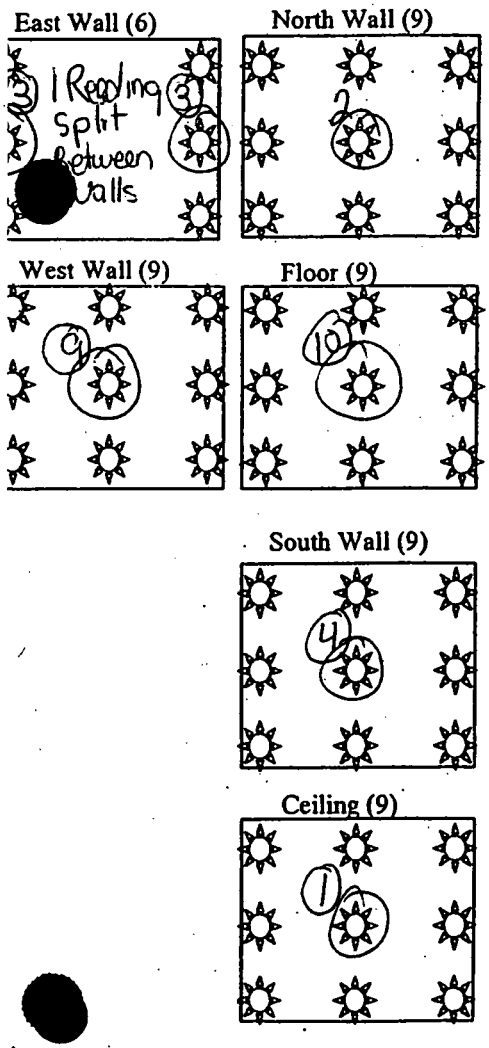
Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

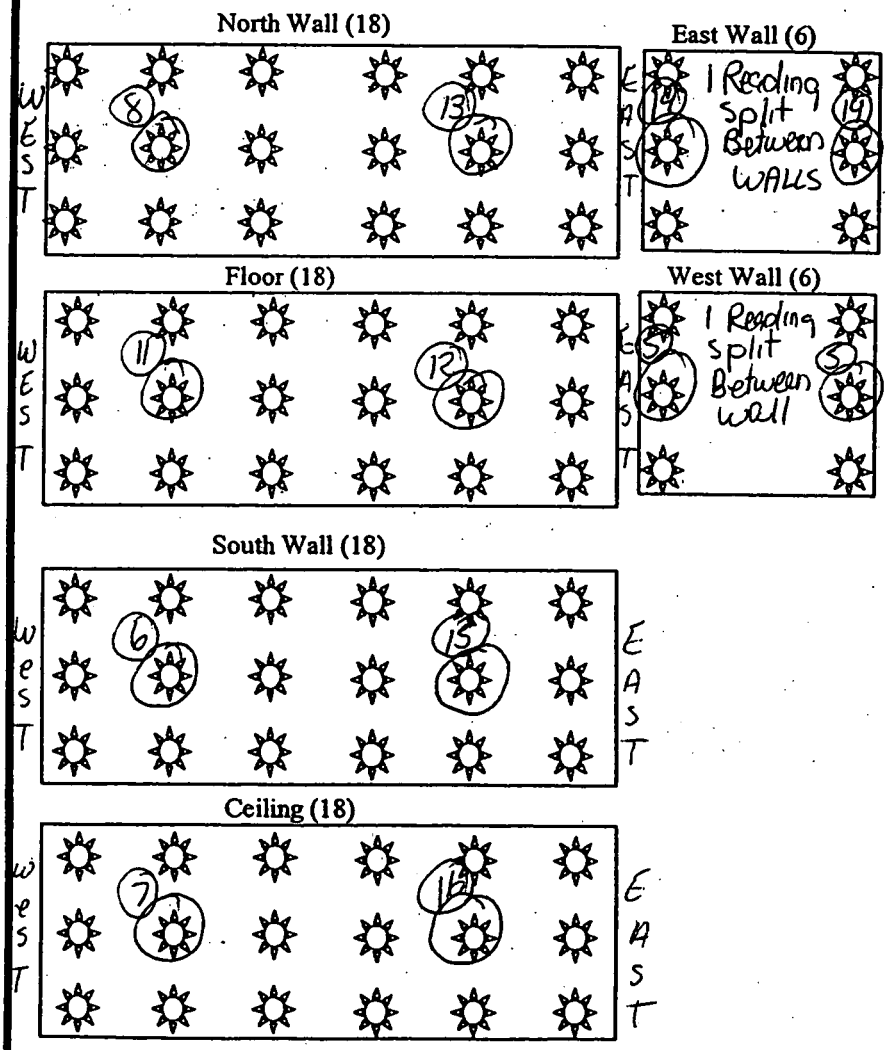
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.

Cutting Room (51)



RDA (84)



Denotes Sample Location

93

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 182578	Serial #	Serial #
Cal Due 10-24-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA

Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 9/10-03 Time: 1500

[redacted]

PRN/REN # : N/A
Comments: A Pre B Post
Note: Record contamination values in accordance with RSP 07.02.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	- Background	= Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	- Background	= Net	Smear (dpm/100cm²)
21A	52	0.13	51.87	1.45	NA				
21B	1.27	0.13	1.14	0.24					
22A	48	0.13	47.87	1.10					
22B	1.39	0.13	1.26	0.18					
23A	28	0.13	27.87	0.52					
23B	1.59	0.13	1.46	0.19					
24A	56	0.13	55.87	1.25					
24B	8.92	0.13	8.79	0.28					
NA				NA					NA

Date Reviewed: 9-11-03 RS Supervision: Matt Sa / Matt
Print Name Signature [redacted]

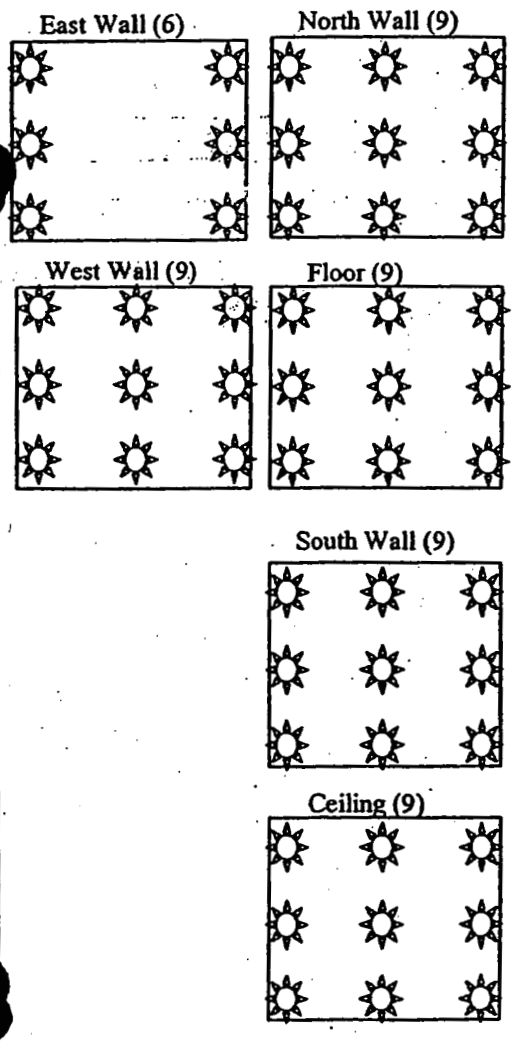
94

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

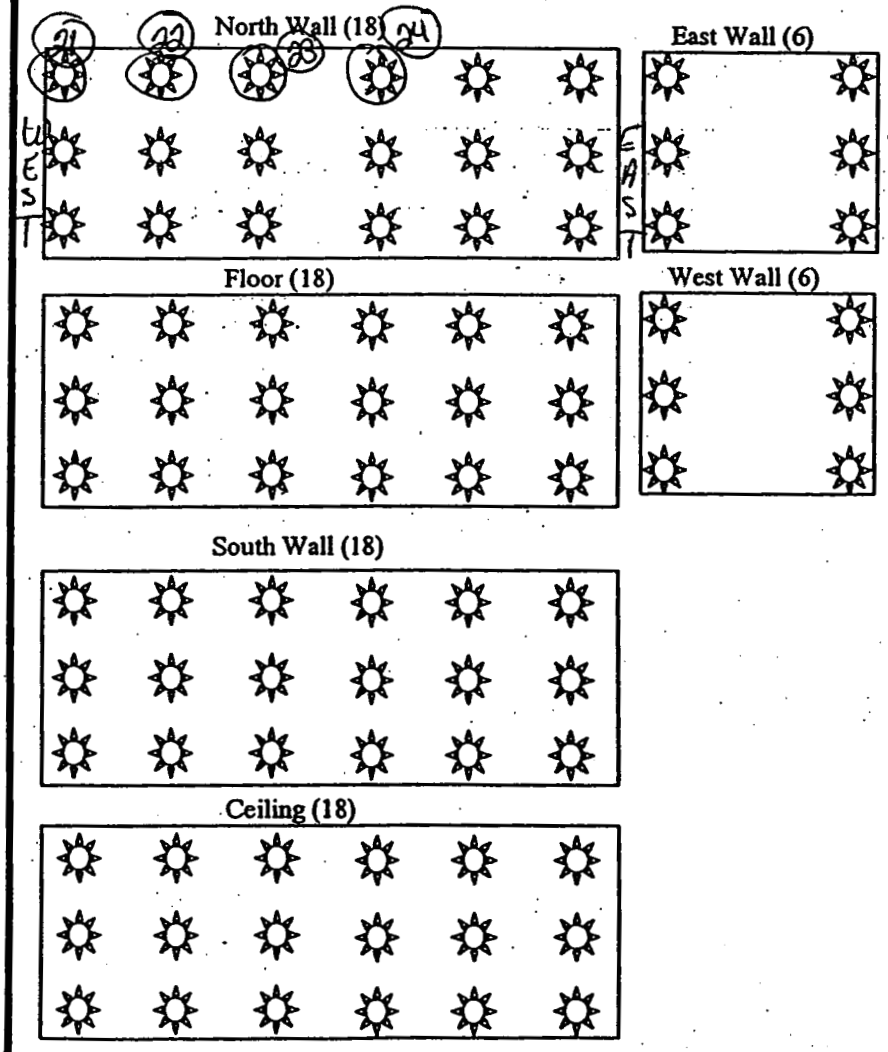
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.

Cutting Room (51)



RDA (84)



Denotes Sample Location

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

same probe and Inst since 9-5-03

Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9-10-03	0805	PR178628	218	256	.13	244 - 244	218.13	256.13	Pass	[redacted]

N/A

96

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 187513	Serial #	Serial #
Cal Due 10-24-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0

RWP #: 03-776-3228

Date: 9-11-03 – 9-12-03 Time: 1430

Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

[redacted]

PRN/REN # : N/A
Comments: A Pre B post
Note: Record contamination values in accordance with RSP 07.02.
All Reading Below are on North wall Beam

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
25A	45	0.20	44.8	0.66	NA				
25B	7.05	0.20	6.85	0.25					
26A	66	0.20	65.8	1.32					
26B	3.32	0.20	3.12	.30					
27A	38.	0.18	37.82	.82					
27B	20	0.18	19.82	.61					
28A	44	0.20	43.8	1.06					
28B	0.94	0.20	0.74	.27					
29A	33	0.20	32.8	.49					
29B	7.80	0.20	7.6	.25					
NA				NA					NA

Date Reviewed: 9-14-03 RS Supervision: Mattson / Matt
Print Name Signature [redacted]

97

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

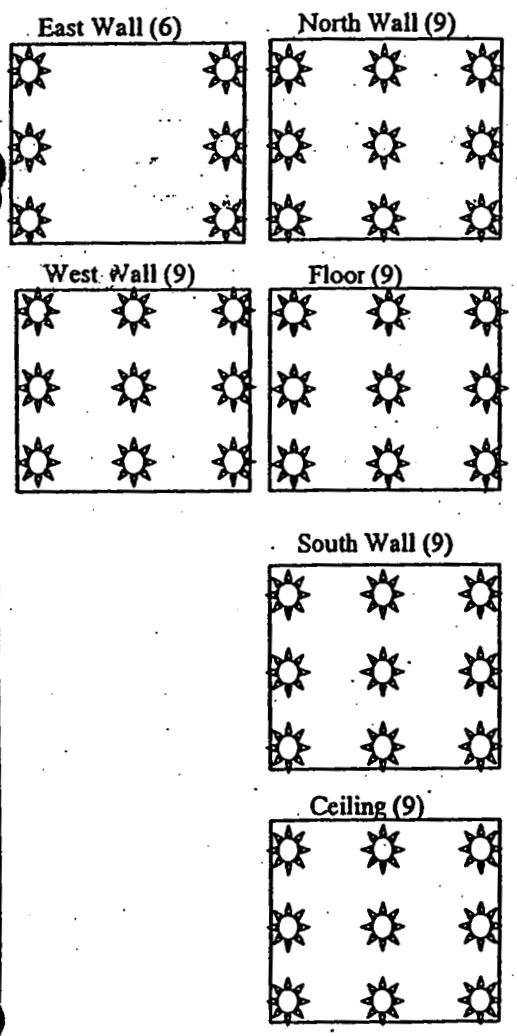
Drawing Showing Survey Points

Interior Surveys of ASRF RDA and Cutting Room: SCO-00776-074-REV0

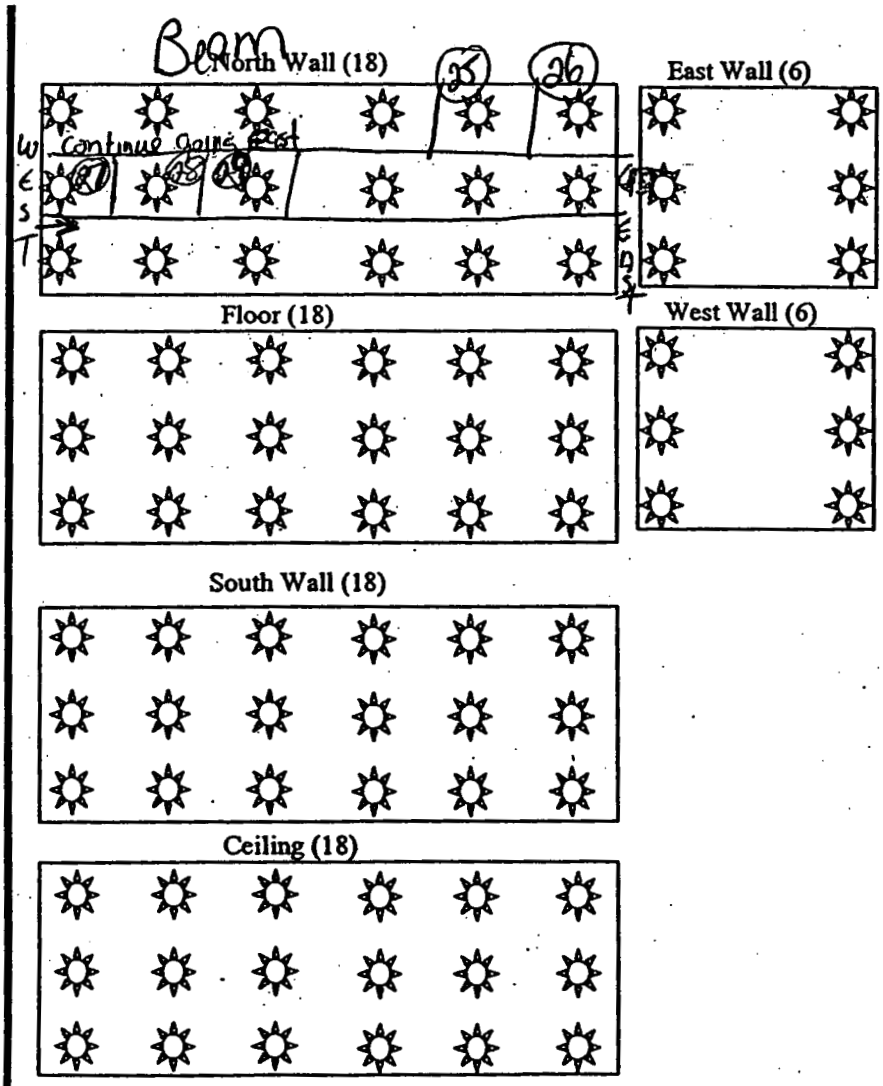
Additional Instructions

Obtain 1 measurement (floor, both sides, and ceiling) approximately every 10 feet of horizontal surface by 10 feet vertical surface in the ASRF RDA and Cutting Room. Surveys to start on bottom corner of each wall, and start from the corner of each floor and ceiling. RCT is to use judgement in obtaining surveys where there is a higher contamination potential on the surfaces being measured.

Cutting Room (51)



RDA (84)



Denotes Sample Location

98

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

SAME Probe and Inst.
since 9-5-03

Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9-11-03	0820	PR178628	~~245~~ 218	296	0.13	245 - 244	218.13	296.13	Pass	[redacted]
~~9-12-03~~		~~PR~~								
9-12-03	0825	PR178628	~~244~~ 218	~~244~~ 296	0.17	244 - 244	218.17	296.17	Pass	[redacted]

A

N

99

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Eberline	Mfg. Eberline	Mfg.
Model SAC-4	Model SAC-4	Model
Serial # N	Serial # N	Serial # N
Cal Due A	Cal Due A	Cal Due A
Bkg. cpm	Bkg. cpm	Bkg.
Efficiency 0.33	Efficiency 0.33	Efficiency
MDA dpm	MDA dpm	MDA
Mfg. Ludlum	Mfg. Ludlum	Mfg.
Model 12-1A	Model 12-1A	Model
Serial # 75985	Serial # N	Serial # N
Cal Due 10-9-03	Cal Due A	Cal Due A
Bkg. 0 cpm	Bkg. cpm	Bkg.
Efficiency 0.50	Efficiency 0.50	Efficiency
MDA 500 dpm	MDA dpm	MDA

Survey Type: JOB SPECIFIC
Building: 776/777
Location: TOP OF ASRF 2ND FLOOR
Purpose:

RWP #: 03-776-3228

Date: 9-12-03 Time: 1300

[redacted]

PRN/REN #: NA

Comments: Pre - During - Post. Large Area Wipes are approximately 1 sq. FT. All radiation results in mR/Hr or mRem/Hr. All results are for PU Alpha unless otherwise noted.

SURVEY RESULTS

#	Swipe dpm/100cm2	Wipe dpm/wipe	Direct dpm/100cm2	#	Gamma Contact	Neutron Contact	Total Contact	#	Gamma at 30 cm	Neutron at 30 cm	Total at 30 cm
1	NA	<500	~~20000~~	1	12.03			1			
2		<500	NA	2				2			
3		<500		3				3			
4		<500		4				4			
5		<500		5				5			
6		<500		6				6			
7	NA	<500		7				7			A
8	2000	NA		8			A	8			
9	1500			9				9			
10	1400			10				10	N		
11	1000			11				11			
12	NA			12				12			
13				13	N			13			
14				14				14			
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19				19				19			
20	NA	NA	NA	20				20			

Date Reviewed: 9/14/03 RS Supervision: Mathson / Matt

Print Name Signature

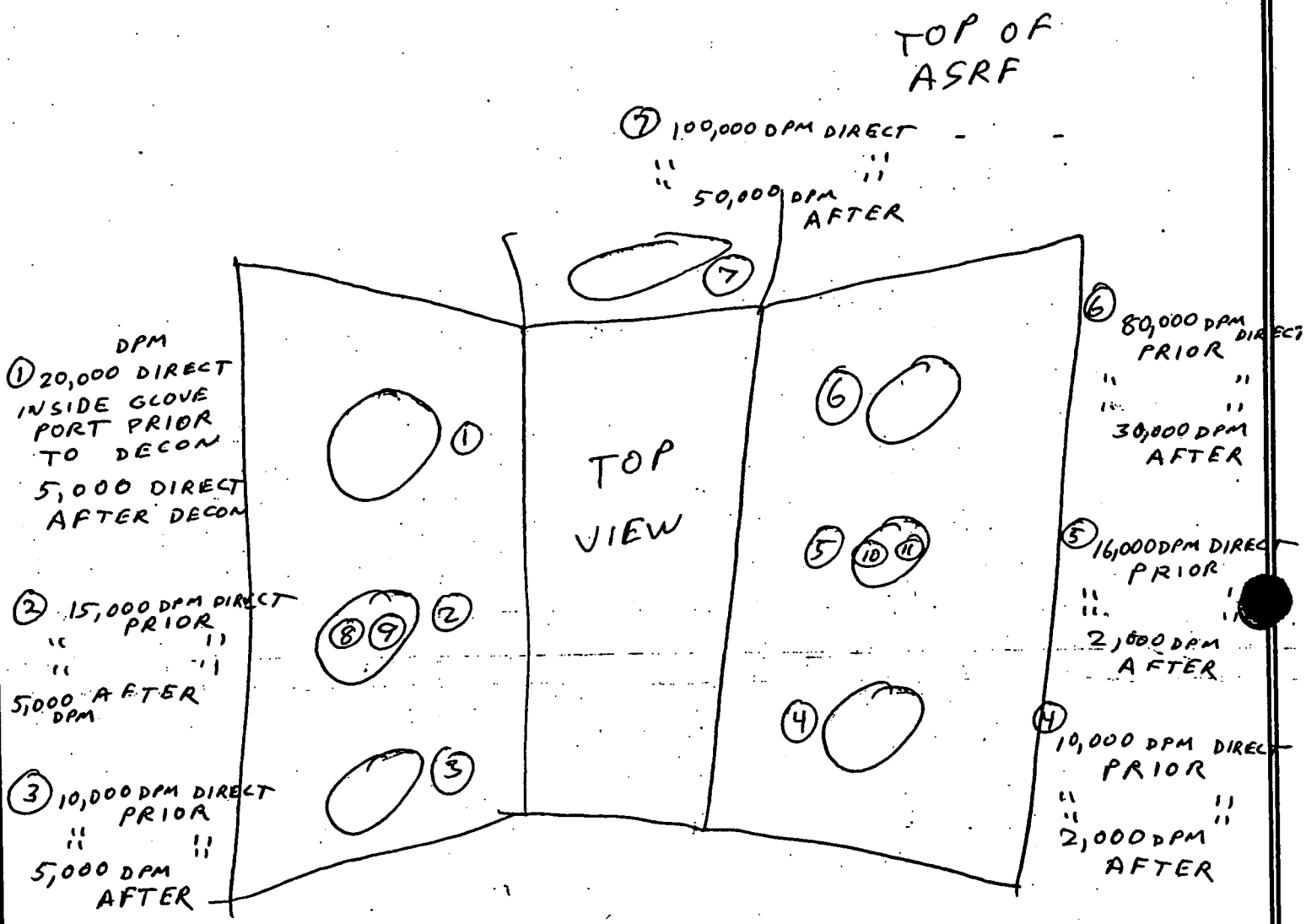
[redacted]

100

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Drawing Showing Survey Points



1-7 WIPE SURVEY OF GLOVES
PRE + POST ALL RESULTS < MDA
GLOVES WERE REPLACED WITH BLANKS.
8,9,10,11 SWIPE SURVEY OF GLOVE PORTS
SURVEY OF WORKERS DURING JOB
ALL RESULTS < MDA
AIR SAMPLING TAKEN IN WORKERS BREATING ZONE

Page ____ of ____

COPY

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg. NA	Mfg. NA
Model 195	Model	Model
Serial # 187513	Serial #	Serial #
Cal Due 10-24-03	Cal Due	Cal Due
Bkg. N/A	Bkg.	Bkg.
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA NA	MDA NA
Mfg. NA	Mfg. NA	Mfg. NA
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due	Cal Due	Cal Due
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA NA	MDA NA	MDA NA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: ASRF Survey – INTERIM DATA

RWP #: 03-776-3228

Date: 9/2/03 Time: 0950

[redacted]

PRN/REN # : N/A

Comments: RCT to perform total and removable surveys on survey locations provided by Radiological Engineering. All survey locations are to be taken on accessible flat surfaces where 100% of survey probe is within 1/4" of surface being measured.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear (dpm/100cm²)
5	0.25	0.22	0.03	0.25	NA				
6	0.26	0.22	0.04	0.23					
7	0.24	0.22	0.02	0.24					
8	0.48	0.22	0.26	0.46					
9	0.46	0.22	0.24	0.26					
10	0.30	0.22	0.08	0.25					
11	0.39	0.22	0.17	0.24					
12	0.55	0.22	0.33	0.28					
13	0.21	0.20	0.01	0.20					
14	0.24	0.20	0.04	0.20					
17	0.22	0.20	0.02	0.21					
18	0.27	0.20	0.07	0.21					
19	0.24	0.22	0.02	0.21					
NA				NA	NA				NA

Date Reviewed: 9-14-03 RS Supervision: Mattson / [signature]
Print Name Signature [redacted]

102

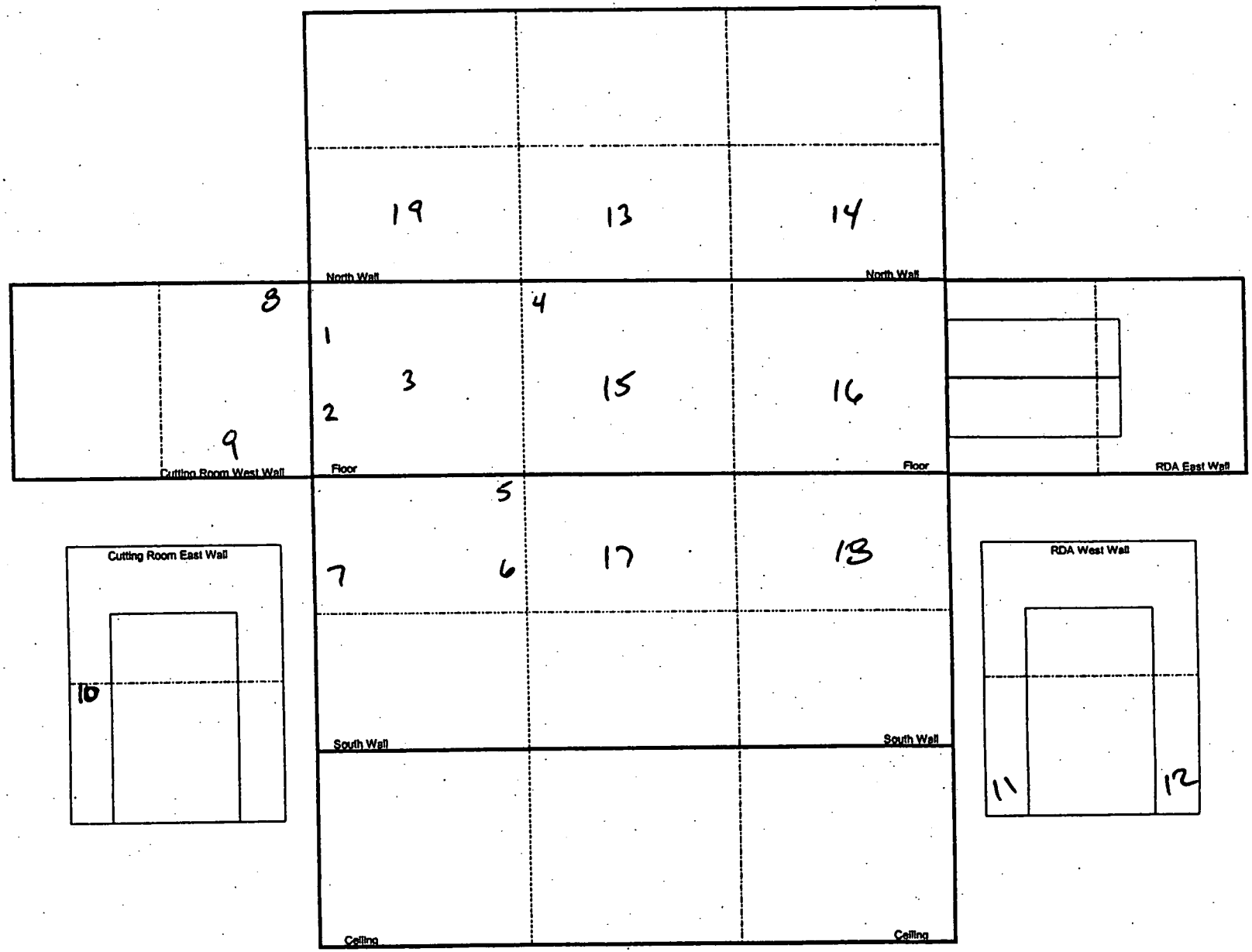
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9/2/03	0825	PR178628	218	296	0.17	244-244	218.17	296.17	Pass	[redacted]
NA										
										NA

103


19
13
14
North Wall
North Wall
8
4
1
3
15
16
2
9
Cutting Room West Wall
Floor
Floor
RDA East Wall
5
Cutting Room East Wall
7
6
17
18
RDA West Wall
10
South Wall
South Wall
11
12
Ceiling
Ceiling

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg.	Mfg.
Model 195	Model	Model
Serial # 187513	Serial #	Serial #
Cal Due 10-24-03	Cal Due N/A	Cal Due N/A
Bkg. N/A	Bkg. N/A	Bkg. N/A
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA	MDA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: ASRF Sampling Plan

RWP #: 03-776-3228

Date: 9-16-03 Time: 1130

Mfg. Lu	Mfg.	Mfg.
Model	Model	Model
Serial # N/A	Serial #	Serial #
Cal Due N/A	Cal Due N/A	Cal Due N/A
Bkg.	Bkg. N/A	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA	MDA	MDA

[redacted]

PRN/REN # : N/A

Comments: RCT to perform total and removable surveys on survey locations provided by Radiological Engineering. All survey locations are to be taken on accessible flat surfaces where 100% of survey probe is within 1/4" of surface being measured.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	= Net	Smear (dpm/100cm²)
1	0.26	0.26	0.0	N/A
2	0.28	0.26	0.02	
3	0.28	0.26	0.02	
4	0.27	0.26	0.01	
5	0.31	0.26	0.05	
6	0.62	0.26	0.36	
7	0.72	0.26	0.46	
8	0.62	0.26	0.36	
9	0.35	0.26	0.09	
10	0.30	0.26	0.04	
11	0.64	0.26	0.38	
12	0.34	0.26	0.08	
13	0.28	0.26	0.02	
14	0.51	0.26	0.25	
15	0.27 0.39	0.26	0.13	
16	0.26	0.26	0.0	
17	0.27	0.26	0.01	
18	0.30	0.26	0.04	
19	0.33	0.26	0.07	
20	0.26	0.26	0.0	
21	0.26	0.26	0.0	
22	0.26	0.26	0.0	
23	0.27	0.26	0.01	
24	0.30	0.26	0.04	
25	0.28	0.26	0.02	
26	0.31	0.26	0.05	N/A

Location	DIRECT million dpm/100cm² Total	Background	= Net	Smear (dpm/100cm²)
27	0.32	0.26	0.06	N/A
28	0.43	0.26	0.17	
29	0.58	0.26	0.32	
30	0.41	0.26	0.15	
31	0.28	0.26	0.02	
32	0.26	0.26	0.0	
33	0.43	0.26	0.17	
34	0.49	0.26	0.23	
35	0.44	0.26	0.18	
36	0.27	0.26	0.01	
37	0.26	0.26	0.0	
38	0.27	0.26	0.01	
39	0.27	0.26	0.01	
40	0.27	0.26	0.01	
41	0.47	0.26	0.21	
42	0.29	0.26	0.03	
43	0.26	0.26	0.0	
44	0.26	0.26	0.0	
45	0.26	0.26	0.0	
46	0.27	0.26	0.01	
47	0.37	0.26	0.11	N/A

Date Reviewed: 9-16-03 RS Supervision: Mattson / [signature]
Print Name Signature [redacted]

105

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9.16.03	0730	PR178628	218	296	0.26	244-244	218.26	296.26	PASS	[redacted]
			--			--				
			--			--				
			--			--				
			--			--				
			--			--				
			--			--				

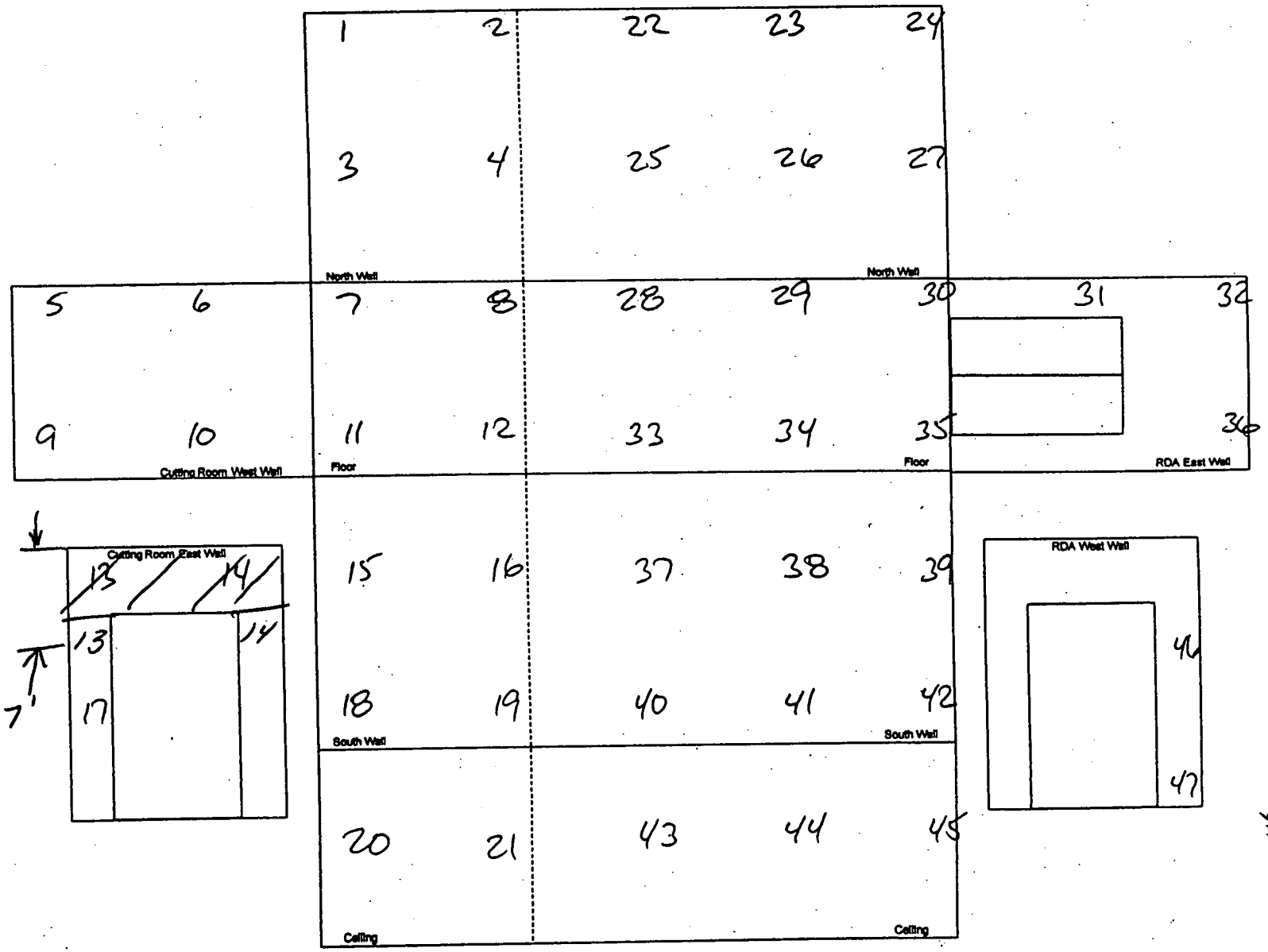
A

N

106

107

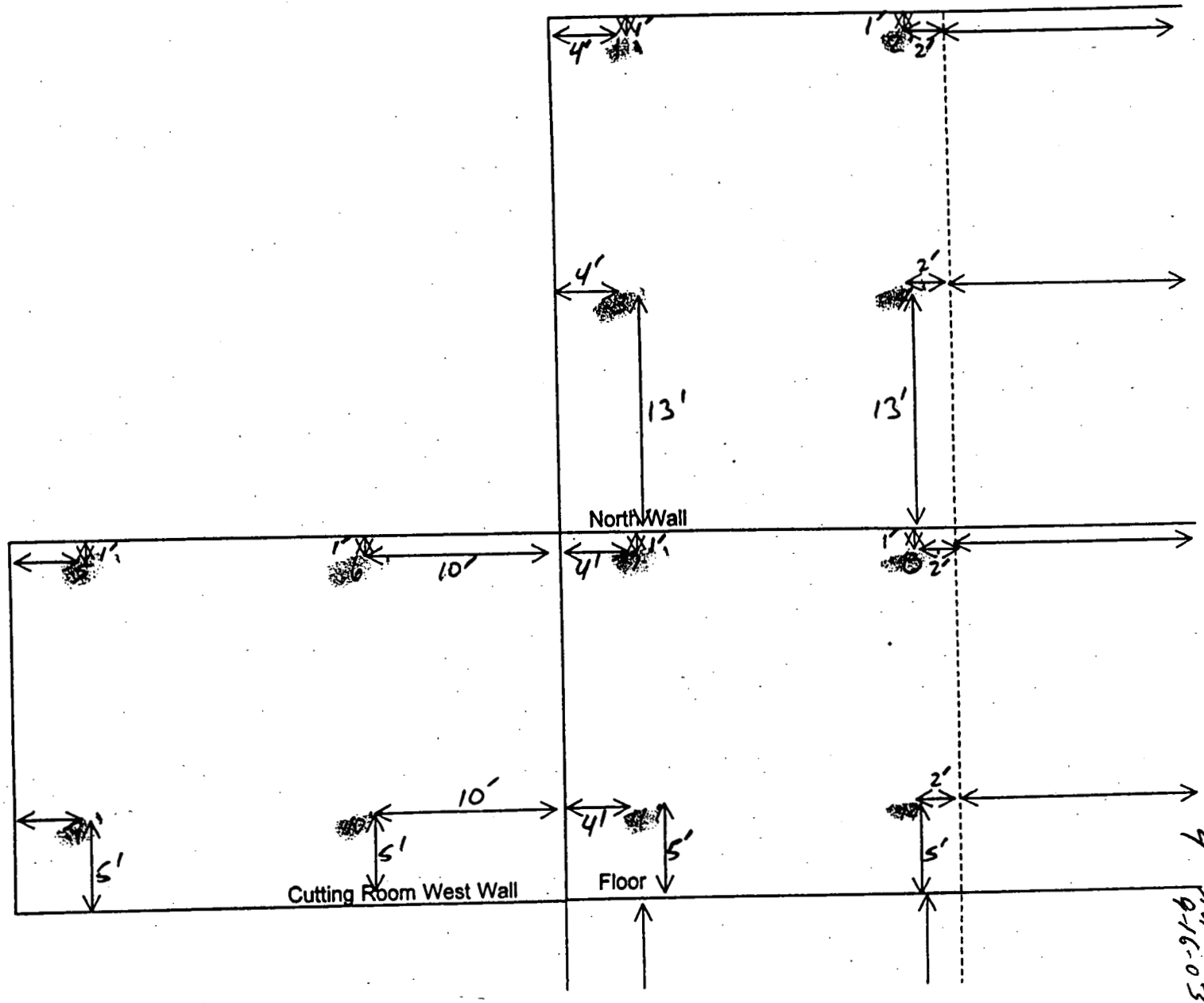
ASRF Survey Diagram



Page for 7
3 SAK
6.14.03

108

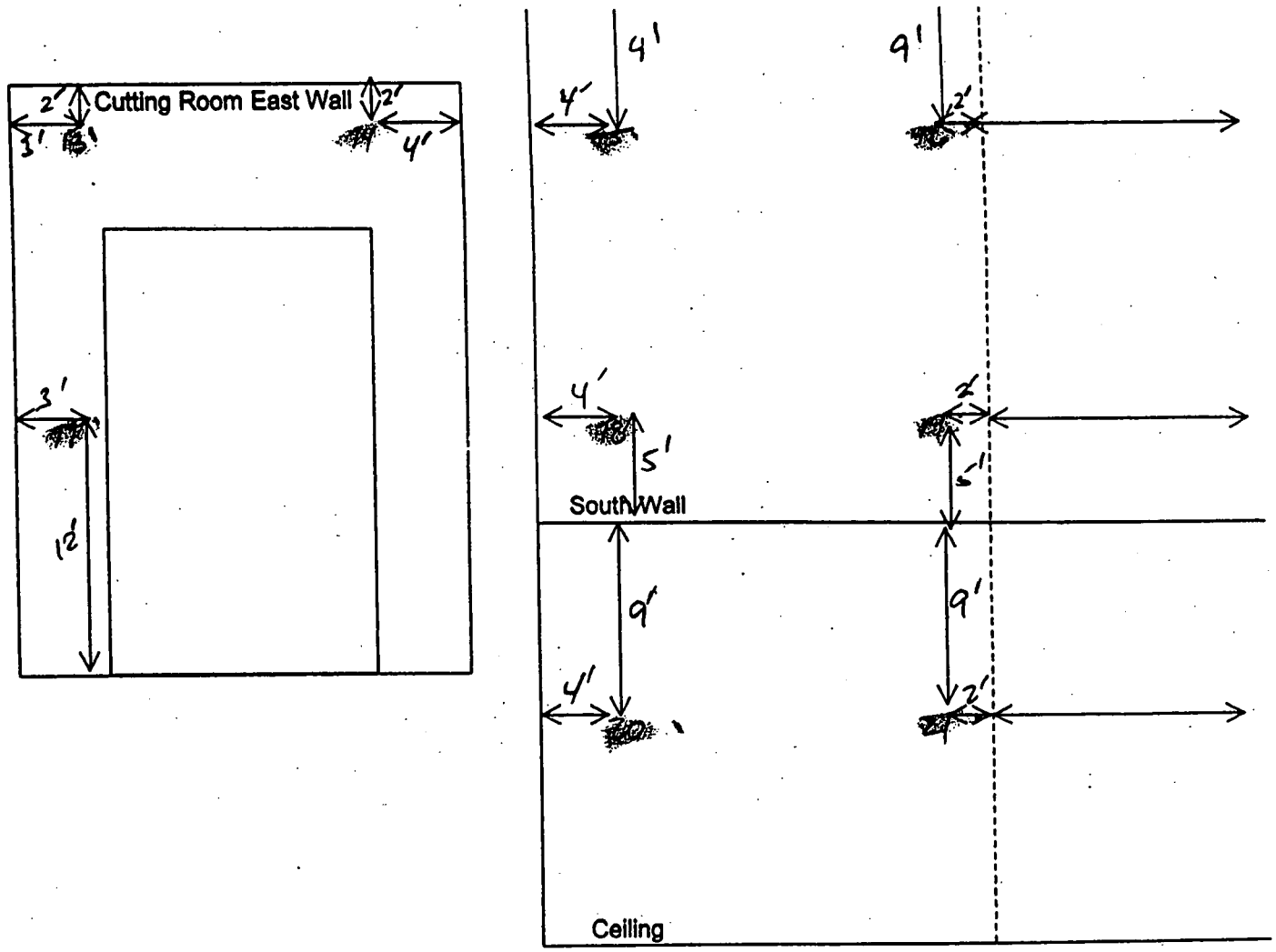
ASRF Survey Diagram



Page 8 of 7
4
SAL
6-16-03

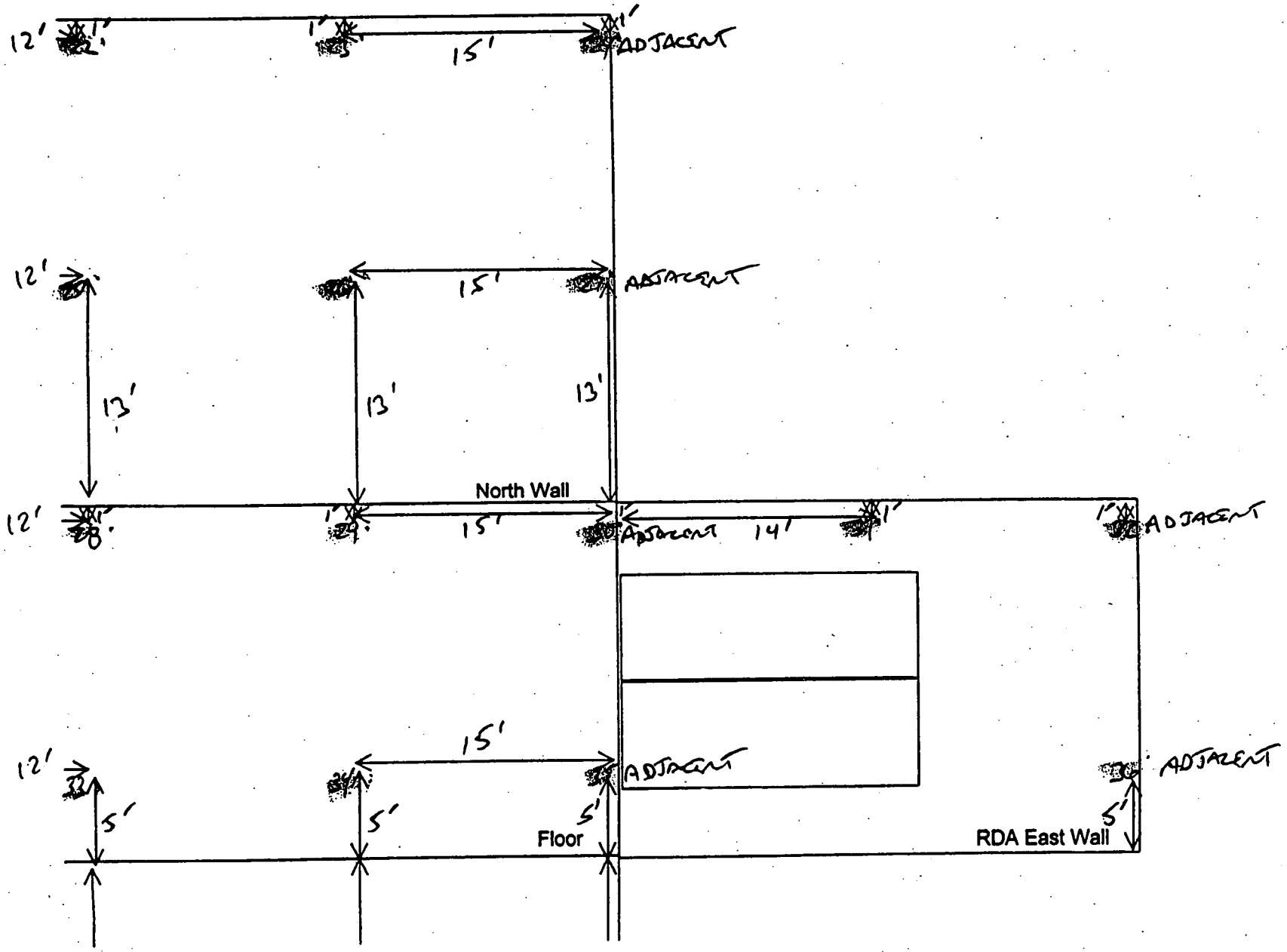
109

ASRF Survey Diagram



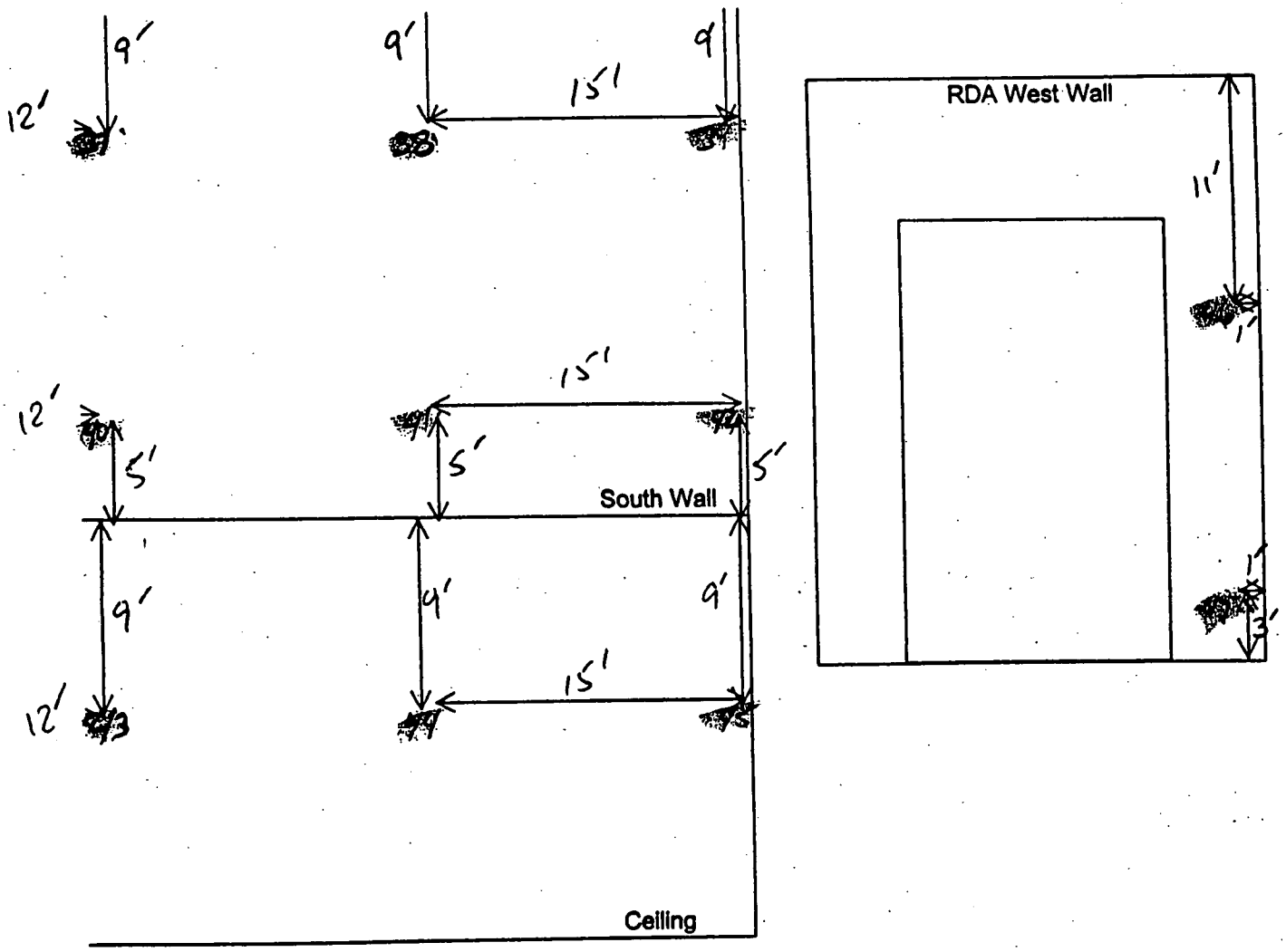
Page 4 of 7
5-19-5

ASRF Survey Diagram



Page 6 of 7

ASRF Survey Diagram



PAGE 7 OF 7

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg. Ludlum	Mfg.	Mfg.
Model 12-1-A	Model	Model
Serial # 75906	Serial #	Serial #
Cal Due 6-17-04	Cal Due N/A	Cal Due N/A
Bkg. 0 cpm	Bkg.	Bkg.
Efficiency 50%	Efficiency %	Efficiency %
MDA 500 dpm	MDA	MDA

Mfg.	Mfg.	Mfg.
Model	Model	Model
Serial #	Serial #	Serial #
Cal Due N/A	Cal Due N/A	Cal Due N/A
Bkg.	Bkg.	Bkg.
Efficiency %	Efficiency %	Efficiency %
MDA	MDA	MDA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: ASRF Survey Plan
RWP #: 03-776-3228

Date: 9-16-03 Time: 1130

[redacted]

PRN/REN # : N/A

Comments: RCT to perform total and removable surveys on survey locations provided by Radiological Engineering. All survey locations are to be taken on accessible flat surfaces where 100% of survey probe is within 1/4" of surface being measured.

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	Direct (cpm)	Direct (dpm/100 cm²)	Smear (cpm)	Smear (dpm/100 cm²)	Location	Direct (cpm)	Direct (dpm/100 cm²)	Smear (cpm)	Smear (dpm/100 cm²)
1	3K	12K	1K	2K	27	45K	180K	4.5K	9K
2	20K	80K	15K	30K	28	100K	400K	10K	20K
3	10K	40K	10K	20K	29	20K	80K	1K	2K
4	10K	40K	5K	10K	30	150K	600K	2.5K	5K
5	30K	120K	7.5K	15K	31	20K	80K	4K	8K
6	200K	800K	35K	70K	32	10K	40K	3K	6K
7	400K	1600K	15K	30K	33	100K	400K	9.5K	19K
8	150K	600K	35K	70K	34	90K	360K	10K	20K
9	6K	18K	7.5K	15K	35	250K	1000K	2.5K	5K
10	55K	220K	15K	30K	36	8K	32K	2.5K	5K
11	250K	1000K	20K	40K	37	10K	40K	7K	14K
12	20K	80K	9K	18K	38	10K	40K	10K	20K
13	10K	40K	2.5K	5K	39	10K	40K	3.5K	7K
14	95K	380K	30K	60K	40	8K	32K	15K	30K
15	75K	300K	20K	40K	41	150K	600K	25K	50K
16	30K	120K	15K	30K	42	20K	80K	10K	20K
17	10K	40K	3K	6K	43	2K	8K	2K	4K
18	15K	60K	15K	30K	44	3.5K	14K	1.5K	3K
19	55K	220K	30K	60K	45	2K	8K	2K	4K
20	25K	100K	4K	8K	46	5K	20K	10K	20K
21	2K	8K	1K	2K	47	45K	180K	5.5K	11K
22	6K	24K	5K	10K					
23	15K	60K	6K	12K					
24	10K	40K	10K	20K					
25	15K	60K	7K	14K					
26	25K	100K	7.5K	15K					

Date Reviewed: 9-16-03 RS Supervision: Mattson / [signature] [redacted]
Print Name Signature

112

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

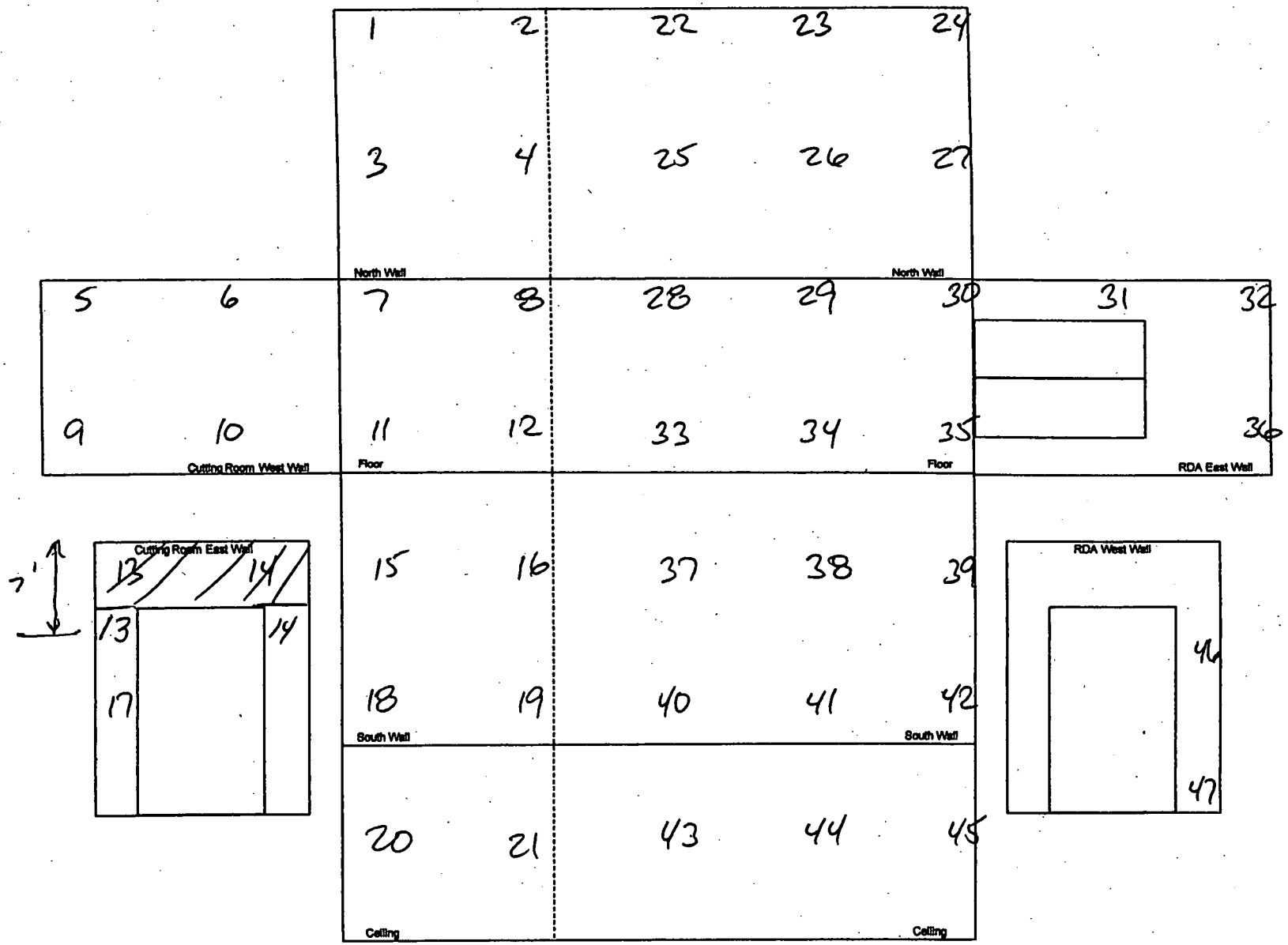
Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre – Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9-16-03	0730	PR	--			--				
			--			--				
			--			--				
			--			--				
			--			--				
			--			--				
			--			--				

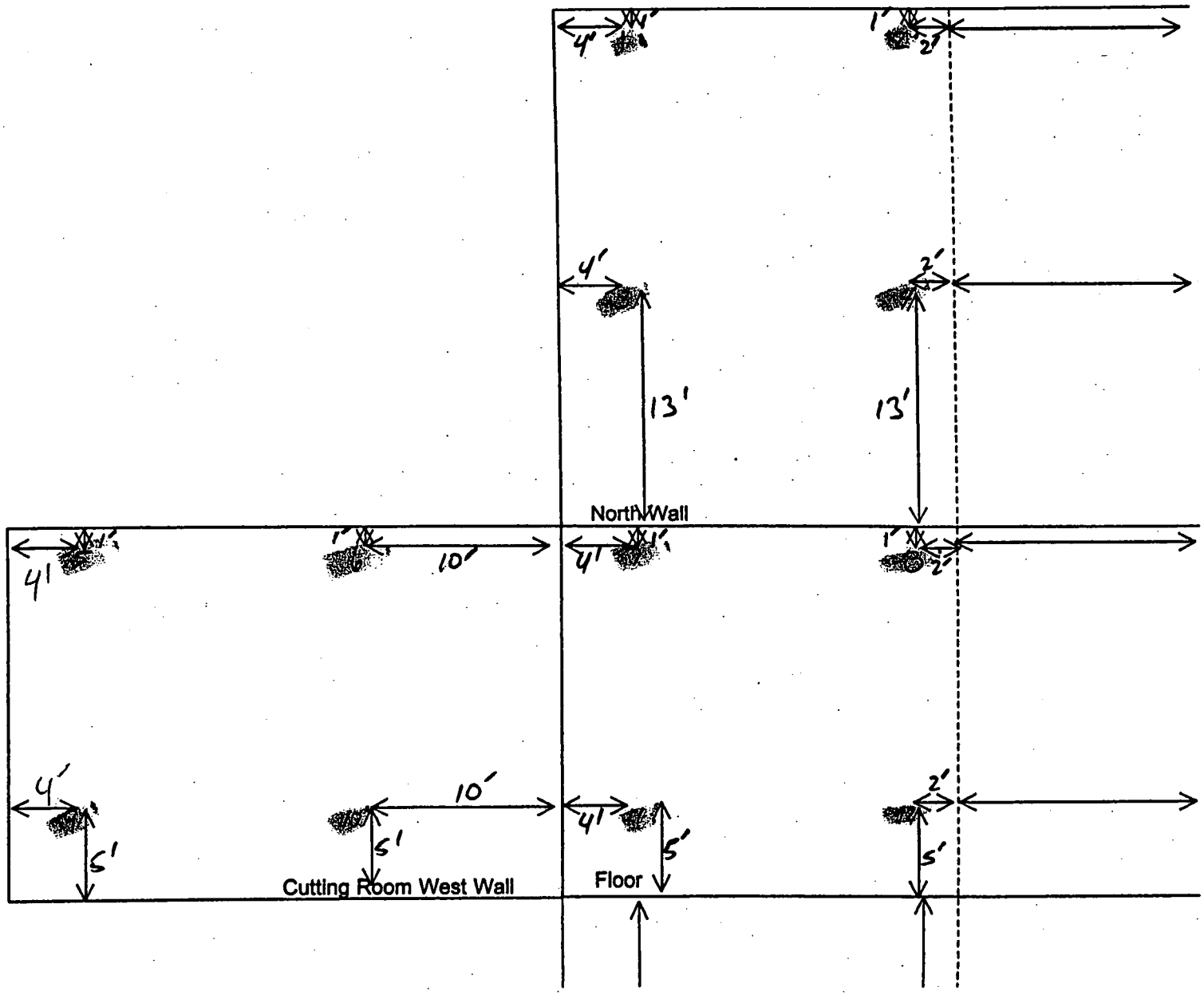
N A

MOD 195
NOT USED

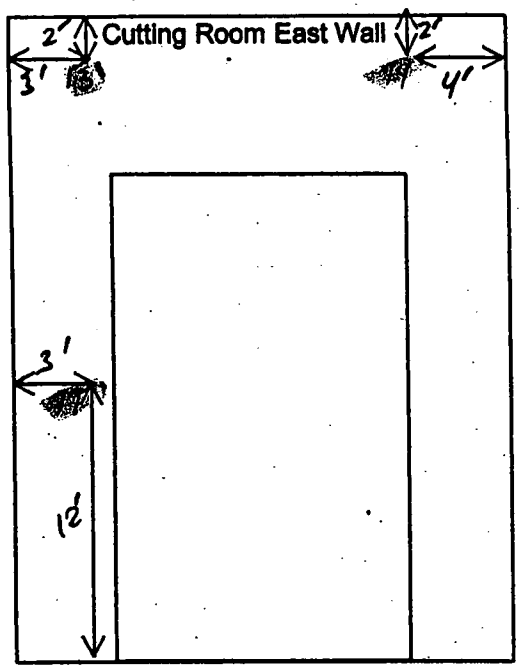
ASRF Survey Diagram

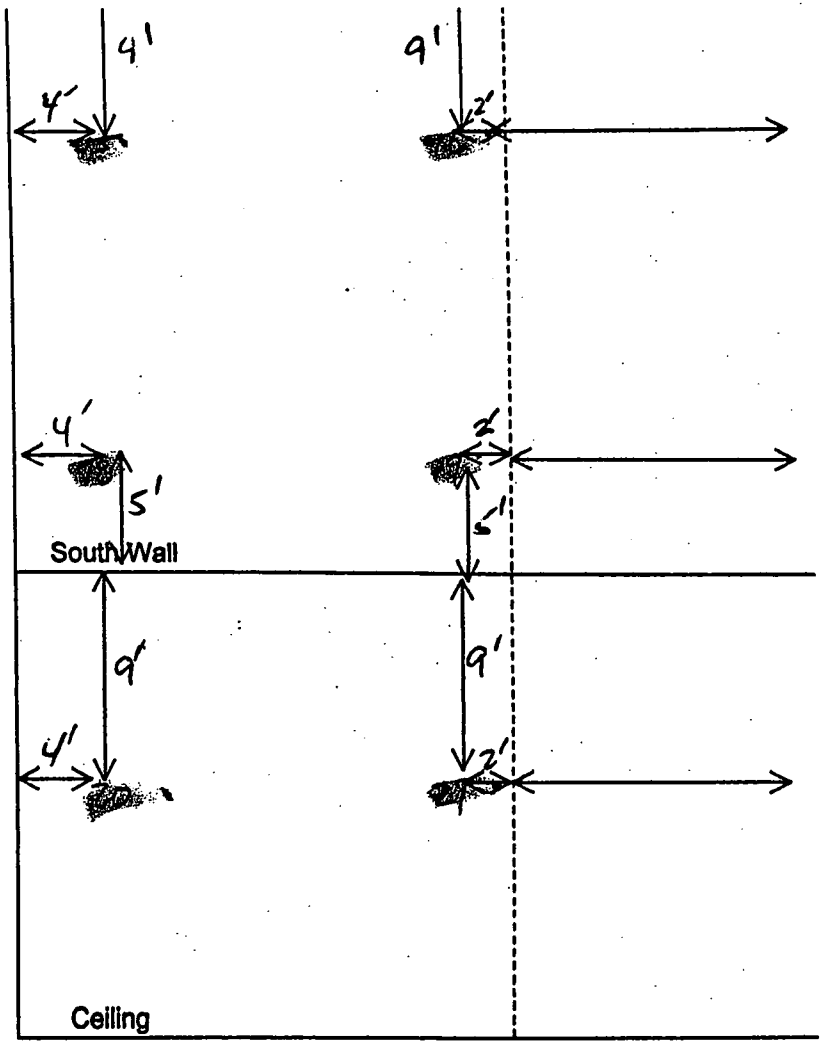


ASRF Survey Diagram

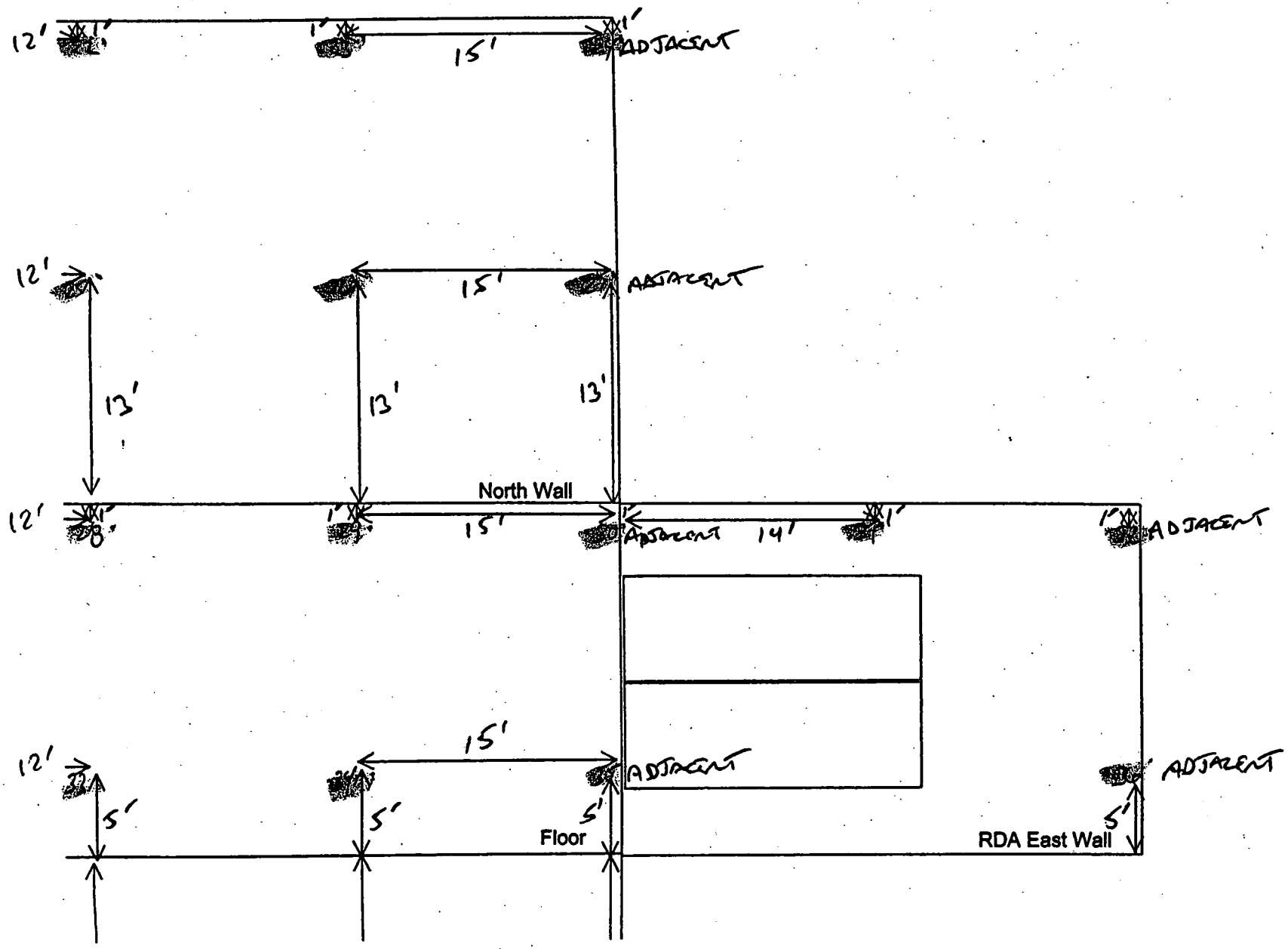


ASRF Survey Diagram





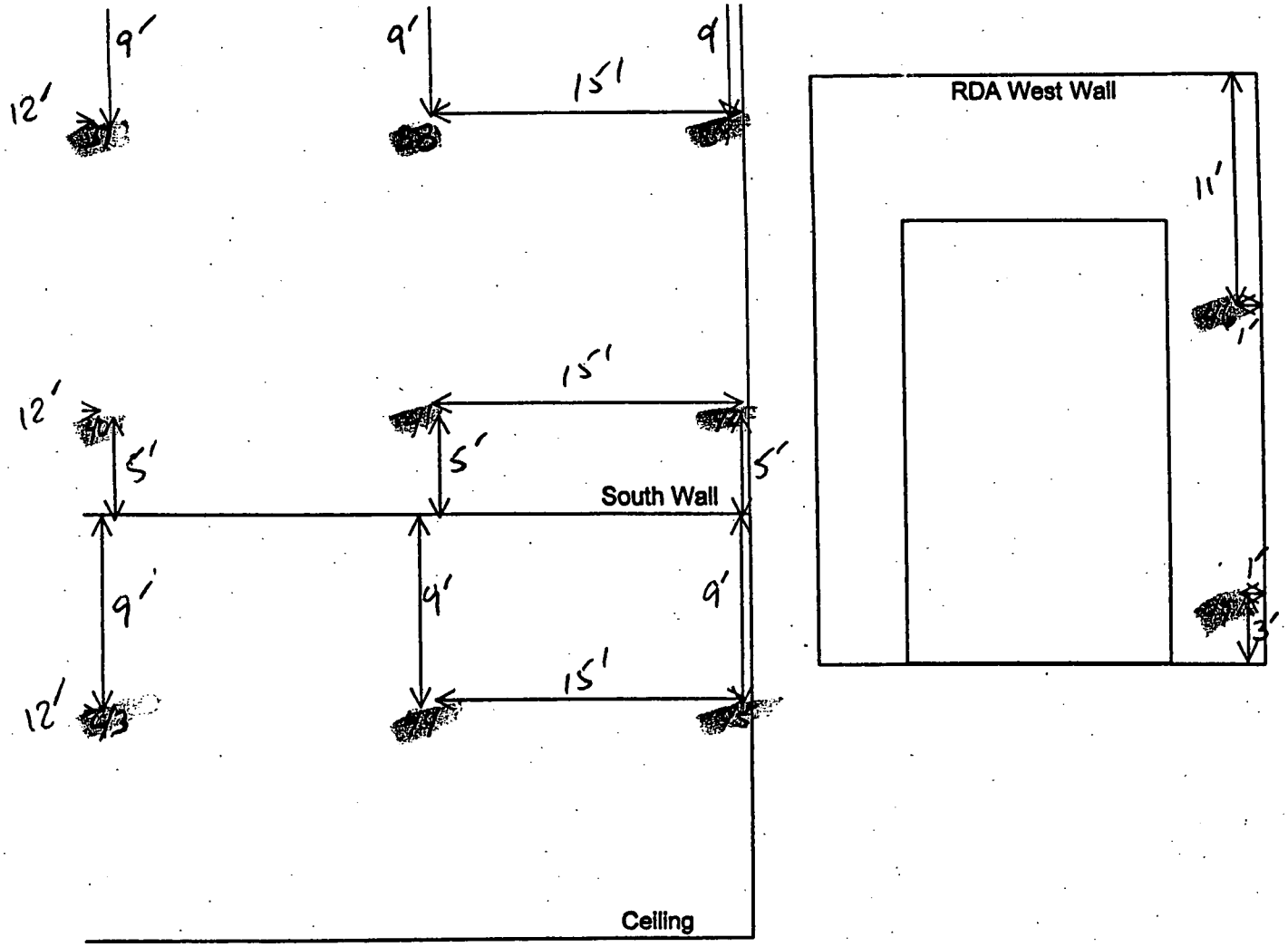
ASRF Survey Diagram



Page 6 of 7

118

ASRF Survey Diagram



Page 7 of 7

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

COPY

INSTRUMENT DATA

Mfg. Ludlum	Mfg.	Mfg.
Model 195	Model	Model
Serial # 187513	Serial # N/A	Serial # N/A
Cal Due 0-24-03	Cal Due N/A	Cal Due N/A
Bkg. N/A	Bkg. N/A	Bkg. N/A
Efficiency N/A%	Efficiency %	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA	MDA

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room)
Purpose: SCO –00776-074-Rev 0
RWP #: 03-776-3228

Date: 9-14-03 Time: 1500

Mfg.	Mfg.	Mfg.
Model	Model	Model
Serial # N/A	Serial # N/A	Serial # N/A
Cal Due N/A	Cal Due N/A	Cal Due N/A
Bkg. N/A	Bkg. N/A	Bkg. N/A
Efficiency %	Efficiency %	Efficiency %
MDA	MDA	MDA

[redacted]

PRN/REN # : N/A
Comments: 9-24-03
Note: Record contamination values in accordance with RSP ~~07.02~~. STA

ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	~~DIRECT~~ SMEAR million dpm/100cm² ~~Total~~	- Background	= Net	~~Smear~~ (dpm/100cm²)
1	1.40	0.20	1.20	N/A
2	0.39	0.20	0.19	
3	0.34	0.20	0.14	
4	0.80	0.20	0.60	
5	0.28	0.20	0.08	
6	0.78	0.20	0.58	
7	0.42	0.20	0.32	
8	0.33	0.20	0.13	
9	0.49	0.20	0.29	
10	0.47	0.20	0.27	
11	0.34	0.20	0.14	
12	1.11	0.20	0.91	
13	0.59	0.20	0.39	
14	2.19	0.20	1.99	
15	1.48	0.20	1.28	
~~16~~	~~0.49~~	~~0.20~~	~~0.39~~	N/A STA 9-14-03
17	1.42	0.20	1.22	
18	0.40	0.25	0.15	
19	0.49	0.20	0.29	
20	0.47	~~0.49~~ 0.25	0.22	STA 9-14-03
21	0.99	0.20	0.79	
22	0.42	0.25	0.17	
23	1.18	0.20	0.98	
24	0.51	0.25	0.26	
~~25~~				NA
26	0.30	0.25	0.05	N/A

Location	~~DIRECT~~ SMEAR million dpm/100cm² ~~Total~~	- Background	= Net	~~Smear~~ (dpm/100cm²)
27	1.30	0.25	1.05	N/A
28	0.34	0.25	0.09	
29	0.70	0.25	0.45	
30	0.43	0.25	0.18	
31	0.82	0.25	0.57	
32	0.35	0.25	0.10	
N/A	See	PAGE	34	N/A STA 9-14-03
33	0.37	.025	0.12	
34	0.30	0.25	0.05	
35	0.45	0.25	0.20	
36	0.41	0.25	0.16	
37	1.29	0.25	1.04	
38	0.39	0.25	0.14	
39	0.31	0.25	0.06	
				N/A

Date Reviewed: 9-15-03 RS Supervision: Mathson / [signature]
Print Name Signature

[redacted]

119

4 21st 9/14/00 PAGE 1 OF 5 5th 9/14/00

See PAGE 3 FOR LOCATIONS

SCO-00776-074-REV 0: ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT million dpm/100cm² Total	Background	Net	Smear dpm/100 cm²	Location	DIRECT million dpm/100cm² Total	Background	Net	Smear dpm/100 cm²
1 D	1.08	0.25	0.83	NA					
2 D	1.50	0.25	1.25						
3 D	3.22	0.25	2.97						
4 D	4.04	0.25	3.79						
5 D	3.96	0.25	3.71	NA					

NA

NA

120

TRANSOM DOOR WINCH
CEILING WEST END RDA
PRE DECON (1) POST DECON (2)

EAST END OF NORTH BEAM
UPPER VERTICLE SURFACE OF
I BEAM ADJACENT TO WALL
POINT 'A'
PRE DECON (3) ~~POST DECON (4)~~ NA STH 9-14-03

EAST END NORTH BEAM
CENTER VERTICLE SURFACE
OF I BEAM POINT 'B'
PRE DECON (4) POST DECON (5)

SOUTH BEAM – 4 FEET WEST
OF MEZZANINE ENTRY
POINT 'A'
PRE DECON (6) ~~0.78~~

NORTH RDA BEAM WEST
END POINT 'A'
PRE DECON (7)

NORTH RDA BEAM WEST END
POINT 'B'
PRE DECON (8)

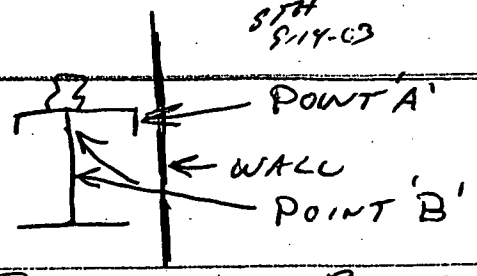
SOUTH WALL – CUT ROOM
EAST END OF PAR 3000
REMOTE ARM SUPPORT ANGLE
PRE DECON (9)

SOUTH BEAM CUT ROOM
EAST END OF BEAM
POINT 'A'
PRE DECON (10)

SOUTH BEAM CUT ROOM
EAST END OF BEAM
POINT 'B'
PRE DECON (11)

NORTH BEAM CUT ROOM
EAST END OF BEAM
POINT 'A'
PRE DECON (12) POST DECON (13)

NORTH BEAM CUT ROOM
EAST END OF BEAM
POINT 'B'
12/ PRE DECON (14) POST DECON (15)



SOUTH BEAM CUT ROOM
CENTER OF LENGTH
POINT 'A'
PRE DECON (17) ~~(16)~~ STH 9-14-03 POST DECON (18)

SOUTH BEAM CUT ROOM
CENTER OF LENGTH
POINT 'B'
PRE DECON (19) POST DECON (20)

NORTH BEAM CUT ROOM
CENTER OF LENGTH
POINT 'A'
PRE DECON (21) POST DECON (22)

NORTH BEAM CUT ROOM
CENTER OF LENGTH
POINT 'B'
PRE DECON (23) POST DECON (24)

NORTH BEAM CUT ROOM
WEST END
POINT 'A'
PRE DECON ~~(25)~~ NA STH 9-14-03 POST DECON (26)

NORTH BEAM CUT ROOM
WEST END
POINT 'B'
PRE DECON (27) POST DECON (28)

SOUTH BEAM CUT ROOM
WEST END
POINT 'A'
PRE DECON (29) POST DECON (30)

SOUTH BEAM CUT ROOM
WEST END
POINT 'B'
PRE DECON (31) POST DECON (32)

NOTE SURVEY POINT (15) ACCESS TO DECON IS LIMITED DUE TO SUPPORT FOR CUT ROOM DOOR AREA IS APPROX 2 FT²

CUT ROOM SOUTH WALL ON TOP SURFACE OF 4" BOX TUBING ATTACHED TO EAST WALL
DIRECT (1D)
SMEAR (33)

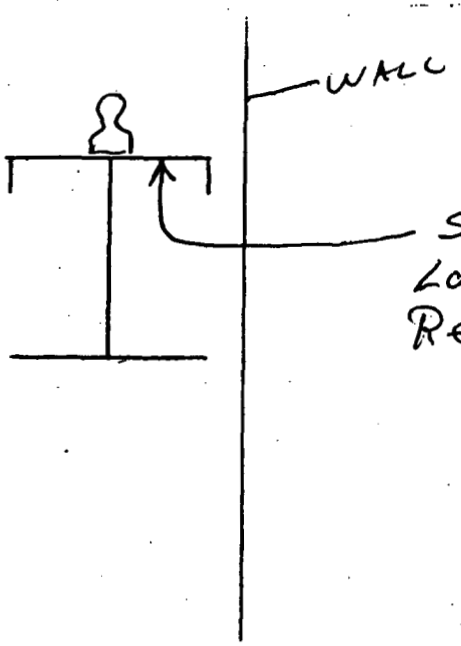
WEST WALL CUT ROOM STEAM BOX ANGLE SUPPORT LOWER SURFACE NEAR FLOOR — SOUTH SUPPORT POST DECON DIRECT (2D) SMEAR (34)

NORTH SUPPORT POST DECON DIRECT (3D) SMEAR (35)

CUT ROOM PAR 3000 REMOTE ARM SUPPORT ON DRIVE CHAIN
POST DECON DIRECT (4D)
SMEAR (36)

CUT ROOM WEST WALL INSIDE DUCT ON RETRACTED FIRE DOOR IN UPPER SOUTH CORNER OF WALL
DIRECT (5D)
POST DECON SMEAR (39)

NOTE: HIDDEN SURFACES OF BEAM APPEAR TO BE RELATIVELY CLEAN USING MIRROR AND FLASHLIGHT SPOT INSPECTION. — NOTE SIMILIAR TO VISIBLE SURFACES.



SWIPE SURVEY OF APPROX 4 LOCATIONS IN CUT ROOM USING REMOTE SMEAR TOOL (MAX READING) (37)

(MIN READING) (38)

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RADIOLOGICAL SAFETY

Performance Test Log

Date	Time	Probe Serial#	Range Low	Range High	Background	Test Reading Pre	Test Reading Post	Bkg. + Low Range	Bkg. + High Range	Pass/Fail	RCT Initials
9-14-03	0807	PR178628	218	276	0.20	244	244	218.20	276.20	PASS	[redacted]

COPY

PAGE 1 OF 6

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ST

INSTRUMENT DATA

Mfg. Ludlum	Mfg. EBERLINE	Mfg. N/A
Model 195	Model SAC 4	Model
Serial # N/A	Serial # 1477	Serial #
Cal Due	Cal Due 3-19-04	Cal Due
Bkg. N/A	Bkg. 0.6 cpm	Bkg.
Efficiency N/A%	Efficiency 33%	Efficiency %
MDA 0.01 (million dpm/100cm²)	MDA 20dpm	MDA N/A

Survey Type: TOTAL / REMOVABLE ACTIVITY
Building: 776/777
Location: Set 66 ASRF (RDA, Cutting Room) T.A.
Purpose: ASRF Sampling Plan

RWP #: 03-776-3228

Date: 10-1-03 Time: 1310

Mfg. Ludlum	Mfg Ludlum	Mfg. Ludlum
Model 12-1-A	Model 12-1A	Model 12-1A
Serial # 56161	Serial # 75906	Serial # 45957
Cal Due 6-24-04	Cal Due 6-17-04	Cal Due 3-4-04
Bkg. 0 cpm	Bkg. 0 cpm	Bkg. 0.0
Efficiency 50%	Efficiency 50 %	Efficiency 50 %
MDA 500dpm	MDA 500dpm	MDA 500 dpm

[redacted]

PRN/REN # : N/A

Comments: RCT to perform total and removable surveys on survey locations provided by Radiological Engineering. All survey locations are to be taken on accessible flat surfaces where 100% of survey probe is within 1/4" of surface being measured. NOTE: SURVEY POINTS 2 THRU 47 LOCATED AT PREDETERMINED GRID POINTS See PAGES 3-6

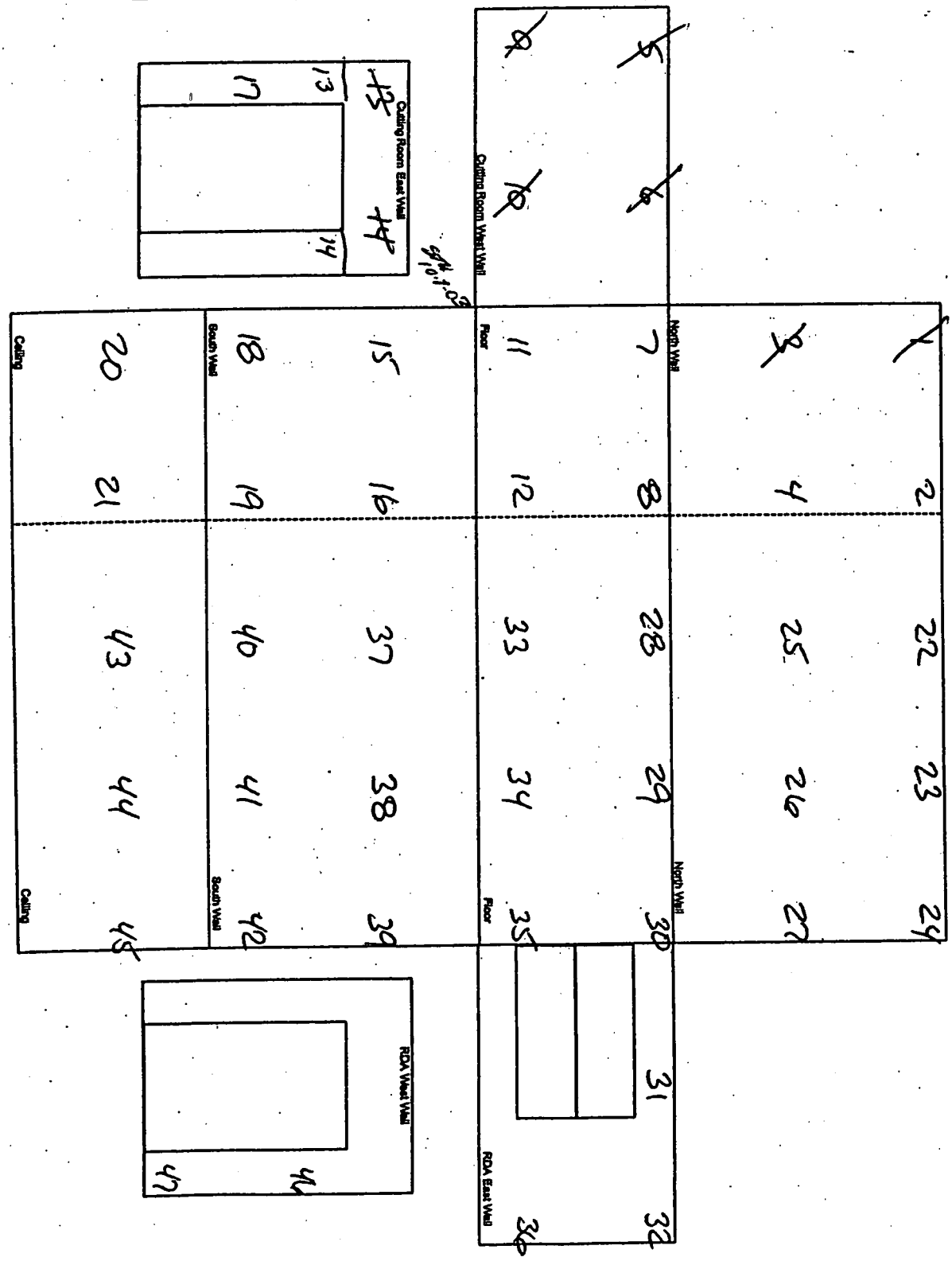
ASRF INTERIOR TOTAL / REMOVABLE ACTIVITY SURVEY RESULTS

Location	DIRECT ~~million~~ dpm/100cm² ST 10-1-03 ~~Total~~	~~Background~~	= Net	Smear (dpm/100cm²)	Location	DIRECT ~~million~~ dpm/100cm² ST 10-1-03 ~~Total~~	~~Background~~	= Net	Smear (dpm/100cm²)
2			<1000	<20	33			<1000	<20
4			<1000	<20	34			<1000	<20
7			<1000	<20	35			<1000	<20
8			<1000	<20	36			<1000	<20
11			<1000	<20	37			<1000	<20
12			<1000	<20	38			<1000	<20
13			<1000	<20	39			<1000	<20
14			<1000	<20	40			<1000	<20
15			<1000	<20	41			<1000	<20
16			<1000	<20	42			<1000	<20
17	N/A		<1000	<20	43	N/A		<1000	<20
18			<1000	<20	44			<1000	<20
19			<1000	<20	45			<1000	<20
20			<1000	<20	46			<1000	<20
21			<1000	<20	47			<1000	<20
22			<1000	<20	48			<1000	<20
23			<1000	<20	49			<1000	<20
24			<1000	<20	50			<1000	<20
25			<1000	<20	51			<1000	<20
26			<1000	<20	52			<1000	<20
27			<1000	<20	53			<1000	<20
28			<1000	<20	54			<1000	<20
29			<1000	<20	55			<1000	<20
30			<1000	<20	56			<1000	<20
31			<1000	<20	57			<1000	<20
32			<1000	<20	NA				NA

Date Reviewed: 10-1-03 RS Supervision: Matt Jan / Matt [redacted]
Print Name Signature

124

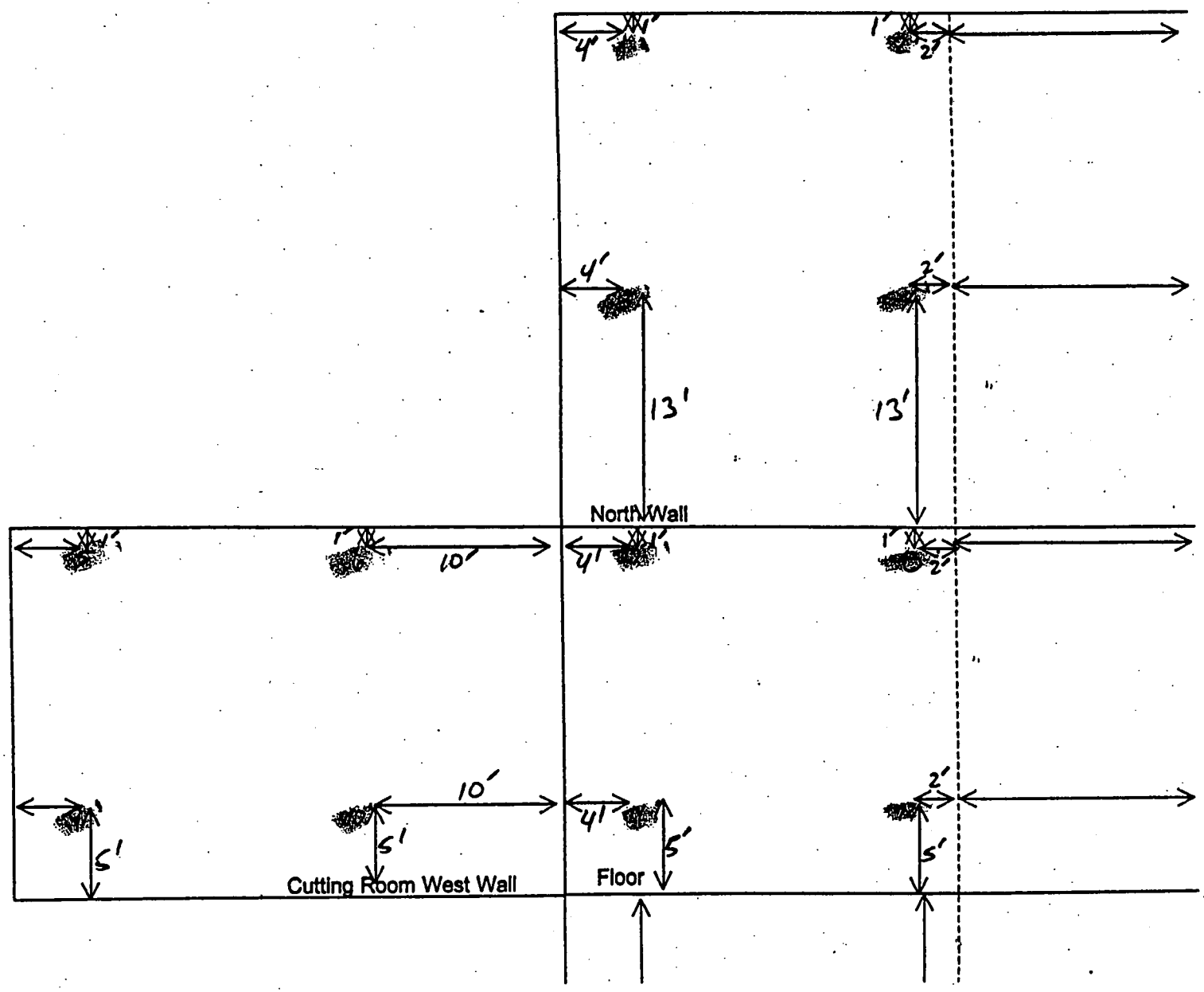
(49) NORTH UPPER WALL T.A. EAST PORTION
(49) NORTH UPPER WALL T.A WEST PORTION
(50) EAST WALL TA CENTER PORTION (UPPER)
(51) CEILING T.A. EAST PORTION
(52) CEILING T.A. WEST PORTION
(53) SOUTH UPPER WALL T.A. WEST PORTION
(54) SOUTH UPPER WALL T.A EAST PORTION
(55) WEST WALL TA UPPER CENTER PORTION
(56) FLOOR TA NORTH PORTION
(57) FLOOR TA SOUTH PORTION



ABRF Survey Diagram

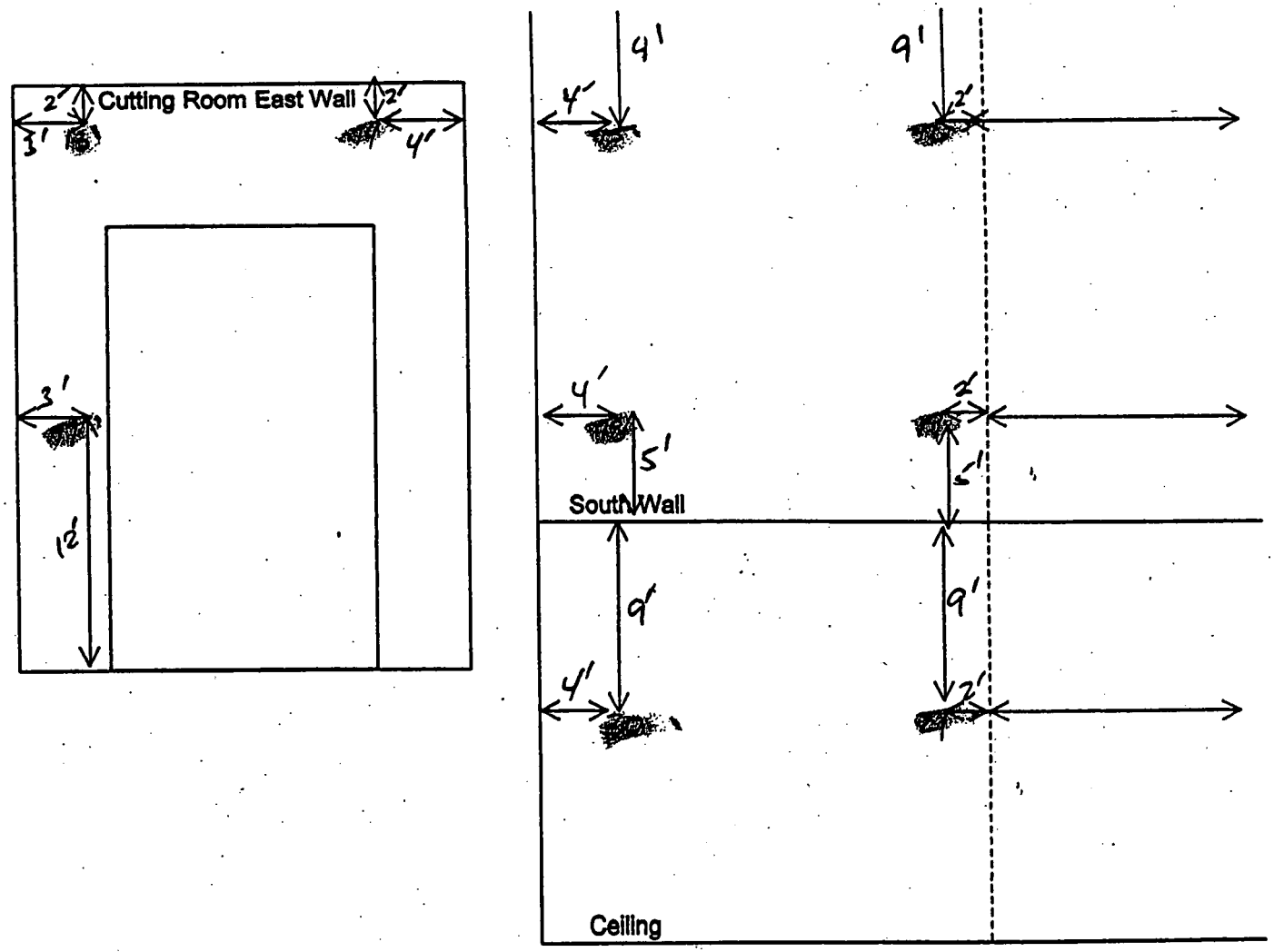
125

ASRF Survey Diagram

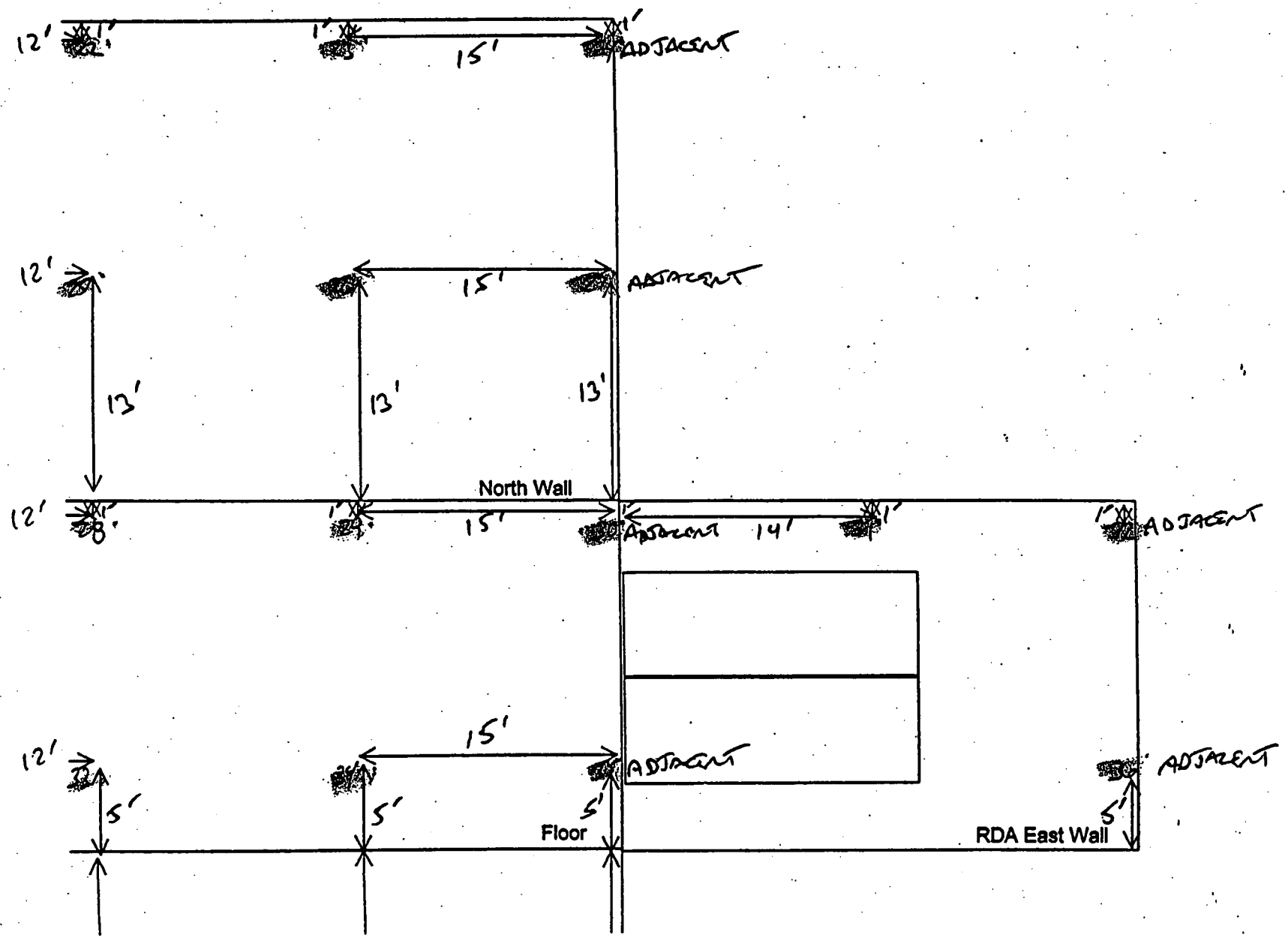


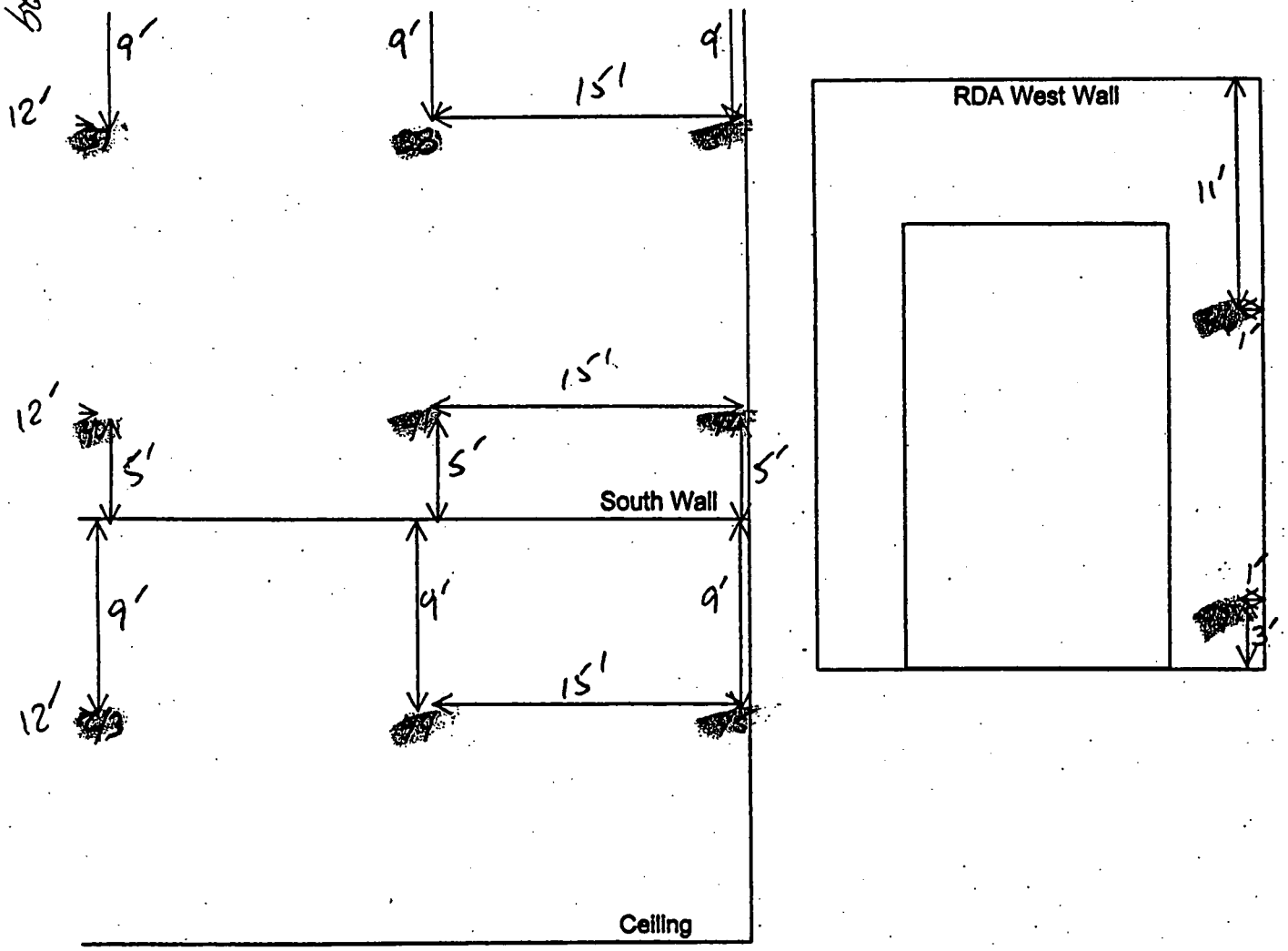
~~Page 1 of 4~~
JL 10-1-03

ASRF Survey Diagram



ASRF Survey Diagram



128/129

ASRF Survey Diagram