

Decommissioning Plan for Room A344 Building 222  
December 19, 1989  
Doug Eagleson

Introduction: The NIST materials license No. SNM-362 specifically allows the use of licensable material in room A344, building 222. The standard reference material program that necessitated operations in this room has been transferred to another facility. Plans are to decommission the room for use as an unrestricted laboratory.

Historic Review: The laboratory was initially constructed for the processing of uranium and plutonium in order to create standard reference materials. Operations began in about 1968. The room contains two laboratory hoods along with two sets of bench units. The basic processes involved dissolution of a bulk material, precipitation of the desired compound and separation/packaging of samples for distribution. Additional work involved those procedures necessary to document sample purity.

Decontamination Summary: Surface contamination exists in the hood designated for "hot" work. Acid vapors carried contamination to the upstream side of the HEPA filter which prevented further spread into the duct system. This hood along with the galvanized steel ducting to the filter bank will be removed for appropriate disposal. The stainless steel filter bank should be easily decontaminated. The second hood was used for only low level work and will be surveyed for release after removal of a layer of strippable paint from the interior surfaces. A minor spill on one of the benches will necessitate its removal to the radioactive waste annex at building 235 for decontamination or disposal. Additionally, contaminated floor tile immediately in front of this bench will be removed for disposal.

Regulatory Review: Code of Federal Regulations Title 10 Part 30 contains specific requirements for termination of licenses. Although the NIST license is not being terminated, a substantial portion of its SNM operations are ending, making a formal release of room A344 from any further regulatory concern an appropriate action. Decommissioning requires that a room survey be conducted and a report sent to the NRC for review. A decommissioning plan, approved by the NRC, is not required because it is judged that there will be no increase in the potential safety impact to workers or the public over the currently reviewed and licensed operations.

Survey Criteria: Current industry practice and license documents reference Nuclear Regulatory Commission decontamination criteria titled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", August 1987(see attachment 1). The most restrictive limit for alpha emitters will be applied to eliminate possible need for isotopic identification and because the level can be readily satisfied. The survey will include a search for beta/gamma emitters because such work was authorized in A344. The limits applied will be those of beta emitters excepting Sr-90; as inventory records indicate that Sr-90 was never authorized for use in this room.

Survey Method: The room surfaces will be divided into 1 m<sup>2</sup> grids as a survey location aid and because survey guidelines allow contamination to be averaged over a maximum area equal to 1 m<sup>2</sup>. All grids on the floor and bench surfaces and several of the ceiling and wall grids will be surveyed. The reduced frequency for the walls and ceiling is appropriate because contamination of these areas would generally occur during an incident that effects a large surface area. Floor and wall areas covered by the hoods and benches do not need surveying since these items have continually been in position. Miscellaneous items in the room will be surveyed on an individual basis.

A single 300 cm<sup>2</sup> smear sample will be taken in each surveyed grid. This large area sample will provide an indication of removable contamination levels for the entire grid. These smears will be counted on a low background proportional detector, for alpha and beta radiation. Direct radiation levels in a grid will be determined by four separate spot counts for alpha and beta emitters. These will be located in areas of the grid which generally have the highest probability of indicating contamination. Typical areas include corners of drawer and floor areas not subject to routine cleaning or protective coverings. Alpha and beta counts will be of sufficient sensitivity to detect levels less than the guideline limits. All detectors will be appropriately calibrated.

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

U.S. Nuclear Regulatory Commission  
Division of Industrial and  
Medical Nuclear Safety  
Washington, DC 20555

August 1987

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

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
  - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
  - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment, or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.



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

- a. Identify the premises.
- b. Show that reasonable effort has been made to eliminate residual contamination.
- c. Describe the scope of the survey and general procedures followed.
- d. State the findings of the survey in units specified in the instruction.

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

TABLE 1  
ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES <sup>a</sup>	AVERAGE <sup>b c f</sup>	MAXIMUM <sup>b d f</sup>	REMOVABLE <sup>b e f</sup>
U-nat, U-235, U-238, and associated decay products	5,000 dpm $\alpha$ /100 cm <sup>2</sup>	15,000 dpm $\alpha$ /100 cm <sup>2</sup>	1,000 dpm $\alpha$ /100 cm <sup>2</sup>
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm <sup>2</sup>	300 dpm/100 cm <sup>2</sup>	20 dpm/100 cm <sup>2</sup>
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm <sup>2</sup>	3000 dpm/100 cm <sup>2</sup>	200 dpm/100 cm <sup>2</sup>
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$ /100 cm <sup>2</sup>	15,000 dpm $\beta\gamma$ /100 cm <sup>2</sup>	1000 dpm $\beta\gamma$ /100 cm <sup>2</sup>

<sup>a</sup>Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

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

<sup>c</sup>Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

<sup>d</sup>The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.

<sup>e</sup>The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

<sup>f</sup>The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

Site Release Survey for Room A344 Building 222

Doug Eagleson  
Health Physics Group  
Occupational Health and Safety Division, NIST

January 12, 1990

Background: The National Institute of Standards and Technology currently holds USNRC license No. SNM-362. This license specifically allows the use of room A344 in Building 222, commonly referred to as Alpha Chemistry Laboratory, for the handling of SNM. Recent programmatic changes eliminate the need to maintain A344 as an alpha chemistry laboratory. This document is intended to satisfy the radiation survey requirements of the Nuclear Regulatory Commission (NRC) before release of the A344 for unrestricted use.

Survey Criteria: Limits of residual contamination are recommended in "Guidelines For Decontamination of Facilities and Equipment Prior to Release For Unrestricted Use Or Termination Of Licenses For Byproduct, Source, Or Special Nuclear Material", U.S. Nuclear Regulatory Commission, 1987 and were used as pass/fail criteria in this survey. The survey method's Lower Limits of Detection (LLD) were lower than the limits referenced in the publication. The LLD for direct alpha radiation detection was equal to about one half the applicable guideline. All other types of surveys had LLDs less than 20 percent of the corresponding guideline.

Survey Method: Direct radiation levels were assessed using a Bicron Model M count rate meter (serial number A970R) with a 75 cm<sup>2</sup> zinc sulfide detector, Ludlum Model PR-2124, for detection of alpha emitting surface contamination, and a Technical Associates Model TBM-3S count rate meter (serial number 12682) with an internal pancake GM detector for detection of beta surface contamination. Each alpha measurement was performed by placing the face of the detector in contact with the surface and acquiring a ten second integrated count. Each beta measurement was performed by placing the detector in contact with the surface and averaging the count rate indicated on the meter over a period of about five seconds. Attachments 1 and 2 are current records of calibration for these survey meters. Attachment 3 contains lower limits of detection, backgrounds and counting efficiencies for the survey meters.

Removable contamination was assessed by the smear technique. Absorbent paper disks were wiped over an area of 300 cm<sup>2</sup> using moderate pressure. The filter papers were then analyzed on a Tennelec model LB 5100 (serial number 208) gas proportional detector for gross alpha and beta activity. Attachment 4 contains records of calibration and lower limits of detection for this instrument.



Survey Frequency: Survey criteria guidelines indicate that survey measurements will be averaged over an area of not more than one square meter. To aid in locating surveyed areas, the entire vault was divided into approximately one meter square blocks. Attachment 5 contains diagrams of the grids. Within each grid, a single swipe was taken, along with four separate alpha and beta survey measurements. All grids covering the floor, shelf, bench and hood areas were surveyed. Several ceiling and wall grids near laboratory hoods and benches were also surveyed. Miscellaneous items such as glassware, ventilation ducts, storage boxes, electronic equipment and plastic sheeting were surveyed individually.

Results: All survey results indicate that the A344 meets the criteria for release as an unrestricted area. Attachment 6 contains the survey results after application of background, efficiency and geometry factors while Appendix A contains the survey data as recorded.

# BICRON CORPORATION

12345 KINSMAN ROAD, NEWBURY, OHIO 44065  
(216) 564-2251 telex 980474

## CERTIFICATE OF INSTRUMENT CALIBRATION

CUSTOMER: U. S. DEPARTMENT OF COMMERCE Q# 38687  
INSTRUMENT MODEL: surveyor M SERIAL # A970R

### CALIBRATION DATA

RANGE	SIMULATED COUNT RATE (cpm)	INST. READING (cpm)	SIMULATED COUNT RATE (cpm)	INST. READING (cpm)
X1000	300,000	800,000	200,000	198,000
X100	80,000	80,000	20,000	19,500
X10	8,000	8,000	2,000	1,950
X1	800	800	200	200

MODEL	APPROX. COUNT RATE PER mR/h
swgm	1200 cpm
ewgm	1750 cpm
pgm	3600 cpm

CALIBRATED BY: R. J. Coe

Attachment 1

DATE: 9-19-89

Certificate of Calibration

Health Physics Group

NIST

Instrument: TA TBM-35

Serial Number: 12682

Calibration Date: 6/21/89

Calibration Notes

Radiation levels are based on standards whose calibrations are traceable to the NIST.

The source used was Cs-137.

This certificate is based on NIST calibration records.

Meter Range	Exposure Rate (mR/hr)	Observed reading (mR/hr)
x10	0.5	0.6
x10	1.5	1.5
x100	5.0	5.0
x100	15	15

Signature: James Fray

Date: 8/31/89



Alpha and Beta Direct Radiation Detectors  
Doug Eagleson  
12-12-89

Background: The absolute detection efficiencies, lower limits of detection and backgrounds for the listed survey meters were determined in order to allow calculation of residual surface contamination activities.

Survey Meters: Bicron Surveyor M with PR-2124 Alpha Probe,  
SN 252

Technical Associates TBM-3S with Pancake GM,  
SN 12682

Alpha Detector

The detector efficiency was determined using NBS Americium-241 point sources.

Source Number	Activity (dpm)	Detector Response (cpm)	Efficiency
4904-E-100	1860	650	0.29
4904-F-68	11600	3400	0.29

The detector background was determined over a ten minute counting interval.

Background = 1.0 cpm

The detector Lower Limit of Detection(LLD) is calculated using the listed parameters.

Efficiency = 0.29  
Background = 1.0 cpm  
Detector Active Area = 75 cm<sup>2</sup>  
Sample Count Time = 10 sec.

LLD (95% confidence level) = 44 dpm/ 100 cm<sup>2</sup>

Beta Detector

Detector efficiency was determined using an Isotope Product Laboratories Sr-90 disk source.

Source Number	Activity (dpm)	Detector Response (cpm)	Efficiency
8530-6	41660	22000	0.53

Detector Background was estimated by averaging the meter response over a two minute time interval.

Background = 100 cpm

Detector Lower Limit of Detection is estimated based on the operators ability to distinguish a count rate of 100 cpm above background.

Efficiency = 0.53  
Detector Active Area = 16 cm<sup>2</sup>

LLD (estimated) = 1000 dpm/100 cm<sup>2</sup>

Calibration of Tennesseec LR 5100

GROUP B Some Alpha & Beta Efficiencies:

TUE AUG 15, 1989

iso	High	Energy	Activity	Time	Alpha	Beta	Alpha	
ID	Beta Voltage	(A,B MEV)	DPM	min	CPM	CPM	Eff	
	Eff							
C14	0.12	1425	0.156	239800	5	7	29429	0
Pm147	0.20	1425	0.225	2996	5	1	625	0
Tc99	0.29	1425	0.292	32410	5	3	9672	0
Cl36	0.35	1425	0.712	24200	5	10	8603	0
Pb210	0.46	1425	1.160	18237	5	14	8424	0
Sr90	0.63	1425	2.270	41495	5	2	26181	0
Am241	0	1425	5.490	11600	5	3490	1317	0.30
Am243	0	1425	5.280	21000	5	6078	15750	0.28

OPERATION COMPLETE

By: *James Gray*

Background:

Count Time: 1000 min.

Alpha Counts: 168

Beta Counts: 1215

Lower Limits of Detection: (95% confidence level)

Sample Count Time: 1 min.

Sample Size: 300 cm sq. or 3 X 100 cm sq.

Alpha Efficiency: 0.300 (Am-241)

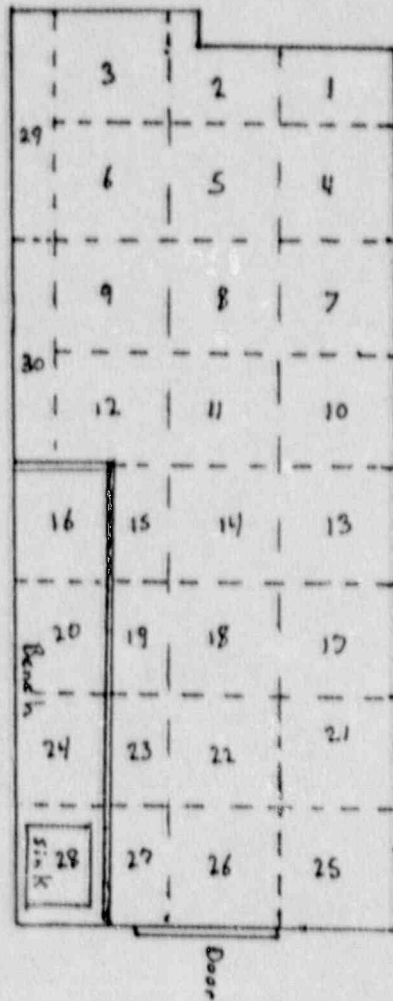
Beta Efficiency: 0.63 (Sr-90)

LLD (alpha) : 2 dpm/100 cm sq.

LLD (beta) : 3 dpm/100 cm sq.

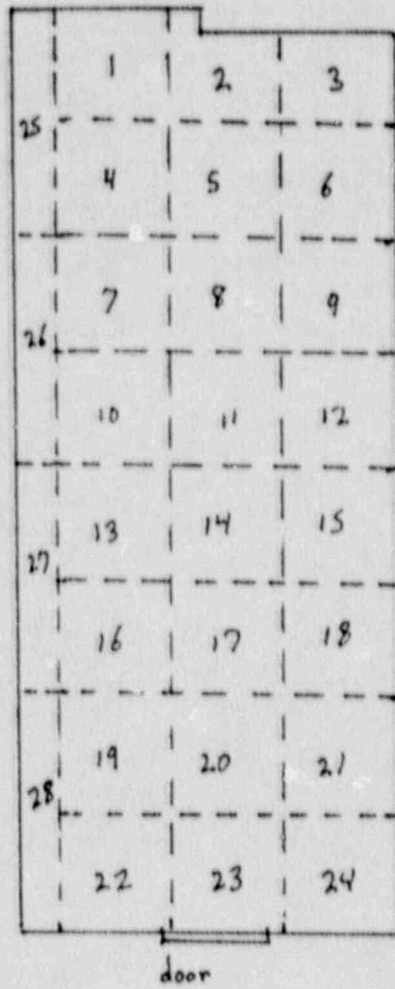


# A344 Floors and Bench Tops

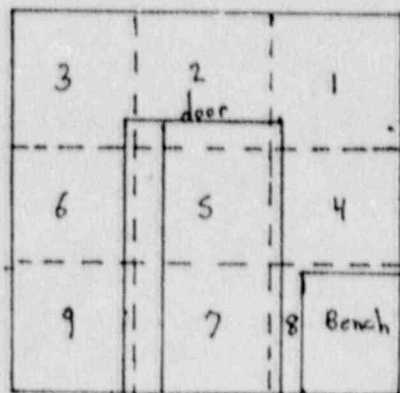
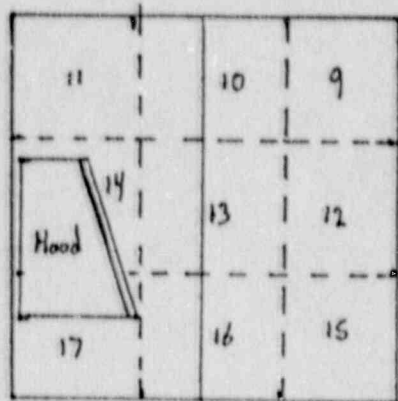


Note: Grids 16, 20, 24, 28 are on the bench top.

A344 Ceiling  
top view

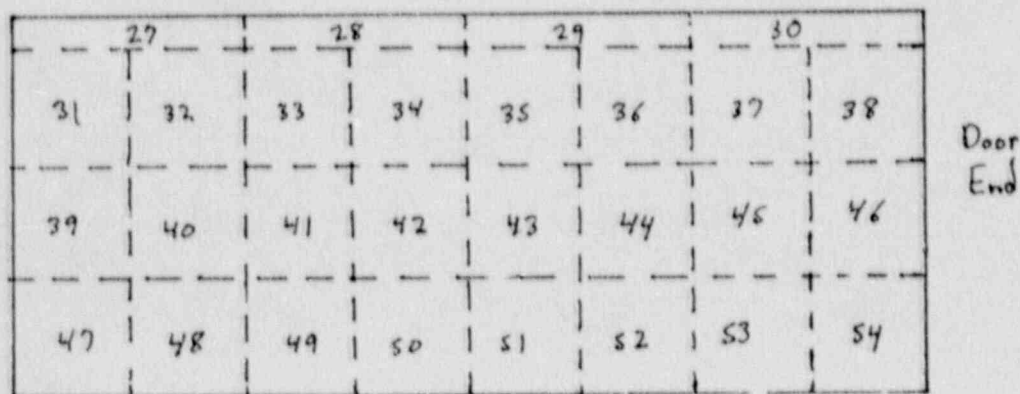
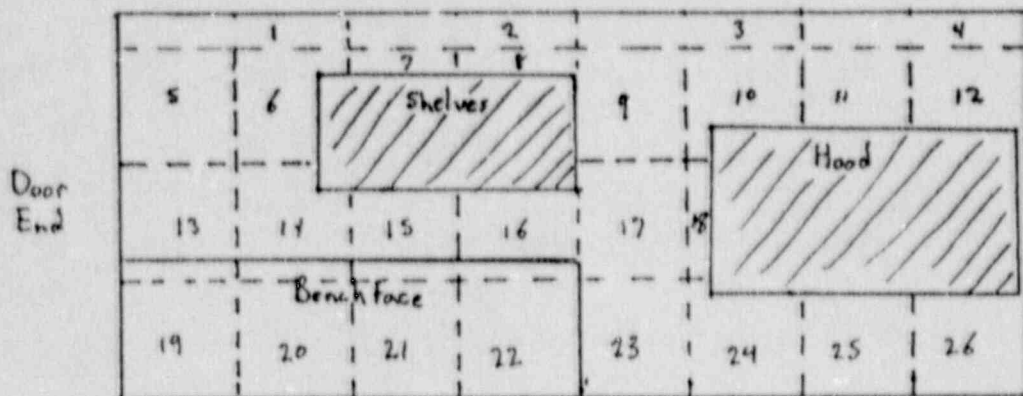


A344 End Walls

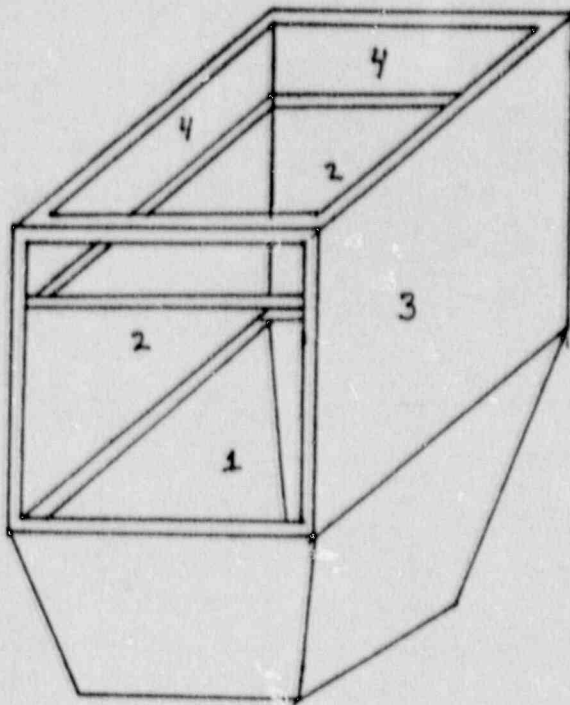




# A344 Walls

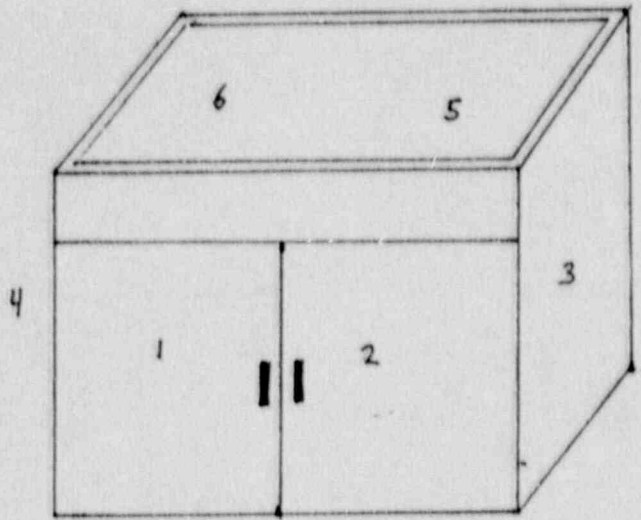


## A34.4 Filter Bank



Note: Grid 1 is located in the downstream plenum.  
Grids 2 & 3 are located inside, at the filter position.  
Grid 4 is located where the upstream plenum was connected.

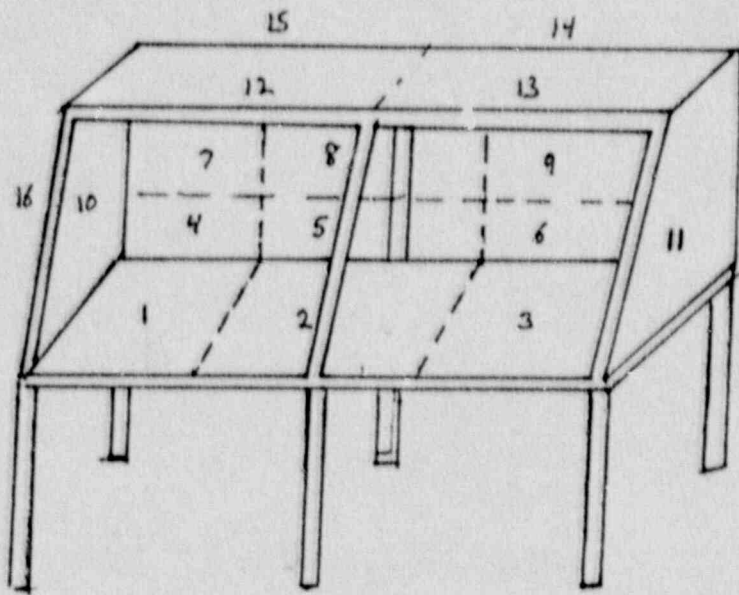
A344 Hood Base Cabinet



Note: Grids 5 & 6 are on inside floor of cabinet  
There is no top to this unit.

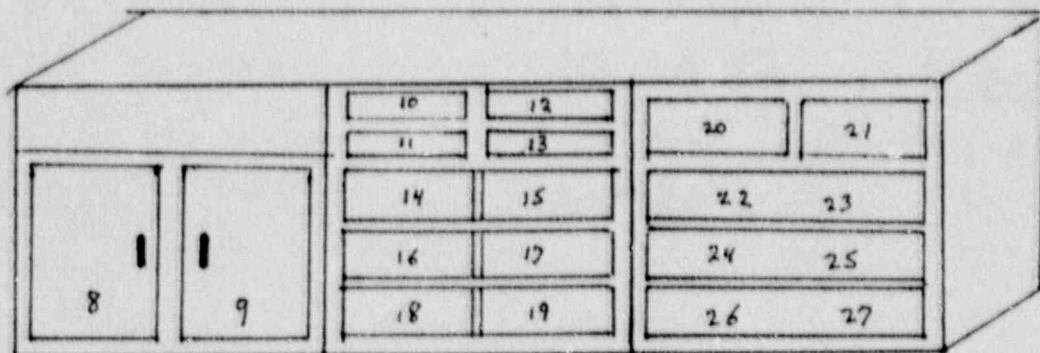
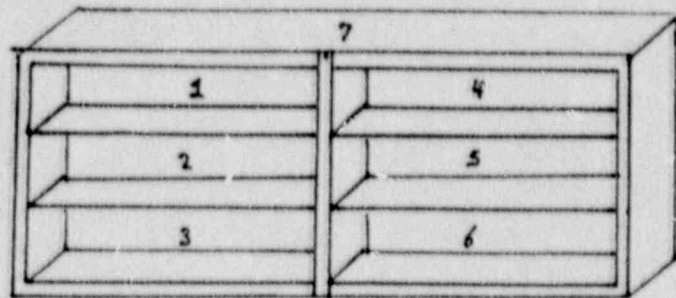


# A344 Hood



Note : Grids 10-13 are on inside surfaces of Hood  
Grids 14-16 are on outside surfaces

# A344 Bench Units and Shelves



Note: Grids 8-27 are located in drawers or cabinets

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

Floor Grid	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
1	<50	<50	<1000	<1000	<2	<3
2	<50	<50	<1000	<1000	<2	<3
3	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	<2	<3
5	<50	<50	<1000	<1000	<2	<3
6	<50	<50	<1000	<1000	<2	<3
7	<50	<50	<1000	<1000	<2	<3
8	<50	<50	<1000	<1000	<2	<3
9	<50	<50	<1000	<1000	<2	<3
10	<50	<50	<1000	<1000	<2	<3
11	<50	<50	<1000	<1000	<2	<3
12	<50	<50	<1000	<1000	<2	<3
13	<50	<50	<1000	<1000	<2	<3
14	<50	<50	<1000	<1000	<2	<3
15	<50	<50	<1000	<1000	<2	<3
16	<50	<50	<1000	<1000	<2	<3
17	<50	<50	<1000	<1000	<2	<3
18	<50	<50	<1000	<1000	<2	<3
19	<50	<50	<1000	<1000	<2	<3
20	<50	<50	<1000	<1000	<2	<3
21	<50	<50	<1000	<1000	<2	<3
22	<50	<50	<1000	<1000	<2	<3
23	<50	<50	<1000	<1000	<2	<3
24	<50	<50	<1000	<1000	<2	<3



Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
25	<50	<50	<1000	<1000	<2	<3
26	<50	<50	<1000	<1000	<2	<3
27	<50	<50	<1000	<1000	<2	<3
28	<50	<50	<1000	<1000	<2	<3
29	<50	<50	<1000	<1000	<2	<3
30	<50	<50	<1000	<1000	<2	<3
Filter Bank						
1	<50	<50	<1000	<1000	<2	<3
2	<50	<50	<1000	<1000	<2	<3
3	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	2	<3
Hood Base						
1	<50	<50	<1000	<1000	<2	4
2	<50	<50	<1000	<1000	<2	<3
3	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	<2	<3
5	<50	<50	<1000	<1000	<2	<3
6	<50	<50	<1000	<1000	<2	<3

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
Hood						
1	<50	<50	<1000	<1000	<2	<3
2	<50	<50	<1000	<1000	2	<3
3	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	<2	<3
5	<50	<50	<1000	<1000	<2	<3
6	<50	<50	<1000	<1000	<2	<3
7	<50	<50	<1000	<1000	<2	<3
8	<50	<50	<1000	<1000	<2	<3
9	<50	<50	<1000	<1000	<2	<3
10	<50	<50	<1000	<1000	<2	<3
11	<50	<50	<1000	<1000	<2	<3
12	<50	<50	<1000	<1000	<2	<3
13	<50	<50	<1000	<1000	<2	<3
14	<50	<50	<1000	<1000	<2	<3
15	<50	<50	<1000	<1000	<2	<3
16	<50	<50	<1000	<1000	<2	<3
Benches						
1	<50	<50	<1000	<1000	2	<3
2	<50	<50	<1000	<1000	<2	<3
3	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	<2	<3
5	<50	<50	<1000	<1000	<2	<3

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
6	<50	<50	<1000	<1000	<2	<3
7	<50	<50	<1000	<1000	<2	<3
8	<50	<50	<1000	<1000	<2	<3
9	<50	<50	<1000	<1000	<2	<3
10	<50	<50	<1000	<1000	<2	<3
11	<50	<50	<1000	<1000	<2	<3
12	<50	<50	<1000	<1000	<2	<3
13	<50	<50	<1000	<1000	<2	<3
14	<50	<50	<1000	<1000	<2	<3
15	<50	<50	<1000	<1000	<2	<3
16	<50	<50	<1000	<1000	<2	<3
17	<50	<50	<1000	<1000	<2	<3
18	<50	<50	<1000	<1000	<2	<3
19	<50	<50	<1000	<1000	<2	<3
20	<50	<50	<1000	<1000	<2	<3
21	<50	<50	<1000	<1000	<2	<3
22	<50	<50	<1000	<1000	<2	<3
23	<50	<50	<1000	<1000	<2	<3
24	<50	<50	<1000	<1000	<2	<3
25	<50	<50	<1000	<1000	<2	<3
26	<50	<50	<1000	<1000	<2	<3
27	<50	<50	<1000	<1000	<2	<3

Wall



## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
9	<50	<50	<1000	<1000	<2	<3
13	<50	<50	<1000	<1000	<2	<3
15	<50	<50	<1000	<1000	<2	<3
34	<50	<50	<1000	<1000	<2	<3
51	<50	<50	<1000	<1000	<2	<3
45	<50	<50	<1000	<1000	<2	<3
42	<50	<50	<1000	<1000	2	<3
End Wall						
6	<50	<50	<1000	<1000	<2	<3
9	<50	<50	<1000	<1000	<2	<3
4	<50	<50	<1000	<1000	<2	<3
7	<50	<50	<1000	<1000	<2	<3
13	<50	<50	<1000	<1000	<2	<3
14	<50	<50	<1000	<1000	<2	<3
16	<50	<50	<1000	<1000	<2	<3
17	<50	<50	<1000	<1000	<2	<3
Ceiling						
5	<50	<50	<1000	<1000	<2	<3
20	<50	<50	<1000	<1000	<2	<3
15	<50	<50	<1000	<1000	<2	<3

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
Silver Pig	<50	<50	<1000	<1000	<2	<3
Misc. Chemical Jars	<50	<50	<1000	<1000	<2	<3
Plywood	<50	<50	<1000	<1000	<2	<3
Reac. Pig	<50	<50	<1000	1000	<2	<3
Two Lead Pigs	<50	<50	<1000	<1000	<2	<3
Cylindrical Pigs	<50	<50	<1000	<1000	<2	<3
Light Bulb, Cylinder Guard	<50	<50	<1000	<1000	<2	<3
Lead Pig, Plastic Bottle	<50	<50	<1000	<1000	<2	<3
Dewar	<50	<50	<1000	<1000	<2	<3
Lead Bricks, 4	<50	<50	<1000	<1000	<2	<3
Lead Bricks, 4	<50	<50	<1000	<1000	<2	<3
Lead Sheeting	<50	<50	<1000	<1000	<2	<3
Lead Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 3	<50	<50	<1000	<1000	<2	<3
Pig	<50	<50	<1000	<1000	<2	<3
Wood Cart	<50	<50	<1000	<1000	<2	<3
Wood Cart	<50	<50	<1000	<1000	<2	<3
Paperwork	<50	<50	<1000	<1000	<2	<3
HV Supply	<50	<50	<1000	<1000	<2	<3
Printer	<50	<50	<1000	<1000	<2	<3
MCA	<50	<50	<1000	<1000	<2	<3

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
Apple	<50	<50	<1000	<1000	<2	<3
Glass Tubing	<50	<50	<1000	<1000	<2	<3
Sample Stand	<50	<50	<1000	<1000	<2	<3
Brick, 4	<50	<50	<1000	<1000	<2	<3
Brick, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 4	<50	<50	<1000	<1000	<2	<3
Bricks, 3	<50	<50	<1000	<1000	<2	<3
NaI Detector	<50	<50	<1000	<1000	<2	<3
Wood Blocks	<50	<50	<1000	<1000	<2	3
Box 1	<50	<50	<1000	<1000	<2	<3
Box 2	<50	<50	<1000	<1000	<2	<3
Box 3	<50	<50	<1000	<1000	<2	<3
Box 4	<50	<50	<1000	<1000	<2	<3
Box 5	<50	<50	<1000	<1000	<2	<3
Box 6	<50	<50	<1000	<1000	<2	<3
Box 7	<50	<50	<1000	<1000	<2	<3
Box 8	<50	<50	<1000	<1000	<2	<3
Box 9	<50	<50	<1000	<1000	<2	<3
Box 10	<50	<50	<1000	<1000	<2	3
Sliding Glass	<50	<50	<1000	<1000	<2	<3



## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
Sliding Glass	<50	<50	<1000	<1000	<2	<3
Glass Pannel	<50	<50	<1000	<1000	<2	<3
Glass Pannel	<50	<50	<1000	<1000	<2	<3
Hood Sash Rims	<50	<50	<1000	<1000	2	<3
Padded Stool	<50	<50	<1000	<1000	<2	<3
Wood Stool	<50	<50	<1000	<1000	<2	<3
Box of Discs	<50	<50	<1000	<1000	<2	<3
2 Bags, 1 Box Discs	<50	<50	<1000	<1000	<2	<3
Balance Repair Kit	<50	<50	<1000	<1000	<2	<3
Goggle Box	<50	<50	<1000	<1000	<2	<3
Alpha Counter	<50	<50	<1000	<1000	<2	<3
Pulse Rate Meter	<50	<50	<1000	<1000	<2	<3
3 Boxes Planchets	<50	<50	<1000	<1000	<2	<3
Pac-4G	<50	<50	<1000	<1000	<2	<3
Box Planchets	<50	<50	<1000	<1000	<2	<3
Probe, Gas	<50	<50	<1000	<1000	<2	<3
Clamps	<50	<50	<1000	<1000	<2	<3
Lab Coat	<50	<50	<1000	<1000	<2	<3
Shield Apron	<50	<50	<1000	<1000	<2	<3
Trash Can	<50	<50	<1000	<1000	<2	<3
Duct Left	<50	<50	<1000	<1000	<2	<3
Duct Right	<50	<50	<1000	<1000	<2	<3
Sink Drain	<50	<50	<1000	<1000	<2	<3
2 Rolls, gloves	<50	<50	<1000	<1000	<2	<3
Misc. Hardware	<50	<50	<1000	<1000	<2	<3

## Alpha Chemistry Room A344, Bldg. 222, Survey Results

	Average Alpha dpm/100 cm sq.	Maximum Alpha dpm/100 cm sq.	Average Beta dpm/100 cm sq.	Maximum Beta dpm/100 cm sq.	Removable Alpha dpm/100 cm sq.	Removable Beta dpm/100 cm sq.
Misc. Hardware	<50	<50	<1000	<1000	<2	<3
Roll Gloves	<50	<50	<1000	<1000	<2	<3
Lab Glass, tubing	<50	<50	<1000	<1000	<2	<3
Labels, Paper	<50	<50	<1000	<1000	<2	<3
Misc. Plastic	<50	<50	<1000	<1000	<2	<3
Prm-6	<50	<50	<1000	<1000	<2	<3
Probe Faces	<50	<50	<1000	<1000	<2	<3
Shield, Apron	<50	<50	<1000	<1000	<2	<3
Light 1	<50	<50	<1000	<1000	<2	<3
Light 2	<50	<50	<1000	<1000	<2	<3
Lead Bricks, 4	<50	<50	<1000	<1000	<2	<3

# A344

Survey Meters: Bioson #A920R  
w/ PB 2124 probe

Date: 1/19/90  
Surveyor: J. M. [Signature]

Floor  
Grids Grid #

$\alpha$  counts

	1	2	3	4
1	0	0	1	0
2	2	0	0	0
3	0	2	0	0
4	0	1	0	0
5	0	1	1	0
6	0	1	0	1
7	1	0	0	0
8	0	1	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	1
12	1	0	0	0
13	0	0	0	0

All results indicate no contamination of this area.



A 344

Survey Meters: Bioson # A920R  
w/ PB 2124 probe

Date: 1/19/90  
Surveyor: [Signature]

Floor  
Grid Grid #

$\alpha$  Counts

	1	2	3	4
14	0	0	0	0
15	0	0	1	0
16	0	0	0	0
17	0	0	0	1
18	0	0	0	0
19	0	0	0	1
20	0	0	0	1
21	0	0	0	0
22	1	0	0	0
23	1	0	0	1
24	0	0	1	1
25	1	1	0	0
26	0	0	0	0

All results indicate no contamination of this area.

A344

Survey Meters: Bicron #A920R  
w/ PB 2124 probe

Date: 1/19/90

Surveyor: [Signature]

<u>Floor</u> <u>Grid</u> Grid #	1	2	3	4
27	0	0	1	0
28	0	0	1	1
29	0	0	1	0
30	1	0	0	1

All results indicate no contamination of this area.

A 344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 1/19/90

Surveyor: M. Hagen

Filter  
Bank

$\alpha$  counts

Grid #

	1	2	3	4
1	0	0	0	0
2	0	1	2	0
3	2	2	0	1
4	1	3	0	2

All results indicate no contamination of this area.



A344

Survey Meter: Bison # A920R  
w/ PB 2124 probe

Date: 1/19/89 <sup>90</sup>  
Surveyor: M. Lagan

Hood  
Base Grid #

$\alpha$  Counts

	1	2	3	4
1	0	1	0	0
2	0	0	1	0
3	0	0	0	0
4	0	0	0	0
5	0	0	1	0
6	0	0	<del>0</del> <sup>20</sup>	0

All results indicate no contamination of this area.

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

A 344

Date: 12/21/89

Surveyor: JAC

$\alpha$  counts

Head Grid #

	1	2	3	4
1	0	0	1	1
2	0	0	2	1
3	1	0	0	0
4	0	0	0	0
5	1	1	0	0
6	2	0	0	0
7	0	1	0	0
8	0	0	0	0
9	0	0	0	1
10	0	0	0	2
11	0	1	2	0
12	0	0	0	0
13	0	0	1	0

All results indicate no contamination of this area.

A344

Survey Meters: Bioscan # A920R  
w/ PB 2124 probe

Date: 12/23/89  
Surveyor: JAE

α counts

Head Grid #

	1	2	3	4
14	0	0	0	0
15	0	0	0	0
16	0	6	0	1

All results indicate no contamination of this area.



A 344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 12/28/89

Surveyor: [Signature]

$\alpha$  counts

Beaches Grid #

	1	2	3	4
1	0	0	1	0
2	0	0	0	1
3	0	0	0	0
4	0	0	0	0
5	0	1	0	0
6	0	1	0	0
7	1	1	1	1
8	0	0	0	1
9	2	0	1	0
10	1	1	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0

All results indicate no contamination of this area.

A344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 12/28/89  
Surveyor: J. Magallon

$\alpha$  counts

Benches Grid #

	1	2	3	4
14	1	0	1	0
15	0	1	0	0
16	0	0	0	1
17	0	0	0	0
18	0	0	1	0
19	0	0	0	0
20	0	2	0	0
21	1	0	0	0
22	0	0	1	0
23	1	0	1	1
24	0	0	0	0
25	1	0	0	0
26	1	1	0	0

All results indicate no contamination of this area.

A 344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 12/28/99

Surveyor: J.M. [Signature]

$\alpha$  counts

Bench Grid #

	1	2	3	4
27	1	0	1	0
<del>28</del> <sup>PAVE</sup> ↓				
<del>29</del>				
<del>30</del>				
<del>31</del>				
<del>32</del>				
<del>33</del>				
<del>34</del>				
<del>35</del>				

All results indicate no contamination of this area.



A 344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 11/20/89

Surveyor: [Signature]

$\alpha$  counts

Wall Grid #

	1	2	3	4
9	1	1	0	0
13	0	0	0	0
15	0	0	0	1
34	0	1	0	0
51	0	0	0	0
45	1	0	1	0
<del>42</del> <sup>40</sup>	1	0	1	1

All results indicate no contamination of this area.

A344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 12/20/89

Surveyor: AME

End

$\alpha$  Counts

Wall Grid #

	1	2	3	4
13	0	0	0	0
14	1	2	0	0
16	0	1	0	0
17	0	1	0	0

All results indicate no contamination of this area.

A 344

Survey Meters: Bioson #A920R  
w/ PB 2124 probe

Date: 1/19/90  
Surveyor: [Signature]

End  
Wall Grid #

$\alpha$  Counts

	1	2	3	4
6	0	0	0	1
9	0	1	0	0
4	0	1	0	0
7	0	0	0	1

All results indicate no contamination of this area.



A344

Survey Meters: Bicron # A920R  
w/ PB 2124 probe

Date: 12/20/89

Surveyor: MES

$\alpha$  counts

Ceiling Grid #

	1	2	3	4
5	0	0	0	1
20	0	0	0	1
15	0	1	0	1
light 1	0	0	0	0
light 2	0	0	2	0

All results indicate no contamination of this area.

<100	<100	<100	<100	13
<100	<100	<100	<100	12
<100	<100	<100	<100	11
<100	<100	<100	<100	10
<100	<100	<100	<100	9
<100	<100	<100	<100	8
<100	<100	<100	<100	7
<100	<100	<100	<100	6
<100	<100	<100	<100	5
<100	<100	<100	<100	4
<100	<100	<100	<100	3
<100	<100	<100	<100	2
<100	<100	<100	<100	1

All results indicate no contamination of this area.

Floor Grid #

Survey Meter: IA Model TRM-35  
SN 12682

B CPM

A344

4

3

2

1

Date: 1/19/90

Surveyor: *[Signature]*

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 1/18/90

Surveyor: J. M. [Signature]

B CPM

Floor Grid #

	1	2	3	4
14	<100	<100	<100	<100
15	<100	<100	<100	<100
16	<100	<100	<100	<100
17	<100	<100	<100	<100
18	<100	<100	<100	<100
19	<100	<100	<100	<100
20	<100	<100	<100	<100
21	<100	<100	<100	<100
22	<100	<100	<100	<100
23	<100	<100	<100	<100
24	<100	<100	<100	<100
25	<100	<100	<100	<100
26	<100	<100	<100	<100

All results indicate no contamination of this area.



A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 1/19/90

Surveyor: J. Taylor

$\beta$  CPM

Floor Grid #

	1	2	3	4
27	<100	<100	<100 <del>50</del>	<100
28	<100	<100	<100	<100
29	<100	<100	<100	<100
30	<100	<100	<100	<100

All results indicate no contamination of this area.

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 1/19/96

Surveyor: JM Saylor

Filter  
Bank Grid #

$\beta$  CPM

	1	2	3	4
1	<100	<100	<100	<100
2	<100	<100	<100	<100
3	<100	<100	<100	<100
4	<100	<100	<100	<100

All results indicate no contamination of this area.

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 1/19/89  
Surveyor: [Signature]

Hood  
Base Grid #

$\beta$  CPM

	1	2	3	4
1	<100	<100	<100	<100
2	<100	<100	<100	<100
3	<100	<100	<100	<100
4	<100	<100	<100	<100
5	<100	<100	<100	<100
6	<100	<100	<100	<100

All results indicate no contamination of this area.



A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 12/22/89

Surveyor: [Signature]

β CPM

Hood Grid #

	1	2	3	4
1	<100	<100	<100	<100
2	<100	<100	<100	<100
3	<100	<100	<100	<100
4	<100	<100	<100	<100
5	<100	<100	<100	<100
6	<100	<100	<100	<100
7	<100	<100	<100	<100
8	<100	<100	<100	<100
9	<100	<100	<100	<100
10	<100	<100	<100	<100
11	<100	<100	<100	<100
12	<100	<100	<100	<100
13	<100	<100	<100	<100

All results indicate no contamination of this area.

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 12/22/89

Surveyor: [Signature]

β CPM

Head Grid #

	1	2	3	4
14	<100	<100	<100	<100
15	<100	<100	<100	<100
16	<100	<100	<100	<100

All results indicate no contamination of this area.

All results indicate no contamination of this area.

7100	7100	7100	7100	13
7100	7100	7100	7100	12
7100	7100	7100	7100	11
7100	7100	7100	7100	10
7100	7100	7100	7100	9
7100	7100	7100	7100	8
7100	7100	7100	7100	7
7100	7100	7100	7100	6
7100	7100	7100	7100	5
7100	7100	7100	7100	4
7100	7100	7100	7100	3
7100	7100	7100	7100	2
7100	7100	7100	7100	1

Bench Grid #

Survey Meters: IA Model TBM-35  
SN 12682

B CPM

A344

Date: 12/28/89

Surveyor: *[Signature]*

4

3

2

1



All results indicate no contamination of this area.

2017	0017	0017	0017	28
0017	0017	0017	0017	25
0017	0017	0017	0017	24
0017	0017	0017	0017	23
0017	0017	0017	0017	22
0017	0017	0017	0017	21
0017	0017	0017	0017	20
0017	0017	0017	0017	19
0017	0017	0017	0017	18
0017	0017	0017	0017	17
0017	0017	0017	0017	16
0017	0017	0017	0017	15
0017	0017	0017	0017	14

Bench Grid #

Survey Meters: IA Model TBM-35  
SN 12682

B.C.P.M

A344

Date: 12/28/89

Surveyor: *[Signature]*

4 3 2 1

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 12/28/89

Surveyor: JM [Signature]

$\beta$  CPM

Bench Grid #

	1	2	3	4
27	<100	400	<100	4106
28 <del>27</del>				

All results indicate no contamination of this area.

All results indicate no contamination of this area.

4100	4100	4100	4100	45
4100	4100	4100	4100	51
4100	4100	4100	4100	34
4100	4100	4100	4100	15
4100	4100	4100	4100	13
4100	4100	4100	4100	9

Wall Grid #

Survey Meters: IA Meters 35  
SN 12682

A344  
BCPM

Date: 12/20/99  
Surveyor: [Signature]

4 3 2 1



A344

Survey Meters: JA model TBM-35  
SN 12682

Date: 12/20/89

Surveyor: [Signature]

$\beta$  CPM

End  
Wall Grid #

	1	2	3	4
13	<100	<100	<100	<100
14	<100	<100	<100	<100
16	<100	<100	<100	<100
17	<100	<100	<100	<100

All results indicate no contamination of this area.

A344

Survey Meters: TA model TBM-35  
SN 12682

Date: 11/9/90

Surveyor: [Signature]

β CPM

End  
Walls Grid #

	1	2	3	4
6	<100	<100	<100	<100
9	<100	<100	<100	<100
4	<100	<100	<100	<100
7	<100	<100	<100	<100

All results indicate no contamination of this area.

A344

Survey Meters: JA model TBM-35  
SN 12682

Date: 12/20/89  
 Surveyor: [Signature]

β CPM

Ceiling Grid #

	1	2	3	4
5	<100	<100	<100	<100
20	<100	<100	<100	<100
15	<100	<100	<100	<100
light 1	<100	<100	<100	<100
light 2	<100	<100	<100	<100

All results indicate no contamination of this area.



# A344

Survey Meters: Bioson w/PR2124  
TBM-95 SN 12682

Date: 12/19/89

Surveyor: JM Egan

α COUNTS / β CPM

Misc. Room Items

	1	2	3	4
Silver Pig	0 <100			
Misc. Chem. Jars	0 <100			
Plywood	1 <100			
Reac Phg Pig	0 <100			
2 Lead Pigs	0 <100			
Storr cylinders Pig	0 <100			
light bulb cylinder and paper carton	0 <100			
lead pig Plastic bottle	1 <100			
Dewar	0 <100	1 <100		
Lead Bricks 4	0 <100			
Bricks 4	1 <100			
Bricks 4	0 <100			
Lead sheeting	0 <100			

All results indicate no contamination of this area.

# A344

Survey Meters: Boron w/PR3124  
TBM-35 SN 12682

Date: 12/19/89

Surveyor: [Signature]

α COUNTS / β CPM

Misc. Room Items

	1	2	3	4
Lead Bricks 4	0 <100			
Bricks 4	0 <100			
Bricks 4	1 <100			
Bricks 3	0 <100			
Pig	0 <100			
Wood Cart	0 <100	0 <100	1 <100	0 <100
Wood Cart	0 <100	0 <100	0 <100	0 <100
Computer Paperwork	1 <100	0 <100	0 <100	0 <100
HV supply & preamp	1 <100	0 <100		
Printer	0 <100	0 <100		
Series 40 mCA	0 <100	1 <100	0 <100	2 <100
Apple Computer	0 <100	0 <100	1 <100	1 <100
Misc Glass Tubing	1 <100			

All results indicate no contamination of this area.



A344

Survey Meters: Boron w/PA 3124  
IBM-35 SN 12682

Date: 12/30/89

Surveyor: JM. Johnson

$\alpha$  counts /  $\beta$  CPM

Misc. Room Items

	1	2	3	4
Sample Stand	1			
4 Lead Bricks	0 <100			
4 Lead Bricks	0 <100			
4 Lead Bricks	1 <100			
4 Lead Bricks	0 <100			
4 Lead Bricks	0 <100			
4 Lead Bricks	0 <100			
4 Lead Bricks	1 <100			
4 Lead Bricks	1 <100			
3 Lead Bricks	1 <100			
NaI Detector	0 <150	0 <100		
Wood Blocks	0 <100			
Box 1	0 <100			

All results indicate no contamination of this area.



A344

Survey Meters: Boron w/ PR 2124  
TBM-35 SN 12682

Date: 12/20/89

Surveyor: JM Rapp

$\alpha$  counts /  $\beta$  CPM

Misc. Room Items

	1	2	3	4
Box 2	0 <100			
3	1 <100			
4	1 <100			
5	0 <100			
6	0 <100			
7	0 <100			
8	0 <100			
9	0 <100			
10	0 <100			
Sliding glass from Hood	1 <100	1 <100	0 <100	0 <100
Sliding glass from Hood	0 <100	1 <100	0 <100	0 <100
Glass Pannel	0 <100	0 <100	1 <100	0 <100
Glass Pannc	0 <100	1 <100	0 <100	1 <100

All results indicate no contamination of this area.

A344

Survey Meters: Bioson w/PA 2124  
TBM-85 SN 12682

Date: 12/20/89

Surveyor: J. M. Hagdon

$\alpha$  COUNTS /  $\beta$  CPM

Misc. Room Items

	1	2	3	4
Hood Shash Rims	0 <100	0 <100	0 <100	1 <100
Padded Stool	0 <100	0 <100		
Wood Stool	0 <100	0 <100		

All results indicate no contamination of this area.



A344

Survey Meters: Boran w/ PB 2124  
TBM-35 SN 12682

Date: 12/20/99  
 Surveyor: MM

d counts /  $\beta$  CPM

Misc. Room Items

	1	2	3	4
Box Discs	0 <100	0 <100		
2 Bags 2 1 Box Disc	1 <100	0 <100		
Balance Repair Kit	1 <100			
Goggle Box Nimrops	0 <100	0 <100		
Eber. Alpha Counter	1 <100			
Eberline Pulse Rate	0 <100			
3 box planchets	1 <100	1 <100	0 <100	
Pac 46 2 Probe	0 <100	1 <100		
Box Planchets	0 <100			
Probes 2 Gas	1 <100	1 <100		
Clamps	0 <100			
Lab Coat	0 <100	0 <100	0 <100	1 <100
Shield Apron	0 <100	1 <100	0 <100	1 <100

All results indicate no contamination of this area.



A344

Survey Meters: Brown w/ PB 2124  
IBM-35 SN 12482

Date: 12/20/89

Surveyor: SMC

$\alpha$  counts /  $\beta$  CPM

Misc. Room Items

	1	2	3	4
Trash can	0 <100	1 <100		
Duct left	0 <100			
Duct right	1 <100			
Sink Drain	1 <100			
2 rolls gloves	0 <100	0 <100		
Misc. Hardware	1 <100	0 400		
Misc. Hardware	0 <100	0 <100		
roll gloves	0 <100	0 400		
lab glass & tubing	1 <100	0 <100		
labels & tape	0 <100	0 <100		
Misc. Plastic	0 <100	0 <100	1 <100	
PRM-6 Probe	0 <100			
Alpha Probe Faces	1 <100			

All results indicate no contamination of this area.



OPERATION COMPLETE

MON JAN 22, 1990 GROUP A

Smear Evaluation: Surveyor's Name D. Engleson / Area Surveyed A344 Bldg 222

Smpl No	Count Time	Alpha Count	Beta Count	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	0	4	-0.2	5.0	15:55:04	1 Floor
2	1	0	.2	-0.2	1.0	15:56:16	2
3	1	.1	.4	1.8	5.0	15:57:27	3
4	1	.0	.1	-0.2	-1.0	15:58:39	4
5	1	.0	.1	-0.2	-1.0	15:59:51	5
6	1	.0	.1	-0.2	-1.0	16:01:02	6
7	1	.1	.0	1.8	-3.0	16:02:14	7
8	1	.1	0	1.8	-3.0	16:03:26	8
9	1	.0	.0	-0.2	-3.0	16:04:38	9
10	1	.0	.0	-0.2	-3.0	16:05:49	10
11	1	.0	.0	-0.2	-3.0	16:07:01	11
12	1	.0	.2	-0.2	1.0	16:08:13	12
13	1	.0	.0	-0.2	-3.0	16:09:24	13
14	1	.0	.1	-0.2	-1.0	16:10:36	14
15	1	.0	0	-0.2	-3.0	16:11:48	15
16	1	.1	2	1.8	1.0	16:13:00	16
17	1	.1	0	1.8	-3.0	16:14:11	17
18	1	.0	3	-0.2	3.0	16:15:23	18
19	1	.0	2	-0.2	1.0	16:16:35	19
20	1	.0	.1	-0.2	-1.0	16:17:47	20
21	1	.0	.1	-0.2	-1.0	16:18:58	21
22	1	.0	2	-0.2	1.0	16:20:10	22
23	1	.0	1	-0.2	-1.0	16:21:22	23
24	1	.0	2	-0.2	1.0	16:22:33	24
25	1	.0	2	-0.2	1.0	16:23:45	25
26	1	0	2	-0.2	1.0	16:24:57	26
27	1	0	1	-0.2	-1.0	16:26:09	27
28	1	0	3	-0.2	3.0	16:27:20	28
29	1	0	1	-0.2	-1.0	16:28:32	29
30	1	0	1	-0.2	-1.0	16:29:44	30
31	1	0	1	-0.2	-1.0	16:30:55	31 30 Duplicate <del>DE</del>
32	1	0	4	-0.2	5.0	16:32:07	Filter Bank 1
33	1	1	2	1.8	1.0	16:33:19	2
34	1	1	2	1.8	1.0	16:34:31	3
35	1	2	4	3.8	5.0	16:35:42	4
36	1	0	9	-0.2	15.0	16:36:54	Hood Base 1
37	1	0	3	-0.2	3.0	16:38:06	2
38	1	0	4	-0.2	5.0	16:39:17	3
39	1	0	0	-0.2	-3.0	16:40:29	4
40	1	0	1	-0.2	-1.0	16:41:41	5
41	1	0	1	-0.2	-1.0	16:42:53	6
42	1	.0	3	-0.2	3.0	16:44:04	6 End wall
43	1	0	.2	-0.2	1.0	16:45:16	9
44	1	0	.3	-0.2	3.0	16:46:28	4
45	1	0	2	-0.2	1.0	16:47:40	7

OPERATION COMPLETE



OPERATION COMPLETE

OPERATION COMPLETE

OPERATION COMPLETE

TUE JAN 23, 1990 GROUP A

Smear Evaluation: Surveyor's Name D. Eagleson / Area Surveyed Bldg 222 A345

Smpl No	Count Time	Alpha Count	Beta Count	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	0	1	-0.2	-1.0	10:16:31	Bencher 8
2	1	0	.2	-0.2	1.0	10:17:43	9
3	1	0	.1	-0.2	-1.0	10:18:55	10
4	1	0	.1	-0.2	-1.0	10:20:06	11
5	1	1	.4	1.8	5.0	10:21:18	12
6	1	0	.0	-0.2	-3.0	10:22:30	13
7	1	0	1	-0.2	-1.0	10:23:41	14
8	1	0	.3	-0.2	3.0	10:24:53	15
9	1	0	.1	-0.2	-1.0	10:26:05	16
10	1	0	.2	-0.2	1.0	10:27:17	17
11	1	0	0	-0.2	-3.0	10:28:28	18
12	1	1	.3	1.8	3.0	10:29:40	19
13	1	0	.3	-0.2	3.0	10:30:52	20
14	1	0	.2	-0.2	1.0	10:32:04	21
15	1	0	1	-0.2	-1.0	10:33:15	22
16	1	0	0	-0.2	-3.0	10:34:27	23
17	1	0	0	-0.2	-3.0	10:35:39	24
18	1	0	1	-0.2	-1.0	10:36:51	25
19	1	0	0	-0.2	-3.0	10:38:02	26
20	1	0	0	-0.2	-3.0	10:39:14	27

OPERATION COMPLETE

OPERATION COMPLETE

OPERATION COMPLETE

ED JAN 10, 1990 GROUP A

Year Evaluation: Surveyor's Name Doug Engleson / Area Surveyed Bldg 222 A344

Impl No	Count Time	Alpha Count	Beta Count	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	1	0	1.8	-3.0	11:33:33	Filter Bank Right #8 *
2	1	0	1	-0.2	-1.0	11:34:45	Under Hood #5 *
3	1	2	0	3.8	-3.0	11:35:56	Floor under Filter bank *
4	1	0	4	-0.2	5.0	11:37:08	Filter Bank Left #9 *
5	1	0	2	-0.2	1.0	11:38:20	Trash can
6	1	0	3	-0.2	3.0	11:39:32	Duct 1 * right *
7	1	0	1	-0.2	-1.0	11:40:43	Duct 2 * left *
8	1	0	0	-0.2	-3.0	11:41:55	Wall 13
9	1	0	2	-0.2	1.0	11:43:07	Wall 15
10	1	0	2	-0.2	1.0	11:44:18	Wall 9
11	1	0	1	-0.2	-1.0	11:45:30	Wall 34
12	1	2	1	3.8	-1.0	11:46:42	Wall 42
13	1	0	2	-0.2	1.0	11:47:54	Wall 51
14	1	0	1	-0.2	-1.0	11:49:05	Wall 45
15	1	0	0	-0.2	-3.0	11:50:17	light 1
16	1	0	3	-0.2	3.0	11:51:29	light 2
17	1	0	2	-0.2	1.0	11:52:40	ceiling 1
18	1	1	1	1.8	-1.0	11:53:52	2 20
19	1	0	3	-0.2	3.0	11:55:04	3 15
20	1	0	3	-0.2	3.0	11:56:16	Filter Bank 1 *
21	1	0	1	-0.2	-1.0	11:57:27	2 *
22	1	0	1	-0.2	-1.0	11:58:39	3 *
23	1	0	0	-0.2	-3.0	11:59:51	4 *
24	1	0	1	-0.2	-1.0	12:01:02	Hood 1
25	1	2	1	3.8	-1.0	12:02:14	2
26	1	0	1	-0.2	-1.0	12:03:26	3
27	1	0	0	-0.2	-3.0	12:04:38	4
28	1	0	1	-0.2	-1.0	12:05:49	5
29	1	0	3	-0.2	3.0	12:07:01	6
30	1	0	0	-0.2	-3.0	12:08:13	7
31	1	0	0	-0.2	-3.0	12:09:24	8
32	1	0	1	-0.2	-1.0	12:10:36	9
33	1	0	1	-0.2	-1.0	12:11:48	10
34	1	0	0	-0.2	-3.0	12:13:00	11
35	1	0	1	-0.2	-1.0	12:14:11	12
36	1	1	0	1.8	-3.0	12:15:23	13
37	1	0	1	-0.2	-1.0	12:16:35	14
38	1	0	0	-0.2	-3.0	12:17:46	15
39	1	0	1	-0.2	-1.0	12:18:58	16
40	1	0	0	-0.2	-3.0	12:20:10	Filter Bank #6 *
41	1	0	1	-0.2	-1.0	12:21:22	

OPERATION COMPLETE

\* These areas were resurveyed on 1/19/90 JME

OPERATION COMPLETE

OPERATION COMPLETE

ED JAN 10, 1990 GROUP A

near Evaluation: Surveyor's Name Doug Eagleson / Area Surveyed Bldg 222 A344

Smpl No	Count Time	Alpha Count	Beta Count	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	0	1	-0.2	-1.0	13:49:58	Cabinet 29
2	1	1	1	1.8	-1.0	13:51:10	28
3	1	0	3	-0.2	3.0	13:52:22	30
4	1	0	0	-0.2	-3.0	13:53:34	32
5	1	0	0	-0.2	-3.0	13:54:45	34
6	1	2	3	3.8	3.0	13:55:57	Bench
7	1	0	4	-0.2	5.0	13:57:09	2
8	1	0	0	-0.2	-3.0	13:58:21	3
9	1	0	3	-0.2	3.0	13:59:32	4
10	1	0	1	-0.2	-1.0	14:00:44	5
11	1	1	0	1.8	-3.0	14:01:56	6
12	1	0	1	-0.2	-1.0	14:03:08	7
13	1	0	2	-0.2	1.0	14:04:19	End wall 1
14	1	0	1	-0.2	-1.0	14:05:31	2
15	1	0	0	-0.2	-3.0	14:06:43	3
16	1	0	1	-0.2	-1.0	14:07:55	4
17	1	0	3	-0.2	3.0	14:09:06	Floor 1
18	1	0	4	-0.2	5.0	14:10:18	2
19	1	0	0	-0.2	-3.0	14:11:30	3
20	1	1	3	1.8	3.0	14:12:41	4
21	1	1	1	1.8	-1.0	14:13:53	5
22	1	0	1	-0.2	-1.0	14:15:05	6
23	1	5	2	9.8	1.0	14:16:17	7
24	1	0	5	-0.2	7.0	14:17:28	8
25	1	0	1	-0.2	-1.0	14:18:40	9
26	1	0	2	-0.2	1.0	14:19:52	10
27	1	0	4	-0.2	5.0	14:21:03	11
28	1	0	1	-0.2	-1.0	14:22:15	12
29	1	0	3	-0.2	3.0	14:23:27	13
30	1	1	2	1.8	1.0	14:24:39	14
31	1	0	3	-0.2	3.0	14:25:50	15
32	1	0	3	-0.2	3.0	14:27:02	16
33	1	0	1	-0.2	-1.0	14:28:14	15
34	1	0	0	-0.2	-3.0	14:29:26	13

Bench removed for disposal. JMC

Grid #

- 13
- 14
- 16
- 17

Resurveyed 1/19/90 JMC

OPERATION COMPLETE



01 JAN 12, 1990 GROUP A

Equipment

near Evaluation: Surveyor's Name

Doug Engleson

/ Area Surveyed Bldg 222 A344

Impl No	Count Time	Alpha Count	Beta Ccount	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	1	1	1.8	-1.0	12:36:40	sink drain
2	1	0	1	-0.2	-1.0	12:37:52	2 rolls of gloves
3	1	0	3	-0.2	3.0	12:39:04	Misc. hardware & paper
4	1	0	3	-0.2	3.0	12:40:16	Misc. hardware
5	1	0	1	-0.2	-1.0	12:41:27	roll of gloves
6	1	0	1	-0.2	-1.0	12:42:39	lab glass & tubing
7	1	0	0	-0.2	-3.0	12:43:51	lab glass
8	1	1	2	1.8	1.0	12:45:02	Rad. labels/pens/paper
9	1	1	0	1.8	-3.0	12:46:14	Misc. Plastic & metal Labware
10	1	0	0	-0.2	-3.0	12:47:26	PRM-6 Probe face
11	1	0	2	-0.2	1.0	12:48:38	Alpha probe faces
12	1	0	2	-0.2	1.0	12:49:49	Box of metal disks
13	1	0	1	-0.2	-1.0	12:51:01	2 bags & 1 box of Planchets
14	1	0	2	-0.2	1.0	12:52:13	Balance repair kit
15	1	0	3	-0.2	3.0	12:53:24	Goggle box & Minowipes
16	1	0	4	-0.2	5.0	12:54:36	Eberline alpha counter
17	1	0	2	-0.2	1.0	12:55:48	Eberline pulse rate meter
18	1	0	1	-0.2	-1.0	12:57:00	3 boxes of small planchets
19	1	0	1	-0.2	-1.0	12:58:12	Pac 4G-3 & probe
20	1	0	3	-0.2	3.0	12:59:23	Box of planchets
21	1	0	1	-0.2	-1.0	13:00:35	Spare probe & gas cylinder
22	1	0	2	-0.2	1.0	13:01:47	Clamps
23	1	0	1	-0.2	-1.0	13:02:59	Lab coat
24	1	0	1	-0.2	-1.0	13:04:10	Shield apron
25	1	0	3	-0.2	3.0	13:05:22	Shield apron

OPERATION COMPLETE

COMPLETE  
 21, 1989 GROUP A  
 Evaluation: Surveyor's Name D. Eagleson / Area Surveyed A344 Bldg 222

Count	Alpha	Beta	Alpha	Beta	Time	Smear Loca-
Time	Count	Count	DPM	DPM	of Day	tion Info
1	1	1	6	1.8	9.0	09:08:29 Floor Grid 25
2	1	0	4	-0.2	5.0	09:09:41 " 26
3	1	0	4	-0.2	5.0	09:10:52 " 29
4	1	0	9	-0.2	15.0	09:12:04 " 18
5	1	0	6	-0.2	9.0	09:13:16 " 20
6	1	0	3	-0.2	3.0	09:14:28 " 16
7	1	1	5	1.8	7.0	09:15:39 Sliding Hood Glass
8	1	0	3	-0.2	3.0	09:16:51 " "
9	1	0	6	-0.2	9.0	09:18:03 Hood Glass Panel
10	1	0	6	-0.2	9.0	09:19:15 " "
11	1	2	2	3.8	1.0	09:20:26 Hood Metal Sash Rims
12	1	0	4	-0.2	5.0	09:21:38 Wood Stool
13	1	0	3	-0.2	3.0	09:22:50 Padded Stool
14	1	1	3	1.8	3.0	09:24:02 NaI Detector
15	1	0	7	-0.2	11.0	09:25:13 Wood Blocks
16	1	0	1	-0.2	-1.0	09:26:25 Box, Corrugated #1
17	1	0	3	-0.2	3.0	09:27:37 " #2
18	1	1	3	1.8	3.0	09:28:49 " #3
19	1	0	2	-0.2	1.0	09:30:00 " #4
20	1	0	0	-0.2	-3.0	09:31:12 " #5
21	1	0	1	-0.2	-1.0	09:32:24 " #6
22	1	0	1	-0.2	-1.0	09:33:36 " #7
23	1	0	3	-0.2	3.0	09:34:47 " #8
24	1	0	0	-0.2	-3.0	09:35:59 " #9
25	1	0	7	-0.2	11.0	09:37:11 " #10
26	1	0	4	-0.2	5.0	09:38:23 Four Lead Bricks
27	1	0	4	-0.2	5.0	09:39:34 " "
28	1	0	1	-0.2	-1.0	09:40:46 " "
29	1	0	0	-0.2	-3.0	09:41:58 " "
30	1	1	0	1.8	-3.0	09:43:09 " "
31	1	0	0	-0.2	-3.0	09:44:21 " "
32	1	1	4	1.8	5.0	09:45:33 " "
33	1	0	1	-0.2	-1.0	09:46:45 " "
34	1	0	2	-0.2	1.0	09:47:56 3 Lead " "
35	1	0	2	-0.2	1.0	09:49:08 Wood Cart 1
36	1	0	2	-0.2	1.0	09:50:20 " 2
37	1	0	1	-0.2	-1.0	09:51:31 " 3
38	1	0	1	-0.2	-1.0	09:52:43 " 4
39	1	0	4	-0.2	5.0	09:53:55 " 5
40	1	0	1	-0.2	-1.0	09:55:07 Computer Paperwork
41	1	0	1	-0.2	-1.0	09:56:18 MCA
42	1	0	1	-0.2	-1.0	09:57:30 Apple computer
43	1	0	1	-0.2	-1.0	09:58:42 Misc. Glass tubing
44	1	0	1	-0.2	-1.0	09:59:54 Sample Stand
45	1	0	1	-0.2	-1.0	10:01:05 Bkg. HV supply XMC
46	1	0	0	-0.2	-3.0	10:02:17 " Printer
47	1	0	1	-0.2	-1.0	10:03:29 " Bkg
48	1	1	2	1.8	1.0	10:04:40 " "
49	1	0	0	-0.2	-3.0	10:05:52 " "
50	1	0	1	-0.2	-1.0	10:07:04 " "

resurveyed.  
1/19/90

OPERATION COMPLETE  
 OPERATION COMPLETE

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ERATION COMPLETE

ERATION COMPLETE

U DEC 21, 1989 GROUP A

Year Evaluation: Surveyor's Name D. Eagleson / Area Surveyed A344 Bldg 222

Impl No	Count Time	Alpha Count	Beta Count	Alpha DPM	Beta DPM	Time of Day	Smear Location Info
1	1	0	3	-0.2	3.0	14:03:44	Silica Pig
2	1	0	1	-0.2	-1.0	14:04:55	Chem. Jps
3	1	0	1	-0.2	-1.0	14:06:07	Plywood
4	1	0	5	-0.2	7.0	14:07:19	Roac Pig
5	1	0	1	-0.2	-1.0	14:08:30	2 Lead Pigs
6	1	0	1	-0.2	-1.0	14:09:42	Cylindrical pig
7	1	0	0	-0.2	-3.0	14:10:54	light bulb paper carton
8	1	0	1	-0.2	-1.0	14:12:05	lead pig/bottle
9	1	0	6	-0.2	9.0	14:13:17	Dewar #1 swipe
10	1	0	1	-0.2	-1.0	14:14:29	Bricks 4
11	1	0	0	-0.2	-3.0	14:15:40	" "
12	1	0	2	-0.2	1.0	14:16:52	" - ?
13	1	0	1	-0.2	-1.0	14:18:04	Lead sheet
14	1	0	3	-0.2	3.0	14:19:16	Bricks 4
15	1	0	2	-0.2	1.0	14:20:27	" "
16	1	0	0	-0.2	-3.0	14:21:39	" "
17	1	0	1	-0.2	-1.0	14:22:51	Dewar #2 swipe
18	1	0	2	-0.2	1.0	14:24:03	Bricks 3
19	1	0	1	-0.2	-1.0	14:25:14	Pig

ERATION COMPLETE