MPI RESEARCH
3058 Research Drive
State College, Pennsylvania 16801 USA
Telephone: 814.272.1039
Fax: 814.272.1019

MPI Research, Inc.
3058 Research Drive
State College, PA 16801

15 Nov 07

NMSS

Licensing Assistant Section
Nuclear Materials Safety Branch
U.S. Nuclear Regulatory Commission, Region I
475 Alllendale Road
King of Prussia, PA 19406-1415

Re: License no. 37-30095-01
Docket no. 030033359

Dear Sir or Madam:

As indicated to you in our letter of 12 Jul 07, MPI Research was in the process of decommissioning the Radioisotope Laboratory and disposing of all radioactive material in preparation for termination of license no. 37-30095-01. The decommissioning is now complete and all licensed material has been disposed. A copy of the Final Status Survey is enclosed. The survey documents that the facilities at MPI Research meet the requirements for unrestricted release. A Certificate of Disposition of Materials (NRC Form 314) is enclosed to verify the disposal of all licensed material.

MPI Research requests that license no. 37-30095-01 be terminated and thanks you for your prompt attention to this matter.

Sincerely,

Kevin Lloyd
General Manager, Analytical Services

Enclosure: NRC Form 314
Final Status Survey

NRC FORM 314 (9-2007)
10 CFR 30.36(j)(1); 40.42(j)(1); 70.38(j)(1); and 72.54(k)(5)(i)(1)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 30 minutes. This submittal is used by NRC as part of the basis for its determination that the facility is released for unrestricted use. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0028), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

CERTIFICATE OF DISPOSITION OF MATERIALS

LICENSEE NAME AND ADDRESS	LICENSE NUMBER	DOCKET NUMBER
MPI Research, Inc., 3058 Research Drive State College, PA 16801	37-30095-01	030-33359
	LICENSE EXPIRATION DATE 05/31/2014	

A. LICENSE STATUS *(Check the appropriate box)*

☐ This license has expired. ☑ This license has not yet expired; please terminate it.

B. DISPOSAL OF RADIOACTIVE MATERIAL

(Check the appropriate boxes and complete as necessary. If additional space is needed, provide attachments)

The licensee, or any individual executing this certificate on behalf of the licensee, certifies that:

☐ 1. No radioactive materials have ever been procured or possessed by the licensee under this license.

☑ 2. All activities authorized by this license have ceased, and all radioactive materials procured and/or possessed by the licensee under this license number cited above have been disposed of in the following manner.

☐ a. Transfer of radioactive materials to the licensee listed below:

☑ b. Disposal of radioactive materials:

☐ 1. Directly by the licensee:

☐ 2. By licensed disposal site:

☑ 3. By waste contractor:

Duratek Services, Inc., 1560 Bear Creek Road, Oak Ridge, TN 37831 865-481-0222

☑ c. All radioactive materials have been removed such that any remaining residual radioactivity is within the limits of 10 CFR Part 20, Subpart E, and is ALARA.

C. SURVEYS PERFORMED AND REPORTED

☑ 1. A radiation survey was conducted by the licensee. The survey confirms:

☐ a. the absence of licensed radioactive materials

☑ b. that any remaining residual radioactivity is within the limits of 10 CFR 20, Subpart E, and is ALARA.

☐ 2. A copy of the radiation survey results:

☐ a. is attached; or ☐ b. is not attached (Provide explanation); or ☑ c. was forwarded to NRC on: 11/15/2007 (Date)

☐ 3. A radiation survey is not required as only sealed sources were ever possessed under this license, and

☐ a. The results of the latest leak test are attached; and/or ☐ b. No leaking sources have ever been identified.

The person to be contacted regarding the information provided on this form:

NAME	TITLE	TELEPHONE *(Include Area Code)*	E-MAIL ADDRESS
Ralene Kreiser	Senior Safety Associate	(800) 281-3219	ralene.kreiser@mpiresearch.com

Mail all future correspondence regarding this license to:
MPI Research, Inc., 3058 Research Drive, State College, 16801

C. CERTIFYING OFFICIAL

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Kevin Lloyd, General Manager		11/15/2007

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECT. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

141361

Final Status Survey
Nuclear Regulatory Commission License 37-30095-01

MPI Research
3058 Research Drive
State College, PA 16801

15 November 2007

Introduction

This report is the Final Status Survey that is required for the termination of Nuclear Regulatory Commission (NRC) byproduct material license number 37-0095-01. It is also intended to serve as a historical reference for MPI Research for information on facilities and the activities conducted under the NRC license.

Historical Information

Nuclear Regulatory Commission byproduct material license 37-30095-01 was issued to Centre Analytical Laboratories, Inc. at 3048 Research Drive, State College, PA 16801 on 28 Feb 94. The radiochemistry laboratory was located in room 6 of the basement of what is now Building 1. The activity limits were:

Carbon 14	95 millicuries
Phosphorus 32	6 millicuries
Sulfur 35	10 millicuries

In October 1996 the radioisotope laboratory was moved to room 209 of the new Building 2 next door to Building 1 at 3058 Research Drive. In March of 2002 the license was amended to also allow the use of licensed material in a new Building 3 located at 3117 Research Drive. The environmental fate studies using Building 3 were completed and it was removed from the license in September 2003 and released for unrestricted use. Building 3 sold shortly thereafter.

In February 2004 the radiochemistry laboratory was moved from Building 2 to the present location in room 101 of Building 1.

The following amendments have been made to the original license.

Amendment #1 was issued 4 Aug 94. It changed the Radiation Safety Officer to Rodger W. Granlund.

On 8 Apr 96 the NRC notified Centre Analytical Laboratories that the expiration date of the license had been extended to 28 Feb 2004.

Amendment #2 was issued 10 Oct 96. This amendment changed the location of the radioisotope lab to room 209 of Building 2.

Amendment #3 was issued 16 Apr 01. This amendment added 20 millicuries of ^{3}H to the license and acknowledged the change of the person responsible for the license from Michael Arjmand to Richard Grazzini.

Amendment #4 was issued on 12 Sep 01. This amendment acknowledged the name change to Exygen Research, Inc.

Amendment #5 was issued on 12 Mar 02. This amendment covered the use of licensed material in Building 3, 3117 Research Drive.

Amendment #6 was issued on 11 Sep 2003. This amendment removed Building 3 from the license and released the building for unrestricted use.

Amendment #7 was issued on 18 Feb 04. This amendment covered the relocation of the Radioisotope Laboratory from room 209 in Building 2 to room 101 of Building 1.

Amendment #8 was issued on 13 May 04. This amendment renewed the license until 31 May 2014.

Amendment #9 was issued on 12 Oct 06 and acknowledged the transfer of the ownership of Exygen Research to MPI Research.

Amendment #10 was issued 10 Aug 07 for the replacement of Richard Grazzini as the management person named on the license with Kevin Lloyd, General Manager. The letter for this amendment also notified the NRC of the intent of MPI Research to terminate the NRC license.

The current radioisotope and activity limits (any chemical or physical form) are:

Hydrogen 3	20 mCi
Carbon 14	95 mCi
Phosphorus 32	6 mCi
Sulfur 35	10 mCi

No ^{35}S was possessed or used under this license. The last ^{32}P acquired under the license was in April 2001, so any ^{32}P activity has been removed by radioactive decay. No ^{3}H was used in any projects. A NIST standard of tritiated water with an activity of 10.8 microcuries was received on 9 Oct 98. This was divided into several vial and flame sealed for storage. Some of the ^{3}H standard was used for calibration of the liquid scintillation counter; the remainder was disposed in the final waste shipment. Two items with 250 microcuries of ^{3}H each were received on 22 Nov 04. This material was stored frozen and never used. It was disposed in the final waste shipment. Therefore, only ^{14}C was of concern for the final status survey, although, those items that were used for storage of tritium-labeled compounds, such as the freezer(s), were checked for ^{3}H contamination. Also, the smears used to check for residual contamination were counted in a liquid scintillation counter in a window that would include tritium counts with those for ^{14}C.

Surveys

The previous locations of the radiochemistry laboratory in room 6 of Building 1 and room 209 of Building 2 were surveyed at the time the laboratories were moved. A closeout survey was also performed for Building 3 after radioisotope use was terminated there and before the building was sold. The guidelines published by the NRC in Regulatory Guide 1.86 in 1974 (NRC 1974) and in 1993 (NRC 1993) were used as the contamination limits. For ^{14}C the values were 5,000 dpm/100 cm^2 averaged over up to 1 m^2, 15,000 dpm/100 cm^2 maximum for up to 100 cm^2, and 1,000 dpm/100 cm^2 for

removable contamination. The current limits for building surface contamination published by the NRC in NUREG 1757 (NRC 2006) are based on specific radionuclides and the value for ^{14}C is 3.7E+6 dpm/100 cm^2. This value assumes 10% of the activity is removable and is based on a dose of 25 mrem/year for building occupants.

The closeout surveys for each of the laboratories are discussed below and copies of the surveys are included as attachments to this report. Building surfaces were all well within the limits for residual contamination and in most instances were below detection limits. The only surfaces with residual contamination were in the interiors of hood ductwork. These surfaces were also within the limits for unrestricted release.

Radioisotope Laboratory, Room 6, Building 1

This laboratory was used for ^{14}C work from February 1994 until October 1996. Routine surveys during this period did not detect any significant contamination. The cabinets, bench tops and floors were surveyed on 27 Feb 97. All smears for removable contamination were less than 100 dpm/100 cm^2. No contamination was detectable with a thin-window GM detector and ratemeter (MDA=4500 dpm/100 cm^2) or with a scaler (MDA=100 dpm/100 cm^2.

The hood ductwork was the only location that any contamination was found. The hood exhaust duct passes through the wall to the outside then up along the outside wall to the roof. The exhaust fan and a short stack with a venturi to draw in extra dilution air are located on the roof. A filter box for a HEPA filter or an activated carbon filter is located just above the point where the duct emerges through the basement wall, but no filters were ever used.

A survey of the interior of the hood and the ductwork accessible at the top of the hood and at the filter box was conducted on 30 Dec 06. The baffles were removed from inside the hood to make all the interior surfaces and the inside of the ductwork available. Smears of the interior of the hood were all less than 100 dpm/100 cm^2. One smear from the inside of the duct at the top of the hood showed 195 dpm/100 cm^2 of removable contamination. No contamination was detectable by direct survey of the surfaces with a thin-window pancake GM detector (MDA=4500 dpm/100 cm^2 with a ratemeter). The inside of the filter box was surveyed before cleaning to estimate the contamination level for the inaccessible surfaces of the ductwork. Smears from inside the filter box had 130 to 640 dpm/100 cm^2. Direct counts inside the filter box with a thin-window pancake GM detector indicated up to 1900 dpm/100 cm^2 (MDA=1200 dpm/100 cm^2 for a 1 minute count with a scaler).

On 2 Nov 02 the fan and stack on the roof were opened for repairs, making some interior surfaces that were not normally accessible available to survey. The filter box and the interior of the hood were also rechecked at that time. The interior of the fan housing had a maximum of 170 dpm/100 cm^2. The interior the exhaust stack had 430 dpm/100 cm^2 at the bottom and 40 dpm/100 cm^2 at the top. Smears from the interior of the filter box were all less than 100 dpm/100 cm^2. Smears from inside the ductwork above and below the filter box were 250 and 160 dpm/100 cm^2 respectively. All smears from the hood and

a small attached canopy were less than 100 dpm/100 cm^2. There was no detectable contamination on any of the surfaces with a thin-window pancake GM detector and ratemeter.

All the smears for removable contamination and the GM measurements for total contamination in the Building 1 Radioisotope Laboratory were within the limits listed above (NRC 1993). No further surveys or decontamination are required. Copies of the laboratory and hood surveys are included as Attachment A.

Radioisotope Laboratory, Room 209, Building 2

The Radioisotope Laboratory was moved from the basement of Building 1 to room 209 Building 2 during Jan-Feb 97. The laboratory remained there until February 2004, when it was moved to the present location in Room 101 of Building 1. During that period ^{14}C was used in the laboratory for a number of environmental fate studies. During the period December 1999 through May 2001 ^{32}P was also used in genetic studies. The closeout survey of Room 209 was performed in Jan-Feb 2004. A draft of the closeout survey report was prepared in March 2004. Through an oversight the final review was not completed until the draft was examined again in July 2007.

The only residual activity after cleaning was in the hood ductwork. Smears of the accessible ductwork were less than 100 dpm/100 cm^2. One side of the ductwork for hood 2-209-A had spots with 100-200 gross cpm with a pancake GM detector. This is equivalent to 3600-8700 dpm/100 cm^2 and is within the release limits for spot contamination. A copy of the closeout survey for Room 209 is enclosed as Attachment B

Building 3

The license was amended in March 2002 to allow the use of ^{14}C in environmental fate studies in Building 3 at 3117 Research Drive. This building contained several environmental chambers that were used for long-term environmental fate studies until November 2002. It also contained a large walk-in freezer that was used for sample storage until July 2003. A closeout survey of Building 3 was conducted on 17 Jul 03. The survey was submitted to the NRC with a request to remove Building 3 from the license in August 2003. Amendment 6 to the license in September 2003 removed Building 3 from the license and released it for unrestricted use. Building 3 was sold after it was released for unrestricted use. A copy of the closeout survey that was submitted to the NRC for Building 3 is included as Attachment C.

Radioisotope Laboratory, Room 101, Building 1

In February 2004 the radioisotope laboratory was moved from room 209 of Building 2 to room 101 of Building 1. In June 2007 work to decommission the laboratory and terminate the license was started. All equipment in the laboratory was surveyed and decontaminated, as necessary, for unrestricted release. The work surfaces, floors, drawers, cabinets, walls and ceiling were all surveyed. With the exception of general license or exempt instrument calibration sources, all radioactive material was shipped for disposal on 3 Oct 07.

A hood on the first floor of Building 2 was used for a ^{14}C compound synthesis in May-June 2005 because the hood in room1 of Building 1 was not large enough to accommodate the apparatus. There was no detectable contamination on accessible surfaces of the hood after cleaning. The hood was not disassembled to check the ductwork, but the contamination level at the exhaust baffles in the hood indicated that any ductwork contamination would be well below the limits for building surfaces. A hood on the third floor of Building 3 was also used for several weeks in 2006 for extractions of samples containing less than 1 microcurie of ^{14}C. No volatile 14C compounds were involved and there was no detectable contamination at the conclusion of the work. The surveys for these hoods are included with the surveys for room 101 of Building 1. After decommissioning there was no detectable activity with survey meters on any accessible room surfaces or equipment and removable contamination was less than 10 dpm/100 cm^2. A copy of the closeout survey for room 101 Building 1 is included as Attachment D.

Conclusion

Centre Analytical Laboratories, Inc. was issued NRC byproduct material license number 37-30095-01 on 28 Feb 94. The license, as amended, allowed the possession and use of ^{3}H, ^{14}C, ^{32}P and ^{35}S. Only ^{14}C and ^{32}P were used in significant quantities and there has been no ^{32}P uses since 2001, so only ^{14}C is of concern for this survey. Licensed material was used in the Radioisotope Laboratories in room 6 of Building 1, room 209 of Building 2, room 101 of Building 1, and the environmental chambers of Building 3. Separate closeout surveys were conducted of these laboratories as work was completed and moved to a new location. The surveys for each of the four areas are included as attachments to this report.

All the laboratories were surveyed with a portable survey meter and smears on a weekly basis when licensed material was in use. These surveys show that contamination of the laboratory was limited to a few experiments and was removed at the completion of the work. Only minor contamination was detected during the Final Status Surveys and it was removed. At the conclusion of the closeout surveys for each area there was no contamination of accessible surfaces detectable with portable survey meters and removable contamination was less than 100 dpm/100 cm^2 (less than 10 dpm/100 cm^2 for the last closeout survey of room 1-101). The inaccessible hood ductwork of the radioisotope laboratories in room 6 of Building 1 and room 209 of Building 2 are known to contain some ^{14}C contamination, which is well below the limit for building surfaces and poses no hazard for persons using or maintaining the hoods.

In summary the Final Status Survey shows that the facilities previously used for work with licensed material are within the contamination limits for unrestricted release.

References

NRC 1974. Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors, NRC June 1974.

NRC 1993. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, NRC, April 1993.

NRC 2006. Table B.1, NUREG-1757, v.1, rev. 2, Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licensees, NRC Sep 2006

Prepared by: Rodger W. Granlund 15 Nov 07

Rodger W. Granlund, CHP
Radiation Safety Officer

Attachments: A. Closeout Survey, Radioisotope Laboratory, Room 6, Building 1
B. Closeout Survey, Radioisotope Laboratory, Room 209, Building 2
C. Closeout Survey, Environmental Fate Facilities, Building 3
D. Closeout Survey, Radioisotope Laboratory, Room 101, Building 1

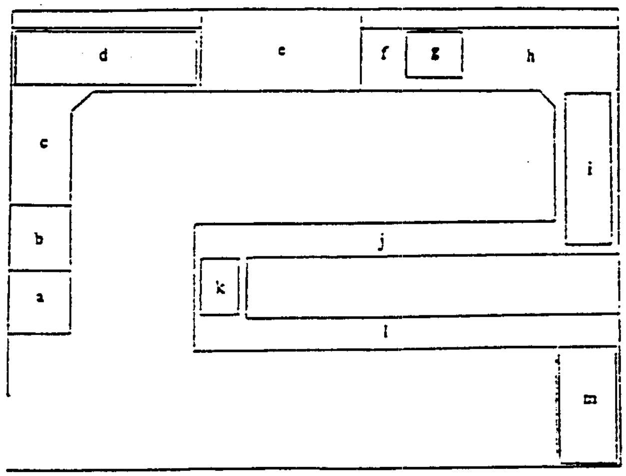
Attachment A

Closeout Survey
Radioisotope Laboratory
Room 6 Building 1

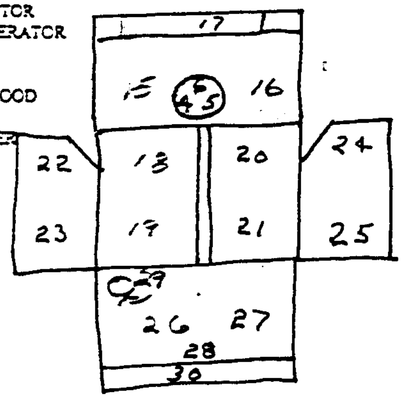
Centre Analytical Laboratories, Inc.
3048 Research Drive State College, PA 16801
Phone: (814) 231-8032 Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: E. Fate Lab. Bldg. 1 DATE: 31 Dec 96
SURVEYOR: R.W. Granlund, Haochung Ye
CONDITIONS: Decommissioning check of hood. Top + bottom baffle plates removed for cleaning
INSTRUMENT(S): Bicron Frisk Tech, Bicron surveyor-M, SE I-Inspector for fixed counts



a. INCUBATOR
b. REFRIGERATOR
c. BENCH
d. AMBIS
e. FUME HOOD
f. BENCH
g. OXIDIZER
h. BENCH
i. HPLC
j. BENCH
k. SINK
l. BANCH
m. LSC



No.	DPM	LOCATION	No.	DPM	LOCATION
4	LSC 195 < 100	inside hood duct	16	< 100	top, behind baffle, rt
5	"	" " "	17	"	Light, inside hood
6	"	" " "	18	"	rear behind baffle
7	"	Top baffle inside rt	19	"	" " "
8	"	" " " left	20	"	" " "
9	"	" " back rt	21	"	" " "
10	"	" " " left	22	"	side, left top
11	"	bottom baffle inside ~~left~~ rt 300 cpm	23	"	" " bottom
12	"	" " ductside	24	"	" rt top
13	"	sash inside	25	"	" " bottom
14	"	Top front panel inside	26	"	base, left
15	"	Top, behind baffle, Left	27	"	" , right

go to page 57

COMMENTS: GMSM check for fixed contamination α, <100 cpm on contact w/ pancake GM.

NRC Guidelines - surface contamination

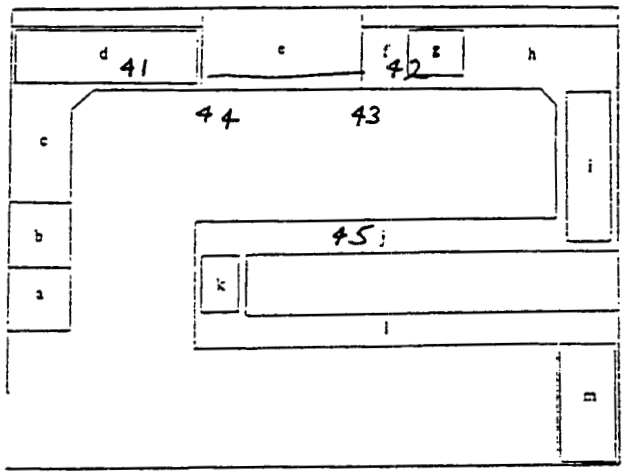
Max.	Avg.	Removable
15,000 dpm/100 cm² α	5,000 dpm/100 cm² α	1,000 dpm/100 cm² α

RW

Centre Analytical Laboratories, Inc.
3048 Research Drive State College, PA 16801
Phone: (814) 231-8032 Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: _____ DATE: 30 Dec 96
SURVEYOR: _____
CONDITIONS: continuation of page 56
INSTRUMENT(S): _____



No.	DPM	LOCATION	No.	DPM	LOCATION
28	< 100	base, front	41	< 100	bench
29	"	sink	42	"	"
30	"	apron	43	"	floor
31	"	sash, outside	44	"	"
32	"	top, front panel, outside	45	"	bench
33	" 276	Filterbox, cover inside	33	GMSM 1 min count on surface	41 cpm gross (dpm/5 cm²) 47
34	" 486	" " base	34	" "	" " " " 78 " " 290
35	" 690	" " "	35	" "	" " " " 67 " " 220
36	" 127	" " rear	36	" "	" " " " 38 " " 27
37	"	duct, inlet, inside		GMSM eff. = 0.15 for ¹⁴C	1930 dpm / 100 cm²
38	—	smear lost up duct		RCy bkg ≈ 34 cpm	
39	<100 200	duct, inside		30 Dec 96	

COMMENTS: no filter was used in filter box

RCy

Centre Analytical Laboratories, Inc.
3048 Research Drive
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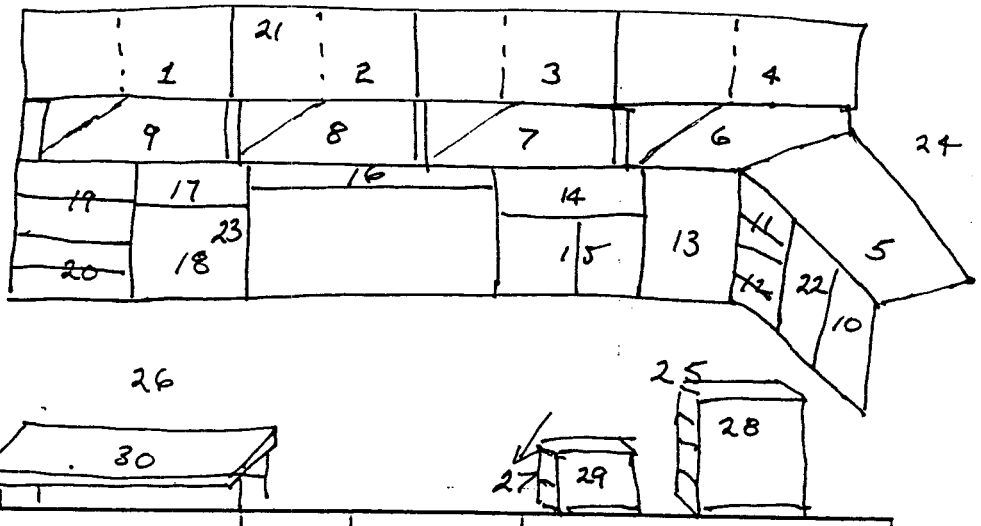
State College, PA 16801
Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: E. Fate Lab Bldg 1
SURVEYOR: R. Granlund
CONDITIONS: Decommissioning survey
INSTRUMENT(S): _____

DATE: 27 Feb 97
Page 1 of 2



No.	DPM	LOCATION	No.	DPM	LOCATION
1	< 100	cabinet inside	13	< 100	cabinet inside
2		" "	14		drawer "
3		" "	15		cabinet "
4		" "	16		drawer "
5		bench top	17		drawer "
6		"	18		cabinet "
7		"	19		drawer "
8		"	20		" "
9		"	21		cabinets outside
10		cabinet inside	22		" "
11		drawers "	23		" "
12		" "	24		wall

COMMENTS: Used LSC vials in cabinet @ 10 & 13 (counted on 3/4/97 my)
GMSR @ hood base = 177 c/5m, GMSR @ bench top (8) = 190/5, floor @ 26 = 196 c/5m

March 1994/0

"THIS IS AN EXACT COPY OF THE ORIGINAL DOCUMENT."

BY RCG DATE 30 Dec 97

RCG

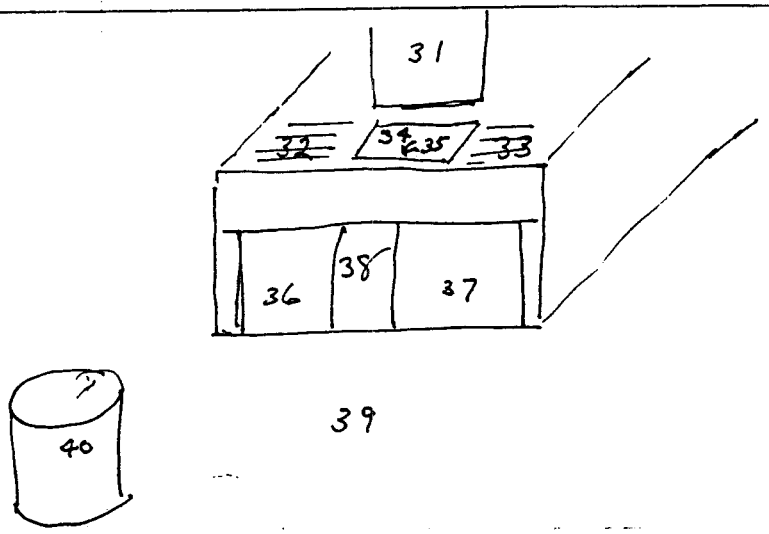
Centre Analytical Laboratories, Inc.
3048 Research Drive
Phone: (814) 231-8032
State College, PA 16801
Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: _____
SURVEYOR: _____
CONDITIONS: _____

DATE: 27 Feb 97

INSTRUMENT(S): _____



No.	DPM	LOCATION	No.	DPM	LOCATION
25	< 100	floor	37	< 100	cabinet inside
26		"	38		cabinet outside
27		wall	39		floor
28		File cabinet	40		drum w/LSC vials
29		" "			
30		Table top.			
31		end of cabinet			
32		drainboard			
33		"			
34		sink sides			
35		" bottom			
36		cabinet, inside			

RCee
27 Feb 97

COMMENTS: GMSM/wipes check ok - tubing and condensers under sink.
GMSM@sink bottom 197c/5min

March 1994/0

"THIS IS AN EXACT COPY OF THE ORIGINAL DOCUMENT."

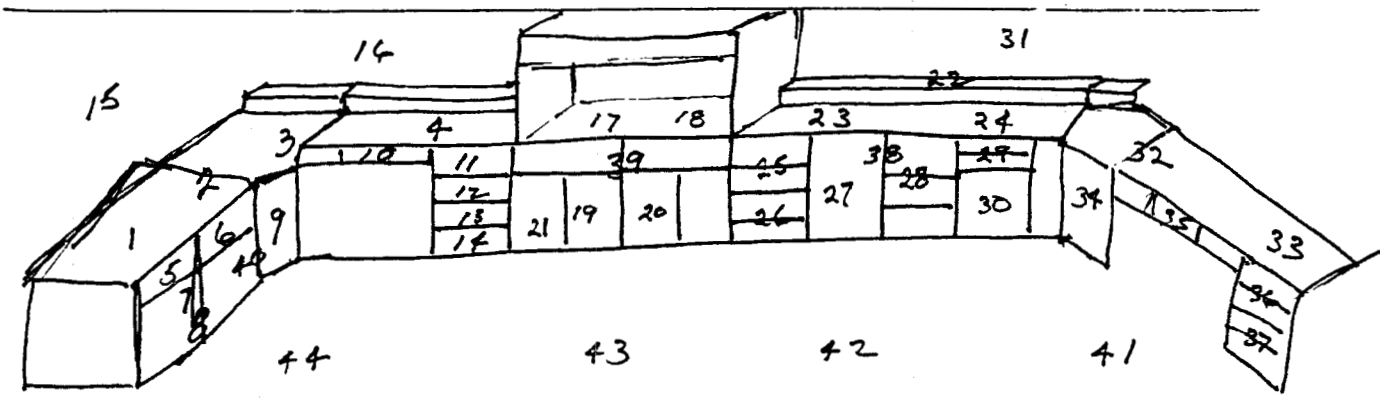
BY Rue DATE 30 Dec 97

Rue

Centre Analytical Laboratories, Inc.
3046 Research Drive State College, PA 16801
Phone: (814) 231-8032 Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: E-Fate Lab Bldg 1 DATE: 7 Mar 97
SURVEYOR: R. W. Granlund
CONDITIONS: Decommissioning survey
INSTRUMENT(S): Beckman LSC, SEI-I GMSM



No.	DPM	LOCATION	No.	DPM	LOCATION
1	< 100	bench top	13	< 100	drawer, inside
2		"	14		" "
3		"	15		wall
4		"	16		"
5		drawer inside	17		hood, left
6		" "	18	↓	" , right
7		cabinet "	19	330	cabinet inside
8		" "	20	< 100	" "
9		" "	21	50	cabinet inside after cleaning (19)
10		drawer "	22	< 100	shelf
11		" "	23		bench top
12	↓	" "	24	↓	"

COMMENTS: Location #21 GMSM indicates ~20-50 cpm above background, cabinet cleaned and rechecked during survey. Other GMSM & Wipes OK

March 1994/0

Centre Analytical Laboratories, Inc.
3048 Research Drive
Phone: (814) 231-8032
State College, PA 16801
Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: E-Fate Lab Bldg-1 DATE: 7 Mar 97
SURVEYOR:
CONDITIONS:

INSTRUMENT(S):

No.	DPM	LOCATION	No.	DPM	LOCATION
25	< 100	drawers inside	37	< 100	drawers, inside
26		" "	38		cabinets, outside
27		cabinet "	39		" "
28		drawers "	40		" "
29		" "	41		floor
30		cabinets "	42		"
31		wall	43		"
32		benchtop	44		"
33		"			
34		cabinet, inside			
35		drawer "			
36		" "			

Reey
7 Mar 97

COMMENTS:

March 1994/0

"THIS IS AN EXACT COPY OF THE ORIGINAL DOCUMENT."

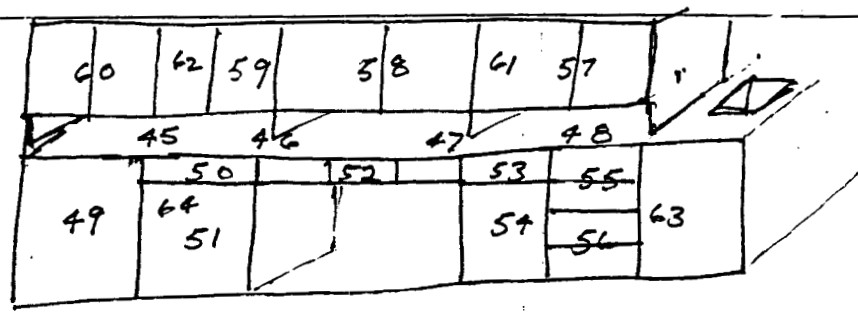
BY Reey DATE 30 Dec 97

Centre Analytical Laboratories, Inc.
3048 Research Drive State College, PA 16801
Phone: (814) 231-8032 Facsimile: (814) 231-1253

RADIATION CONTAMINATION SURVEY

LOCATION: E-Fate Lab Bldg-1 DATE: 7 Mar 97
SURVEYOR:
CONDITIONS:

INSTRUMENT(S):



No.	DPM	LOCATION	No.	DPM	LOCATION
45	< 100	tabletop	57	< 100	cabinets inside
46		beach top	58		" "
47		"	59		" "
48		"	60		" "
49		cabinet inside	61		" outside
50		drawer "	62		" "
51		cabinet "	63		" "
52		drawer "	64		" "
53		" "			
54		cabinet "			
55		drawers "			
56		" "			

CRuey 7 Mar 97

COMMENTS: Background radiation level = 0.01 mrem/hr – 0.02 mrem/hr.

March 1994/0

"THIS IS AN EXACT COPY OF THE ORIGINAL DOCUMENT."

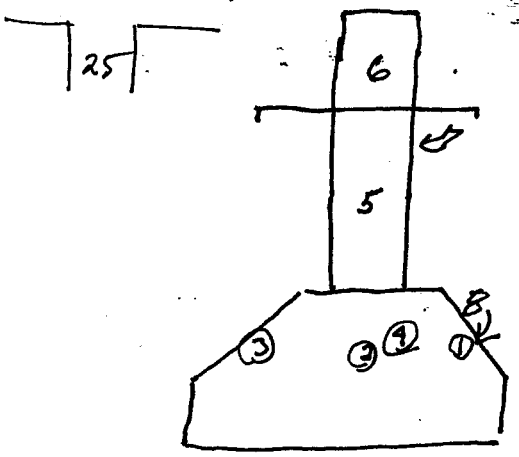
BY Ruey DATE 30 Dec 97

Exact copy from original
RWG
11 Nov 02

PAGE 1 of 4

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Rm 6 Bldg 1 **DATE** 8 Nov 02
SURVEYOR R. Granlund
CONDITIONS Check of canopy hood in old radiochem lab
INSTRUMENT(S) Bicron Frisk-Tech ✓ ~~Bicron Surveyor M~~ ✓ Ludlum 3 ✓ LSC ✓
RWG 8 Nov 02



Canopy hood

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	hood inside side 1			
2	< 10	" " " 2			
3	< 10	" " " 3			
4	< 10	" " " 4			
5	< 10	duct inside			
6	< 10	" "			
7	< 10	" outside			
8	< 10	canopy outside			
25	< 10	Inside T			
		RWG 8 Nov 02			

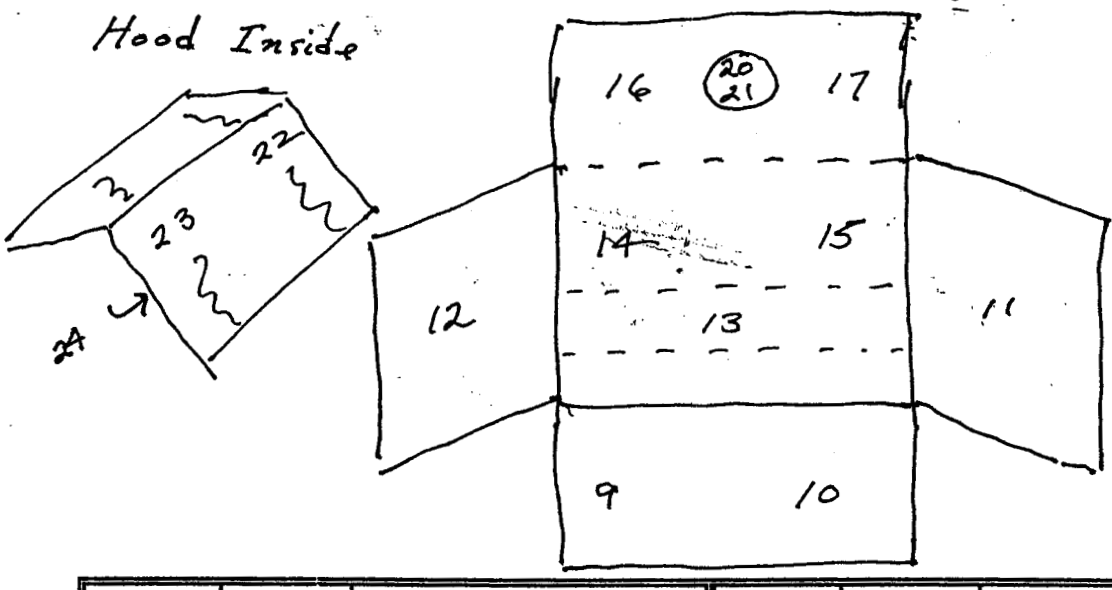
COMMENTS Paper smears, LSC 20 min count x 2, bkg 24-27 cpm, Eff = 52-93% (color quench from dust), LLD = 3-6 dpm/smears, Smears covered ~ 300 cm^2, Smears screened w/ Frisk Teck before LSC count. Frisktech efficiency appears to be ~ 0.57 x 0.11 or 0.063 c/dpm ^{14}C beta or about 1/2 that for ^{99}Tc beta.

RWG

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Rm 6 Bldg 1 **DATE** 8 Nov 02
SURVEYOR RW Geranium
CONDITIONS Old radiochem lab hood
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M Ludlum 3 ✓ **LSC** ✓

Hood Inside

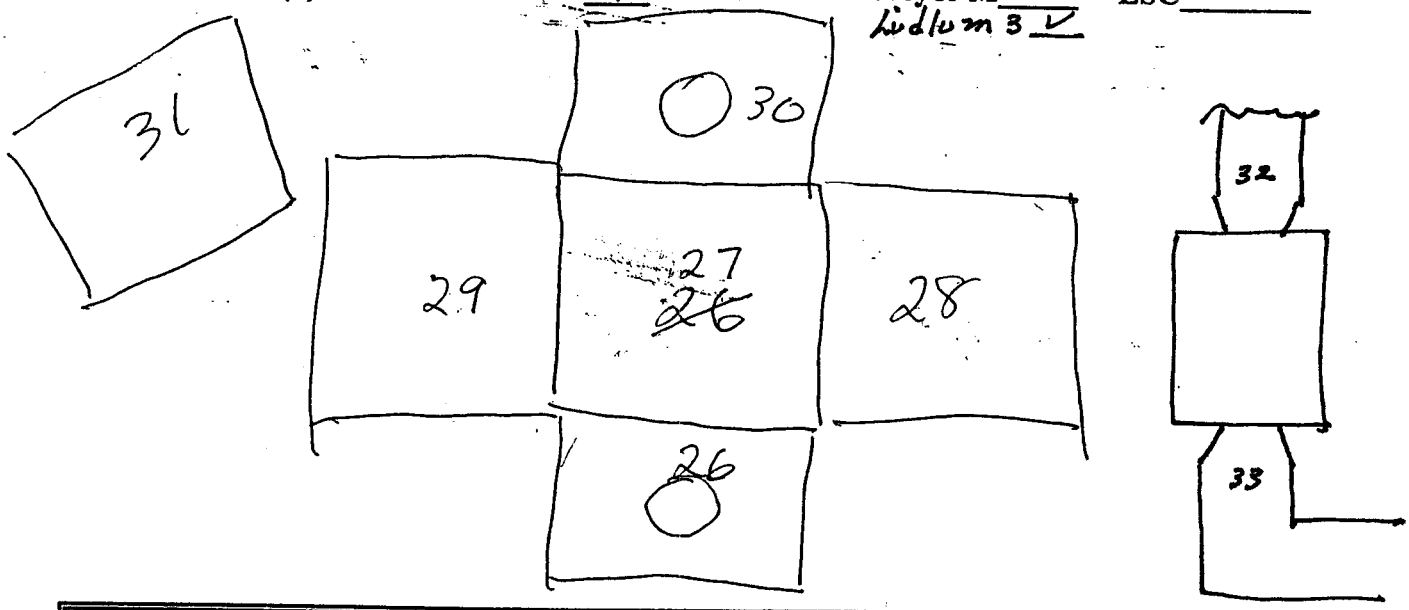


NO.	DPM	LOCATION	NO.	DPM	LOCATION
9	26	base left	19	< 10	Front bypass cover inside
10	24	" rt	20	< 10	inside duct
11	< 10	side rt	21	< 10	" "
12	< 10	side left	22	< 10	inside panel - duct side
13	< 10	inside panel	23	< 10	" " " "
14	< 10	back panel left	24	< 10	" " hood side
15	< 10	" " right			
16	< 10	Top - left			RWG 8 Nov 02
17	< 10	" - right			
18	< 10	sash, inside			

COMMENTS paper smears, no detectable contamination w/GMSM (bkg ~ 30 cpm).

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Inside filter box for Rm 6 Bldg 1 hood **DATE** 8 Nov 02
SURVEYOR R. Granlund
CONDITIONS Check of old radiochem hood ductwork
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ____ Ludlum 3 ✓ LSC ____



NO.	DPM	LOCATION	NO.	DPM	LOCATION
26	< 10	Filter box inside base			
27	< 10	back			
28	< 10	side			
29	< 10	"			
30	11	top			
31	< 10	cover			
*32	245	inside duct above box			
*33	155	" " below box			
		Rey 8 Nov 02			

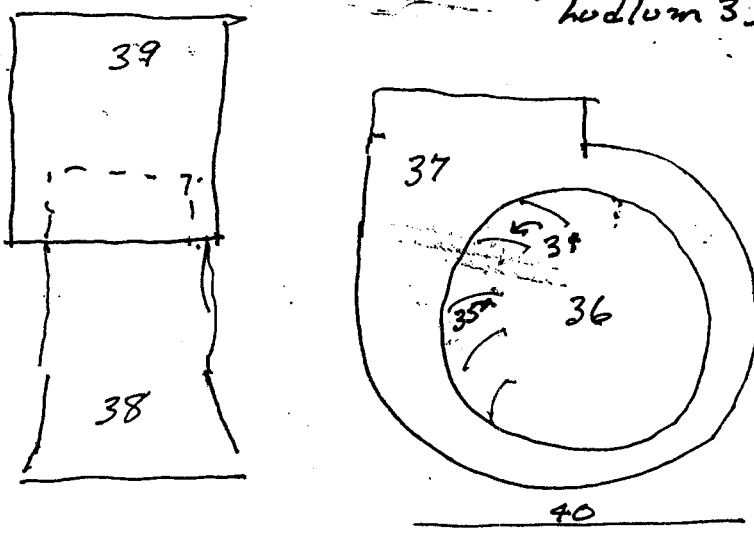
Rey 8 Nov 02

COMMENTS paper smears. No detectable contamination w/ GMSM survey (Ludlum 3/44-9). * cloth smear.

RWG

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Roof of Bldg I. Fan for Room 6 hood DATE 8 Nov 02
SURVEYOR R. Granlund
CONDITIONS check of ductwork for old radiochem lab hood.
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ____ LSC ✓
Hudlum 3 ✓



NO.	DPM	LOCATION	NO.	DPM	LOCATION
34	10	Impeller upstream side			
35	93	" downstream "			
36	168	" side			
37	34	Fan housing, inside			
38	434	Exhaust duct, bottom, inside			
39	40	" " top "			
40	14	Fan base under housing drain			

RWG 8 Nov 02

RWG 8 Nov 02

COMMENTS cloth smears. No detectable contamination w/GM S/M (Bkg ~30 cpm)

RWG

ID: SMEARS　　　　　　　　　　　　　　　　　　　　　8 NOV 2002 17:03

USER: 5　　　　　　　　COMMENT:C-14 SMEARS 1 MIN LSC2

PRESET TIME :	20.00				
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS: 1	PRINTER	:EDIT
COUNT BLANK :	YES	IC# : NO	REPLICATES : 1	RS232	: STD
TWO PHASE :	NO	AEC : NO	CYCLE REPEATS : 2	DISK	:EDIT
SCINTILLATOR:	LIQUID	LUMEX:YES	LOW SAMPLE REJ: 0	RWM LIST	: OFF
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none	

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

WIDE OPEN WINDOW %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off　　　COLOR QUENCH CORRECTION: On

Quench Limits　　Low:-10.44　　High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	WIDE CPM	WIDE %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	20.00	94.6	25.50	9.65	43.25	7.16	27.45	92.90	10.18	21.26
B2	**-2	20.00	92.9	25.05	9.29	41.65	7.09	26.95	92.96	4.89	42.40
B3	**-3	20.00	93.2	22.40	9.73	37.45	7.44	24.10	92.95	3.85	63.52
		Blank Average		DPM for	14C :	26.16 COEF. OF VAR:		6.908			
1	**-5	20.00	98.0	22.45	10.46	38.90	7.63	-1.96	92.76	11.92	84.84
2	**-6	20.00	100.1	23.85	9.90	39.25	7.49	-0.43	92.68	9.65	106.10
3	**-7	20.00	92.6	20.80	10.68	36.45	7.79	-3.79	92.98	9.77	127.34
4	**-8	20.00	103.6	21.00	12.58	36.20	8.74	-3.47	92.53	28.05	148.87
5	**-9	20.00	126.4	22.30	11.23	36.20	8.31	-1.76	91.36	20.30	170.31
6	**-10	20.00	126.2	24.15	9.37	36.95	7.50	0.26	91.38	4.14	191.44
7	**-11	20.00	128.2	23.00	9.89	38.25	7.50	-0.96	91.26	7.21	212.65
8	**-12	20.00	122.4	22.30	11.22	36.95	8.20	-1.82	91.59	19.74	234.05
9	**-1	20.00	211.5	39.70	10.60	50.65	8.81	24.38	79.55	49.17	256.20
10	**-2	20.00	198.1	39.65	11.20	51.25	9.16	22.71	[illegible]	53.47	278.37
11	**-3	20.00	100.6	23.30	13.04	37.80	9.30	-1.02	92.66	39.27	300.09
12	**-4	20.00	101.5	27.55	12.65	43.15	9.05	3.59	92.60	43.49	321.95
13	**-5	20.00	114.9	28.35	18.62	41.80	13.27	4.65	91.99	72.57	[illegible]
14	**-6	20.00	107.4	24.55	9.45	39.95	7.73	0.42	[illegible]	5.88	365.77
15	**-7	20.00	142.5	[illegible]	[illegible]	38.35	7.89	2.40	90.33	16.51	387.14
16	**-8	20.00	123.3	27.10	14.85	40.35	10.76	3.44	91.54	57.20	409.27
17	**-9	20.00	125.5	30.50	9.97	45.00	7.74	7.20	91.42	26.11	430.85
18	**-10	20.00	104.4	30.05	8.60	45.30	6.98	6.33	92.49	7.03	452.08
19	**-11	20.00	126.8	27.15	9.99	40.20	7.28	3.56	91.34	6.50	473.29
20	**-12	20.00	119.0	30.15	9.36	43.60	7.48	6.69	91.78	18.29	494.72
21	**-1	20.00	117.0	30.00	8.93	44.55	7.13	6.49	91.88	12.06	516.15
22	**-2	20.00	126.0	23.90	10.14	37.55	7.81	-0.01	91.39	12.89	537.46
23	**-3	20.00	111.7	26.05	9.34	39.25	7.45	2.10	92.15	8.49	558.71
24	**-4	20.00	114.7	26.75	18.10	42.05	12.24	2.91	92.00	68.15	581.16
25	**-5	20.00	146.0	23.90	9.66	37.25	7.59	0.37	90.08	7.22	602.38
26	**-6	20.00	128.0	29.50	9.15	43.75	7.28	6.16	91.27	13.94	623.73
27	**-7	20.00	130.7	32.50	8.27	46.65	6.80	9.51	91.11	7.39	644.98
28	**-8	20.00	130.3	30.20	8.62	43.40	7.07	6.97	91.13	8.10	666.23
29	**-9	20.00	129.6	30.50	8.56	42.95	7.10	7.29	91.18	7.95	687.48
30	**-10	20.00	146.3	33.05	8.36	45.55	6.99	10.53	90.06	10.55	708.79
31	**-11	20.00	133.5	28.70	8.93	44.15	7.04	5.40	[illegible]	[illegible]	730.05
32	**-12	20.00	190.6	221.35	[illegible]	[illegible]	2.97	242.09	82.52	2.94	751.42
33	**-1	[illegible]	132.0	142.45	3.78	152.90	3.65	151.03	90.39	1.77	772.74
34	**-2	20.00	154.1	32.35	8.64	46.70	7.00	10.00	89.46	12.77	794.09
35	**-3	20.00	325.1	65.20	5.71	71.10	5.45	98.73	52.20	5.56	815.35

WARNING: QUENCH VALUE IS OUTSIDE QUENCH LIMIT

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	WIDE CPM	WIDE %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
36	**-4	20.00	373.7	78.05	5.18	84.30	4.98	167.07	40.39	4.31	836.73
WARNING: QUENCH VALUE IS OUTSIDE QUENCH LIMIT											
37	**-5	20.00	212.8	47.05	6.73	59.85	5.93	33.94	78.28	5.06	857.96
38	**-6	20.00	223.2	346.20	2.42	356.90	2.38	428.32	76.17	1.38	879.26
39	**-7	20.00	162.0	56.20	6.14	69.65	5.48	37.12	88.81	4.70	900.48
40	**-8	20.00	191.6	32.95	7.93	44.15	6.82	13.85	82.34	2.88	921.60
b/k 41	**-9	20.00	98.4	23.60	9.97	40.60	7.37	-0.72	92.75	9.42	942.89
b/k 42	**-10	20.00	94.6	23.50	10.07	38.65	7.60	-0.87	92.90	10.84	964.17

Cycle 2 of 2

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	WIDE CPM	WIDE %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	20.00	95.1	23.85	9.35	40.35	7.13	25.68	92.88	2.60	986.30
B2	**-2	20.00	92.7	24.35	9.23	40.75	7.08	26.19	92.97	2.44	1007.40
B3	**-3	20.00	94.2	20.80	10.04	35.80	7.58	22.39	92.91	3.00	1028.49
Blank Average DPM for 14C : 24.75 COEF. OF VAR: 8.340											
1	**-5	20.00	98.7	21.45	10.69	37.20	7.88	-1.62	92.74	13.83	1049.83
2	**-6	20.00	100.9	22.55	10.35	37.85	7.71	-0.41	92.64	11.29	1071.09
3	**-7	20.00	93.0	20.60	11.07	35.95	8.00	-2.59	92.96	13.46	1092.40
4	**-8	20.00	104.4	20.00	12.38	35.00	8.63	-3.13	92.49	23.64	1113.85
5	**-9	20.00	126.2	21.95	10.71	36.05	8.01	-0.73	91.38	13.81	1135.17
6	**-10	20.00	125.7	21.95	10.39	37.50	7.69	-0.74	91.40	10.01	1156.43
7	**-11	20.00	127.4	23.75	9.99	37.55	7.71	1.26	91.30	10.84	1177.70
8	**-12	20.00	127.3	23.40	12.22	37.40	8.86	0.87	91.31	32.09	1199.30
9	**-1	20.00	210.9	41.00	10.65	50.80	9.03	27.37	78.66	51.70	1221.55
10	**-2	20.00	195.6	40.50	11.95	50.85	9.93	24.88	81.60	60.05	1243.89
11	**-3	20.00	102.1	24.00	12.12	39.35	8.63	1.17	92.59	[illegible]	[illegible]
12	**-4	20.00	103.7	25.15	12.79	[illegible]	[illegible]	2.43	92.52	39.96	1287.28
13	**-5	20.00	[illegible]	28.95	20.26	45.25	13.56	6.75	91.89	75.86	1310.14
14	**-6	20.00	109.0	26.15	9.07	39.70	7.27	3.59	92.28	5.07	1331.30
15	**-7	20.00	145.0	26.70	10.07	40.80	7.77	4.86	90.16	18.99	1352.73
16	**-8	20.00	124.9	29.25	10.50	41.50	8.30	7.23	91.45	30.22	1374.35
17	**-9	20.00	127.1	30.45	9.41	45.70	7.34	8.59	91.33	19.11	1395.81
18	**-10	20.00	106.5	31.45	8.29	48.80	6.56	9.29	92.40	5.08	1417.02
19	**-11	20.00	126.6	28.80	8.65	43.70	6.93	6.78	91.35	5.11	1438.20
20	**-12	20.00	119.8	32.55	8.26	46.35	6.82	10.73	91.74	7.51	1459.45
21	**-1	20.00	118.1	29.60	8.53	44.70	6.86	7.48	91.83	5.14	1480.72
22	**-2	20.00	127.0	26.65	9.01	40.70	7.19	4.43	91.33	5.38	1501.90
23	**-3	20.00	114.1	24.10	9.45	39.80	7.25	1.44	92.03	4.93	1523.07
24	**-4	20.00	116.2	31.65	14.93	46.20	10.87	9.68	91.93	63.31	1545.43
25	**-5	20.00	145.1	23.95	9.66	37.40	7.58	1.82	90.15	7.37	1566.65
26	**-6	20.00	127.6	27.30	9.03	42.50	7.11	5.15	91.29	[illegible]	[illegible]
27	**-7	20.00	128.8	31.40	8.26	[illegible]	[illegible]	9.67	[illegible]	4.77	[illegible]
28	**-8	20.00	[illegible]	[illegible]	[illegible]	46.10	6.72	9.60	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	29.00	8.59	41.05	7.15	7.07	91.13	4.96	1651.39
30	**-10	20.00	143.5	[illegible]	7.81	47.55	6.67	14.36	[illegible]	[illegible]	[illegible]
31	**-11	20.00	133.1	27.20	8.86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32	**-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	248.10	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.59	158.93	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	30.70	[illegible]	43.70	7.04	9.59	89.40	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	97.77	[illegible]	[illegible]	[illegible]
[illegible]	**-4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	167.85	[illegible]	4.09	1800.07
WARNING: QUENCH VALUE IS OUTSIDE QUENCH LIMIT											
[illegible]	[illegible]	[illegible]	[illegible]	46.85	6.67	58.40	5.95	34.49	79.09	3.35	1821.25
38	**-6	20.00	221.1	355.60	2.38	364.60	2.35	439.51	76.59	0.85	1842.47
39	**-7	20.00	159.9	59.60	5.88	72.30	5.32	42.23	88.96	2.62	1863.63
40	**-8	20.00	191.6	32.55	7.92	45.65	6.67	14.78	82.35	[illegible]	[illegible]

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	WIDE CPM	WIDE %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
41	**-9	20.00	98.2	22.20	9.94	38.85	7.37	-0.82	92.75	5.55	[illegible]
42	**-10	20.00	94.1	[illegible]	[illegible]	37.20	[illegible]	-0.75	[illegible]		1927.09

Attachment B

Closeout Survey
Environmental Fate Laboratory
Room 209 Building 2

EXYGEN RESEARCH
RADIOISOTOPE LABORATORY CLOSEOUT SURVEY
Building 2, Room 209

SUMMARY

The radioisotope laboratory in Room 209 of Building 2 has only been used with ^{14}C and ^{32}P. No ^{32}P has been received since May 2001. It has all decayed to undetectable levels and only ^{14}C could be present. All areas of the laboratory and all equipment used with radioactive material were checked for contamination using a pancake GM probe and smears assayed with a liquid scintillation counter. Historically there was only one incident that resulted in significant contamination. There was some contamination still present on the inside surfaces of the exhaust system for hood 209-B. The inside panels of the hood were removed and the contamination removed. There was also contamination on the inside of the ductwork for this hood, primarily on the outside curve of the first elbow above the hood. This contamination was also removed. Any remaining contamination on the inaccessible inside surface of the ductwork between the hood and the roof should be within the acceptable limits for unrestricted release.

The survey shows that there is no significant residual radioactive contamination in Room 209 of Building 2 in excess of the release criteria in NUREG 1556 v7 Table Q.2 for release of equipment (15,000 dpm/100 cm^2 maximum, 5,000 dpm/100 cm^2 average and 1,000 dpm/100 cm^2 removable) and in Table Q.3 for building surfaces (3.7E6 dpm/100 cm^2). Room 209 may be released for unrestricted use.

This report was prepared 1 March 2004. Final review and minor editorial revisions were made 14 Jun 07.

INTRODUCTION

The radioisotope laboratory was moved from the basement of Building 1 to Room 209 of Building 2 after the issuance of amendment 3 to the NRC license in October of 1996. The only radioactive isotopes used in this laboratory were ^{14}C and ^{32}P. The last ^{32}P received was in May 2001, so it has decayed to undetectable levels and only ^{14}C is of concern. There are plated disc sources of $^{90}Sr/^{90}Y$ and ^{99}Tc for calibration of the pancake GM probes and ^{14}C and ^{3}H solutions for the calibration of the liquid scintillation counters. The calibration sources are license exempt quantities and their use has not resulted in any contamination. However, if any contamination from the calibration sources was present, it would have been detected in the wide ^{14}C channel of the liquid scintillation counter that was used to assay the samples in this survey.

Work areas are checked with a pancake GM survey meter each day that unsealed radioactive material is used. Weekly checks are made with smears counted with a pancake GM tube or a liquid scintillation counter. There has been only one incident involving significant contamination in the laboratory. In August and September 2002 some ^{14}C stock solution contamination was purified using thin layer chromatography. When the material was scraped from the glass TLC plate, some of the fine particles contaminated the work area and one hood.

Removable contamination levels were up to 1,300 dpm/100 cm^2 on the benchtop and up to 13,000 dpm/100 cm^2 in the rear air intake of the hood. The contamination was removed from the benchtop and the accessible sections of the hood, but it was assumed that some contamination remained in the upper, covered portions of the hood and inside the ductwork. Therefore, in the interior panels of both hoods were removed to make the air intake and ductwork connections of the hoods accessible for this survey.

In addition to the benchtops and hoods all the other parts of the lab were checked for contamination, including the drawers, cabinets, shelves, floor, walls, ceiling, sink and equipment.

SURVEY METHOD

Surfaces were checked with a portable survey meter with a pancake GM probe for any detectable contamination. The surfaces were also checked for removable contamination with paper smears counted in the wide ^{14}C window of a liquid scintillation counter. A scaler with a GM pancake probe for direct counting of smears was also available, but the liquid scintillation counter is more sensitive and was used in this survey.

The equipment and materials used for the survey included.

Beckman 6500 liquid scintillation counter.
Bicron Surveyor M survey meter with PGM probe.
National Diagnostics Ecoscint liquid scintillation fluid (10 ml/sample)
Plastic scintillation vials, 20 ml.
Acme paper smears, 1 5/8" diameter.
RC5BCTWF 42-mm cloth smears (for sink drains and some hood areas).

SENSITIVITY

The liquid scintillation counter has a background range of 20-30 cpm in the wide ^{14}C channel and an efficiency of 90+%. Smears were counted for 5 minutes each giving an MDA (4.65 σ_{bkg}) of about 15 dpm/smear. Results less than 100 dpm are simply reported as <100 dpm. Assuming that smears cover an area of 100 cm^2, this is equal to a sensitivity of 15 dpm/100 cm^2 for removable contamination.

The background for the portable GMSM is about 30 cpm and the efficiency for ^{14}C (as determined with ^{99}Tc) is 0.13 count/beta. A count rate increase of about 3 times background is usually detectable with the audible indicator in a survey for surface contamination. This is equivalent to 90 cpm/15 cm^2 or a sensitivity of about 4,600 dpm/100 cm^2 for total contamination.

Both of these survey methods provide adequate sensitivity to meet the criteria for the maximum ^{14}C contamination in NUREG 1556 v7 Table Q.2 for release of equipment (15,000 dpm/100 cm^2 maximum, 5,000 dpm/100 cm^2 average and 1,000 dpm/100 cm^2 removable) and in Table Q.3 for building surfaces (3.7E6 dpm/100 cm^2).

RESULTS

The results are presented below for each area of the laboratory. Copies of the individual survey forms are included with the report.

Benchtops

Three surveys with 29 smears included benchtops. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2.

Cabinets, shelves and drawers.

Five surveys with 23 smears included cabinets, shelves and drawers. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2.

Floor

There were 3 surveys of the floor with 22 smears. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2.

Walls

Two surveys included 9 smears of wall surfaces. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2.

Ceiling

One survey included a ceiling tile from each of the three areas of the lab. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2 (p.26).

Hoods

The laboratory contains two large hoods, 209-B (north) and 209-A (south). The hoods are adjacent, but have separate exhaust fans and ductwork. Removable panels in the back and top of the hood with adjustable openings provide the exhaust passage for the hoods. Each hood has two exhaust ducts at the top. The ducts are joined in a Y to the duct that goes to the fan on the roof above the third floor. With the top panel removed it is possible to reach up in the duct to where the two exhaust ducts make the Y connection to the duct that goes to the roof. Hood 209-A (nearest the sink) was the hood primarily used with radioactive material, although the 209-B was occasionally used for such work. As indicated above in the Introduction, 209-A was known to contain some contamination in the inside of the back panels and possibly in the ductwork. The back and top panels were removed in both hoods to make these areas accessible.

The top and back panels of hood 209-B were removed to allow access to the interior of the exhaust passage and the ductwork. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2 (p. 5).

The survey of hood 209-A before removal of the panels showed no detectable contamination with the GMSM. One smear on the ceiling of the hood had 100 dpm and all others were <100 dpm/100 cm^2 (p. 14). Before cleaning the left side of the ductwork Y connection showed no detectable contamination with the GMSM and <100 dpm/100cm^2 with smears. Smears from the

right side were 230 to 310 dpm/100 cm2 and there was one area on the inside of the elbow that showed about 200 gross cpm with the GMSM (about 8,700 dpm/100 cm^2) (p. 15). Before cleaning the inside surfaces of the back of the hood the panels indicated 200-400 gross cpm with the pancake GM probe or 8,700-19,000 dpm/100 cm^2 (p. 16). After cleaning, smears from the panels and the back and top of the hood were all <100 dpm/100 cm2 and there was no detectable activity with the GMSM (p. 16, 17, 19). After wiping, the inside surface of the right side of the ductwork had a gross count rate with the GMSM of 100-200 cpm (3600-8700 dpm/100 cm2) (p. 19) and all smears were <100 dpm/100 cm^2 (p. 20).

Sinks

The laboratory has three sinks. Only the sink on the south wall near hood 209A has been used with radioactive material for washing labware and for the discharge of liquid waste. There is also a sink on the north wall and a small cup sink in hood 209-A. The traps in all three sinks were disassembled and the interior wiped with cloth smears to check for contamination. The water in the traps was also assayed for ^{14}C.

The smear from the inside of the inlet pipe to the trap of the sink on the south wall had 360 dpm. The smears from the trap and the outlet pipe from the trap were <100 dpm. The water in the trap had no detectable ^{14}C.

The sink on the north wall had no detectable activity on the smears or the liquid in the trap.

The smears from the cup sink in the hood had <100 dpm. The water sample from the trap had 120 dpm/2 ml (2.7E-5 μCi/ml or about 2.7E-3 μCi in 100 ml). The sink has not been used so the activity was probably from some of the particles from TLC plates that caused the hood contamination. The water from the trap was absorbed and put in the solid ^{14}C waste for disposal and the trap was reassembled.

Laboratory Equipment

The following equipment items were surveyed. There was no detectable contamination with the GMSM and all smears were <100 dpm/100 cm^2.

Sonicator #2 (p. 1)
Nitrogen evaporator (p. 1)
Pyro Magnestir #4 (p. 2)
Mini-Vortex #2 (p. 2)
Sonicator #5 (p. 2)
Centrifuge #7 (p. 2)
Incubator #5 (p. 3)
Incubator #6 (p. 3)
Computer PC00420 (p. 4)
Biological material oxidizer #1 (p. 4)
Biological material oxidizer #2 (p. 4)
Balance #11 (p. 6)
Computer PC898 (p. 6)

TLC Scanner #1 (p. 6)
TLC Scanner #2 (p. 6)
P-10 cylinder (p. 6)
Oxygen cylinder (p. 6)
Refrigerator/freezer #24 (p. 7)
Multi-Magnestir (p. 7)
Lamp (p. 8)
Porta-Trace lightbox (p. 8)
Recirculator (p. 8)
Soxhlet extractor #2 (p. 8)
Soxhlet extractor #3 (p. 8)
Stability chamber #4 (p. 9)
HPLC #3 (p. 10)
HPLC#7 (p. 11)
Refrigerator/freezer #13 (p. 25)

Prepared by: Rodger W. Granlund, CHP Date: 14 Jun 07
Radiation Safety Officer

Attachments: Survey forms (26 pages) plus counter printouts (21 pages).

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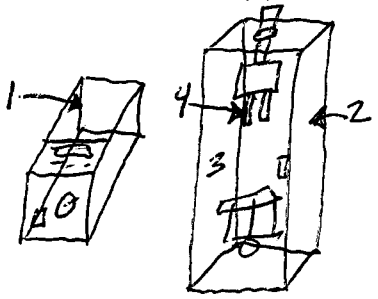
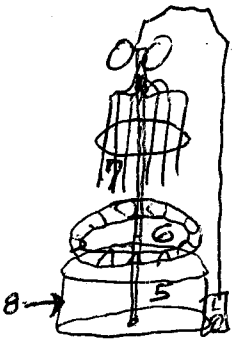
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/7/04
SURVEYOR BRENT McCRACKEN
CONDITIONS SONICATOR 2 & NITROGEN EVAPORATOR 1
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



SONICATOR #2



NITROGEN EVAPORATOR #1

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	<100	OUTSIDE OF SONICATOR			
2	<100	OUTSIDE OF BOX			
3	<100	INSIDE OF BOX			
4	<100	TIPS			
5	<100	BASE INSIDE			BAM 1/7/04
6	<100	SAMPLE HOLDER			
7	<100	NEEDLES			
8	<100	OUTSIDE OF BOTTOM			
.		BAM 1/7/04			

COMMENTS GMSM SURVEY OKAY. BAM 1/7/04
<100 ~~cpm~~ NCPM

RE BAM 1/8/04

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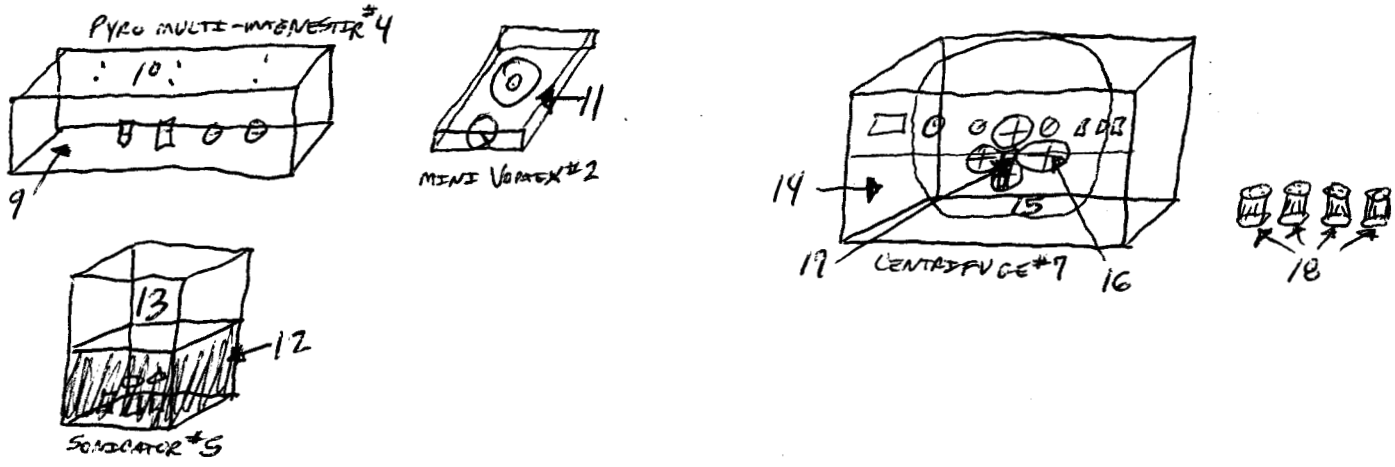
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/7/04

SURVEYOR BRENT McCRACKEN

CONDITIONS PYRO MULTI-MAGNESTIR 4, SONICATOR 5, MINI VORTEX 2, CENTRIFUGE 7

INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
9	<100	OUTSIDE OF MAGNESTIR			
10	<100	TOP OF MAGNESTIR			
11	<100	OUTSIDE OF VORTEX			
12	<100	OUTSIDE OF SONICATOR			BAM 1/7/04
13	<100	INSIDE OF SONICATOR			
14	<100	OUTSIDE OF CENTRIFUGE			
15	<100	INSIDE BOTTOM			
16	<100	BUCKETS			
17	<100	ARMS			
18	<100	LIGHT GREEN HOLDERS			

COMMENTS GM SM Survey OKAY. BAM 1/7/04
<100 NCPM

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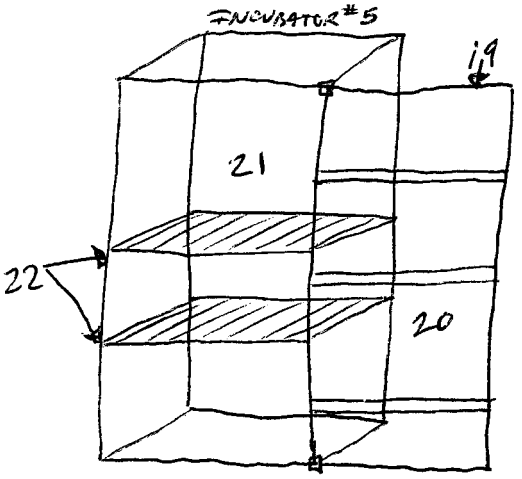
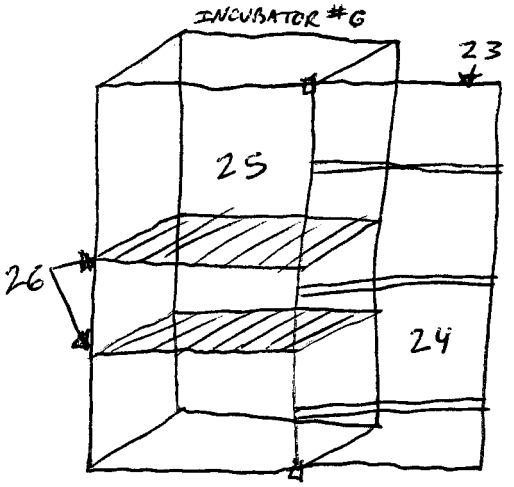
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/7/04
SURVEYOR BRENT M°CRACKEN
CONDITIONS INCUBATOR 5 & 6
INSTRUMENT(S) Bicron Frisk-Tech___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
19	<100	OUTSIDE DOOR #5			
20	<100	INSIDE DOOR #5			
21	<100	INSIDE INCUBATOR #5			
22	<100	RACKS IN #5			
23	<100	OUTSIDE DOOR #6			BAM 1/7/04
24	<100	INSIDE DOOR #6			
25	<100	INSIDE INCUBATOR #6			
26	<100	RACKS IN #6			
		BAM 1/2/04			

COMMENTS GMSM SURVEY OKAY. BAM 1/2/04
<100 NCPM

ID=C-14 CHECK 7 JAN 2004 15:4

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST	
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none		

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	79.0	25.80	17.61	26.89	95.95	5.80	5.51
		Blank Average		DPM for		14C :	26.89	COEF. OF VAR:	0.000
1	**-3	5.00	105.1	41.20	13.93	16.47	95.01	29.93	11.21-1
2	**-4	5.00	107.6	63.60	11.22	40.12	94.91	24.43	16.88-2
3	**-5	5.00	99.3	43.60	13.55	18.89	95.24	17.15	22.52-3
4	**-6	5.00	96.0	32.80	15.62	7.51	95.36	24.79	28.20-4
5	**-7	5.00	97.5	84.60	9.72	61.88	95.31	43.93	33.94-5
6	**-8	5.00	118.1	73.80	10.41	51.25	94.44	12.06	39.59-6
7	**-9	5.00	103.8	67.20	10.91	43.80	95.06	9.35	45.23-7
8	**-10	5.00	118.0	38.80	14.36	14.19	94.45	14.42	50.88-8
9	**-11	5.00	100.2	41.00	13.97	16.18	95.21	13.47	56.51-9
10	**-12	5.00	109.1	32.20	15.76	7.06	94.85	15.49	62.16-10
11	**-1	5.00	100.3	46.80	13.07	22.27	95.20	22.45	67.94-11
12	**-2	5.00	103.9	34.80	15.16	9.72	95.06	12.43	73.59-12
13	**-3	5.00	100.7	37.80	14.55	12.82	95.18	9.56	79.23-13
14	**-4	5.00	99.1	40.80	14.00	15.95	95.25	12.29	84.88-14
15	**-5	5.00	114.3	35.00	15.12	10.10	94.62	8.40	90.51-15
16	**-6	5.00	125.3	93.40	9.25	72.37	94.09	4.04	96.14-16
17	**-7	5.00	117.9	35.00	15.12	10.17	94.45	8.60	101.78-17
18	**-8	5.00	105.3	46.80	13.07	22.37	95.00	6.00	107.40-18
19	**-9	5.00	109.5	33.40	15.48	8.33	94.83	10.92	113.05-19
20	**-10	5.00	106.8	39.40	14.25	14.61	94.94	7.16	118.67-20
21	**-11	5.00	108.3	46.40	13.13	22.01	94.88	5.12	124.30-21
22	**-12	5.00	103.0	25.60	17.68	0.03	95.10	8.48	129.92-22
23	**-1	5.00	104.8	45.00	13.33	20.47	95.02	7.34	135.64-23
24	**-2	5.00	110.1	33.00	15.57	7.92	94.80	7.93	141.27-24
25	**-3	5.00	109.8	38.00	14.51	13.19	94.82	7.40	146.89-25
26	**-4	5.00	110.2	28.80	16.67	3.49	94.80	7.94	152.50-26

RADIO ACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BMM
1/7/04

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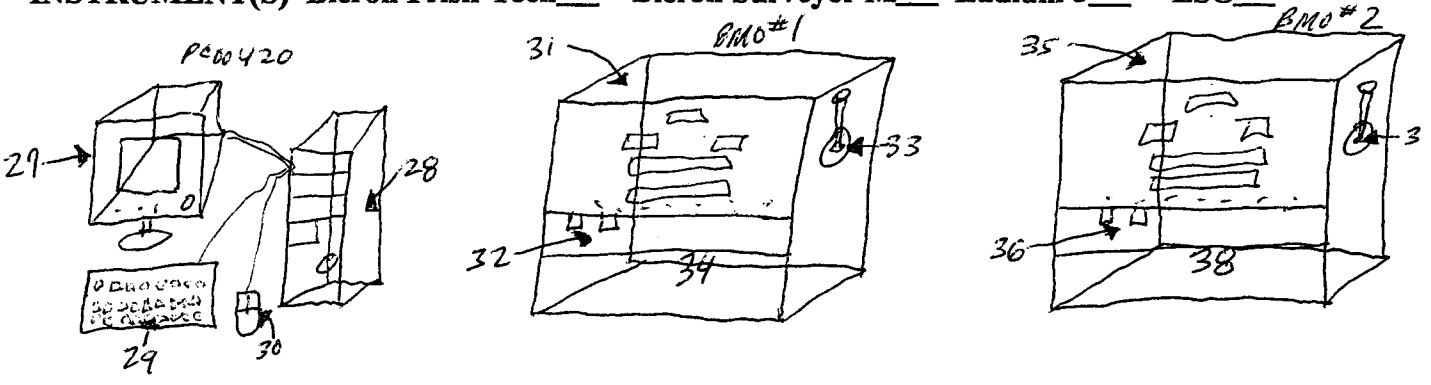
RADIOACTIVE CONTAMINATION SURVEY

LOCATION BZ-209 **DATE** 1/9/04

SURVEYOR BRENT McCRACKEN

CONDITIONS PC00420, BMO#1, BMO#2

INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
27	<100	MONITOR	37	<100	ARM AREA OF BMO#2
28	<100	CASE	38	<100	REAR OUTLETS BMO#2
29	<100	KEYBOARD			
30	<100	MOUSE			
31	<100	OUTSIDE OF BMO#1			
32	<100	TIPS OF BMO#1			
33	<100	ARM AREA OF BMO#1			
34	<100	REAR OUTLETS BMO#1			
35	<100	OUTSIDE OF BMO #2			
36	<100	TIPS OF BMO#2			

GMSM 1/9/04

COMMENTS GMSM SURVEY OKAY. GMSM 1/9/04
<100 NC PM

ID:C-14 CHECK 9 JAN 2004 10:0

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00								
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00 Blank	78.8 Average	23.20 DPM for	18.57 14C :	24.18	95.95 24.18 COEF. OF	2.21 VAR:	5.49 0.000
1	**-3	5.00	102.2	49.00	12.78	27.33	95.13	30.62	11.20 -27
2	**-4	5.00	102.9	62.40	11.32	41.44	95.10	13.22	16.84 -28
3	**-5	5.00	101.3	44.20	13.45	22.27	95.16	21.73	22.50 -29
4	**-6	5.00	96.6	68.00	10.85	47.14	95.34	42.08	28.24 -30
5	**-7	5.00	104.0	67.60	10.88	46.94	95.05	28.65	33.94 -31
6	**-8	5.00	98.6	34.00	15.34	11.51	95.27	17.88	39.58 -32
7	**-9	5.00	99.8	30.00	16.33	7.33	95.22	18.53	45.23 -33
8	**-10	5.00	108.4	53.20	12.26	31.90	94.87	30.52	50.92 -34
9	**-11	5.00	100.4	24.20	18.18	1.24	95.20	16.71	56.55 -35
10	**-12	5.00	105.2	33.40	15.48	10.98	95.01	8.66	62.17 -36
11	**-1	5.00	101.7	51.60	12.45	30.05	95.15	6.16	67.89 -37
12	**-2	5.00	101.0	38.60	14.40	16.38	95.17	21.27	73.56 -38

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BAM
1/9/04

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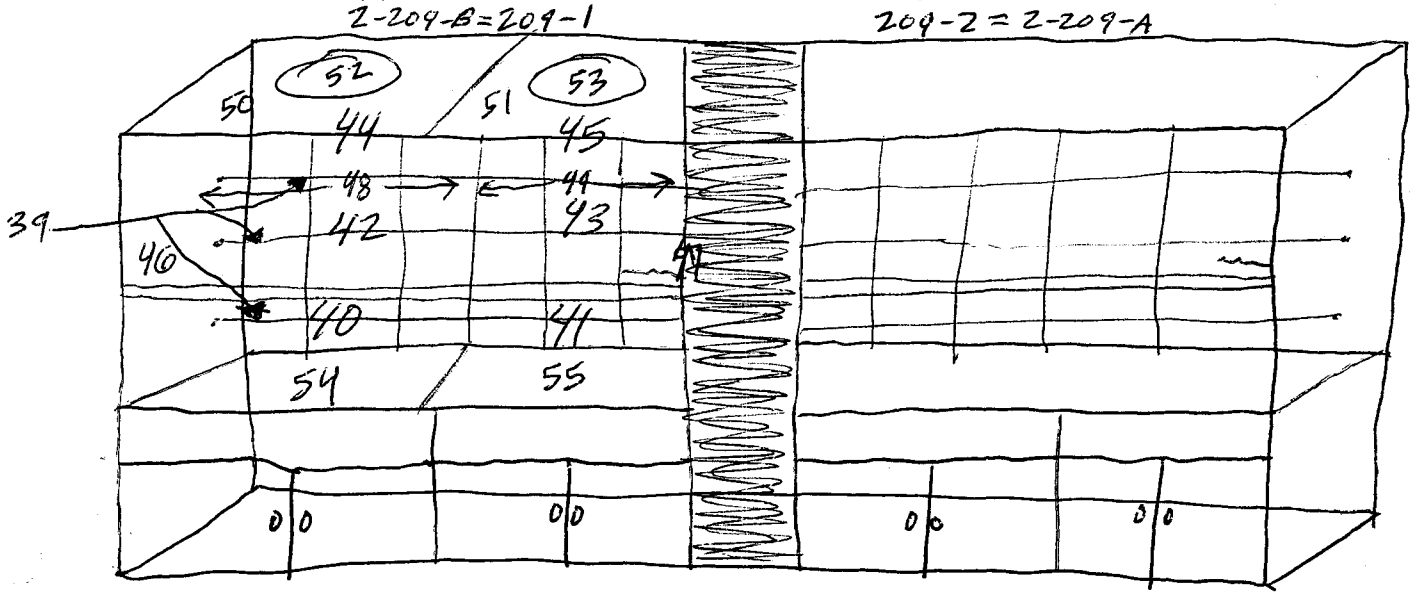
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 B2-209-B **DATE** 1/9/04
SURVEYOR BRENT McCRACKEN
CONDITIONS EXHAUST FAN 209-1 AND 209-2
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**X **Ludlum 3**__ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
39	<100	GRID 2-209-B	49	<100	BACK RIGHT 2-209-B
40	<100	BACK/LEFT/LOWER PANEL 2-209-B	50	<100	TOP LEFT 2-209-B
41	<100	BACK/RIGHT/LOWER PANEL 2-209-B	51	<100	TOP RIGHT 2-209-B
42	<100	BACK/LEFT/MIDDLE PANEL 2-209-B	52	<100	INSIDE LEFT EXHAUST PIPE 2-209-B
43	<100	BACK/RIGHT/MIDDLE PANEL 2-209-B	53	<100	INSIDE RIGHT EXHAUST PIPE 2-209-B
44	<100	BACK/LEFT/UPPER PANEL 2-209-B	54	<100	LEFT COUNTER 2-209-B
45	<100	BACK/RIGHT/UPPER PANEL 2-209-B	55	<100	RIGHT COUNTER 2-209-B
46	<100	LEFT SIDE 2-209-B			
47	<100	RIGHT SIDE 2-209-B			BAM 1/9/04
48	<100	BACK LEFT 2-209-B			

COMMENTS GMSM SURVEY OKAY, <100 NCPM BAM 1/9/04
HOOD WAS DISASSEMBLED FOR CLEANING AND WIPE TEST.

ID=C-14 CHECK 9 JAN 2004 15:5

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none	

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00 Blank	79.4 Average	19.60 DPM for	20.20 14C :	20.43	95.93 20.43 COEF. OF	4.32 VAR:	5.50 0.000
1	**-3	5.00	115.1	87.40	9.57	71.98	94.58	22.85	11.23-39
2	**-4	5.00	109.9	111.60	8.47	97.28	94.81	12.51	16.90-40
3	**-5	5.00	102.8	72.20	10.53	55.49	95.10	19.70	22.57-41
4	**-6	5.00	113.4	66.80	10.94	50.14	94.66	24.19	28.26-42
5	**-7	5.00	121.2	71.40	10.59	55.29	94.30	28.08	33.97-43
6	**-8	5.00	109.9	47.40	12.99	29.57	94.81	19.83	39.63-44
7	**-9	5.00	107.2	47.00	13.05	29.08	94.93	30.89	45.31-45
8	**-10	5.00	106.7	34.60	15.21	16.01	94.94	17.88	50.97-46
9	**-11	5.00	106.7	27.60	17.03	8.64	94.95	14.54	56.60-47
10	**-12	5.00	121.3	36.80	14.74	18.60	94.29	11.12	62.24-48
11	**-1	5.00	109.1	53.20	12.26	35.66	94.84	18.32	67.98-49
12	**-2	5.00	111.3	38.60	14.40	20.31	94.75	11.04	73.64-50
13	**-3	5.00	112.9	36.60	14.78	18.23	94.68	13.46	79.27-51
14	**-4	5.00	244.5	61.00	11.45	60.30	75.56	9.97	84.91-52
15	**-5	5.00	152.3	34.40	15.25	16.76	92.50	12.67	90.55-53
16	**-6	5.00	119.9	36.60	14.78	18.36	94.36	12.31	96.19-54
17	**-7	5.00	106.6	32.40	15.71	13.69	94.95	16.48	101.84-55

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BAM
1/9/04

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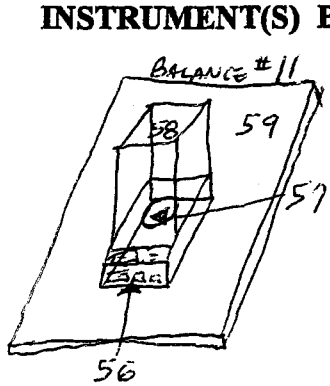
RADIOACTIVE CONTAMINATION SURVEY

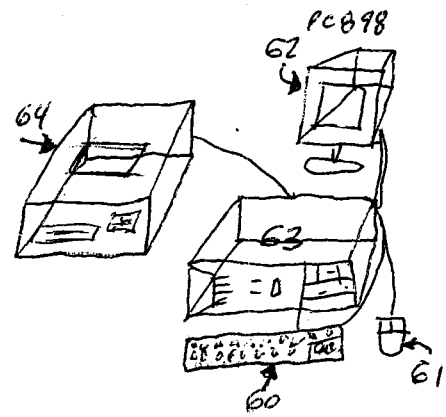
LOCATION B2-209 **DATE** 1/13/04

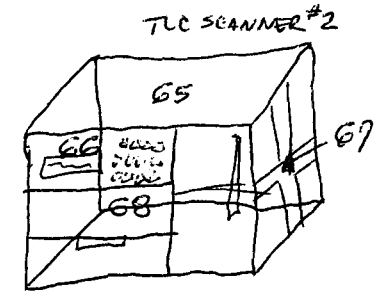
SURVEYOR BRENT MCCRACKEN

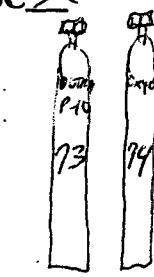
CONDITIONS BALANCE #11, TLC SCANNER #1 & #2, PC898, GAS CYLINDERS

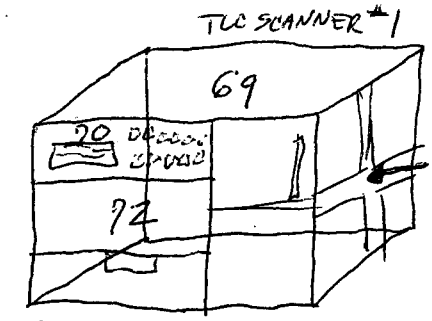
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M** X **Ludlum 3**___ **LSC** X











NO.	DPM	LOCATION	NO.	DPM	LOCATION
56	<100	FRONT CONTROLS	66	<100	FRONT CONTROLS SCANNER #2
57	<100	PAN AREA	67	<100	INSIDE PLATE CHANGER SCANNER #2
58	<100	GLASS TOP	68	<100	INSIDE UNIT HEAD SCANNER #2
59	<100	TRAY	69	<100	TOP OF SCANNER #1
60	<100	KEYBOARD	70	<100	FRONT CONTROLS SCANNER #1
61	<100	MOUSE	71	<100	INSIDE PLATE CHANGER SCANNER #1
62	<100	MONITOR	72	<100	INSIDE UNIT HEAD SCANNER #1
63	<100	COMPUTER	73	<100	ULTRA P-10 TANK
64	<100	PRINTER	74	<100	OXYGEN TANK
65	<100	TOP OF SCANNER #2	—	—	—

COMMENTS GMSM SURVEY OKAY BAM 1/13/04
<100 NCPM.

ID: C-14 CHECK 13 JAN 2004 10:2

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST	
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none			

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00 Blank	79.5 Average	26.40 DPM for	17.41 14C :	27.52	95.93 27.52 COEF. OF	2.43 VAR:	5.48 0.000
1	**-3	5.00	108.1	31.00	16.06	5.15	94.89	8.72	11.12-56
2	**-4	5.00	97.6	30.00	16.33	3.96	95.30	6.93	16.71-57
3	**-5	5.00	107.1	30.20	16.28	4.29	94.93	15.26	22.33-58
4	**-6	5.00	103.2	29.20	16.55	3.19	95.09	7.57	27.95-59
5	**-7	5.00	101.7	48.00	12.91	22.93	95.15	13.93	33.60-60
6	**-8	5.00	98.1	41.80	13.83	16.35	95.29	9.87	39.23-61
7	**-9	5.00	103.4	52.20	12.38	27.38	95.08	12.22	44.89-62
8	**-10	5.00	103.9	42.80	13.67	17.51	95.06	9.10	50.52-63
9	**-11	5.00	106.0	41.40	13.90	16.07	94.97	11.21	56.16-64
10	**-12	5.00	98.8	36.40	14.82	10.69	95.26	6.74	61.77-65
11	**-1	5.00	105.5	29.40	16.50	3.43	94.99	7.19	67.47-66
12	**-2	5.00	101.2	32.40	15.71	6.53	95.17	9.98	73.11-67
13	**-3	5.00	107.5	34.60	15.21	8.94	94.91	5.65	78.73-68
14	**-4	5.00	110.0	29.20	16.55	3.28	94.80	7.31	84.34-69
15	**-5	5.00	98.1	31.00	16.06	5.01	95.29	5.60	89.96-70
16	**-6	5.00	110.7	30.40	16.22	4.56	94.78	8.32	95.59-71
17	**-7	5.00	99.4	26.00	17.54	-0.22	95.24	7.31	101.20-72
18	**-8	5.00	123.3	27.00	17.21	1.15	94.19	7.96	106.82-73
19	**-9	5.00	126.2	28.60	16.72	2.89	94.05	5.79	112.44-74

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BMM 1/13/04

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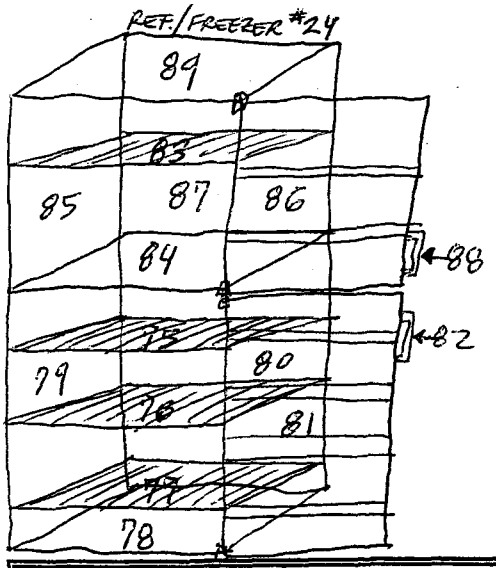
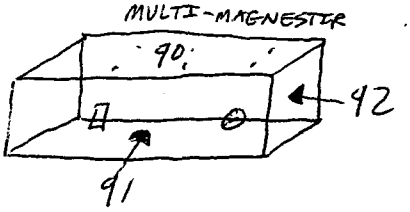
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/13/04
SURVEYOR BRENT McCRACKEN
CONDITIONS REF/FREEZER #24, MULTI-MAGNESTIR
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**X **Ludlum 3**__ **LSC**X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
75	<100	TOP SHELF REF.	85	<100	LEFT INSIDE FREEZER
76	<100	MIDDLE SHELF REF.	86	<100	RIGHT INSIDE FREEZER
77	<100	BOTTOM SHELF REF.	87	<100	BACK INSIDE FREEZER
78	<100	FLOOR IN REF.	88	<100	OUTSIDE HANDLE FREEZER
79	<100	LEFT INSIDE REF.	89	<100	OUTSIDE TOP OF UNIT
80	<100	RIGHT INSIDE REF.	90	<100	TOP OF MAGNESTIR
81	<100	SHELF ON DOOR REF.	91	<100	FRONT PANEL MAGNESTIR
82	<100	OUTSIDE HANDLE REF.	92	<100	SIDE PANEL MAGNESTIR
83	<100	TOP SHELF FREEZER	—	—	—
84	<100	BOTTOM SHELF FREEZER	—	—	—

COMMENTS GMSM SURVEY OKAY BAM 1/13/04
<100 NCPM.

ID: C-14 CHECK 13 JAN 2004 12:1

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none		

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
B1	**-1	5.00	80.3	23.60	18.41	24.61	95.91	2.30	5.49	
		Blank Average		DPM for	14C :	24.61	COEF. OF	VAR:	0.000	
1	**-3	5.00	100.5	28.20	16.84	5.02	95.19	11.34	11.13	-75
2	**-4	5.00	105.4	31.40	15.96	8.45	95.00	9.35	16.74	-76
3	**-5	5.00	107.1	30.20	16.28	7.21	94.93	6.23	22.35	-77
4	**-6	5.00	101.5	21.80	19.16	-1.70	95.16	7.13	27.96	-78
5	**-7	5.00	97.2	27.40	17.09	4.14	95.32	5.44	33.56	-79
6	**-8	5.00	102.9	33.00	15.57	10.09	95.10	7.84	39.18	-80
7	**-9	5.00	96.6	22.40	18.90	-1.11	95.34	6.06	44.79	-81
8	**-10	5.00	101.4	31.40	15.96	8.39	95.16	5.26	50.40	-82
9	**-11	5.00	101.4	27.60	17.03	4.40	95.16	5.10	56.01	-83
10	**-12	5.00	105.2	39.40	14.25	16.86	95.01	4.21	61.60	-84
11	**-1	5.00	97.1	35.00	15.12	12.11	95.32	4.39	67.29	-85
12	**-2	5.00	104.1	20.00	20.00	-3.57	95.05	5.57	72.91	-86
13	**-3	5.00	113.3	23.60	18.41	0.32	94.66	5.87	78.52	-87
14	**-4	5.00	102.6	20.60	19.71	-2.95	95.11	5.41	84.12	-88
15	**-5	5.00	101.0	26.80	17.28	3.55	95.17	7.33	89.75	-89
16	**-6	5.00	95.9	25.00	17.89	1.61	95.37	6.09	95.36	-90
17	**-7	5.00	99.9	24.20	18.18	0.81	95.22	4.55	100.97	-91
18	**-8	5.00	103.2	22.20	18.98	-1.26	95.09	4.17	106.59	-92

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BKM
1/13/04

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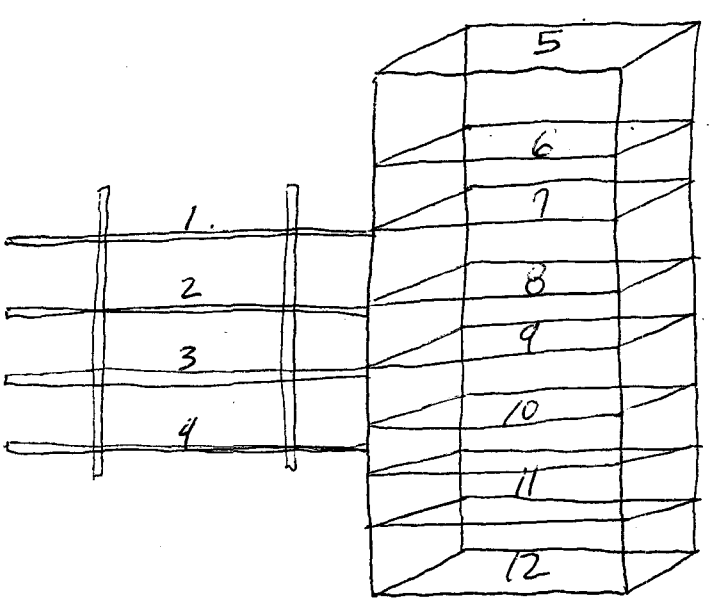
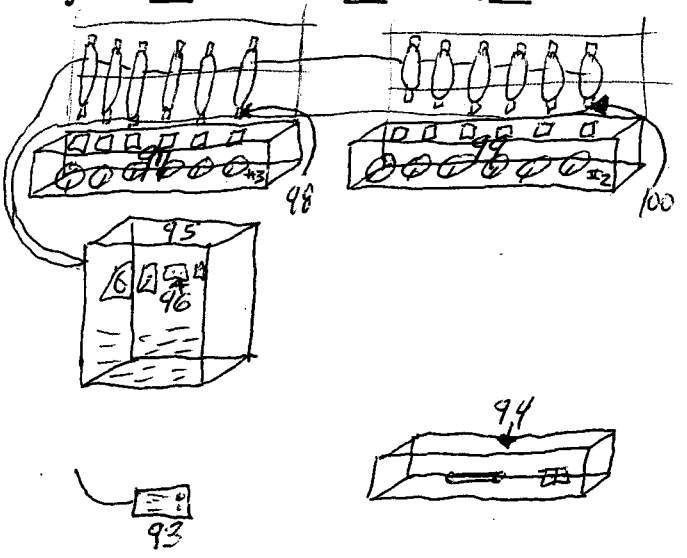
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/16/04
SURVEYOR BRENT McCRACKEN
CONDITIONS SHELVES, SOXHLET EXTRACTOR, PORTA-TRACE #1, MINERAL LIGHT LAMP #2
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M X Ludlum 3___ LSC X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
93	<100	OUTSIDE LAMP	3	<100	SHELF B3
94	<100	TOP OF PORTA-TRACE	4	<100	SHELF B4
95	<100	TOP OF RECIRCULATOR	5	<100	TOP OF CABINET
96	<100	RECIRCULATOR CONTROLS	6	<100	SHELF C1
97	<100	HEATER #3 BASE	7	<100	SHELF C2
98	<100	TIPS OF GLASS TUBES	8	<100	SHELF C3
99	<100	HEATER #2 BASE	9	<100	SHELF C4
100	<100	TIPS OF GLASS TUBES	10	<100	SHELF C5
1	<100	SHELF B1	11	<100	SHELF C6
2	<100	SHELF B2	12	<100	SHELF C7

COMMENTS GMSM SURVEY OKAY BAM 1/16/04
<100 NCPM.

ID: C-14 CHECK 16 JAN 2004 15:

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME :	5.00								
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: S		
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: O		
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1	DISK	: O		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0	RWM LIST	: O		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			4 JUN 1998 00:00				

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
31	**-1	5.00	76.6	23.40	18.49	25.04	93.52	3.22	5.50	
	Blank	Average	DPM for 14C :			25.04	COEF. OF VAR:		0.000	
1	**-3	5.00	95.1	37.20	14.66	15.04	92.88	27.82	11.18	-93
2	**-4	5.00	95.2	50.40	12.60	29.26	92.88	18.48	16.84	-94
3	**-5	5.00	101.5	41.60	13.87	19.91	92.62	20.48	22.50	-95
4	**-6	5.00	94.9	37.80	14.55	15.69	92.89	15.99	28.14	-96
5	**-7	5.00	99.8	30.60	16.17	8.00	92.69	13.33	33.78	-97
6	**-8	5.00	95.5	27.40	17.09	4.49	92.86	14.97	39.41	-98
7	**-9	5.00	99.3	32.20	15.76	9.72	92.71	12.33	45.04	-99
8	**-10	5.00	93.9	31.00	16.06	8.35	92.93	19.06	50.70	-100
9	**-11	5.00	102.1	37.40	14.63	15.38	92.59	22.91	56.35	-1
10	**-12	5.00	95.6	31.60	15.91	9.01	92.86	15.25	62.00	-2
11	**-1	5.00	93.5	42.60	13.70	20.83	92.94	8.28	67.72	-3
12	**-2	5.00	95.6	42.00	13.80	20.22	92.86	8.61	73.35	-4
13	**-3	5.00	95.2	45.40	13.27	23.88	92.88	13.87	79.00	-5
14	**-4	5.00	99.8	26.80	17.28	3.90	92.69	13.63	84.64	-6
15	**-5	5.00	93.6	25.60	17.68	2.53	92.94	8.25	90.26	-7
16	**-6	5.00	97.8	27.80	16.96	4.95	92.77	11.12	95.90	-8
17	**-7	5.00	95.1	22.60	18.81	-0.69	92.88	9.11	101.52	-9
18	**-8	5.00	101.0	28.20	16.84	5.42	92.64	13.52	107.15	-10
19	**-9	5.00	97.4	29.60	16.44	6.88	92.79	9.10	112.78	-11
20	**-10	5.00	99.3	26.60	17.34	3.67	92.71	7.73	118.40	-12

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BAM
1/16/04

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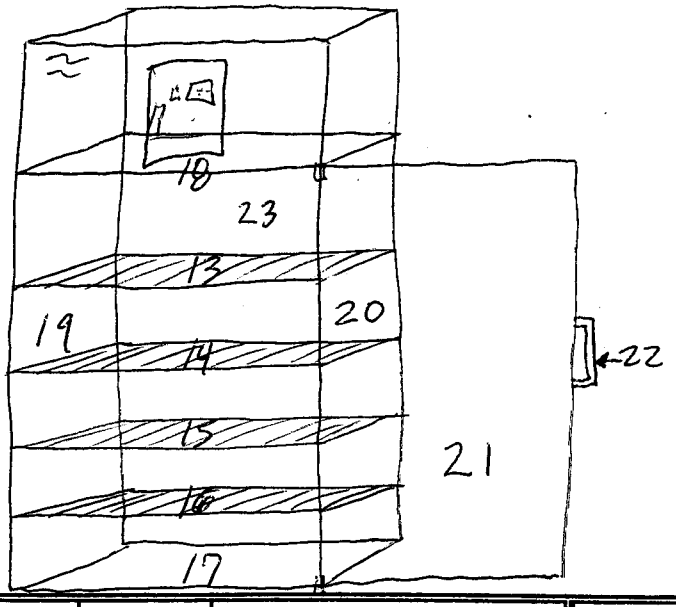
RADIOACTIVE CONTAMINATION SURVEY

LOCATION BZ-209 **DATE** ~~1/16/04~~ 1/19/04

SURVEYOR BRENT McCRACKEN

CONDITIONS STABILITY CHAMBER #4

INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
13	<100	SHELF #1	23	<100	BACK INSIDE
14	<100	SHELF #2			
15	<100	SHELF #3			
16	<100	SHELF #4			
17	<100	FLOOR			
18	<100	CEILING			
19	<100	LEFT INSIDE			
20	<100	RIGHT INSIDE			
21	<100	DOOR INSIDE			
22	<100	DOOR HANDLE			

BAM 1/19/04

COMMENTS GMSM SURVEY OKAY BAM 1/19/04
<100 NCPM.

ID: C-14 CHECK 19 JAN 2004 11:4
USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2
PRESET TIME : 5.00
DATA CALC : SL DPM H# :YES SAMPLE REPEATS: 1 PRINTER : ST
COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : OF
TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OF
SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0 RWM LIST : OF
LOW LEVEL : NO HALF LIFE CORRECTION DATE: 4 JUN 1998 00:00

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	M#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
31	**-1	5.00	75.4	20.40	19.80	21.82	93.56	2.34	5.48
		Blank	Average	DPM for	14C :	21.82	COEF. OF VAR:		0.000
1	**-3	5.00	97.9	36.40	14.82	17.45	92.77	25.48	11.15
2	**-4	5.00	98.1	33.80	15.38	14.64	92.76	16.49	16.79
3	**-5	5.00	94.2	25.00	17.89	5.11	92.91	10.25	22.39
4	**-6	5.00	95.0	28.80	16.67	9.21	92.88	12.06	28.02
5	**-7	5.00	115.7	21.60	19.25	1.69	91.95	12.80	33.64
6	**-8	5.00	110.5	25.80	17.61	6.18	92.21	10.72	39.28
7	**-9	5.00	116.3	23.80	18.33	4.09	91.92	20.96	44.91
8	**-10	5.00	124.1	29.80	16.38	10.77	91.50	14.13	50.56
9	**-11	5.00	102.4	27.00	17.21	7.37	92.58	5.51	56.16
10	**-12	5.00	98.4	22.80	18.73	2.78	92.75	5.28	61.76
11	**-1	5.00	146.7	31.20	16.01	12.86	90.03	17.85	67.50

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BMM
1/19/04

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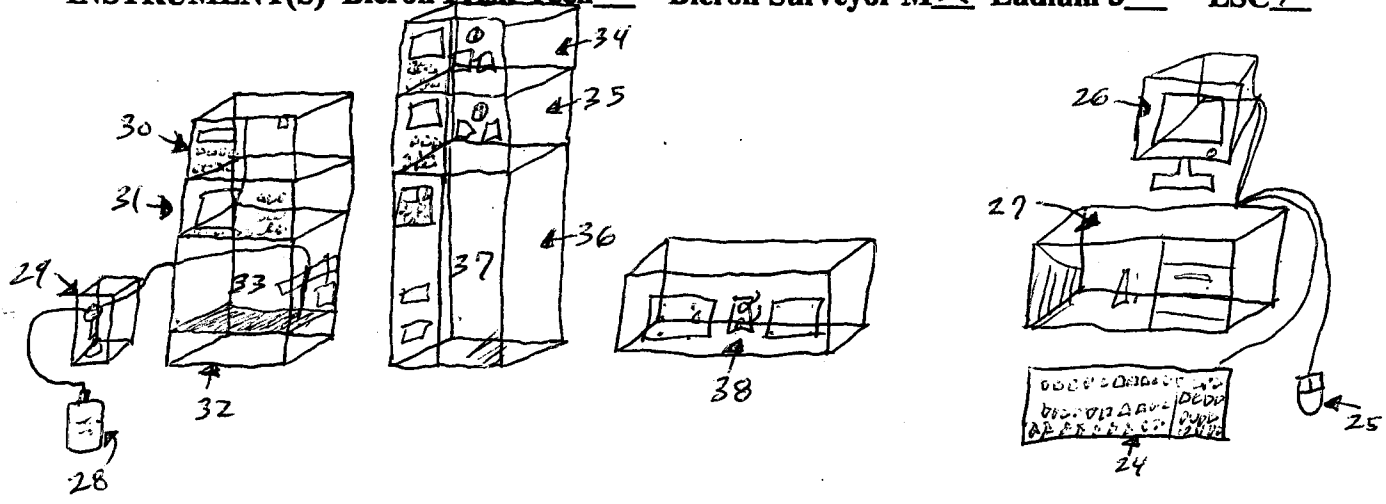
RADIOACTIVE CONTAMINATION SURVEY

LOCATION BZ-209 **DATE** 11/20/04
SURVEYOR BRENT McCRACKEN
CONDITIONS HPLC #3
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M X Ludlum 3___ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
24	<100	KEYBOARD	34	<100	PUMP A
25	<100	MOUSE	35	<100	PUMP B
26	<100	MONITOR	36	<100	COLUMN OVEN
27	<100	CASE	37	<100	INSIDE COLUMN OVEN
28	<100	SOLUTION BOTTLE	38	<100	β-RAM DETECTOR
29	<100	SYRINGE PUMP			
30	<100	UV-VIS DETECTOR			
31	<100	SYSTEM CONTROLLER			
32	<100	AUTO INJECTOR			
33	<100	INSIDE AUTO INJECTOR			

BAM 11/20/04

COMMENTS GMSM SURVEY OKAY BAM 11/20/04
<100 NCPM.

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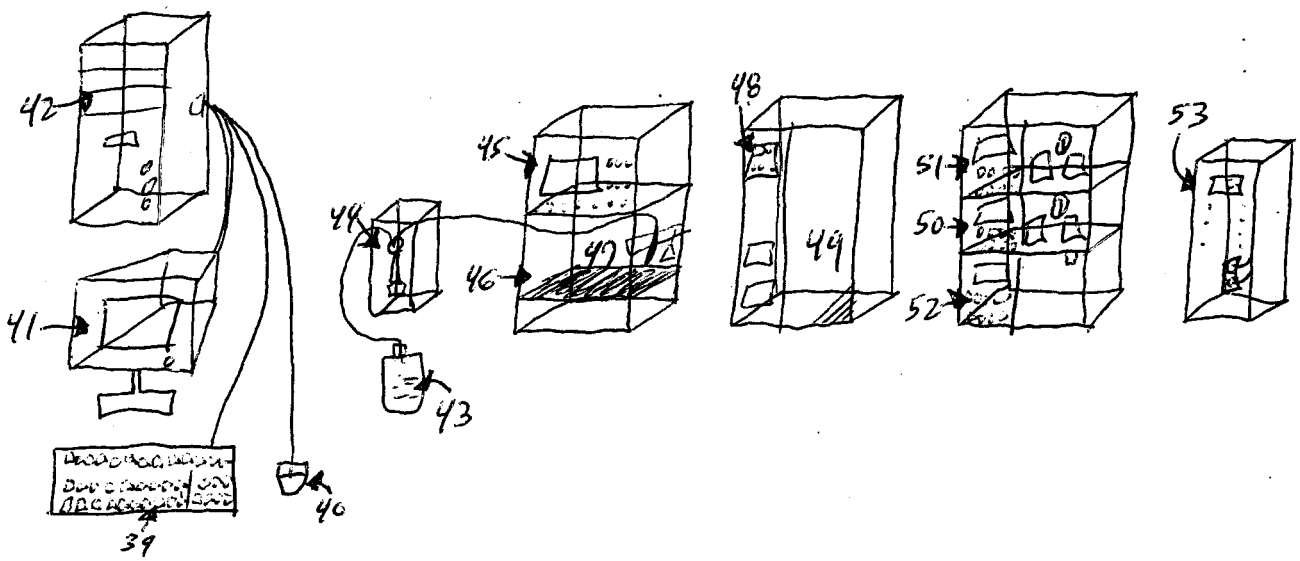
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 11/20/04
SURVEYOR BRENT McCRACKEN
CONDITIONS HPLC #7
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
39	<100	KEYBOARD	49	<100	INSIDE COLUMN OVEN
40	<100	MOUSE	50	<100	PUMP A
41	<100	MONITOR	51	<100	PUMP B
42	<100	CASE	52	<100	UV-VIS DETECTOR
43	<100	SOLUTION BOTTLE	53	<100	β-RAM DETECTOR
44	<100	SYRINGE PUMP			
45	<100	SYSTEM CONTROLLER			BAM 11/20/04
46	<100	AUTO INJECTOR			
47	<100	INSIDE AUTO INJECTOR			
48	<100	COLUMN OVEN			

COMMENTS GMSM SURVEY OKAY BAM 11/20/04
<100 dpm.

[illegible]

[illegible] JAN 2004 [illegible]

[illegible]

PRESET TIME : 5.00

DATA CALC : [illegible] SAMPLE REPEATS : [illegible] PRINTER : [illegible]

[illegible] YES [illegible] NO REPLICATES : [illegible] [illegible]

[illegible] NO [illegible] CYCLE REPEATS : [illegible] DISK : OF[illegible]

[illegible] LUMEX: NO LOW SAMPLE REJ: 0 RWM LIST : OF[illegible]

[illegible] NO HALF LIFE CORRECTION DATE: 4 JUN 1998 00:00

[illegible] 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

[illegible] QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	75.4	23.20	18.57	24.81	93.56	1.81	5.50

Blank Average DPM for 14C : 24.81 COEF. OF VAR: 0.000

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
1	**-3	5.00	96.2	35.40	15.03	13.34	92.84	22.45	11.17-24
2	**-4	5.00	93.9	37.80	14.55	15.89	92.93	15.80	16.80-25
3	**-5	5.00	96.6	36.80	14.74	14.86	92.82	25.34	22.46-26
4	**-6	5.00	96.5	35.40	15.03	13.35	92.82	20.12	28.11-27
5	**-7	5.00	91.7	25.20	17.82	2.30	93.01	10.83	33.73-28
6	**-8	5.00	91.9	26.20	17.47	3.38	93.00	11.47	39.36-29
7	**-9	5.00	91.6	33.80	15.38	11.55	93.02	25.24	45.02-30
8	**-10	5.00	93.0	25.80	17.61	2.96	92.96	16.49	50.66-31
9	**-11	5.00	93.7	25.00	17.89	2.11	92.93	12.44	56.28-32
10	**-12	5.00	95.0	38.60	14.40	16.77	92.88	8.58	61.92-33
11	**-1	5.00	100.1	26.20	17.47	3.48	92.68	12.33	67.63-34
12	**-2	5.00	96.2	26.20	17.47	3.43	92.84	9.87	73.26-35
13	**-3	5.00	95.2	26.80	17.28	4.06	92.87	12.12	78.89-36
14	**-4	5.00	99.5	55.80	11.97	35.42	92.70	6.59	84.51-37
15	**-5	5.00	99.2	25.20	17.82	2.39	92.71	11.47	90.15-38
16	**-6	5.00	94.9	30.60	16.17	8.15	92.89	16.16	95.80-39
17	**-7	5.00	94.1	23.80	18.33	0.82	92.92	7.97	101.42-40
18	**-8	5.00	92.1	25.80	17.61	2.95	93.00	9.34	107.06-41
19	**-9	5.00	98.0	23.20	18.57	0.21	92.76	10.39	112.67-42
20	**-10	5.00	93.5	23.60	18.41	0.60	92.94	7.40	118.30-43
21	**-11	5.00	91.1	24.40	18.11	1.43	93.03	8.37	123.92-44
22	**-12	5.00	91.3	27.20	17.15	4.45	93.03	7.97	129.56-45
23	**-1	5.00	95.1	24.80	17.96	1.91	92.88	6.73	135.27-46
24	**-2	5.00	93.3	24.00	18.26	1.02	92.95	6.43	140.88-47
25	**-3	5.00	94.2	22.00	19.07	-1.12	92.91	8.46	146.50-48
26	**-4	5.00	91.8	27.80	16.96	5.10	93.01	5.48	152.12-49
27	**-5	5.00	95.3	25.60	17.68	2.77	92.87	7.05	157.73-50
28	**-6	5.00	96.4	23.40	18.49	0.41	92.83	6.04	163.34-51
29	**-7	5.00	89.8	23.60	18.41	0.56	93.08	6.42	168.96-52
30	**-8	5.00	93.3	23.60	18.41	0.59	92.95	6.80	174.58-53

RADIO ACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BAM
1/20/04

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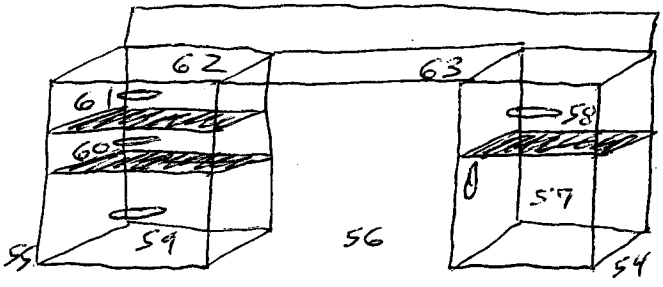
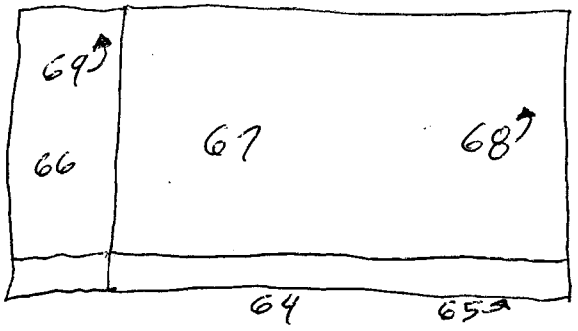
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/21/04
SURVEYOR BRENT MCCRACKEN
CONDITIONS REMOVING DESK & WALL
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
54	<100	FLOOR	64	<100	FLOOR
55	<100	FLOOR	65	<100	FLOOR OPPOSITE SIDE
56	<100	FLOOR	66	<100	WALL
57	<100	INSIDE CABINET	67	<100	WALL
58	<100	INSIDE DRAWER	68	<100	WALL OPPOSITE SIDE
59	<100	INSIDE DRAWER	69	<100	WALL OPPOSITE SIDE
60	<100	INSIDE DRAWER			
61	<100	INSIDE DRAWER			BAM 11/21/04
62	<100	TOP LEFT			
63	<100	TOP RIGHT			

COMMENTS GMSM SURVEY OKAY BAM 1/21/04
<100 NCPM.

ID: C-14 CHECK 21 JAN 2004 16:(

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME :	5.00								
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: S		
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: O		
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1	DISK	: O		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0	RWM LIST	: O		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			4 JUN 1998 00:00				

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	74.9	26.20	17.47	28.02	93.57	1.59	5.49
	Blank Average			DPM for	14C :	28.02	COEF. OF VAR:		0.000
1	**-3	5.00	113.8	30.60	16.17	5.25	92.05	19.94	11.16-54
2	**-4	5.00	118.8	40.40	14.07	16.03	91.79	27.23	16.81-55
3	**-5	5.00	120.6	38.00	14.51	13.45	91.69	17.10	22.46-56
4	**-6	5.00	100.5	26.20	17.47	0.28	92.66	15.44	28.09-57
5	**-7	5.00	91.8	28.00	16.90	2.11	93.01	10.05	33.71-58
6	**-8	5.00	101.1	23.80	18.33	-2.31	92.64	10.00	39.33-59
7	**-9	5.00	105.6	27.60	17.03	1.86	92.44	9.69	44.94-60
8	**-10	5.00	99.6	33.80	15.38	8.47	92.70	6.85	50.57-61
9	**-11	5.00	104.1	28.60	16.72	2.92	92.50	11.68	56.19-62
10	**-12	5.00	109.0	23.00	18.65	-3.08	92.28	11.59	61.81-63
11	**-1	5.00	113.8	29.60	16.44	4.16	92.05	13.65	67.56-64
12	**-2	5.00	120.0	30.00	16.33	4.71	91.73	10.07	73.18-65
13	**-3	5.00	94.7	23.20	18.57	-3.03	92.90	9.82	78.81-66
14	**-4	5.00	97.3	25.20	17.82	-0.84	92.79	8.36	84.44-67
15	**-5	5.00	101.2	27.60	17.03	1.80	92.63	7.87	90.05-68
16	**-6	5.00	94.9	25.80	17.61	-0.22	92.89	8.77	95.69-69

Radio Active Contamination Survey

Wipes LSC counted direct

Ecoscint Cocktail

BAM
1/21/04

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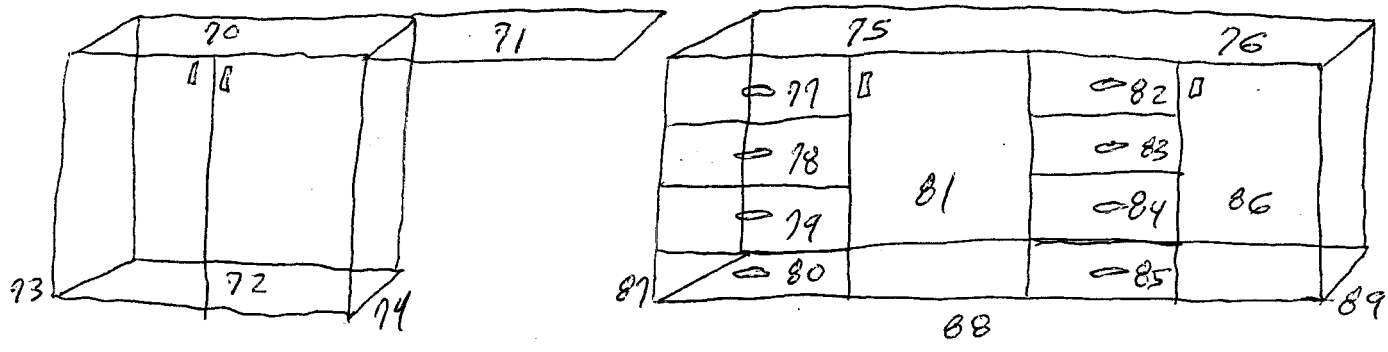
RADIOACTIVE CONTAMINATION SURVEY

LOCATION BZ-209 **DATE** 1/22/04
SURVEYOR BRENT McCRACKEN
CONDITIONS BENCHTOP AND DRAWERS
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
70	<100	BENCH TOP	80	<100	INSIDE DRAWER
71	<100	BENCHTOP	81	<100	INSIDE SHELF
72	<100	INSIDE SHELF	82	<100	INSIDE DRAWER
73	<100	FLOOR	83	<100	INSIDE DRAWER
74	<100	FLOOR	84	<100	INSIDE DRAWER
75	<100	BENCH TOP	85	<100	INSIDE DRAWER
76	<100	BENCH TOP	86	<100	INSIDE SHELF
77	<100	INSIDE DRAWER	87	<100	FLOOR
78	<100	INSIDE DRAWER	88	<100	FLOOR
79	<100	INSIDE DRAWER	89	<100	FLOOR

COMMENTS GMSM SURVEY OKAY BMM 1/22/04
<100 NCPM.

ID: C-14 CHECK 22 JAN 2004 10:

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME :	5.00								
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: S		
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: O		
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1	DISK	: O		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0	RWM LIST	: O		
LOW LEVEL :	NO	HALF LIFE		CORRECTION DATE:	4 JUN 1998 00:00				

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
B1	**-1	5.00	75.5	26.20	17.47	28.02	93.56	1.26	5.49	
		Blank Average		DPM for	14C :	28.02	COEF. OF VAR:		0.000	
1	**-3	5.00	109.5	36.00	14.91	11.02	92.26	18.87	11.14	-70
2	**-4	5.00	105.5	33.60	15.43	8.35	92.44	15.56	16.78	-71
3	**-5	5.00	110.0	42.00	13.80	17.55	92.23	12.90	22.41	-72
4	**-6	5.00	108.4	31.60	15.91	6.23	92.31	8.22	28.04	-73
5	**-7	5.00	105.2	27.40	17.09	1.63	92.46	7.48	33.65	-74
6	**-8	5.00	106.9	25.00	17.89	-0.94	92.38	8.31	39.27	-75
7	**-9	5.00	107.2	35.40	15.03	10.33	92.36	9.36	44.89	-76
8	**-10	5.00	105.6	29.60	16.44	4.02	92.44	11.81	50.50	-77
9	**-11	5.00	95.5	23.60	18.41	-2.59	92.87	8.86	56.12	-78
10	**-12	5.00	99.8	27.60	17.03	1.77	92.69	10.20	61.74	-79
11	**-1	5.00	96.7	21.60	19.25	-4.74	92.82	6.99	67.45	-80
12	**-2	5.00	108.3	26.40	17.34	0.81	92.31	6.10	73.06	-81
13	**-3	5.00	100.9	22.60	18.81	-3.61	92.64	3.95	78.67	-82
14	**-4	5.00	100.0	23.80	18.33	-2.33	92.68	3.77	84.27	-83
15	**-5	5.00	99.0	22.00	19.07	-4.28	92.72	3.89	89.89	-84
16	**-6	5.00	104.9	24.20	18.18	-1.84	92.47	4.09	95.49	-85
17	**-7	5.00	117.3	37.60	14.59	12.93	91.87	4.55	101.10	-86
18	**-8	5.00	110.2	23.80	18.33	-2.20	92.23	4.88	106.71	-87
19	**-9	5.00	115.8	29.40	16.50	3.97	91.95	6.23	112.34	-88
20	**-10	5.00	114.4	24.00	18.26	-1.92	92.02	7.43	117.95	-89

Radio Active Contamination Survey

Wipes LSC counted Direct

Ecoscint Cocktail

BAM
11/22/04

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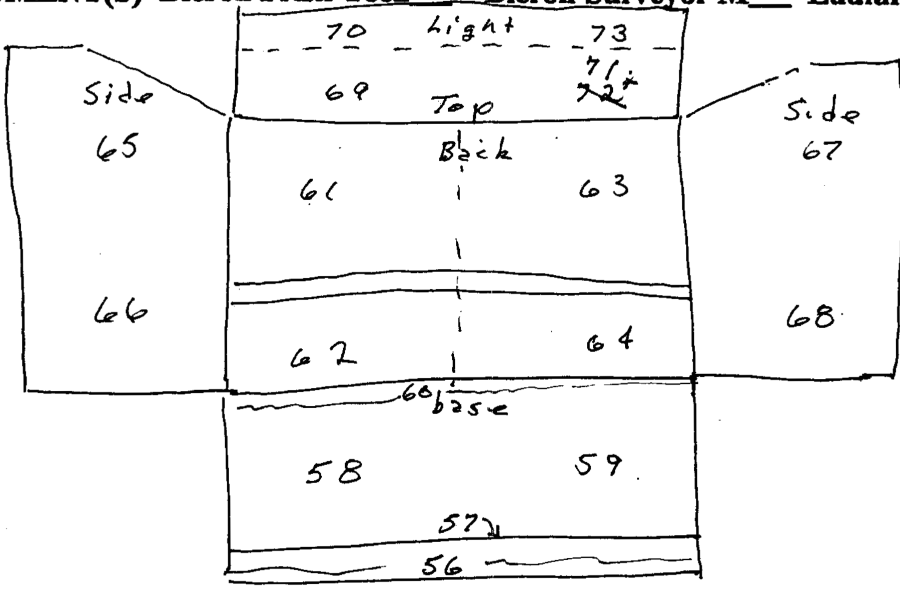
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 2-209 E. Hood 209-A RWG 1 Mar 04 **DATE** 22 Jan 04
SURVEYOR Granlund / McCracken
CONDITIONS Close-out survey. Hood before disassembly
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ✓ Ludlum 3 ___ LSC ✓



NO.	DPM	LOCATION	NO.	DPM	LOCATION
56	<100	apron	66	<100	side
57	<100	under apron	67	<100	"
58	<100	base left	68	<100	"
59	<100	" right	69	<100	top
60	<100	rear @ intake	70	<100	light
61	<100	back	71 ~~72*~~	101 ① ~~112~~	top
62	<100	"	73	<100	light
63	<100	"			RWG 6 Feb 04
64	<100	"			
65	<100	side			

COMMENTS *#72 lost in hood. RWG 22 Jan 03 GMSM background all locations.
① (RE) BAM 1/22/04

ID=C-14 CHECK 22 JAN 2004 20:

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME	5.00								
DATA CALC	SL DPM	H#	YES	SAMPLE REPEATS	1	PRINTER	S
COUNT BLANK	YES	IC#	NO	REPLICATES	1	RS232	O
TWO PHASE	NO	AQC	NO	CYCLE REPEATS	1	DISK	O
SCINTILLATOR	LIQUID	LUMEX	NO	LOW SAMPLE REJ	0	RWM LIST	O
LOW LEVEL	NO	HALF LIFE CORRECTION DATE			4 JUN 1998 00:00		

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	77.1	18.40	20.85	19.69	93.51	2.36	5.50
		Blank Average		DPM for		14C :	19.69	COEF. OF VAR:	0.000
1	**-3	5.00	98.8	27.00	17.21	9.45	92.73	3.56	11.10-56
2	**-4	5.00	110.3	39.00	14.32	22.63	92.22	3.31	16.69-57
3	**-5	5.00	97.6	29.40	16.50	12.02	92.78	2.63	22.28-58
4	**-6	5.00	105.1	51.60	12.45	36.15	92.46	2.38	27.87-59
5	**-7	5.00	102.5	51.40	12.48	35.87	92.57	2.09	33.46-60
6	**-8	5.00	100.2	36.60	14.78	19.83	92.67	23.51	39.12-61
7	**-9	5.00	102.3	25.20	17.82	7.55	92.58	6.61	44.73-62
8	**-10	5.00	101.2	39.80	14.18	23.31	92.63	22.78	50.39-63
9	**-11	5.00	97.0	34.40	15.25	17.40	92.80	2.82	55.99-64
10	**-12	5.00	102.2	32.20	15.76	15.11	92.59	20.51	61.64-65
11	**-1	5.00	101.9	42.80	13.67	26.56	92.60	30.73	67.42-66
12	**-2	5.00	105.2	100.00	8.94	88.54	92.46	63.17	73.25-67
13	**-3	5.00	98.9	29.40	16.50	12.04	92.73	11.14	78.88-68
14	**-4	5.00	101.6	54.20	12.15	38.87	92.61	44.81	84.61-69
15	**-5	5.00	112.1	57.20	11.83	42.43	92.13	23.83	90.30-70
16	**-6	5.00	97.6	112.60	8.43	101.76	92.78	65.84	96.13-71
17	**-7	5.00	115.0	54.80	12.08	39.92	91.99	29.62	101.84-73

Radio Active Contamination Survey

Wipes LSC counter direct

Ecoscint Cocktail

BAM 11/22/04

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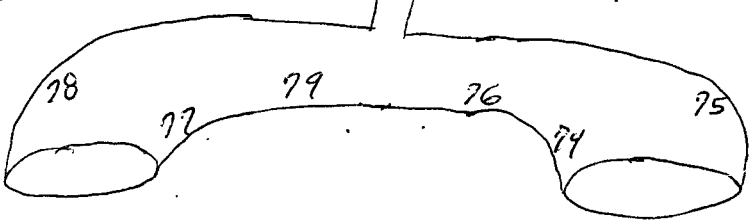
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B2-209 **DATE** 1/22/04
SURVEYOR BRENT McCRACKEN / ROGGER GRANLUND
CONDITIONS HOOD 2-209-A EXHAUST DUCT
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M X Ludlum 3___ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
74	313 * ~~301~~	RIGHT INNER SIDE EXHAUST			
75	228 * ~~234~~	RIGHT OUTER SIDE EXHAUST			
76	~~255~~ ~~258~~ *	RIGHT INNER TOP SIDE EXHAUST			
77	<100	LEFT INNER SIDE EXHAUST			
78	<100	LEFT ~~*IAW~~ OUTER SIDE EXHAUST			RW 6 Feb 04
79	<100	LEFT INNER TOP SIDE EXHAUST			
		RW 6 Feb 04			

COMMENTS *(RE) BAM 1/22/04 GMSM @ ~#74 200 cpm w/pancake GM.

ID:C-14 CHECK 22 JAN 2004 16:

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME :	5.00							
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: S
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: O
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1	DISK	: O
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0	RWM LIST	: O
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			4 JUN 1998 00:00		

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	76.5	27.00	17.21	28.89	93.53	2.41	5.51
		Blank Average		DPM for		14C :	28.89	COEF. OF VAR:	0.000
1	**-3	5.00	171.7	301.20	5.15	313.88	87.93	1.14	11.14-74
2	**-4	5.00	127.8	234.60	5.84	228.29	91.28	1.33	16.76-75
3	**-5	5.00	132.6	258.20	5.57	255.06	90.99	1.05	22.35-76
4	**-6	5.00	129.3	59.80	11.57	36.73	91.20	3.28	27.96-77
5	**-7	5.00	137.8	59.60	11.59	36.90	90.65	3.39	33.56-78
6	**-8	5.00	138.2	88.40	9.51	68.72	90.63	2.46	39.18-79

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

11/22/04

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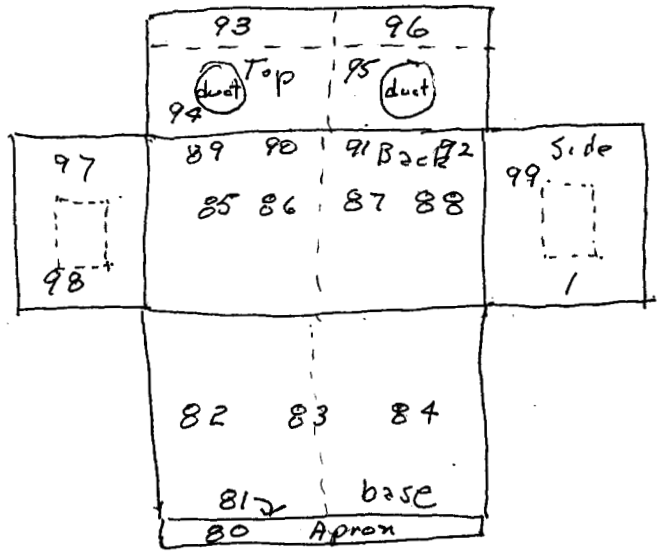
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Bldg E Hood 2-209A **DATE** 12 Jan 04
SURVEYOR Granlund/McCracken
CONDITIONS Inside of hood w/back & top panels removed - after cleaning
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**✓ **Ludlum 3**___ **LSC**___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
80	<100	apron	90	<100	back, top
81	<100	base under apron	91	<100	" "
82	<100	base left	92	<100	" "
83	<100	" center	93	<100	top - light
84	<100	" right	94	<100	top around duct
85	154	back	95	<100	" " "
86	<100	"	96	<100	top, light
87	475	"	97	<100	side left
88	149	"	98	<100	" "
89	<100	back - top	99, 1	<100	side right

COMMENTS Before cleaning pancake GM counts @ 87, 88, 91, 92 200-400 cpm. After cleaning GMSM @ background all areas.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION 2-209-A hood **DATE** 22 Jan 04
SURVEYOR Granlund/McCracken
CONDITIONS Panels (top + back) from hood after cleaning
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**✓ **Ludlum 3**__ **LSC**✓

NO.	DPM	LOCATION	NO.	DPM	LOCATION
2	<100	Back panel - right - front	12	<100	top - left - front
3	<100	" " " rear	13	<100	" " - rear
4	<100	Back Panel - Left - front			
5	<100	" " " - rear			
6	<100	Back - bottom - right - front			
7	<100	" " " - rear			
8	<100	back - bottom - left - front			
9	<100	" " " - rear			
10	<100	top - right - front			
11	<100	" " - rear			

Panels off hood

COMMENTS Before cleaning back of panels showed 200 - 400 cpm w/pancake probe in spots.

ID: C-14 CHECK 32 JAN 2004 17:
USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2
PRESET TIME : 5.00
DATA CALC : SL DPM H# :YES SAMPLE REPEATS: 1 PRINTER : S
COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : O
TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : O
SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0 RWM LIST : O
LOW LEVEL : NO HALF LIFE CORRECTION DATE: 4 JUN 1998 00:00

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
31	**-1	5.00	76.4	21.60	19.25	23.11	93.53	2.92	5.50	
		Blank Average		DPM for	14C :	23.11	COEF. OF VAR:		0.000	
1	**-3	5.00	97.5	36.80	14.74	16.58	92.78	10.56	11.14	-80
2	**-4	5.00	110.7	40.20	14.11	20.52	92.20	5.10	16.73	-81
3	**-5	5.00	96.0	30.20	16.28	9.44	92.84	4.25	22.33	-82
4	**-6	5.00	93.6	27.80	16.96	6.82	92.94	3.96	27.92	-83
5	**-7	5.00	96.6	29.80	16.38	9.02	92.82	4.78	33.50	-84
6	**-8	5.00	111.7	163.40	7.00	154.32	92.18	52.67	39.36	-85
7	**-9	5.00	101.0	85.20	9.47	73.24	92.64	18.06	45.06	-86
8	**-10	5.00	103.9	460.80	4.17	475.31	92.51	2.32	50.72	-87
9	**-11	5.00	108.5	159.60	7.08	149.91	92.31	12.21	56.41	-88
10	**-12	5.00	96.5	39.20	14.29	19.15	92.82	8.13	62.03	-89
11	**-1	5.00	100.7	59.80	11.57	41.48	92.65	19.41	67.81	-90
12	**-2	5.00	96.4	33.60	15.43	13.11	92.83	4.09	73.41	-91
13	**-3	5.00	92.6	30.00	16.33	9.18	92.98	3.32	79.02	-92
14	**-4	5.00	97.6	33.80	15.38	13.34	92.78	9.74	84.65	-93
15	**-5	5.00	97.4	56.20	11.93	37.50	92.79	8.43	90.29	-94
16	**-6	5.00	100.1	112.60	8.43	98.47	92.68	5.30	95.94	-95
17	**-7	5.00	100.0	62.20	11.34	44.05	92.68	10.16	101.58	-96
18	**-8	5.00	100.3	39.20	14.29	19.22	92.67	17.94	107.24	-97
19	**-9	5.00	101.9	30.60	16.17	9.96	92.60	18.04	112.90	-98
20	**-10	5.00	101.9	68.40	10.81	50.81	92.60	43.69	118.64	-99
21	**-11	5.00	106.4	61.40	11.41	43.39	92.40	14.78	124.30	-1
MISSING SAMPLE										
23	**-1	5.00	99.1	50.40	12.60	31.29	92.72	32.87	130.12	-2
24	**-2	5.00	92.0	32.00	15.81	11.32	93.00	3.44	135.72	-3
25	**-3	5.00	96.2	40.40	14.07	20.44	92.84	30.81	141.42	-4
26	**-4	5.00	95.2	48.60	12.83	29.25	92.87	24.83	147.10	-5
27	**-5	5.00	94.2	27.80	16.96	6.83	92.92	3.72	152.71	-6
28	**-6	5.00	93.9	24.40	18.11	3.17	92.93	4.28	158.32	-7
29	**-7	5.00	95.5	26.00	17.54	4.91	92.87	4.10	163.93	-8
30	**-8	5.00	96.9	28.00	16.90	7.08	92.81	8.58	169.56	-9
31	**-9	5.00	97.0	33.00	15.57	12.47	92.81	7.72	175.17	-10
32	**-10	5.00	96.6	36.80	14.74	16.56	92.82	2.72	180.77	-11
33	**-11	5.00	94.6	31.00	16.06	10.28	92.90	5.17	186.40	-12
34	**-12	5.00	100.7	31.00	16.06	10.37	92.65	3.52	192.01	-13

RADIO ACTIVE CONTAMINATION SURVEY
WIPES LSC COUNTED DIRECT
FINGERNT COCKTAIL

BAM
11/22/04

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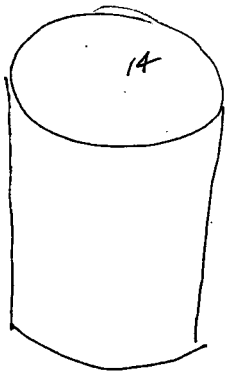
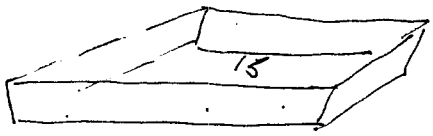
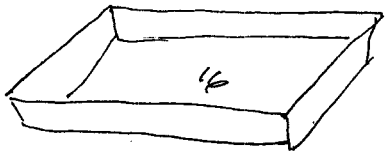
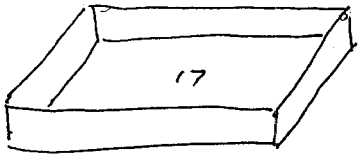
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Radiochem Lab **DATE** 23 Jan 04
SURVEYOR R. Granlund
CONDITIONS Check of carboy & trays for release.
INSTRUMENT(S) **Bicron Frisk-Tech** __ **Bicron Surveyor M** — **Ludlum 3** __ **LSC** —









NO.	DPM	LOCATION	NO.	DPM	LOCATION
14	< 100	Top of carboy B after cleaning			
15	< 100	evap. pan Teflon			
16	< 100	" " poly			
17	< 100	" " steel			
					Rwg 27Jan04
		Rwg 27Jan04			

COMMENTS GMSM check all < 50 cpm above bkg.

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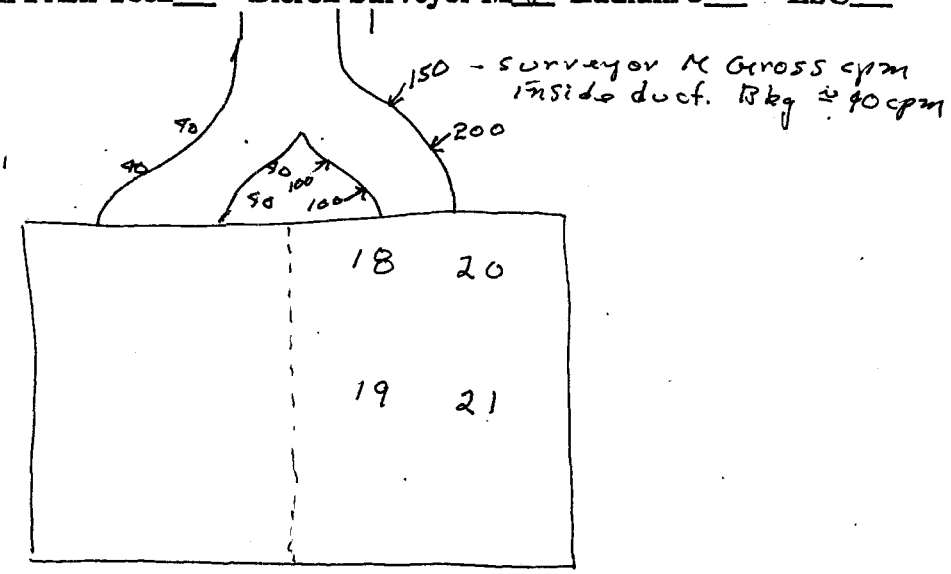
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Hood 2-209-A **DATE** 23 Jan 04
SURVEYOR R. Granlund.
CONDITIONS Hood 2-209-A after further cleaning back panel
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**_V_ **Ludlum 3**__ **LSC**_V_



NO.	DPM	LOCATION	NO.	DPM	LOCATION
18	< 100	back panel			
19	< 100	" "			
20	< 100	" "			
21	< 100	" "			

RWG 27 Jan 04

RWG 27 Jan 04

COMMENTS Gross/M check of back panel. all < 50 cpm above bkg.

ID:C-14 CHECK 23 JAN 2004 18:

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC2

PRESET TIME	:	5.00					
DATA CALC	:	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: S
COUNT BLANK	:	YES	IC# : NO	REPLICATES :	1	RS232	: O
TWO PHASE	:	NO	AQC : NO	CYCLE REPEATS :	2	DISK	: O
SCINTILLATOR:		LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0	RWM LIST	: O
LOW LEVEL	:	NO	HALF LIFE CORRECTION DATE:		4 JUN 1998 00:00		

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low:-10.44 High:302.29

	SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
	B1	**-1	5.00	75.2	20.20	19.90	21.60	93.57	1.52	5.49
			Blank Average		DPM for 14C :		21.60	COEF. OF VAR:		0.000
14	1	**-3	5.00	93.6	41.80	13.83	23.40	92.94	35.91	11.19
15	2	**-4	5.00	103.9	38.00	14.51	19.50	92.51	14.42	16.81
16	3	**-5	5.00	93.7	31.20	16.01	11.99	92.93	11.56	22.45
17	4	**-6	5.00	98.0	33.20	15.52	14.21	92.76	10.62	28.07
18	5	**-7	5.00	93.6	32.80	15.62	13.71	92.94	17.17	33.72
19	6	**-8	5.00	94.8	27.80	16.96	8.34	92.89	10.95	39.33
20	7	**-9	5.00	93.0	27.60	17.03	8.11	92.96	8.11	44.95
21	8	**-10	5.00	95.5	25.20	17.82	5.55	92.87	6.39	50.55

Cycle 2 of 2

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	75.5	19.60	20.20	20.96	93.56	1.40	56.49
		Blank Average		DPM for 14C :		20.96	COEF. OF VAR:		0.000
1	**-3	5.00	93.6	33.60	15.43	15.21	92.94	14.62	[illegible]
2	**-4	5.00	103.3	37.00	14.70	19.05	92.54	7.93	67.75
3	**-5	5.00	94.5	[illegible]	[illegible]	5.75	[illegible]	[illegible]	73.37
4	**-6	5.00	[illegible]	[illegible]	[illegible]	15.50	92.75	6.54	[illegible]
5	**-7	[illegible]	[illegible]	27.90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	**-8	[illegible]	[illegible]	[illegible]	[illegible]	5.54	92.89	[illegible]	90.24
7	**-9	[illegible]	[illegible]	[illegible]	[illegible]	8.32	92.95	5.51	95.85
8	**-10	5.00	[illegible]	[illegible]	[illegible]	5.12	92.85	4.30	101.44

RADIO ACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BAM
1/27/04

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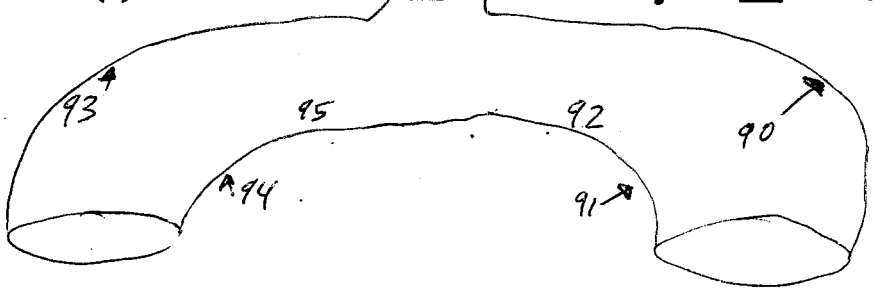
RADIOACTIVE CONTAMINATION SURVEY

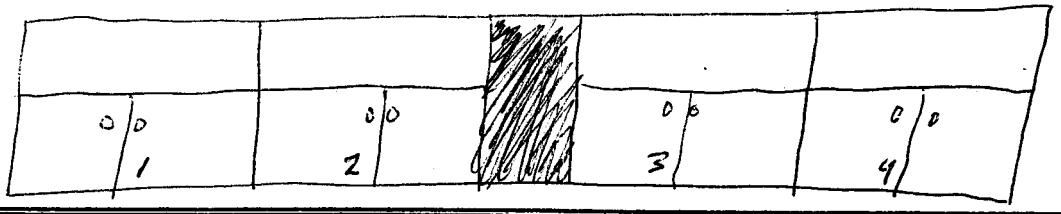
LOCATION B2-209 **DATE** 11/27/04

SURVEYOR BRENT McCRACKEN / ROGER GRANLUND

CONDITIONS HOOD 2-209-A / 2-209-B

INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** X **Ludlum 3** ___ **LSC** X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
90	<100	RIGHT OUTER SIDE EXHAUST			
91	<100	RIGHT INNER SIDE EXHAUST			
92	<100	RIGHT INNER TOP SIDE EXHAUST			
93	<100	LEFT OUTER SIDE EXHAUST			
94	<100	LEFT INNER SIDE EXHAUST			
95	<100	LEFT INNER TOP SIDE EXHAUST			
1	<100	2-209-B INSIDE CABINET			
2	<100	2-209-B INSIDE CABINET			
3	<100	2-209-A INSIDE CABINET			
4	<100	2-209-A INSIDE CABINET			

GMSM 11/28/04

COMMENTS GMSM SURVEY OKAY BMM 11/28/04
<100 NCPM

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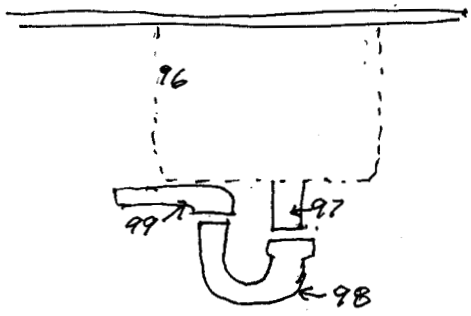
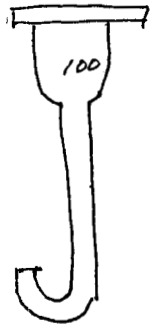
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 2-209 **DATE** 29 Jan 04
SURVEYOR R. Granlund / B. McCracken
CONDITIONS Survey of sink traps.
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M** ✓ **Ludlum 3**___ **LSC** ✓

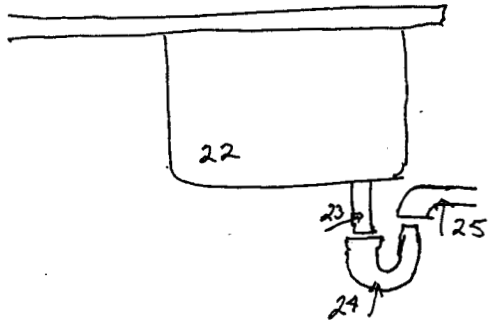
Window Sink by hood



Hood sink



Sink by stairwell wall



NO.	DPM	LOCATION	NO.	DPM	LOCATION
96	<100	Window sink basin	1	<100	2ml from trap - window sink
97	364	drain inside	2	<100	" " " " "
98	<100	trap inside	3	126	" " " hood sink
99	<100	drain inside	4	120	" " " " "
100	<100	hood sink basin	5	<100	" " " stairwell sink
22	<100	STAIRWELL WALL SINK BASIN	6	<100	" " " " "
23	<100	DRAIN INSIDE			
24	<100	TRAP INSIDE			BKM 1/29/04
25	<100	DRAIN INSIDE			
—	—	—			

COMMENTS Smears from sink basin and inside trap. Water sample from trap. Hood sink trap inaccessible, not disassembled but water sample and basin smear obtained.

Hood sink trap emptied to rad waste (~100 ml) and trap & drain surveyed 29 Jan 04. RWS 29 Jan 04

ID: C-14 CHECK 27 JAN 2004 16:0

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none	

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
B1	**-1	5.00 Blank	81.2 Average	22.80 DPM	18.73 for	23.78 14C :	95.88	1.03 23.78 COEF. OF	5.47 VAR:	0.000
1	**-3	5.00	128.3	111.40	8.47	94.81	93.93	6.85	11.13	-90
2	**-4	5.00	116.1	59.20	11.62	38.84	94.53	9.23	16.76	-91
3	**-5	5.00	124.5	88.40	9.51	70.13	94.13	4.42	22.38	-92
4	**-6	5.00	121.5	32.60	15.62	11.01	94.28	9.93	28.01	-93
5	**-7	5.00	120.1	36.60	14.78	15.01	94.35	8.09	33.62	-94
6	**-8	5.00	123.4	49.20	12.75	28.46	94.19	6.28	39.24	-95
MISSING SAMPLE										
11	**-1	5.00	105.8	53.00	12.29	32.02	94.98	18.95	45.07	-96
12	**-2	5.00	158.4	357.40	4.73	364.44	92.06	0.82	50.68	-97
13	**-3	5.00	149.9	86.00	9.64	69.04	92.65	5.10	56.31	-98
14	**-4	5.00	141.5	89.60	9.45	72.36	93.19	4.28	61.92	-99
15	**-5	5.00	106.3	39.20	14.29	17.50	94.96	12.10	67.57	-100
16	**-6	5.00	116.9	28.00	16.90	5.85	94.50	9.79	73.19	-22
17	**-7	5.00	210.3	38.00	14.51	22.37	82.34	8.52	78.82	-23
18	**-8	5.00	261.4	27.00	17.21	13.76	71.92	7.79	84.43	-24
19	**-9	5.00	221.7	32.00	15.81	16.13	80.18	11.82 *	90.06	-25

Radioactive Contamination Survey

Wipes LSC counted direct

Ecoscint Cocktail

BAM

1/28/04

ID:C-14 CHECK 27 JAN 2004 17:3

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME : 5.00

DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			[illegible]		

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: [illegible]

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: [illegible]

Quench Limits Low: 0.000 High:351.13

SAM NO	POS	TIME MIN	H#	14C DPM	14C %ERROR	14C DPM	14C EFF-1	[illegible] %	[illegible] TIME	
B1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24.55	94.48	2.47	5.49	
[illegible]	[illegible]	[illegible]	117.8	24.80	17.96	26.26	94.45	2.01	11.08	
		Blank Average		DPM for	14C :	25.41	COEF. OF VAR:		4.736	
1	**-4	5.00	106.9	28.60	16.72	4.72	94.94	1.98	16.68	WINDOW SINK
2	**-5	5.00	119.0	28.20	16.84	4.47	94.40	1.75	22.26	
3	**-6	5.00	135.5	142.00	7.51	126.40	93.54	0.86	27.87	HOOD SINK
4	**-7	5.00	134.3	137.00	7.64	120.94	93.61	0.98	33.47	
5	**-8	5.00	118.0	19.60	20.20	-4.65	94.45	2.61	39.06	STAIR WELL SINK
6	**-9	5.00	117.4	21.20	19.43	-2.97	94.47	2.61	44.66	

RADIO ACTIVE CONTAMINATION SURVEY

2 x 2mL ALIQ. PIP. 480

ECOSCINT COCKTAIL

BAM
1/28/04

ID: C-14 CHECK 28 JAN 2004 09:1
USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1
PRESET TIME : 5.00
DATA CALC : SL DPM H# :YES SAMPLE REPEATS: 1 PRINTER : ST
COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : OF
TWO PHASE : NO AQC : NO CYCLE REPEATS : 1
SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	81.1	22.20	18.98	23.15	95.88	1.29	5.49
		Blank Average		DPM for	14C :	23.15	COEF. OF VAR:		0.000
1	**-3	5.00	113.8	27.40	17.09	5.80	94.64	7.18	11.10-1
2	**-4	5.00	124.0	39.20	14.29	18.48	94.16	6.78	16.72-2
3	**-5	5.00	119.8	27.20	17.15	5.67	94.36	7.01	22.31-3
4	**-6	5.00	103.4	25.00	17.89	3.14	95.08	6.26	27.93-4

RADIOACTIVE CONTAMINATION SURVEY

WIPES LSC COUNTED DIRECT

ECOSCINT COCKTAIL

BM
11/28/04

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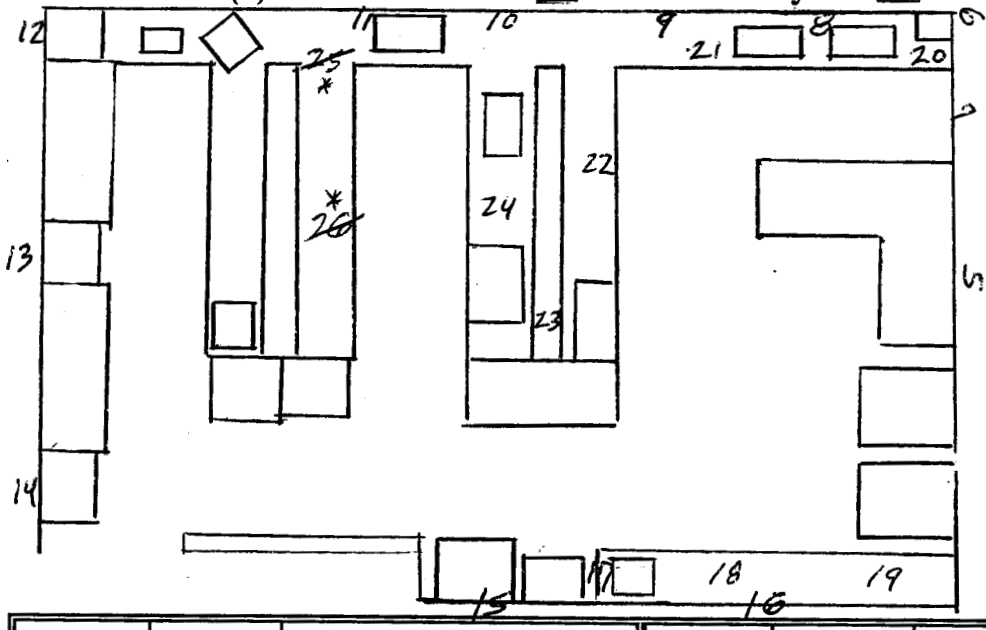
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Radiochem Lab, Building 2 **DATE** 1/28/04

SURVEYOR BRENT McCRACKEN

CONDITIONS B2-209

INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M X Ludlum 3___ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
5	<100	WALL	15	<100	WALL
6	<100	WALL	16	<100	WALL
7	<100	WINDOW	17	<100	DESKTOP
8	<100	WINDOW	18	<100	DESKTOP
9	<100	WALL	19	<100	DESKTOP
10	<100	WALL	20	<100	DESKTOP
11	<100	WINDOW	21	<100	DESKTOP
12	<100	WALL	22	<100	DESKTOP
13	<100	WALL	23	<100	DESKTOP
14	<100	WALL	24	<100	DESKTOP

COMMENTS GM SM SURVEY OKAY BAM 1/28/04
<100 NEPM

*(RE) BAM 1/28/04

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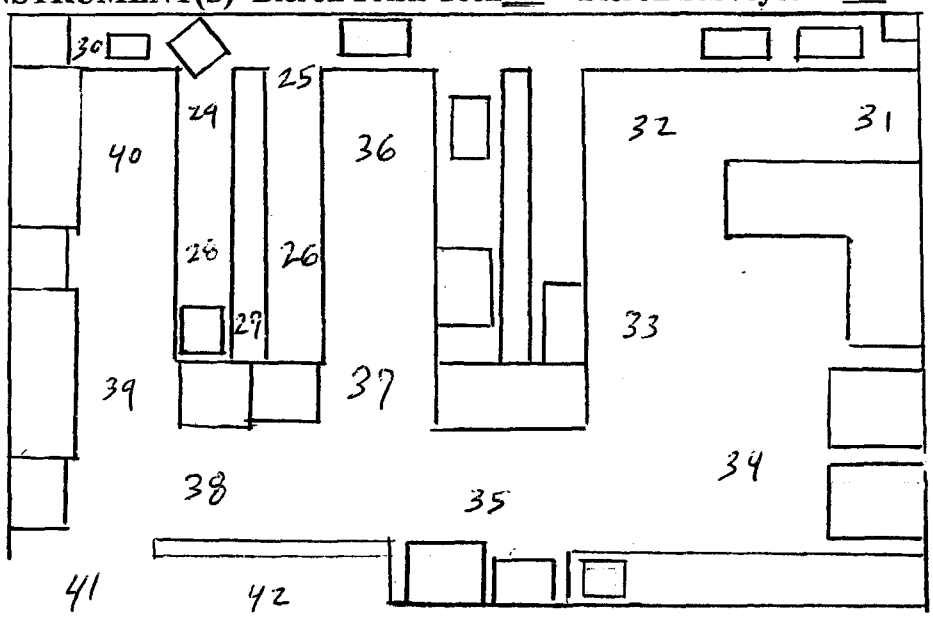
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Radiochem Lab, Building 2 **DATE** 1/29/04

SURVEYOR BRENT McCRACKEN

CONDITIONS B2-209

INSTRUMENT(S) Bicron Frisk-Tech__ Bicron Surveyor M X Ludlum 3__ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
25	<100	DESKTOP	35	<100	FLOOR
26	<100	DESKTOP	36	<100	FLOOR
27	<100	DESKTOP	37	<100	FLOOR
28	<100	DESKTOP	38	<100	FLOOR
29	<100	DESKTOP	39	<100	FLOOR
30	<100	DESKTOP	40	<100	FLOOR
31	<100	FLOOR	41	<100	FLOOR
32	<100	FLOOR	42	<100	FLOOR
33	<100	FLOOR	—	—	—
34	<100	FLOOR	—	—	—

COMMENTS GMSM SURVEY OKAY BRM 1/29/04
<100 NCPM.

ID: C-14 CHECK 28 JAN 2004 09:5

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST	
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none		

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00 Blank	80.7 Average	23.00 DPM for	18.65 14C :	23.98	95.89 23.98 COEF. OF VAR:	0.94	5.48 0.000
1	**-3	5.00	95.5	44.80	13.36	22.98	95.38	27.37	11.16-5
2	**-4	5.00	98.8	30.40	16.22	7.93	95.26	7.89	16.78-6
3	**-5	5.00	107.0	31.00	16.06	8.67	94.93	6.86	22.38-7
4	**-6	5.00	109.0	31.20	16.01	8.91	94.85	7.10	28.00-8
5	**-7	5.00	96.1	25.60	17.68	2.86	95.36	6.14	33.59-9
6	**-8	5.00	99.6	23.40	18.49	0.59	95.23	6.38	39.19-10
7	**-9	5.00	115.7	38.00	14.51	16.20	94.55	4.97	44.81-11
8	**-10	5.00	103.0	29.40	16.50	6.93	95.10	4.76	50.41-12
9	**-11	5.00	112.1	21.60	19.25	-1.18	94.72	5.89	56.01-13
10	**-12	5.00	97.3	26.80	17.28	4.13	95.31	5.83	61.63-14
11	**-1	5.00	104.4	23.00	18.65	0.22	95.04	4.95	67.32-15
12	**-2	5.00	101.9	20.60	19.71	-2.33	95.14	5.15	72.92-16
13	**-3	5.00	107.9	31.00	16.06	8.68	94.89	5.93	78.54-17
14	**-4	5.00	120.4	27.60	17.03	5.27	94.33	5.87	84.16-18
15	**-5	5.00	106.8	62.60	11.30	41.95	94.94	3.55	89.76-19
16	**-6	5.00	114.8	28.00	16.90	5.62	94.59	5.21	95.38-20
17	**-7	5.00	122.5	34.20	15.29	12.31	94.23	6.44	101.00-21
18	**-8	5.00	117.0	24.80	17.96	2.26	94.49	10.28	106.62-22
19	**-9	5.00	122.2	24.00	18.26	1.48	94.25	6.04	112.24-23
20	**-10	5.00	113.6	28.40	16.78	6.02	94.65	5.10	117.86-24
21	**-11	5.00	122.5	24.60	18.03	2.12	94.23	8.63	123.49-25
22	**-12	5.00	152.3	55.60	12.00	36.13	92.49	7.75	129.13-26
23	**-1	5.00	121.4	71.60	10.57	51.95	94.29	2.83	134.83-27
24	**-2	5.00	111.1	31.00	16.06	8.73	94.76	5.31	140.44-28
25	**-3	5.00	118.6	32.40	15.71	10.33	94.42	8.48	146.07-29
26	**-4	5.00	110.1	33.40	15.48	11.25	94.80	5.41	151.68-30
27	**-5	5.00	111.5	26.20	17.47	3.67	94.74	4.91	157.29-31
28	**-6	5.00	120.7	29.00	16.61	6.76	94.32	11.43	162.93-32
29	**-7	5.00	110.9	29.00	16.61	6.62	94.77	6.55	168.55-33
30	**-8	5.00	106.2	27.00	17.21	4.45	94.97	5.86	174.15-34
31	**-9	5.00	120.7	27.60	17.03	5.28	94.32	7.23	179.78-35
32	**-10	5.00	115.1	36.60	14.78	14.71	94.58	6.88	185.40-36
33	**-11	5.00	117.4	29.20	16.55	6.92	94.48	6.79	191.02-37
34	**-12	5.00	120.5	24.60	18.03	2.09	94.33	6.20	196.64-38
35	**-1	5.00	111.6	31.20	16.01	8.95	94.74	5.55	202.33-39
36	**-2	5.00	111.8	21.80	19.16	-0.97	94.73	5.46	207.94-40
37	**-3	5.00	122.8	21.60	19.25	-1.06	94.22	5.28	213.55-41
38	**-4	5.00	117.6	26.20	17.47	3.75	94.46	7.65	219.16-42

RADIOACTIVE CONTAMINATION SURVEY WIPES LSC COUNTED DIRECT ECOSCINT COCKT

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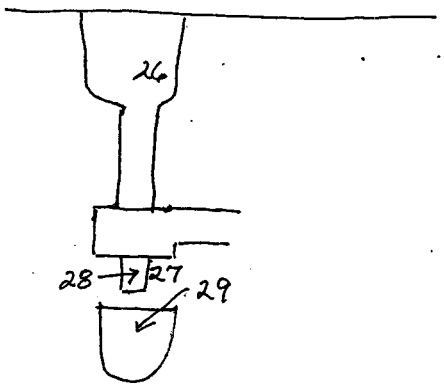
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Hood sink 2-209-A **DATE** 29 Jan 04
SURVEYOR R.W. Granlund
CONDITIONS Check of hood sink after emptying trap.
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**✓ **Ludlum 3**__ **LSC**✓



NO.	DPM	LOCATION	NO.	DPM	LOCATION
26	< 100	basin & top of drain			
27	< 100	drain outside			
28	< 100	" inside			
29	< 100	trap inside		RCell 29 Jan 04	
		RCell 29 Jan 04			

COMMENTS Towel wipes check w/GMSM Ck.
Trap contents (~100 ml) had assay of 120 dpm/2 ml (see survey of 27 Jan 04. Trap emptied and drain & trap rechecked.

ID:C-14 CHECK 29 JAN 2004 15:4

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00								
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	: OF
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME
B1	**-1	5.00	81.2	24.20	18.18	25.24	95.88	2.86	5.50
		Blank Average		DPM for 14C :		25.24	COEF. OF VAR:		0.000
1	**-3	5.00	102.6	37.00	14.70	13.66	95.11	12.08	11.15
2	**-4	5.00	100.6	22.40	18.90	-1.71	95.19	9.88	16.75
3	**-5	5.00	100.9	23.80	18.33	-0.23	95.18	6.28	22.36
4	**-6	5.00	100.9	24.00	18.26	-0.03	95.18	7.82	27.96

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RADIOACTIVE CONTAMINATION SURVEY

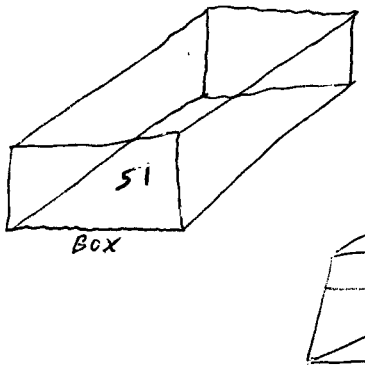
LOCATION B2-209 TO B1-101 **DATE** 2/20/04

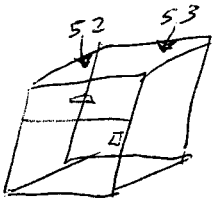
SURVEYOR BRENT McCRACKEN

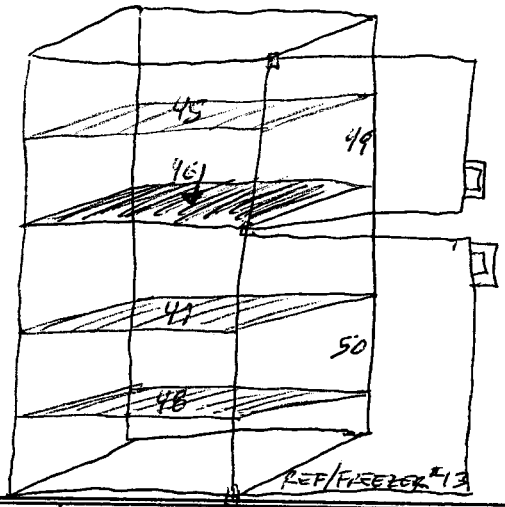
CONDITIONS MOVE REF/FREEZER #13 FROM B2-209 TO B1-101

INSTRUMENT(S) Bicron Frisk-Tech___ **Bicron Surveyor M**X **Ludlum 3**___ **LSC**X

ALL STANDARDS AND SAMPLES REMOVED FROM UNIT AND PLACED INTO A BOX, BOX TRANSFERED FROM B2-209 TO B1-101 AND STANDARDS AND SAMPLES PLACED BACK INTO UNIT.







NO.	DPM	LOCATION	NO.	DPM	LOCATION
45	<100	FREEZER SHELF	52*	<100	DESKTOP
46	<100	FREEZER BOTTOM	53*	<100	DESKTOP
47	<100	REF. SHELF			
48	<100	REF. SHELF			
49	<100	FREEZER INSIDE DOOR			
50	<100	REF. INSIDE DOOR			
51	<100	INSIDE BOX			
		BAM 2/20/04			

BAM 2/20/04

COMMENTS GMSM SURVEY OKAY BAM 2/20/04

* NO. 52/53 WERE RUN ON 2/23/04, BAM 2/23/04

ID: C-14 CHECK 20 FEB 2004 16:C

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST	
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:			none		

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
B1	**-1	5.00	78.2	37.80	14.55	39.39	95.97	0.82	5.48	
		Blank Average		DPM for 14C :		39.39	COEF. OF VAR:		0.000	
1	**-3	5.00	102.3	43.80	13.51	6.66	95.12	10.11	11.12	-45
2	**-4	5.00	104.0	40.80	14.00	3.54	95.06	6.97	16.72	-46
3	**-5	5.00	97.7	37.20	14.66	-0.35	95.30	7.92	22.32	-47
4	**-6	5.00	103.9	25.60	17.68	-12.46	95.06	9.62	27.94	-48
5	**-7	5.00	100.8	26.40	17.41	-11.65	95.18	7.87	33.54	-49
6	**-8	5.00	104.7	26.00	17.54	-12.03	95.03	8.50	39.17	-50
7	**-9	5.00	105.8	34.20	15.29	-3.38	94.98	10.32	44.79	-51

RADIOACTIVE CONTAMINATION SURVEY

REF./FREEZER #13 MOVE FROM B2-209 TO B1-101

WIPES DIRECT LSC COUNTED

ECOSCINT COCKTAIL

2/20/04

ID:C-14 CHECK 23 FEB 2004 17:2

USER: 1 COMMENT:14C PERFORMANCE CHECK LSC1

PRESET TIME :	5.00						
DATA CALC :	SL DPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	: ST	
COUNT BLANK :	YES	IC# : NO	REPLICATES :	1	RS232	: OF	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:					

ISOTOPE 1: 14C %ERROR: 0.50 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 0.000 High:331.13

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	
B1	**-1	5.00	85.4	37.40	14.63	39.07	95.74	4.31	5.51	
		Blank Average		DPM for 14C :		39.07	COEF. OF VAR:		0.000	
1	**-3	5.00	102.0	46.60	13.10	9.92	95.14	19.08	11.18	-52
2	**-4	5.00	101.1	46.20	13.16	9.48	95.17	12.30	16.81	-53

Radioactive Contamination Survey

Ref. Freezer #13 Move from B2-209 to B1-101

Wipes Perfect LSC counted

Ecoscint Cocktail

BAM

2/23/04

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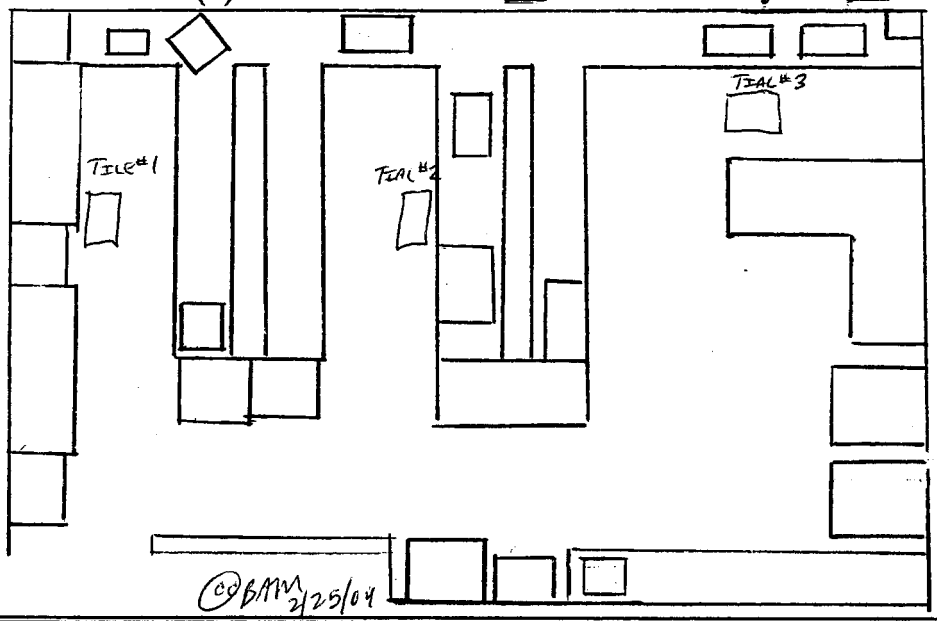
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Radiochem Lab, Building 2 **DATE** 2/25/04

SURVEYOR BRENT McCRACKEN

CONDITIONS CEILING TILE

INSTRUMENT(S) Bicron Frisk-Tech__ Bicron Surveyor M X Ludlum 3__ LSC__



NO.	~~DPM~~ N-cpm	LOCATION	NO.	DPM	LOCATION
1	<100	TILE #1			
2	<100	TILE #2			
3	<100	TILE #3			
		BAM 2/25/04			BAM 2/25/04

COMMENTS GMSM SURVEY OKAY. BAM 2/25/04
<100 N-cpm

Attachment C

Closeout Survey
Environmental Fate Laboratory
Building 3

EXYGEN RESEARCH INC.
Closeout Survey
Building 3

Summary
Building 3 of Exygen research was used for the incubation and storage of samples containing ^{14}C. It is planned that the building will sold and ownership transferred on or about 31 Aug 03. No contamination was detected in the routine surveys conducted while ^{14}C was used in the environmental chambers. All licensed material was removed from the building and a closeout survey was performed to determine whether there was any ^{14}C contamination left in the building. The interior of the complete building was included in the survey, with emphasis on the locations of the environmental chambers where ^{14}C was used and the freezer where ^{14}C samples were stored. No contamination was detected and the building can be released without any restrictions on use because of radioactive material.

Introduction
Exygen Research (formerly Centre Analytical Laboratories) was issued byproduct material license number 37-30095-01 on 28 Feb 94. The license allowed the use of ^{3}H, ^{14}C, ^{32}P and ^{35}S in the radioisotope laboratory located in the building (Building 1) at 3048 Research Drive, State College, PA. Amendment number 2, which was issued on 10 Oct 96 added Building 2 at 3058 Research Drive to the license and allowed the radioisotope laboratory to be moved to the second floor of Building 2. Amendment number 5 was issued on 12 Mar 02 and added Building 3 at 3117 Research Drive to the license. The use of radioactive material in building 3 was limited to 1 mCi of ^{14}C in samples maintained in environmental chambers. The large walk-in freezer in Building 3 was also used for the storage of samples that had been processed and were being held until the client(s) accepted the study report gave permission to dispose of the samples. The environmental chambers and the work areas around them were subject to the same requirements for surveys as the radiochemistry laboratory when radioactive material was in use. Building 3 also housed the receiving department for Exygen, including the receipt of radioisotope shipments. Radioisotope shipments were delivered to the radioisotope laboratory for opening. The receiving department was moved back to Building 1 in November 2002.

It is planned that Building 3 will be sold by Exygen Research on or about 31 Aug 03. This survey was made to document that all licensed radioactive material has been removed from the building and that there is no residual radioactive contamination.

Disposition of Licensed Material
The use of the environmental chambers in building 3 was terminated in November 2002. The chambers and samples were transferred to the radioisotope laboratory in Building 2, where they are still in use. The remaining licensed material in Building 3, the samples that were stored in the walk-in freezer, was transferred to a freezer in Building 1 on about 15 Jul 03.

Radiation Survey
The only licensed material used in Building 3 was ^{14}C, which does not produce an external radiation hazard. No specific measurements for external dose rates were made as part of this survey. However, the survey for surface contamination with a pancake GM probe indicated no radiation levels above the normal background level.

Contamination Survey
A survey for fixed and removable radioactive contamination was conducted in Building 3 on 17 Jul 03. All areas in the building were checked with a Geiger Mueller Survey Meter with a 2-inch pancake probe. Paper smears, assayed by liquid scintillation counting were used to check for removable contamination. Spot checks were made in all the rooms. The locations of the environmental chambers and the storage area for samples in the walk-in freezer were checked in more detail. There was no indication of contamination, either fixed or removable with the GMSM survey or the smears.

The surveys included the accessible portions of floor drains. The environmental chambers have drains for condensation that were routed to the floor drain with flexible plastic tubing. The environmental chambers were operated above room temperature and no condensation from volatile ^{14}C compounds was expected. The samples in the chambers were also connected to a gas collection system which continuously purged the gas from the samples and trapped $^{14}CO_2$ to measure the breakdown of the materials under test. No contamination was found in or near the floor drain in this survey or in the routine surveys when the environmental chambers were in use.

The walk-in freezer used for storage of samples in Building 3 is a closed unit with no ventilation. Air is blown over two sets of cooling coils inside the chamber by fans. The coils have a defrost cycle to remove frost. The catch pans for the defrost water drain to the outside of the building through 3/4" copper/plastic drains. Smears were taken from the inside of the exit ends of the drain pipes outside the building (the only accessible location without cutting open the pipes) to check for any contamination from condensation of volatile ^{14}C compounds. No ^{14}C was detectable in either of the drain pipe smears. One smear had an activity of about 70 dpm in the ^{14}C channel of the Liquid Scintillation Counter, but an 800-minute beta spectrum of the sample also indicated energies higher than ^{14}C and the spectrum was not distinguishable from background. The activity is attributed to natural activity in the buildup of dirt inside the pipe.

Instrumentation
The portable survey meter used in the survey was a Bicron Surveyor M, S/N B426K with a Bicron PGM probe S/N B107N calibrated on 27 Feb 03. The efficiency of the pancake probe on contact with a surface is 0.13 c/beta, as determined with a 45-mm plated ^{99}Tc source. Background is typically 25-30 cpm. The liquid scintillation counter used to count smears was a Beckman LS6500. This instrument has an internal quench correction program and is checked daily with a factory ^{14}C standard and is calibrated annually under the Exygen QA program with the same standard. Smears were counted on 17 Jul 03 for 5 minutes each with 2 vials with blank smears used for background. The sample set was recounted on 18 Jul 03 for 30 minutes each

(MDA estimate is 4.3 dpm). The activity on all paper smears was well below 100 dpm limit for removable contamination. The highest value was 11 dpm. The cloth smears were also counted using the Beckman LS6500.

Attachments
The contamination survey forms are attached.

Prepared by: _____ Date: 8 Aug 03
Rodger W. Granlund
Radiation Safety Officer

\Exygen\Closeout survey 28 Jul 03/RWG

Jul 03 RWG 29 Jul 03

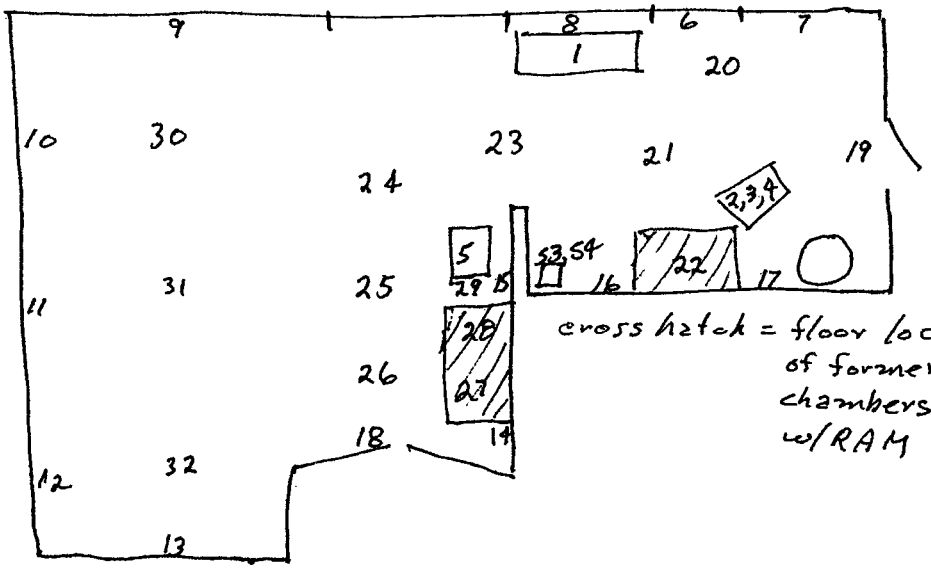
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Exygen Bldg 3 (room outside freezer) **DATE** 17 Jan 03

SURVEYOR R. W. Grandlund

CONDITIONS Closeout survey, no RAM in building

INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** x **LSC** ___ **Ludlum-3** ___



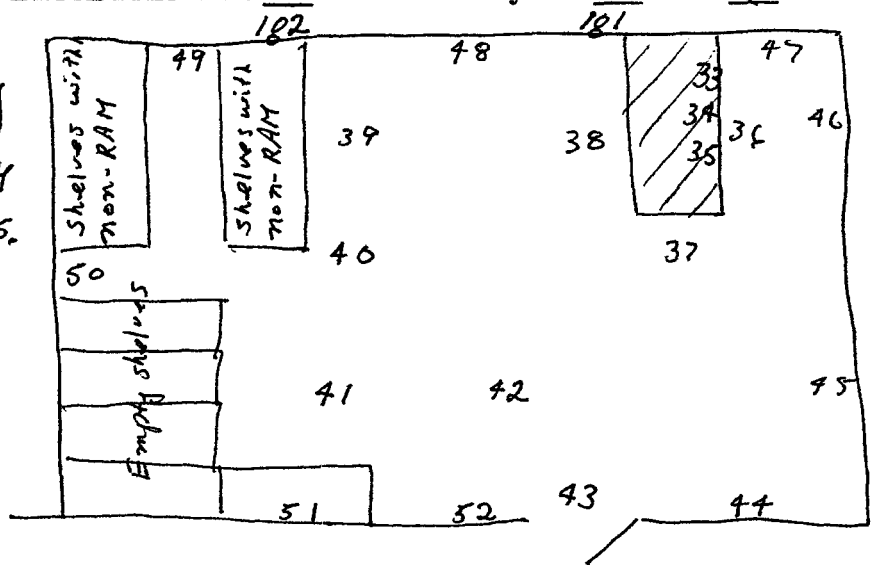
NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	table	54	< 10	floor drain - inside
2	< 10	cart top shelf			
3	< 10	" bottom "			
4	< 10	" trays			
5	< 10	cart			
6	< 10	freezer door			RWG 8 Jul 03
7-17	< 10	walls			
18	< 10	doors			
19-32	< 10	floor			
53	< 10	floor drain top			

COMMENTS GMSM survey - no detectable contamination

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Exygen Bldg. 3 (-20°C freezer room) **DATE** 17 Jul 03
SURVEYOR R.W. Granlund
CONDITIONS Close out survey, No RAM in building Freezer #8
INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** X **LSC** X **Ludlum-3** ___

Crosshatch = only shelf used for storage of RAM samples in boxes.

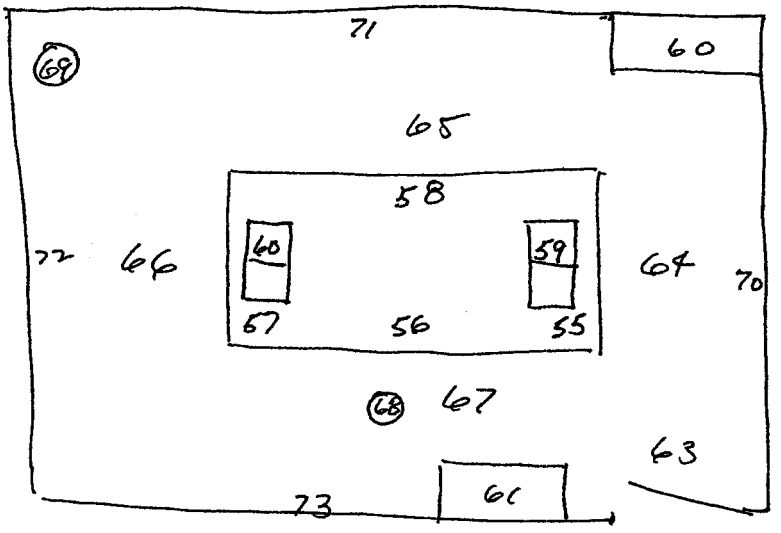


NO.	DPM	LOCATION	NO.	DPM	LOCATION
33	11	Shelf 1, 2			
34	< 10	" 3, 4			
35	< 10	" 5 (bottom)			
36-43	< 10	floor			
44-52	< 10	walls			RWG 8 Aug 03
101	70	drain - inside pipe			
102	< 10	" " "			
		RWG			
		8 Aug 03			

COMMENTS GeMSM survey - no detectable contamination #101 & #102 Cloth smears from inside end of condensate drains for freezer coils outside the building on 16 Jul 03

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Exygen Bldg 3- West Lab #105 **DATE** 17 Jul 03
SURVEYOR R.W. Granlund
CONDITIONS Closeout survey - no RAM in building
INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor MX** √ **LSC** X **Ludlum-3** ___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
55-58	<100*	bench top			
59, 60	<100*	sinks			
~~60, 62~~ 61, 62	<100*	desks			
63-67	<100*	floor			
68, 69	<100*	drains			
70-73	<100*	walls			

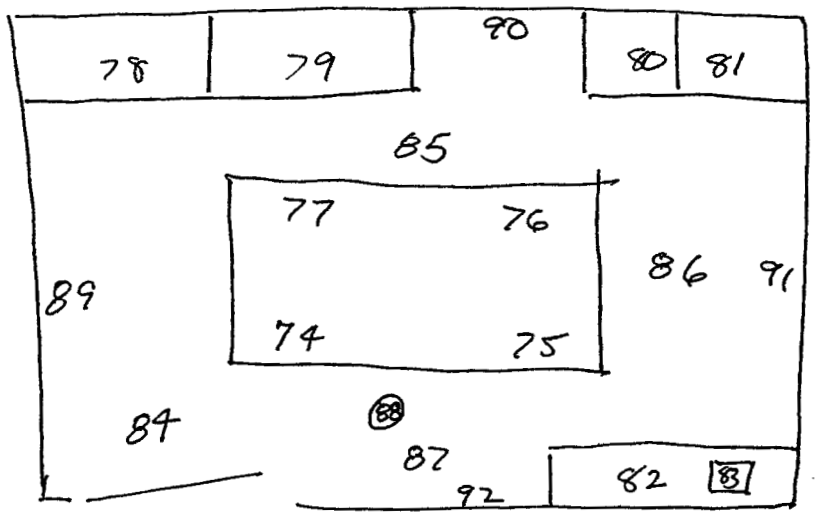
RWG 8 Aug 03

RWG 8 Aug 03

COMMENTS GMSM survey - no detectable contamination
Ceramic tile floor background elevated
*<10 incorrect entry RWG 8 Aug 03

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Exygen Bldg 3 - East lab - no RAM use=106 **DATE** 17 Jul 03
SURVEYOR R.W. Grandlund
CONDITIONS Closeout survey, no RAM in building
INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** XV **LSC** X **Ludlum-3** ___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
79-82	< 10	bench tops			
83	< 10	sink			
84-87	< 10	floor			
88	< 10	drain			
89-92	< 10	walls			

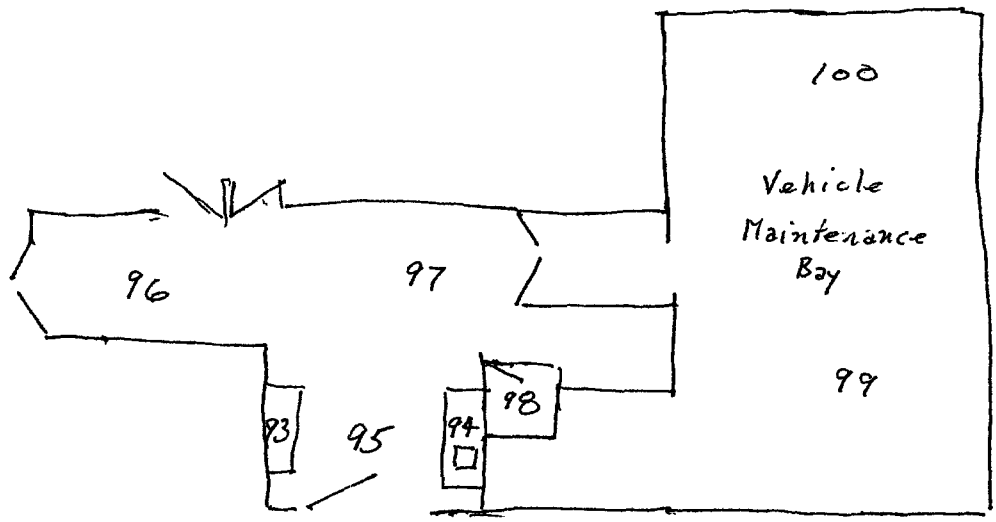
RWG 8 Aug 03 ✓

RWG 5 Aug ✓03

COMMENTS GMSM survey - no detectable contamination
Ceramic tile floor background elevated

RADIOACTIVE CONTAMINATION SURVEY

LOCATION Exygen Bldg 3, Entrance + hallway **DATE** 17 Jul 03
SURVEYOR R.W. Granlund
CONDITIONS closeout survey, no RAM in building
INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** X **LSC** X **Ludlum-3** ___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
93	< 10	Table			
94	< 10	countertop/sink			
95-97	< 10	floor - hallway			
98	< 10	" restroom			
99, 100	< 10	" garage			
					KCG 8 Aug 03
		KCG 5 Aug 03			

COMMENTS GM5M survey - no detectable contamination

Attachment D

Closeout Survey
Radioisotope Laboratory
Room 101, Building 1

Closeout Survey
Radioisotope Laboratory
Room 101, Building 1
MPI Research, State College, PA

SUMMARY

The Radioisotope Laboratory in room 1-101 has been decommissioned. All radioactive material, except the general license sources in the liquid scintillation counters and exempt quantity calibration sources for the pancake GM counters, has been disposed as radioactive waste. The survey included the work surfaces, cabinets, drawers, floor, walls, ceiling, sink drains, hood, refrigerator/freezers, and all other equipment used or stored in the room.

Work surfaces and other flat surfaces were surveyed with a Ludlum 2360 ratemeter/scaler and a Ludlum 43-89 100 cm^2 detector. Smaller areas and equipment surfaces, not accessible to the Ludlum 43-89 probe, were checked with a Ludlum 3 ratemeter and Ludlum 44-9 thin end-window detector. Paper smears counted with a liquid scintillation counter were used to check for removable contamination. The MDA for smears from a 100 cm^2 area and counted for 30 minutes was 5 dpm. The MDA for the Ludlum 43-89 detector was 2320 dpm/100 cm^2 or 1370 dpm/100 cm^2 if the scaler function was used to integrate counts during the survey. The MDA for the pancake GM detectors was 8,000 dpm/100 cm^2 to 16,000 dpm/100 cm^2 .These MDA's are all well below the limit of 3.7E+6 dpm/100 cm^2 for unrestricted release of building surfaces.

After decommissioning, accessible building and equipment surfaces had less than 10 dpm/100 cm^2 of removable contamination and no detectable contamination with survey meters. These values are well below the limits for unrestricted release and room 1-101 can be returned to normal use without restrictions.

INTRODUCTION

The Radioisotope Laboratory was moved from room 209 of Building 2 to room 101 of Building 1 in February 2004. Tritiated compounds were stored in the lab and some assays of samples containing tritium were performed, but the inventory did not exceed 0.51 mCi and no work with more than a few microcuries was performed. One project in 2005 involved a total of 15 mCi of ^{14}C and resulted in minor contamination (<1000 dpm/100 cm^2) of some work surfaces and equipment. All areas were cleaned to less than 100 dpm/100 cm^2 at the completion of the work. All other work was with microcurie amounts and there was essentially no contamination. In the routine weekly surveys of the laboratory in 2004-2006, only about 3 smears of the floor and uncovered bench tops exceeded 100 dpm/100 cm^2.

RELEASE LIMITS

The guidelines published by the NRC in Regulatory Guide 1.86 in 1974 (NRC 1974) and in 1993 (NRC 1993) were used as the contamination limits for previous closeout surveys. For ^{14}C the values were 5,000 dpm/100 cm^2 averaged over up to 1 m^2, 15,000 dpm/100 cm^2 maximum for up to 100 cm^2, and 1,000 dpm/100 cm^2 for removable contamination. The current limits for building surface contamination published by the NRC in NUREG 1757 (NRC 2006) are based on specific radionuclides and the value for ^{14}C is 3.7E+6

dpm/100 cm^2. This value assumes 10% of the activity is removable and is based on a dose limit of 25 mrem/year for building occupants.

SURVEY METHOD

Routine daily surveys when unsealed radioactive material was handled included a direct survey of the work surface with a thin-window pancake GM detector and wipes of the work surface, also checked with the thin-window pancake GM detector. The radioisotope user also checked hands, shoes and clothing with the GM detector. Routine weekly surveys included a direct survey with a thin-window pancake GM detector and smears of the floor and work surfaces. The 4 cm diameter paper smears were counted with either a thin-window GM detector and scaler or with a liquid scintillation counter. Styrofoam smears counted in the liquid scintillation counter were also used in some surveys.

For this survey paper smears were counted using a Beckman LS 6500 liquid scintillation counter to improve the MDA (minimum detectable activity). Surfaces were also surveyed with a Ludlum 43-89 alpha-beta probe. This probe has a thin ZnS alpha scintillator backed by a plastic beta scintillator. The probe was operated in the beta-only mode with a Ludlum 2360 ratemeter. More than 90% of the area of bench tops, cabinet exteriors and interiors and drawer exteriors and interiors were surveyed with this instrument. Equipment was surveyed with a thin-window pancake GM tube and smears before release.

CALIBRATION

The Beckman LS 6500 liquid scintillation counter was calibrated with factory ^{14}C and ^{3}H standards. The factory-installed quench curves and the external source quench factor were used to provide the quench correction for individual samples. The detection efficiency for ^{14}C on smears with this counter is typically about 93%.

The portable Ludlum model 3 with Ludlum 44-9 pancake GM probe and the Bicron Surveyor with Bicron PGM pancake probe were routinely calibrated for beta detection efficiency with an Eberline electroplated ^{99}Tc disc source. The Bicron frisk-tech scaler with the Bicron LPGM lead-shielded pancake detector used for smear counting was also routinely calibrated with the Eberline electroplated ^{99}Tc disc source. The detection efficiency for ^{99}Tc beta radiation with these counters was 11% to 14% at the last calibration in July 2007.

For this survey the detectors were calibrated with ^{14}C sources to achieve a more accurate efficiency for ^{14}C surface contamination. Two^{14}C disc sources were prepared using ^{14}C glucose solution that had been standardized using the liquid scintillation counter. The sources were prepared by depositing the same number of 10 ul aliquots of solution on several equal-area annular rings to simulate a uniform deposit. The 4.75 diameter discs had an active diameter of 4.4 cm. The discs were made of heavy paper with the annular rings marked on the paper and topped with a transparent adhesive plastic film. The solution was deposited on the film and evaporated at low temperature to produce a simulated uniform deposit of ^{14}C without self-absorption. The detection efficiencies of the Ludlum 3/44-9, Bicron Surveyor M/PGM and Ludlum 2360/43-89 survey meters for ^{14}C surface contamination determined with these sources were 5.3% to 6.5%.

DETECTION LIMITS

Most smears were counted for 30 minute periods in the liquid scintillation counter. A blank smear was used for the background count, which was typically 25-30 cpm. This equates to a standard deviation (σ) of 1 cpm or 1.1 dpm. The MDA ($4.66*\sigma_{bkg}$) for smears assayed with liquid scintillation counting is 5 dpm. The Bicron frisk-tech has an efficiency of 4.5% for ^{14}C on smears and a background of about 30 cpm. Routine smears counted for 1 minute have a standard deviation of 5.5 cpm or 120 dpm and a MDA of 570 dpm. Therefore, to achieve the lowest MDA for this survey the liquid scintillation counter was used with a 30 minute count time to assay smears.

For surveys with the portable survey meters, changes in the audible count rate are used to detect contamination on surfaces. A change in count rate to 2-3 times the average background is usually detectable. The background for the Ludlum and Bicron pancake GM meters was about 60 cpm, so an increase of 60-120 cpm is assumed to be detectable. For a detector area of 15 cm^2 and a ^{14}C detection efficiency of 5%, this corresponds to a MDA of 1200-2400 dpm or 8,000-16,000 dpm/100 cm^2.

The background for the Ludlum 2360/43-89 survey meter was 270 cpm and in increase to 400 cpm was detectable. For a detector area of 100 cm^2 and a ^{14}C efficiency of 5.6% this corresponds to a MDA of 2320 dpm or 2320 dpm/100 cm^2. In addition to an analog ratemeter, the Ludlum 2360 is equipped with a digital scaler that was used to integrate the counts for 1-minute periods during the scans. This provided the average count rate for the surface scanned during the 1-minute period. The MDA is the same as for a 1-minute count with a background of 270 cpm, which is 1,370 dpm. The average area scanned with the Ludlum 43-89 probe in one minute was 4,500 cm^2, giving a MDA of 1,370 dpm/100 cm^2 averaged over 4,500 cm^2. Using the scaler function during the scans reduced the detection limit for the Ludlum 2360/43-89 survey meter and that survey meter was used to survey all building surfaces. The smaller pancake GM detectors were used to survey the irregular surfaces of equipment.

RESULTS

The results of the surveys are described below. The 73 pages of survey records are attached to this report.

Bench top work surfaces

The results for the surveys of the bench top work surfaces are on pages 58-60 of the surveys. Only one smear (11 dpm) exceeded 10 dpm. No contamination was detected in the scan with the Ludlum 2360/43-89 survey meter.

Sinks

Room 101 contains two sinks. The small sink on the south wall is the one routinely used. The larger sink at the end of the counter island was rarely used. Samples of the water in the traps of both sinks were collected and 1-ml aliquots were assayed on 31 Aug 07 (page 37). Both samples were less than background with a MDC of 2E-6 microcuries/ml. The sink on the south wall was used after that date for washing equipment used in the preparation of liquid waste for disposal. Therefore, samples were collected from the surface and bottom of the

trap for the south wall sink on 4 Oct 07 and 2-ml aliquots of the samples were assayed (page 60). The results were 1.1E-6 microcuries/ml and 1.6E-6 microcuries/ml respectively, with a MDC of 2E-7 microcuries/ml. This is less than 1% of the sewer release concentration for ^{14}C and indicates only minor contamination in the sink trap, which would be expected to have the highest contamination in the plumbing. Therefore, no attempt was made to disassemble and survey the interior of any plumbing.

Floor

The floor of room 1-101 was surveyed on 10 and 11 Oct 07 after all other areas had been cleaned and surveyed (page 62-64). Two smears (35 dpm and 32 dpm) of 37 exceeded 10 dpm. After cleaning, smears from this area were also less than 10 dpm. Each of the floor smears covered a single 1 ft^2 tile, so the results were less than 10 dpm/930 cm^2. In addition to smears, 11 areas of about 10 ft^2each were scanned with the Ludlum 2360/43-89 survey meter. There was no detectable contamination in these scans. Smears from the hallway between the building entrance and room 101 were also less than 10 dpm.

Walls

Thirty-five smears were taken of the wall surfaces (page 52-54), with more attention to the areas on the west wall behind the radioisotope lab bench and hood, the south wall behind the sink, and the east wall where an experiment using millicuries amounts of ^{14}C was conducted. The windows and shades behind the hood exhaust were also surveyed. About 160 ft^2 of those areas were also surveyed with the Ludlum 2360/43-89 survey meter. All smears were less than 10 dpm and there was no detectable contamination with the survey meter scan.

Ceiling

The suspended ceiling is made up of 2'x2' acoustic tile with 12 2'x4' fluorescent light diffuser panels. Smears taken from 5 of the diffuser panels and 4 tiles were all less than 10 dpm. There was no detectable contamination on the five diffuser panels and 9 tiles that were scanned with the Ludlum 2360/43-89 survey meter. However, the background of the tiles with the survey meter was about 130 cpm greater than for the rest of the room. This was determined by gamma spectroscopy to be from ^{232}Th in the tile. The tiles that were surveyed included those directly above the exhaust port for the portable hood.

Hoods

A portable hood was located on the radioisotope bench along the west wall of the lab. The hood was equipped with an activated carbon filter and a fiber prefilter. The carbon from the filter was assayed by combusting samples in the biological oxidizer and counting with the liquid scintillation counter. Two carbon filters were used in the hood during the time radioactive material was used in room 1-101. The filter removed on 8 Apr 05 contained 0.36 microcuries and the filter removed on 17 Jul 07 contained 38.6 microcuries. The higher activity in the second filter is attributed to the opening of a vial of ^{14}C-formic acid in the hood in June 2005. The activated carbon was included in the radioactive waste shipment of 3 Oct 07. The hood was disassembled and surveyed with smears and a pancake GM detector (page 17). No contamination was detected with the GM

survey meter but, three of the 20 smears had detectable contamination (12-23 dpm). After cleaning the contaminated area all smears were less than 10 dpm. The hood was released for unrestricted use.

In May and June 2005 the hood in room 111 of Building 2 was used for the synthesis of ^{14}C compounds, because the hood room 101 of Building 1 was not large enough to accommodate the apparatus. A total of about 3.2 mCi of ^{14}C was used in three syntheses. The glassware used for the syntheses was vented through a LN_2 trap to catch any volatile ^{14}C compounds. The hood, other work areas in the room and the equipment were cleaned and surveyed after each use. All accessible areas and equipment items had <100 dpm/100 cm2 removable contamination after cleaning. The hood was not disassembled, but contamination levels at the air exhaust slots at the back of the hood were well below the limit for unrestricted release of building surfaces. Copies of the hood surveys are included as pages 67-72 of the attached surveys.

In August-October 2006 hoods 2-305-A and 2-305-B were used for some extractions of samples with microcuries quantities of ^{14}C. No volatile ^{14}C compounds were involved and the assay of the extraction waste indicated the total activity in the samples was less than 1 microcurie. Routine weekly smear and GMSM surveys of the hoods did not detect any contamination. The final survey was done on 5 Oct 06 and is included as page 73 of the attached surveys.

Refrigerators and freezers

Room 1-101 contained two combination refrigerator/freezers that were used for the storage of radioactive standards and samples. The freezers were emptied, cleaned and checked with smears and a pancake GM survey meter (page 14-16). There was no detectable contamination on the smears or with the pancake GM survey for either unit. The smears were counted for both ^{14}C and ^{3}H. A smear used to absorb some condensate water on the floor under refrigerator/freezer #13 indicated 18 dpm ^{3}H. This was not considered significant because there was no indication of any contamination inside the refrigerator/freezer. The refrigerator/freezers were no longer needed and were released for disposal as municipal waste.

Walk-in freezer #10 had been used to store some samples containing ^{14}C and routine surveys did not indicate any contamination. Smear samples taken from the floor and shelves inside the freezer and the floor outside the freezer were all less than 10 dpm (page 64). The low-temperature freezer #35 had also been used for some storage of ^{14}C samples. Frost from this freezer was thawed and a 2 ml aliquot had 28 dpm ^{3}H (page 64). This was suspected to be cross contamination of the sample container so another sample of frost was removed from the freezer on 18 Oct 07. Duplicate 2 ml aliquots of this sample indicated no contamination (MDA=1.3 dpm ^{3}H, 4.0 dpm ^{14}C) and no further action was deemed necessary.

Equipment

Room 101 contained a great deal of equipment that had been used in radioisotope experiments including 2 liquid scintillation counters, 2 biological oxidizers, 2 TLC plate scanners and 2 HPLC units with Beta-Ram detectors. A large amount

of other TLC equipment was stored in the room. All the equipment was surveyed with smears and a pancake GM survey meter. Equipment that showed no detectable contamination with the pancake GM survey and had smears of less than 10 dpm was released for unrestricted use. Items that could not be readily decontaminated were disposed as radioactive waste. The surveys of equipment are contained in pages 1-13, 19-36, 50, 51, 61, 65, and 66. All equipment except the two liquid scintillation counters, the pancake GM meters and the office equipment used in preparing this report has been removed from room 1-101. The two Beckman LS 6500 liquid scintillation counters were surveyed (page 61) and will be transferred to the MPI laboratories at Mattawan, MI. The transfer of the ^{137}Cs sources in the liquid scintillation counters will be handled by a Beckman service representative.

Prepared by: Rodger W. Granlund 14 Nov 07

Rodger W. Granlund, CHP
Radiation Safety Officer

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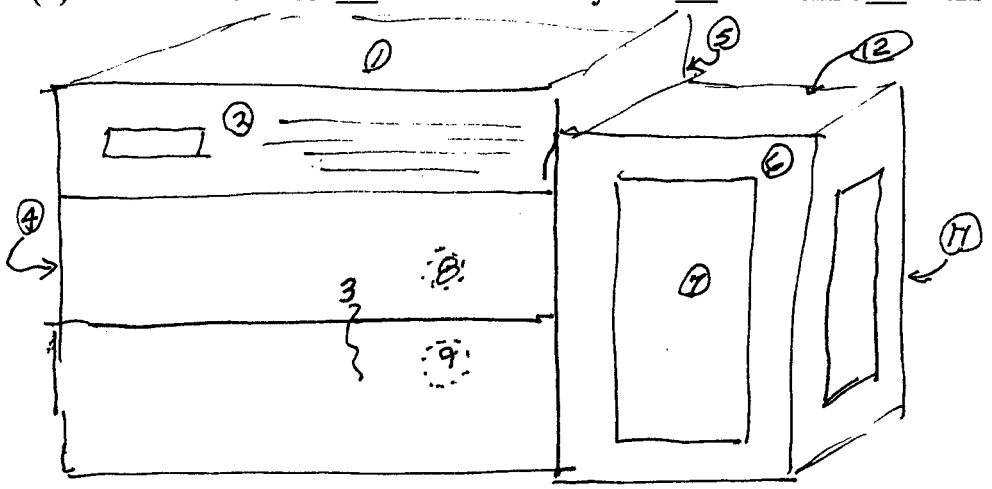
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 25 Jun 07
SURVEYOR R. Granlund
CONDITIONS Release survey for TLC Plate Scanners
INSTRUMENT(S) Bicron Frisk-Tech ___ Bicron Surveyor M ✓ Ludlum 3 ___ LSC ✓



AMBIS 4000 TLC Plate scanner

	Scanner 1			Scanner 2	
NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	80	Top	1	< 10	top
2	60	Front panels	2	< 10	front panels
3	70	" "	3	< 10	front panel
4	< 10	Side panel	4	< 10	side panel
5	< 10	rear panel	5	< 10	rear panel
6	150	plate loader outside	6	< 10	plate loader outside
7	70	" " inside	7	< 10	" " inside
8	< 10	Detector chamber & window	8	< 10	Detector chamber & window
9	< 10	Plate holder	9	< 10	Plate holder
10	< 10	collimator plate	10	< 10	collimator plate
11	< 10	side cover (removed)	11	< 10	side cover (removed)
12	<10	top & front cover (removed)	12	< 10	top & front cover (removed)

COMMENTS GMSM survey - no contamination detected
Clean ✓ Scanner #1 and resurvey (RWG 27 Jun 07)
Scanner #2 approved for release ✓

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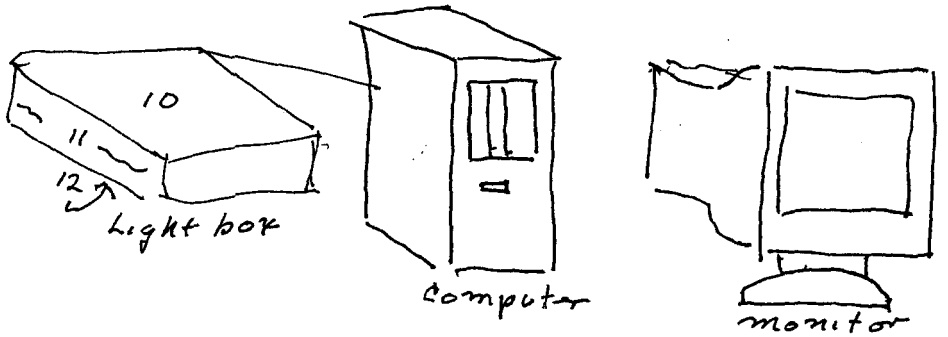
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 27 Jun 07
SURVEYOR R. Gronlund
CONDITIONS Equipment release survey
INSTRUMENT(S) Bicron Frisk-Tech__ Bicron Surveyor M X Ludlum 3__ LSC X



Scanner #1 see p. 1 #1-B-7-B

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1-B	< 10	Top	11-B	< 10	sides light box
2-B	< 10	front panel	12-B	< 10	bottom " "
3-B	< 10	front panel	13-B	< 10	computer AMBUS / top
4-B	< 10	side panel	14-B	< 10	sides
5-B	< 10	rear panel	15-B	< 10	front
6-B	< 10	plate loader-outside	16-B	< 10	rear + base
7-B	< 10	" " -inside	17-B	< 10	monitor-2439-front
8-B	< 10	Bottom #1	18-B	< 10	Top
9-B	< 10	" #2	19-B	< 10	sides
10-B	< 10	top Porta-Trace / Lightbox	20-B	< 10	rear + base

COMMENTS GMSM survey - no detectable contamination (monitor face ~100 cpm, probably K-40 in glass).
Smears 1-B through 7-B from scanner 1 after cleaning

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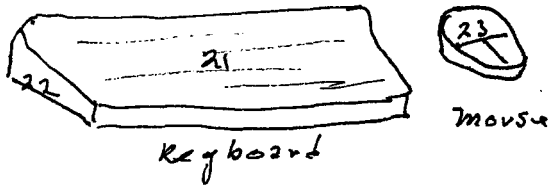
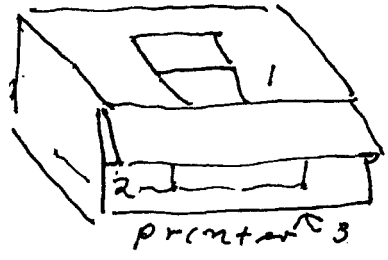
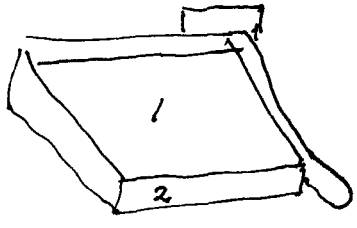
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 27 Jun 07
SURVEYOR R. Granlund
CONDITIONS Equipment release survey
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M ✓ Ludlum 3___ LSC ✓







NO.	DPM	LOCATION	NO.	DPM	LOCATION
21-B	< 10	keyboard 27/B-top	7-C	< 10	paper cutter b/base
22-B	< 10	s. " sides+base			
23-B	< 10	mouse 285k			
24-B	< 10	printer 171 front			
1-C	< 10	" top			
2-C	< 10	" sides			
3-C	< 10	" rear + base			
4-C	< 10	" paper tray			
5-C	< 10	paper cutter Top			
6-C	< 10	" " base			

Rwg
27 Jun 07

COMMENTS GCMSM survey - no detectable contamination
All items on pages 2 and 3 are released for unrestricted use.

RWG

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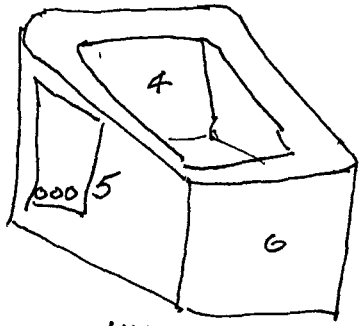
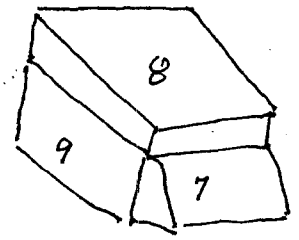
RADIOACTIVE CONTAMINATION SURVEY

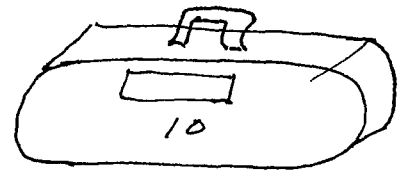
LOCATION I-101 **DATE** 28 Jun 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M ✓ Ludlum 3___ LSC ✓



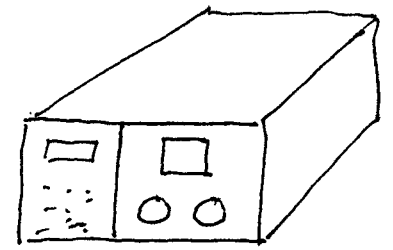
Ultrasonic



hot plate



radio


HPLC Pumps

NO.	DPM	LOCATION	NO.	DPM	LOCATION
D-1	< 10	Power Box A	D-11	< 10	HPLC Pump D709 Top+front
D-2	< 10	Power Box B	D-12	< 10	" " " side+base
D-3	< 10	Chart of Elements	D-13	< 10	" " D1256 top+front
D-4	< 10	D585 basin Ultrasonic cleaner	D-14	20	" " " side+base
D-5	< 10	" front	D-15	< 10	" " D1257 top+front
D-6	< 10	" sides+base	D-16	< 10	" " " sides+base
D-7	< 10	Control D561 hotplate	D-17	< 10	" " D2308 top+front
D-8	13	top "	D-18	< 10	" " " sides+base
D-9	< 10	side & base "	D-19	< 10	workbench
D-10	< 10	radio	D-20	< 10	"

COMMENTS GMSM survey - no contamination detected. All items meet release limits. Clean and resurvey hot plate (D561) and HPLC pump D1256. ✓

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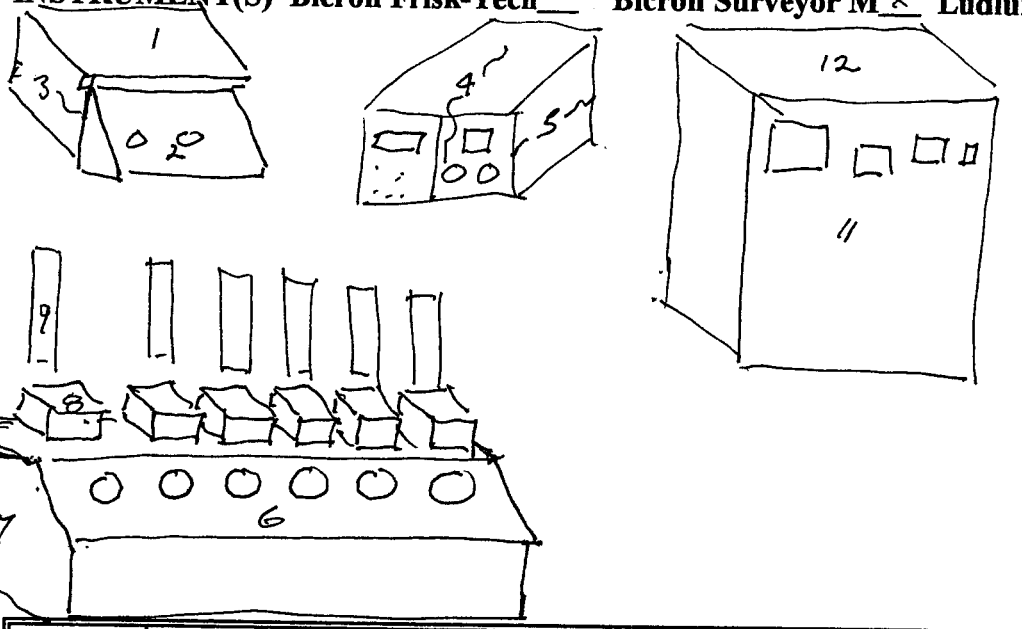
RADIOACTIVE CONTAMINATION SURVEY

LOCATION I-101 **DATE** 29 Jun 05 OT wd RWG 2Jul07

SURVEYOR R. Granlund

CONDITIONS release surveys

INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M** X **Ludlum 3**__ **LSC** X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-1	42	hotplate D561 top	B11	< 10	Recirc/chiller D2112 front
B-2	14	" control	B-12	< 10	top
B-3	< 10	" sides + base	B-13	< 10	sides
B-4	< 10	HPLC Pump D1256 Front top	B-14	< 10	rear
B-5	< 10	" " sides + base	B-15	< 10	UV lamp D1852
B-6	< 10	Extraction heater 1 D1044 front panel	B-16	< 10	Extraction heater 2 D1044 same as B-6
B-7	< 10	sides + rear	B-17	< 10	" B-7
B-8	12	heaters	B-18	< 10	" B-8
B-9	< 10	condensers	B-19	< 10	" B-9
B-10	< 10	condensers inside *	B-20	< 10	" B-10 *

COMMENTS * cotton swab. Pump D1256, UV Lamp, chiller, Extraction heater D1044 released. More decon required for extraction heater D1045 heater plates and hot plate.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 2 Jul 07
SURVEYOR R. Granlund
CONDITIONS release surveys
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**_x_ **Ludlum 3**__ **LSC**_x_

Extraction Heater D1045

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	Heater # 1			
2	< 10	" # 2			
3	< 10	" # 3			
4	< 10	" # 4			
5	< 10	" # 5			
6	< 10	" # 6			

COMMENTS Check to find contaminated heater plate (see page 5) GMSM check - no detectable contamination Extraction heater # D1045 is released. RWG 3Jul07

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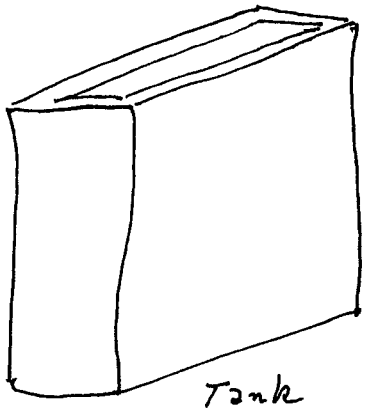
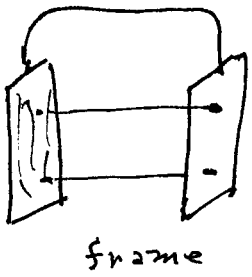
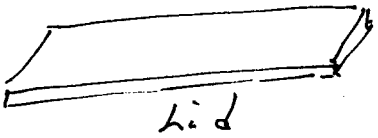
RADIOACTIVE CONTAMINATION SURVEY

LOCATION I-101 **DATE** 9 Jul 07
SURVEYOR R. Granlund
CONDITIONS Release Survey
INSTRUMENT(S) **Bicron Frisk-Tech** X **Bicron Surveyor M** X **Ludlum 3** X **LSC** X







NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-1	< 10	Lid 1	B-11	< 10	frame 2
B-2	< 10	Lid 2	B-12	< 10	frame 3
B-3	< 10	Lid 3	B-13	< 10	4V lamp # D 2204
-4	< 10	Lid 4			
-5	< 10	Lid 5			
-6	< 10	Tank 1			
-7	< 10	" 2			
-8	< 10	" 3			
-9	< 10	" 4			
-10	< 10	Frame 1			

RWG 12 Jul 07

COMMENTS GM SM Check OK -
All items OK for release RWG 12Jul07

RWG

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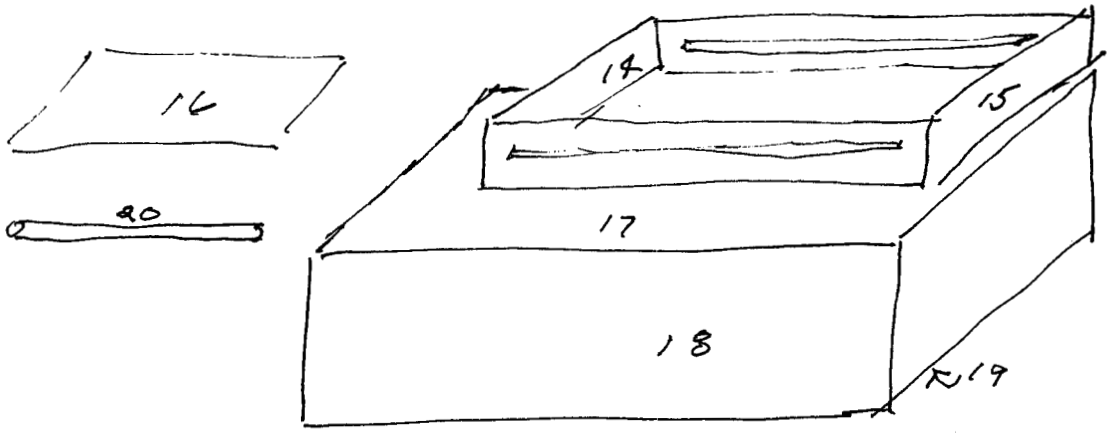
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 9 Jul 07
SURVEYOR R. Granlund
CONDITIONS Release survey
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**X **Ludlum 3**__ **LSC**X



Sample Shaker D3668

NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-14	< 10	Tray inside			
15	< 10	" outsid			
16	< 10	" pad			
17	< 10	Enclosure top			
18	< 10	" sides			Rwg
19	< 10	" bottom			12Jul07
20	< 10	rods			
21	< 10	Enclosure Inside sides			
22	< 10	" " bottom			
23		Rwg 12Jul07			

COMMENTS GMSM survey - no detectable contamination
Item is ok for release Rwg 12Jul07

Rwg

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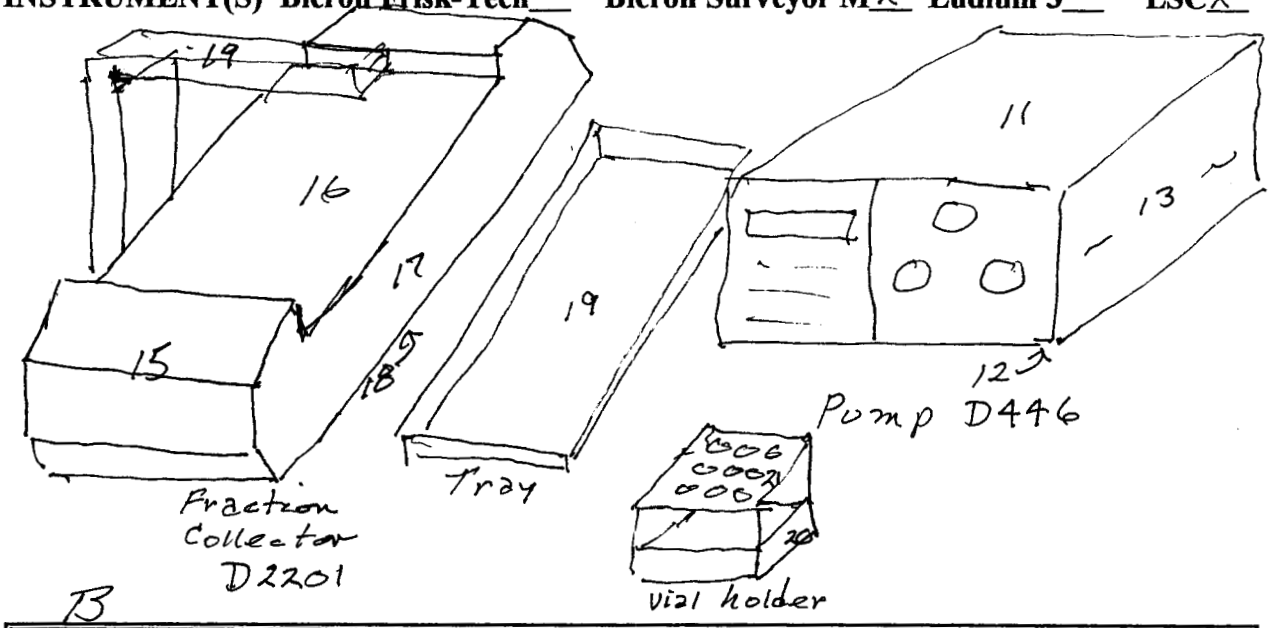
RADIOACTIVE CONTAMINATION SURVEY

LOCATION I-101 **DATE** 12Jul07
SURVEYOR R. Granlund
CONDITIONS release survey
INSTRUMENT(S) **Bicron Frisk-Tech** ___ **Bicron Surveyor M** X **Ludlum 3** ___ **LSC** X



B

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	Dispenser #1	11	< 10	Top - Pump
2	< 10	" # 2	12	< 10	bottom "
3	< 10	# 3	13	< 10	sides + rear "
4	< 10	# 4	14	< 10	front "
5	< 10	# 5	15	< 10	Front - frac. collector
6	< 10	# 6	16	< 10	top " "
7	< 10	# 7	17	< 10	sides " "
8	< 10	AC outlet center	18	< 10	base " "
9	< 10	D2096 Vacuum Pump	19	< 10	tray " "
10	< 10	Silicon hot hands	20	< 10	holder base 1

COMMENTS GMSM survey - no detectable contamination
Release above items 13 Jul 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 12 Jul 07
SURVEYOR R. Gravlund
CONDITIONS release surveys
INSTRUMENT(S) **Bicron Frisk-Tech** X **Bicron Surveyor M** ___ **Ludlum 3** ___ **LSC** X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
< 10	B-21	holder #1	D-7	< 10	vial holder 6
< 10	B-22	holder base #2	D-8	< 10	" " 7
< 10	B-23	holder #2			
< 10	B-24	Letter trays			
< 10	D-1	stapler			
< 10	D-2	vial holder 1			
< 10	D-3	" " 2			
< 10	D-4	" " 3			
< 10	D-5	" " 4			
< 10	D-6	" " 5			

RWG
13 Jul 07

COMMENTS GMSM survey – no detectable contamination
Release above items 13 Jul 07 RWG

RWG

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION I-101 **DATE** 23 Jul 02
SURVEYOR R. Granlund
CONDITIONS waste processing - equipment release.
INSTRUMENT(S) **Bicron Frisk-Tech** X **Bicron Surveyor M** ___ **Ludlum 3** ___ **LSC** X

Book B.

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	5-gal pail 1 - outside	11	< 10	chair #2 - top
2	< 10	" " 1 inside	12	< 10	" " base
3	< 10	" " 2 outside	13	10	chair #3 - top
4	< 10	" " 2 inside	14	< 10	" " base
5	< 10	" " 3 outside	15	< 10	chair #4 - top
6	< 10	" " 3 inside	16	< 10	" " - base
7	10	Fiber drum 4 - outside	17	33	fract. coll. tray 1
8	< 10	" " 4 inside	18	12	" " " 2
9	< 10	chair #1 - top	19	19	" " " 3
10	< 10	" " base	20	< 10	" " " 4

COMMENTS #2 fraction collector rack 500 cpm fixed contamination - rack discarded. All other GMSM survey no detectable contamination.

\CAL\SURVEY/RWG REV. 14 Mar 2003

Fraction collector tray # 4 released.
Chair #3 recheck
Chair 1, 2, 4 released
Pails & drum released.
Clean fraction collectors 1, 3

RWG

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION 1-101 **DATE** 23 Jul 07
SURVEYOR R. Granlund
CONDITIONS equipment release
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M**x **Ludlum 3**__ **LSC**x

NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	Syringe housing D2018 h			
22	< 10	" cover			
		RCeq 24 Jul 07			

COMMENTS GMSM check OK.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION I-101 **DATE** 24 Jul 07
SURVEYOR R. Granlund
CONDITIONS equipment release
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M** ✓ **Ludlum 3**___ **LSC** ✓

Book C

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 100	Chair #3 top			
2	< 100	" " base			
3	< 100	Frac. collect. tray 1			
4	< 100	" " " 3			
5	< 100	Cooler #1 top handles			
6	< 100	" " sides & bottom			
7	< 100	" " lid inside			
8	< 100	" " bottom "			

COMMENTS All smears < 10 dpm. No detectable contamination with GMSM. Release tags attached to 4 items listed above.

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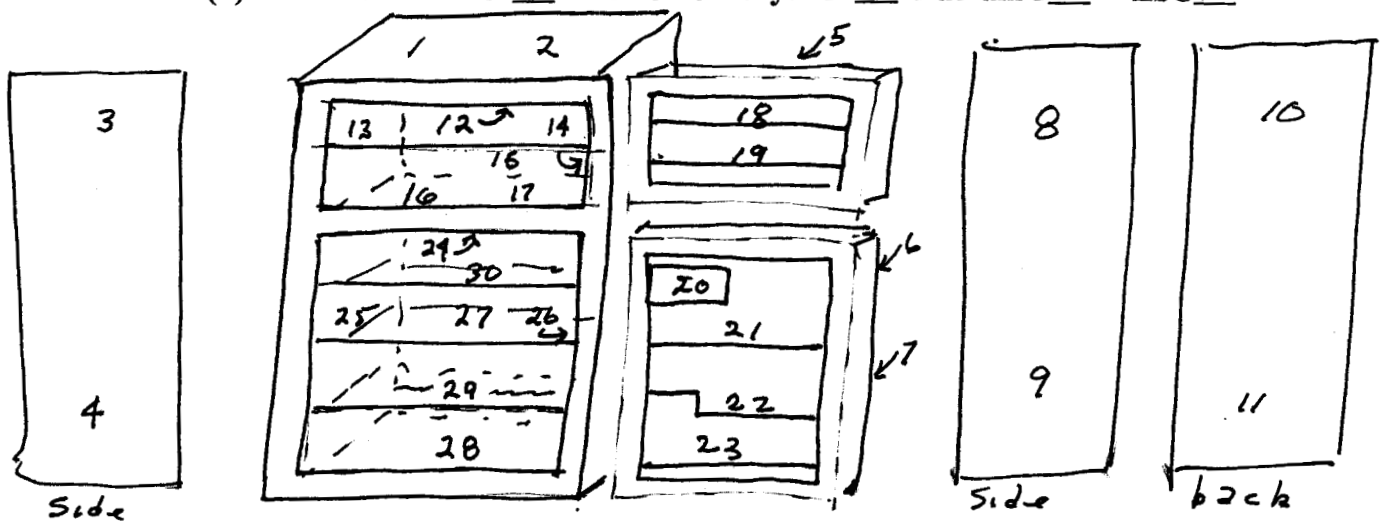
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 28 Jul 07
SURVEYOR R. Granlund
CONDITIONS Release survey Refrigerator - Freezer #24; D1998
INSTRUMENT(S) **Bicron Frisk-Tech**__ **Bicron Surveyor M** X **Ludlum 3**__ **LSC** X



book D

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	Top	11	< 10	back
2	< 10	"	12	< 10	freezer top
3	< 10	L. side	13	< 10	" L. side
4	< 10	" "	14	< 10	" R. side
5	< 10	front - freezer	15	< 10	" rear
6	< 10	" - ref.	16	< 10	" bottom
7	< 10	" "	17	< 10	" "
8	< 10	R. side	18	< 10	" door shelf
9	< 10	" "	19	< 10	" " "
10	< 10	back	20	< 10	ref. door shelf

COMMENTS GMSM survey - no detectable contamination
Paste w/release form

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 28 Jul 07
SURVEYOR RW Graveland
CONDITIONS equipment release
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M___ Ludlum 3___ LSC ✓

NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	ref - door shelf	31	< 10	1ml ice
22	< 10	" " "			
23	< 10	" " "			
24	< 10	ref. top			
25	< 10	" L. side		RWG	
26	< 10	" R. side		30 to 07	
27	< 10	" back			
28	< 10	" bottom			
29	< 10	" shelf glass			
30	< 10	shelves - grates			

COMMENTS

RWG

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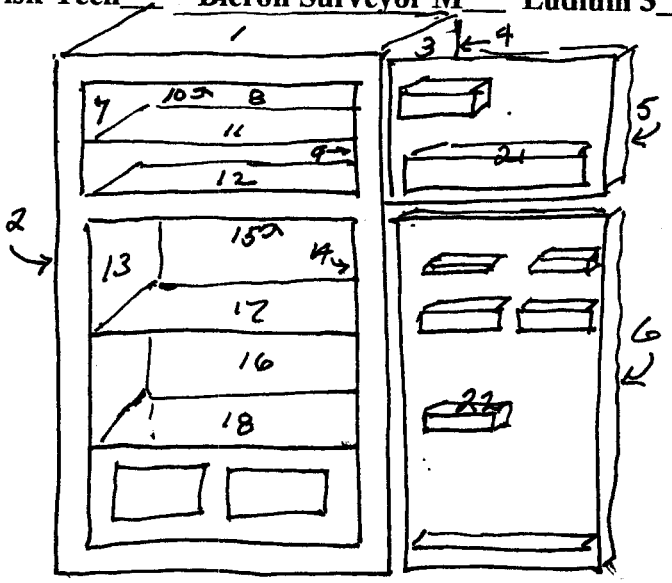
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 2 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release survey.
INSTRUMENT(S) Bicron Frisk-Tech ___ Bicron Surveyor M ___ Ludlum 3 ✓ LSC ✗



Refrigerator/Freezer #13 D1126

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	Top	11	< 10	Ref. L. Freezer shelf
2	< 10	L. side	12	< 10	" "
3	< 10	R. side	13	< 10	Ref - L. side
4	< 10	Back.	14	< 10	" R. "
5	< 10	Front top	15	< 10	" top
6	< 10	" bottom	16	< 10	" rear
7	< 10	Freezer L-side	17	< 10	" top shelf
8	< 10	" rear	18	< 10	" lower "
9	< 10	" R. side	19	< 10	" drawer L
10	< 10	" top	20	< 10	" " R
			21	< 10	door shelves
			22	< 10	" "

COMMENTS Count for ^{14}C & ^{3}H
No detectable contamination w/ GMSM. Sample of condensate from floor absorbed on paper smear - 17.8 dpm/3 ll

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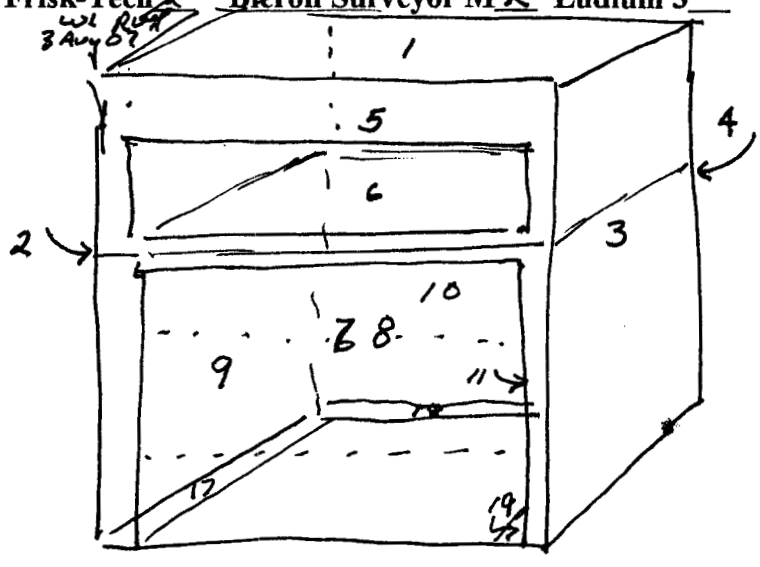
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 3 Aug 07
SURVEYOR R. Granlund
CONDITIONS release survey
INSTRUMENT(S) Bicron Frisk-Tech X Bieron Surveyor M X Ludlum 3 LSC X



Portable Hood D1186

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	top	11	< 10	R. side inside
2	< 10	L. side	12	< 10	top inside
3	< 10	R. side	13	< 10	Filter holder
4	< 10	rear	14	< 10	sides & rear. Filter compartment
5	< 10	front - top	15	< 10	" bottom "
6	< 10	front panel	16	< 10	" top "
7	< 10	front shield	17	10	base, left
8	19	front shield back	18	< 10	" , rear
9	12	L. side inside	19	< 10	" right
10	23	10. rear "	20	< 10	L. side inside *

COMMENTS *after detergent wipe. No detectable contamination with GMSM. Areas with ≥ 10 dpm (8-10, 17) were all < 10 dpm after cleaning w/ detergent (20-24).

Hood released 7 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 3 Aug 07
SURVEYOR R. Granlund
CONDITIONS release survey
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ✓ Ludlum 3__ LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	rear inside*			
22	< 10	r. side inside*			
23	< 10	bases - top*			
24	< 10	bases - bottom*			

RWG 7 Aug 07
RWG 7 Aug 07

COMMENTS

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 7 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) Bicron Frisk-Tech X Bicron Surveyor M__ Ludlum 3__ LSCx

Survey of plastic storage containers

	Outside			Inside			
Container	top	sides	bottom	Lid	sides	ends	bottom
1-115 liter	B-1	B-2	B-3	B-4	B-5	B-6	B-7
2-53 L	B-8	B-9	B-10	B-11	B-12	B-13	B-14
3-30 L	B-15	B-16	B-17	B-18	B-19	B-20	B-21
4-53L QC1364	B-22	B-23	B-24	C-1	C-2	C-3	C-4
5-Cooler	C-5	C-6	C-7	C-8	C-9	C-10	C-11
6-10L	C-12	C13	C-14	C-15	C-6	C-17	C-18
7-10L	C-19	C-20	C-21	C-22	C-23	C-24	D-1
8-53L	D-2	D-3	D-4	D-5	D-6	D-7	D-8

NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-1	11	container #1	B-11	< 10	container #2
2	< 10		12	< 10	
3	< 10		13	< 10	
4	< 10		14	< 10	
5	13		15	< 10	container #3
6	< 10		16	< 10	
7	19		17	< 10	
8	< 10	container #2	18	< 10	
9	< 10		19	< 10	
10	< 10		20	< 10	

COMMENTS No detectable contamination w/GMSH on #1-#7. Bottom of #8 1,000-3,000 cpm (residue from broken sample bottles), reduced to 100-300 cpm after several cleanings.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION _____ DATE 7 Aug 07
SURVEYOR _____
CONDITIONS _____
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___

NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-21	< 10	container # 3	C-7	< 10	container # 5
B-22	< 10	container #4	8	< 10	
B-23	< 10		9	< 10	
B-24	< 10		10	< 10	
C-1	< 10		11	< 10	
2	< 10		12	< 10	container #6
3	< 10		13	< 10	
4	< 10		14	< 10	
5	< 10	container # 5	15	< 10	
6	< 10	" "	16	< 10	

COMMENTS Storage container #1-#5 released 8 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION _____ **DATE** 7 Aug 07
SURVEYOR _____
CONDITIONS _____
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___

NO.	DPM	LOCATION	NO.	DPM	LOCATION
C-17	< 10	container #6	D-3	< 10	container #8
18	< 10	" " "	D-4	< 10	
19	12	container #7	D-5	< 10	
20	< 10		D-6	< 10	
21	< 10		D-7	< 10	
22	< 10		D-8	1030	
23	23				
24	< 10				
D-1	48				
D-2	< 10	container #8			

RWG
9 Aug 07

COMMENTS storage container #6 released 9 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 8 Aug 07
SURVEYOR R. Granlund
CONDITIONS release survey.
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3 X LSC X

HPLC Pumps	front	sides & top	rear & bottom	Door
D1822	B-15	B-16	B-17	—
D1298 (UV)	B-18	B-19	B-20	B-21
D1247 (cont)	B-22	B-23	B-24	~~C-Trione~~
D1249 (LC)	C-1	C-2	C-3	—
D710	C-4	C-5	C-6	—
D445 (LC)	C-7	C-8	C-9	—
D1007 (UV)	C-10	C-11	C-12	C-13
D1013 (cont).	C-14	C-15	C-16	—

	NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	B-1	< 10	CPU D381 side	B-11	< 10	power strip 1
	B-2	< 10	" " front, rear	12	< 10	" " 2
	3	< 10	" " top, bottom	13	< 10	" " 3
	4	< 10	keyboard D2639	14	< 10	" " 4
	5	< 10	mouse	15	< 10	HPLC D1822
	6	< 10	Monitor D2600 screen	16	< 10	" "
	7	< 10	" sides & rear	17	< 10	" "
	8	< 10	" top & bottom	18	< 10	D1298
	9	< 10	Syringe D2072 sides	19	< 10	"
	10	< 10	" cover	20	< 10	"

COMMENTS Release D381, D2639, mouse, D2600, D2072, power strip 1, 2, 3, 4, D1822, D1428, RWG 10 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 8 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3 X LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
B-21	< 10	D1248	C- 7	< 10	we RWG 9 Aug 07 DE D445
B-22	< 10	D1247	8	< 10	"
B-23	< 10	"	9	< 10	"
B-24	< 10	"	10	< 10	D1007
C-1	< 10	D1249	11	< 10	"
2	< 10	"	12	< 10	"
3	< 10	"	13	< 10	"
4	< 10	D710	14	< 10	D1013
5	< 10	"	15	< 10	"
6	< 10	"	16	< 10	"

COMMENTS Released D1247, D1249, D710, D445, D1007, D1013 RWG 10 Aug 07

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PAGE 24 ~~8 Aug 07~~

RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 8 Aug 07
SURVEYOR R. Granlund
CONDITIONS release surveys
INSTRUMENT(S) Bicron Frisk-Tech__ Bicron Surveyor M__ Ludlum 3 X LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
C-17	< 10	D-582 Injector Top+sides	D-3	< 10	oven - doors
18	< 10	" rear+bottom	4	< 10	" interior
19	< 10	" door	5	< 10	syringe pump D597
20	< 10	" . Inside	6	< 10	" " door.
21	24	" Injector	7	< 10	tray for D-582 (cleaned)
22	156	" sampler	8		
23	78	" Injector swab	9		Rwg 9 Aug 07
24	166	" sampler swab	10		
D-1	< 10	D-1250 oven top+sides	11		
D-2	< 10	" rear+bottom	12		

31

COMMENTS D-582 sample tube holder 300 cpm (needle removed)
D528 injector parts cleaned 9 Aug 07 & rechecked.
Release D1250 Rwg 10 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 9 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release survey
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**___ **Ludlum 3** x **LSC** x

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	CPU D357 front	11	< 10	D438 back+bottom
2	< 10	" " side+top	12	< 10	" Door inside
3	< 10	" " rear, bottom	13	< 10	" inside
4	< 10	Monitor D2478 front	14	< 10	" tray
5	< 10	" " side+top	15	< 10	" sampler
6	< 10	" " rear+bottom	16	< 10	" injector
7	< 10	Keyboard D2617	17	< 10	D582 Injector tray
8	< 10	mouse	18	11	" sampler after cleaning
9	< 10	Injector D438 front +	19	21	" injector
10	< 10	top + sides	20	< 10	B-RAM D2021 front

COMMENTS D438 500 cpm at sampling tube (cleaned w/acid) all others < 100 cpm w/GM SM
release D357, D2478, D2617, mouse, D438 RWG 10 Aug 07
release D382, D2021, D022 RWG 13 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 9 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**___ **Ludlum 3**___ **LSC**___

NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	B-ram detector	31	< 10	D2022 Tray 2
22	< 10	" " port			
23	< 10	" " Top + sides			
24	< 10	" " back + bottom			
25	< 10	D2022 Fract. Collector front			
26	< 10	Top + sides			
27	< 10	rear + bottom			
28	< 10	gantry.			
29	< 10	basin			
30	< 10	Tray 1			

RWG 9 Aug 07

COMMENTS

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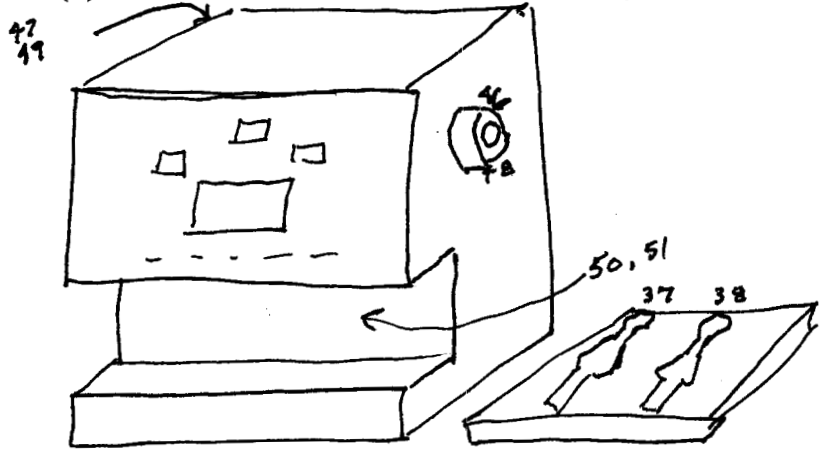
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 10 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Survey
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**___ **Ludlum 3** K **LSC** a



Biological Oxidizer OX500

NO.	DPM	LOCATION	NO.	DPM	LOCATION
32	< 10	D2200 BMO2 front	42	< 10	D938 L. side
33	< 10	Top	43	< 10	rear
34	< 10	R. side	44	< 10	sample holder boat 3
35	< 10	L. side	45	< 10	" " 4
36	< 10	rear	46	< 10	sample port
37	10	sample holder boat 1	47	< 10	rear access chamber
38	14	" " 2	48	< 10	D2200 sample port
39	< 10	D938 BMO1 front	49	< 10	" rear access
40	< 10	top	50	< 10	" interior pump compartment
41	< 10	R. Side	51	< 10	D938 " " "

COMMENTS All item < 100 cpm w/GMSM
Release D2200, D938 RWG 13 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION BL-101 **DATE** 10 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**_✓_ **Ludlum 3**___ **LSC**_✓_

NO.	DPM	LOCATION	NO.	DPM	LOCATION
52	< 10	U.V. lamp - D2081	62	< 10	D944 back + bottom
53	< 10	CM-10 Box outside	63	< 10	" chamber
54	< 10	" Box inside	64	< 10	D98 Controller front
55	< 10	" Viewport	65	< 10	↓ top + sides
56	< 10	UV lamp D2080 cover	66	< 10	↓ rear + bottom
57	< 10	" " " Top	67	< 10	D2020 pump front
58	< 10	" " " sides + bottom	68	< 10	↓ Top + sides
59	< 10	UV safety glasses	69	< 10	↓ rear + bottom
60	< 10	D944 UV Chamber Front	70	< 10	D1009 UV det. front
61	< 10	↓ sides + top	71	< 10	" to + 4 sides

COMMENTS All item < 100 cpm w/ GeMSM
Release D2081, CM-10 box, D2080, UV Safety glasses
UV chamber, D944, D98, D2020, D1009 Rel 13 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 10 Aug 07
SURVEYOR R. Granlund
CONDITIONS release surveys
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**x **Ludlum 3**___ **LSC**x

NO.	DPM	LOCATION	NO.	DPM	LOCATION
72	< 10	D1009 back + bottom	82	< 10	D1014 rear + bottom
73	< 10	D1008 oven front	83	< 10	" sample rack
74	< 10	top & sides	84	< 10	sampler
75	< 10	rear + bottom	85	< 10	injector
76	< 10	oven chamber	86	< 10	↓ chamber
77	< 10	D2019 cooler front			
78	< 10	sides + top			
79	< 10	rear + bottom			
80	< 10	D1014 - Injector front			
81	< 10	top & sides			

Rwg 10 Aug 07

COMMENTS all items < 100 cpm w/ GMSH
Release D1008, D2019, D2014 RWG 13 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION BI-101 **DATE** 13 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Survey
INSTRUMENT(S) **Bicron Frisk-Tech** X **Bicron Surveyor M**__ **Ludlum 3**__ **LSC** X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
87	< 10	D597 Syringe pump front	97	< 10	TLC Jar outside
88	< 10	sides & top	98	< 10	" inside
89	< 10	rear & bottom	99	< 10	" rack
90	< 10	cover	100	< 10	shield box outside
91	< 10	D1817 Fract. Collector front	1	< 10	" " inside
92	< 10	top & side	2	< 10	Film holder outside
93	< 10	rear & bottom	3	< 10	" " inside
94	< 10	tray			
95	< 10	plastic tray			
96	< 10	TLC Jar - top			

Cleared 15 Aug 07

COMMENTS No detectable contamination w/GMSM. Release D597, D1817, TLC jar, shield box, film holder - Cleared 15 Aug 07

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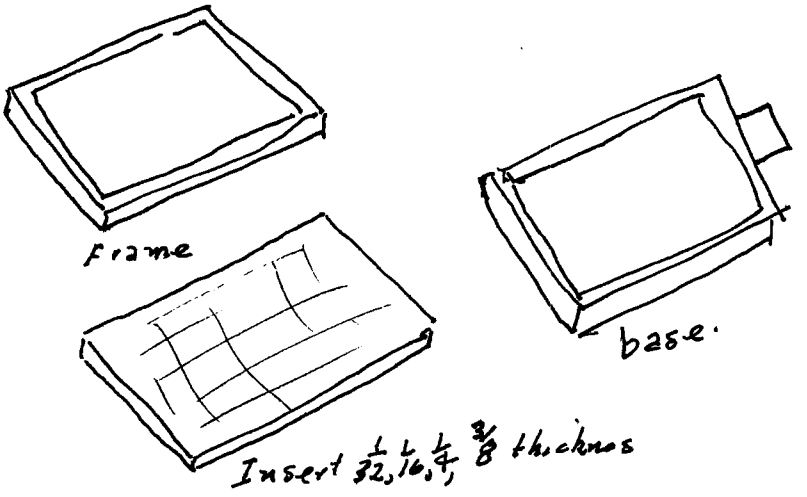
RADIOACTIVE CONTAMINATION SURVEY

LOCATION BI-101 **DATE** 15 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Survey
INSTRUMENT(S) **Bicron Frisk-Tech**___ **Bicron Surveyor M**_x_ **Ludlum 3**___ **LSC**_x_

Ambis TLC plate scanner plate holders



NO.	DPM	LOCATION	NO.	DPM	LOCATION
4	< 10	14C test plate top	14	< 10	3/8 (1)
5	< 10	base	15	< 10	3/8 2
6	< 10	frames (1)	~~16~~	< 10	not used RWG 17Aug07
7	< 10	frames (2)			
8	< 10	bases 1			
9	< 10	" 2			Recs
10	72	1/32 inserts			17Aug07
11	190	1/16 "			
12	< 10	1/4 (1)			
13	< 10	1/4 (2)			

COMMENTS No detectable contamination w/ GM SM. Release all items except 1/32, & 1/16 inserts. Recs 17Aug
1/32 + 1/16 to be washed and rechecked.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 17 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release surveys
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M X Ludlum 3___ LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
16	< 10	B-Ram ^{14}C source S/N 2081	26	< 10	Hotplate D561 top
17	< 10	B-ram detector S/N 11981	27	< 10	" " front
18	< 10	B-ram " S/N 11783	28	< 10	" " sides + bottom
19	< 10	Hamilton Syringe (1)	29	< 10	" " Top - after cleaning
20	< 10	" " (2)			
21	< 10	250-090308 O_2 cylinder bottom			
22	< 10	" " top			
23	< 10	" " valve			
24	< 10	" " cover			
25	< 10	" " Reg. FZ36140			

RW 20 Aug 07

COMMENTS D 561 ~50 cpm above bkg w/GMSM.
Release B-Ram detectors, Hamilton syringes, O_2 cylinder, regulator, hot plate, RWG 20 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION BI-101 **DATE** 23 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Surveys
INSTRUMENT(S) **Bicron Frisk-Tech** X **Bicron Surveyor M**___ **Ludlum 3**___ **LSC** X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
30	< 10	AMBIS-plates 1/32"	40	< 10	S.S. TLC plateholder outside
31	< 10	" " 1/16"	41	< 10	" " " inside
32	< 10	1000ml bottles outside	42	< 10	D2163 autotransformer
33	< 10	" " lids	43	< 10	bases Fraction collector trays
34	< 10	" " " inside-swab	44	< 10	" " " 1
35	< 10	" " " " -smear	45	< 10	2
36	< 10	Plastic TLC plateholder outside	46	< 10	3
37	< 10	inside	47	< 10	4
38	< 10	* sideplates	48	< 10	5
39	< 10	tray.	49	< 10	6
			50	< 10	7

COMMENTS *side plate 500 cpm w/GeMSM before cleaning. No detectable contamination w/GeMSM.
Release all items page 1&2 -24Aug07 Rwg

Rwg

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 23 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Surveys
INSTRUMENT(S) Bicron Frisk-Tech X Bicron Surveyor M___ Ludlum 3___ LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
51	< 10	Block heater D 9 F2			
52	< 10	block 1			
53	< 10	2			
54	< 10	3			
55	< 10	block 1 swab			RWG
56	< 10	" 2 "			24 Aug 07
57	< 10	" 3 "			
58	< 10	Sieve #60 mesh			
59	< 10	" #10			
60	< 10	magnetic stirrer			

COMMENTS No detectable contamination w/GeMSM

RWG

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 27 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Surveys
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M___ Ludlum 3___ LSC ✓

NO.	DPM	LOCATION	NO.	DPM	LOCATION
61	< 10	propane torch	71	< 10	1000 ml Erlenmeyer (2)
62	< 10	PC65 stirrer	72	< 10	" " (3)
63	30	Lab Jack	73	< 10	mini-impinger
64	< 10	B-shield box	74	< 10	Lid Freezer 32 D95B
65	< 10	Filter funnels (3)	75	< 10	Front
66	< 10	Empty columns (2)	76	< 10	inside lid
67	< 10	1000 ml cylinder	77	< 10	" compartment
68	< 10	250 ml beaker	78	< 10	1 ml H_2O from ice
69	< 10	10 ml cylinder			
70	< 10	1000 ml erlenmeyer (1)			RWG 27 Aug 07

COMMENTS No detectable contamination W/GMSM.
RAM label removed from freezer in sample room, Room 105
Release all items except lab jack RWG 27 Aug 07

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 30 Aug 07
SURVEYOR release survey R. Granlund
CONDITIONS
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3 x LSC x

NO.	DPM	LOCATION	NO.	DPM	LOCATION
78	< 10	4-liter bottle carrier	88	< 10	evap dish
79	25	Lab-Jack - cleaned	89	40	glass 5ml syringe
80	< 10	Blot - tray	90	< 10	stir bar retriever
81	< 10	Tray lids - 2			
82	26	poly sample cont.			
83	< 10	poly beakers			
84	< 10	glass beakers			
85	< 10	Al - tube holder			
86	< 10	2-L bottle			
87	< 10	3/4" tubing			

RWG 31 Aug 07

COMMENTS Discard glass syringe, reclean lab jack, ~~not~~ discard poly sample containers, release other items. No detectable contamination w/ GMSM.

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 31 Aug 07
SURVEYOR R. Granlund
CONDITIONS Release Survey
INSTRUMENT(S) Bicron Frisk-Tech X Bicron Surveyor M__ Ludlum 3__ LSC X

NO.	DPM	LOCATION	NO.	DPM	LOCATION
91	< 10	1ml island sink trap			
92	< 10	1ml wall sink trap			
93	< 10	lab jack end plates			
94	< 10	sissors			
95	< 10	lateral supports			
6					

RWG 6Sep07

RWG 6Sep07

COMMENTS No detectable contamination w/ GM SH
Lab jack released 6 Sep 07 RWG

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RADIOACTIVE CONTAMINATION SURVEY

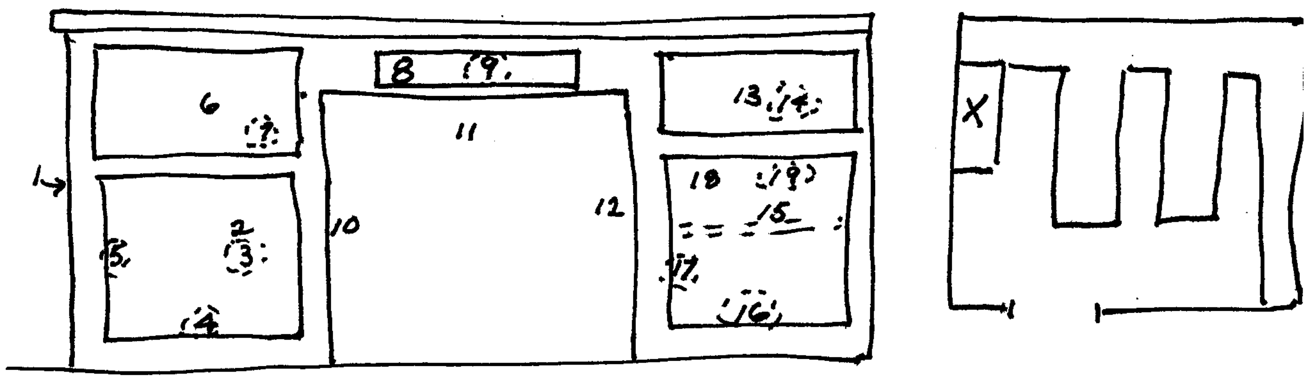
LOCATION B1-101 DATE 10 Sep 07

SURVEYOR R. Granlund

CONDITIONS FSS E. wall cabinets

INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X

Ludlum 2360 S/N 177116 / Ludlum 43-89 S/N PR184173
HV=800 Bonly Bkg 278 c/min C-14 check 10,555 c/min



NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 10	side	11	< 10	back kneehole
2	< 10	door front	12	< 10	side "
3	< 10	" rear	13	< 10	drawer front
4	< 10	cavity bottom	14	< 10	" inside
5	< 10	" sides	15	< 10	shelf
6	< 10	drawer front	16	< 10	cavity - bottom
7	< 10	" inside	17	< 10	" sides
8	< 10	drawer front	18	< 10	door front
9	< 10	drawer inside	19	< 10	" rear
10	< 10	side kneehole	20		~~RG 10 Sep 07~~

COMMENTS 17-279 cpm, 4-268, 7-265, 9-267 static measurements 1 min counts 100% survey w/ Ludlum 2360 - no detectable contamination.

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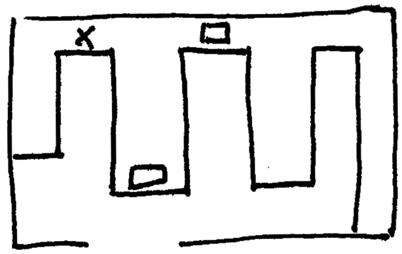
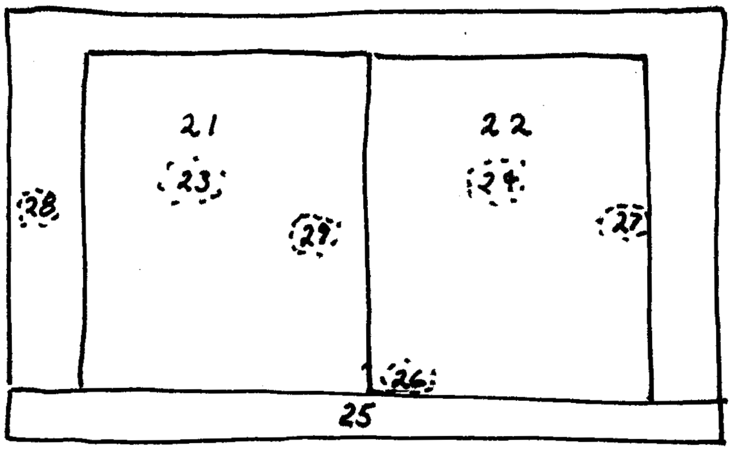
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 11 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS S. wall cabinet
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___
Ludlum 2360 S/N 172116/Ludlum 43-89 S/N PR184173
HV800 B only Bkg 296 cpm C-14 check 10,460 cpm





NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	L. front			
22	< 10	R. front			
23	< 10	L. inside			
24	< 10	R. inside			
25	< 10	base board.			
26	< 10	base			
27	< 10	R. side			
28	< 10	L. side			
29	< 10	Back board			
30	< 10	Shelf.			

RG 11Sep07

COMMENTS static #26-301cpm, #29-274cpm, #30-290cpm
No detectable contamination on 90+% scan (pp1-5)

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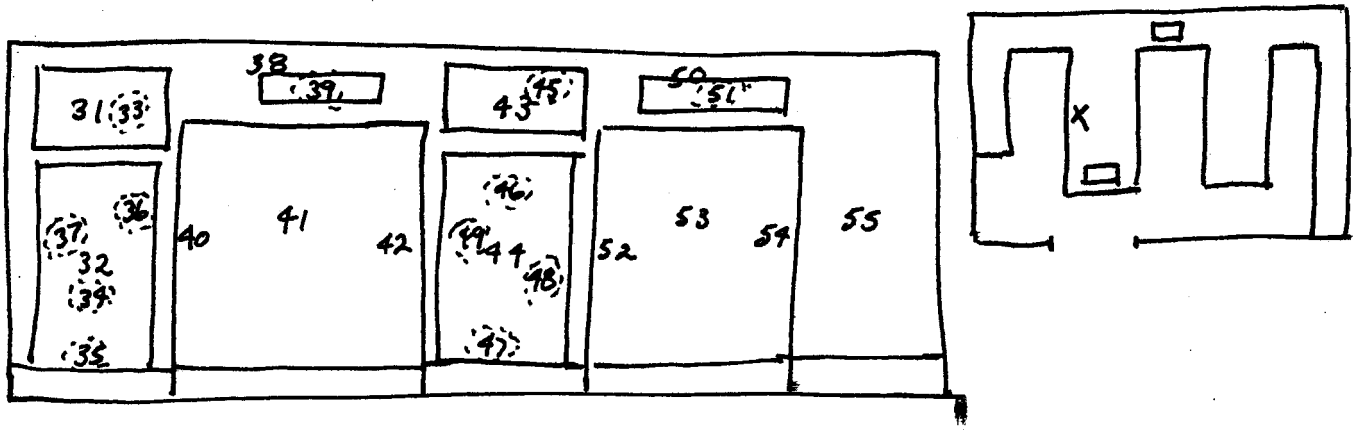
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 11 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS E. side E. Island cabinets
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
31	< 10	Front	41	< 10	Knockhole rear
32	< 10	Front	42	< 10	" right
33	< 10	Drawer, inside	43	< 10	Front
34	< 10	Door, inside	44	< 10	"
35	< 10	base	45	< 10	Drawer inside
36	< 10	side + rear	46	< 10	Door inside
37	< 10	shelf	47	< 10	base
38	< 10	Front	48	< 10	side + rear
39	< 10	Drawer inside	49	< 10	shelf.
40	< 10	Knockhole L	50	< 10	Front

COMMENTS Static #33- 290cpm, #37-306 cpm, #39-276, #45-323 cpm, #35-311 cpm, #47-304, #49-314 cpm, #51-299 cpm

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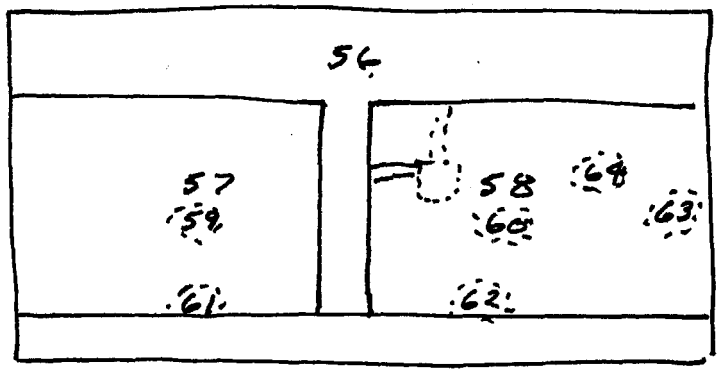
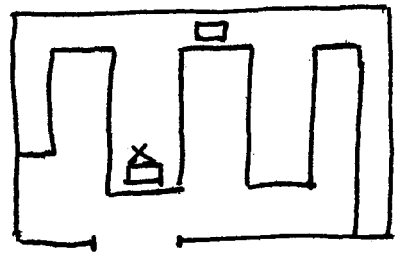
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 11 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS. E. side E. Island cabinets, E. Island sink
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___





NO.	DPM	LOCATION	NO.	DPM	LOCATION
51	< 10	Drawer inside	61	< 10	base L.
52	< 10	knee hole L.	62	< 10	" R
53	< 10	" Rear	63	< 10	sides
54	< 10	" R.	64	< 10	rear
55	< 10	Front.			
56	< 10	Front			
57	< 10	L. door Front			
58	< 10	R " "			
59	< 10	L. door inside			
60	< 10	R. " "			

Rest 11 Sep 07

COMMENTS static #61-313cpm, #62-296cpm

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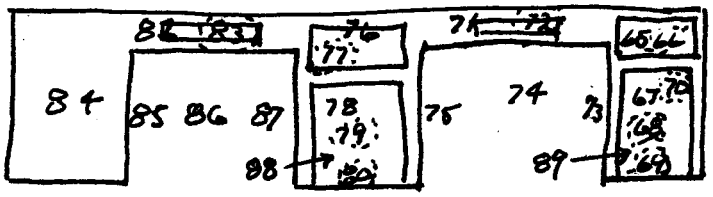
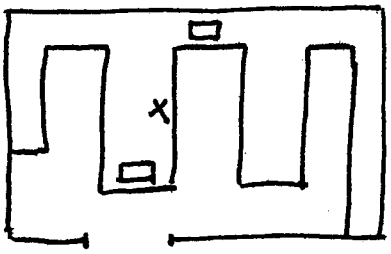
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 11 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S. W. side E. island cabinets
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
65	< 10	Front	75	< 10	Kneehole L.
66	< 10	Drawer, inside	76	< 10	Front
67	< 10	Front	77	< 10	drawer inside
68	< 10	Door inside	78	< 10	front
69	< 10	base	79	< 10	door * w/ 11 Sep 07 rear drawer inside
70	< 10	side + rear	80	< 10	base
71	< 10	Front	81	< 10	sides + rear
72	< 10	drawer, inside	82	< 10	front
73	< 10	Kneehole R	83	< 10	drawer inside
74	< 10	" rear	84	< 10	front

COMMENTS static #66 - 280cpm, #69 - 282cpm #72 - 298 cpm
#77 - 294cpm #80 - 316 cpm, #88 - 269 cpm, #83 - 334cpm, #89 - 276

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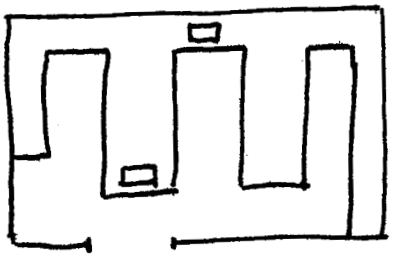
P.5-55.

RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 11Sep07
SURVEYOR R. Granlund
CONDITIONS FSS w/side E. island cabinets
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
85	< 10	kneehole L			
86	< 10	" rear			
87	< 10	" right			
88	< 10	shelf			
89	< 10	shelf			

RLeeg 11Sep07

RLeeg 11Sep07

COMMENTS

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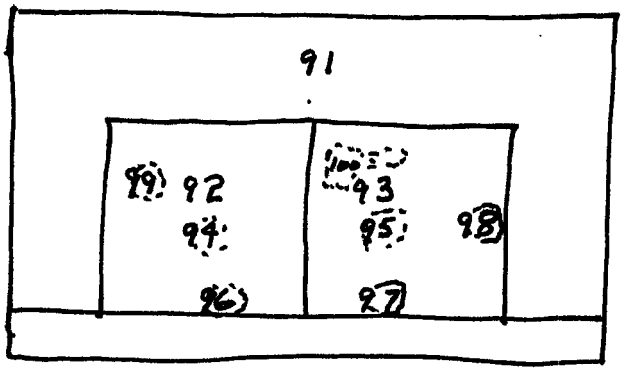
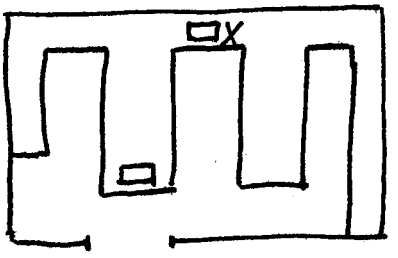
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 12 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS s.wall sink
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC x
Ludlum 2360 SIN 187116/Ludlum 43-89 SIN PR 184173
HV 800 β only Bkg 289 cpm (10 min) ^{14}C check 10,402 cpm





NO.	DPM	LOCATION	NO.	DPM	LOCATION
91	< 10 ~~< 100~~ (re)	front	1		front
92	< 10	L. door outside	2		drawer inside
93	< 10	R. " "	3		door outside
94	< 10	L " inside	4		" inside
95	< 10	R " "	5		base
96	< 10	L. base	6		side + back
97	< 10	R. "	7		knee hole L.
98	< 10	sides	8		" rear
99	< 10	rear	9		" R
100	< 10	Trap outside	10		shelf

COMMENTS Static 1 min counts #96 - 285 cpm # 97 - 281 cpm

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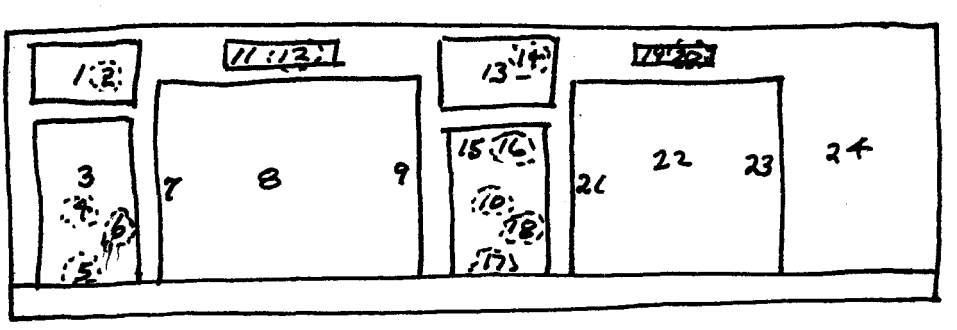
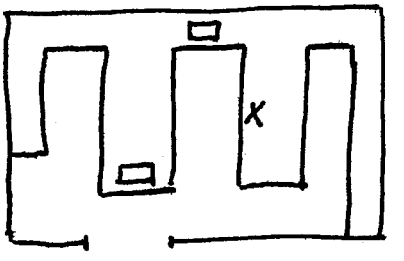
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 12Sep07
SURVEYOR R. Granlund
CONDITIONS FSS E. side W. island
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___





NO.	DPM	LOCATION	NO.	DPM	LOCATION
11	< 10	front	21	< 10	kneehole L.
12	< 10	drawer inside	22	< 10	" rear
13	< 10	front	23	< 10	" R.
14	< 10	drawer inside	24	< 10	front.
15	< 10	door outside			
16	< 10	" inside			
17	< 10	base			
18	< 10	sides & rear			
19	< 10	front			
20	< 10	drawer			

RWG 14 Sep07

COMMENTS Static 1 min counts # 2 - 265cpm, #5 - ~~315~~ 312 re RWG 12Sep07 cpm, #12 - 292 cpm #14 - 274cpm, # 17 - 282 cpm #10 - 276 cpm, #20 - 293 cpm

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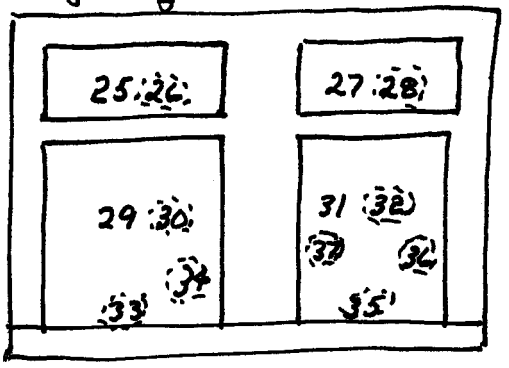
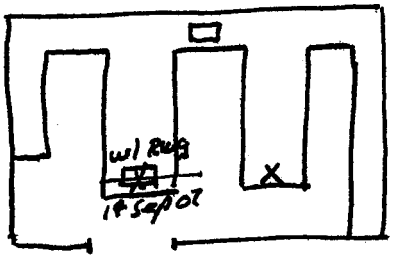
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 14 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS Lab cabinets w. island end section
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC K
Ludlum 2360 S/N 177116/Ludlum 43-89 S/N PR184173
800V, β only; Bkg 277 cpm (10 min), ^{14}C check 10, 581 cpm





NO.	DPM	LOCATION	NO.	DPM	LOCATION
25	< 10	Front	35	< 10	base
26	< 10	drawer inside	36	< 10	sides and rear
27	< 10	front	37	< 10	shelf
28	< 10	drawer inside	38		
29	< 10	door outside	39		
30	< 10	" inside	40		
31	< 10	" outside	41		
32	< 10	" inside	42		
38	< 10	base	43		
34	< 10	sides & rear	44		

Rwg 14 Sep 07

COMMENTS Static 1/min counts #26 - 275 cpm, #28 - 297 cpm, #[illegible] 210 cpm #35 - 278 cpm #37 - 301

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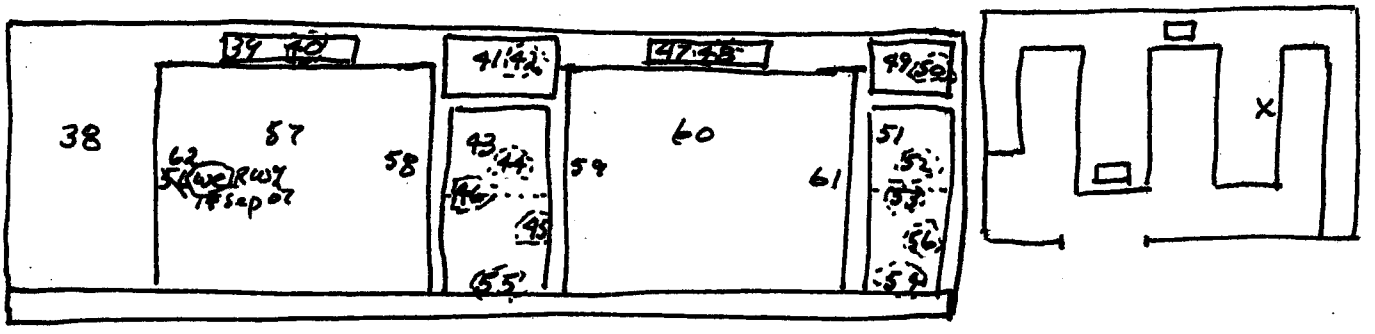
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 14 Sep 07
SURVEYOR R. Granlund
CONDITIONS FSS - Lab cabinets
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
38	< 10	front	48	< 10	drawer, inside
39	< 10	front	49	< 10	front
40	< 10	drawer inside	50	< 10	drawer, inside
41	< 10	front	51	< 10	51 door front
42	< 10	drawer inside	52	< 10	" inside
43	< 10	door front	53	< 10	shelf
44	< 10	" inside	54	< 10	base
45	< 10	sides & rear	55	< 10	base
46	< 10	shelf	56	< 10	sides & rear
47	< 10	front	57	< 10	kneehole rear

COMMENTS 1 min static counts #40-297, #42-270, #55-278, #46-251, #48-276, #50-248, #54-276, #53-284

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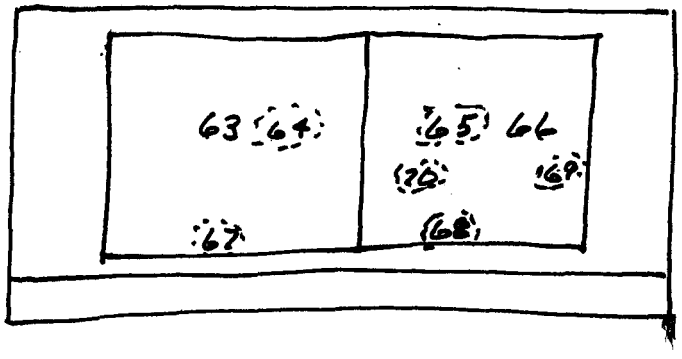
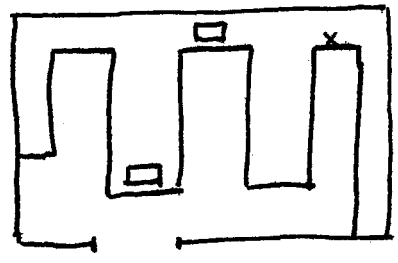
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Bl-101 DATE 14 Sep 07
SURVEYOR R. Granlund
CONDITIONS ESS - s. end of w. aisle
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X





NO.	DPM	LOCATION	NO.	DPM	LOCATION
58	< 10	kneehole, R	68	< 10	base R.
59	< 10	" L	69	< 10	sides
60	< 10	" rear	70	< 10	rear
61	< 10	" R	71	< 10	door, front
62	< 10	" L.	72	< 10	" inside
63	< 10	door front	73	< 10	" front
64	< 10	" inside	74	< 10	" inside
65	< 10	" "	75	< 10	base L.
66	< 10	" front	76	< 10	base R
67	< 10	base L	77	< 10	sides

COMMENTS static 1/min count #67-305, #68-310, ~~#79-~~

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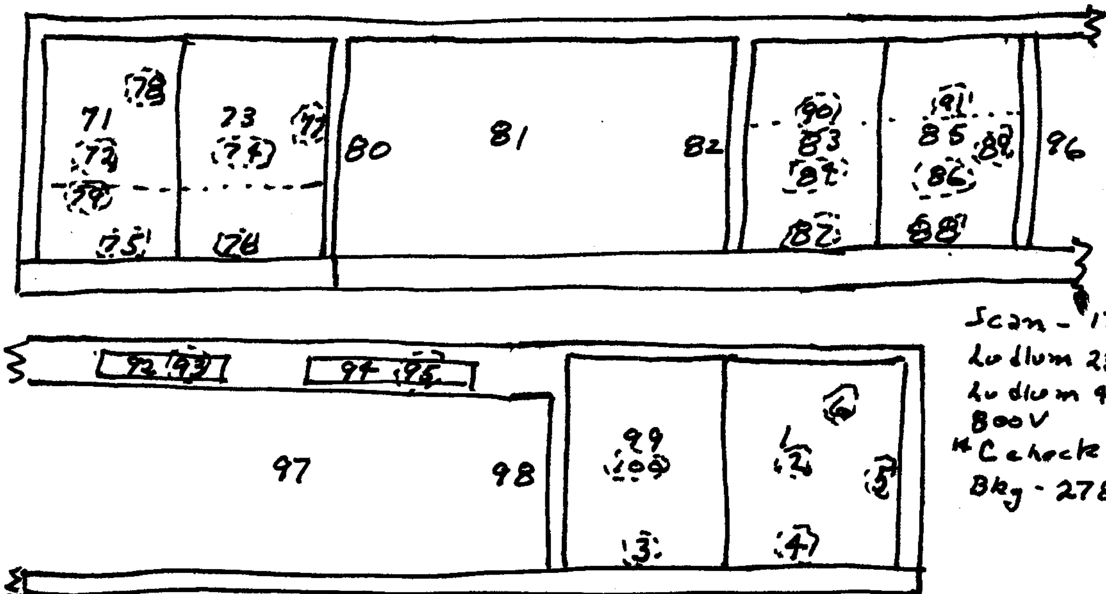
RADIOACTIVE CONTAMINATION SURVEY

LOCATION 81-101 DATE 14 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S. - W. wall cabinets
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC ✓



Scan - 17 Sep 07
Ludlum 2360 S/N 177126
Ludlum 43-89/S/N PR184173
800V
*Check 10,466 c/1min
Bkg - 278 cpm (10min)

NO.	DPM	LOCATION	NO.	DPM	LOCATION
78	< 10	rear	88	< 10	base R.
79	< 10	shelf	89	< 10	sides
80	< 10	kneehole L.	90	< 10	rear
81	< 10	" rear	91	< 10	shelf
82	< 10	" R	92	< 10	drawer front
83	< 10	door front	93	< 10	" inside
84	< 10	" inside	94	< 10	" front
85	< 10	" front	95	< 10	" inside
86	< 10	" inside	96	< 10	kneehole L.
87	< 10	base L.	97	< 10	" rear

COMMENTS static 1min counts #75-337, #76-311, #79-284, #87-326, #88-293, #91-287, #93-275, #95-314, #3-316, #4-336, #10-301, Bkg-316 c/1min

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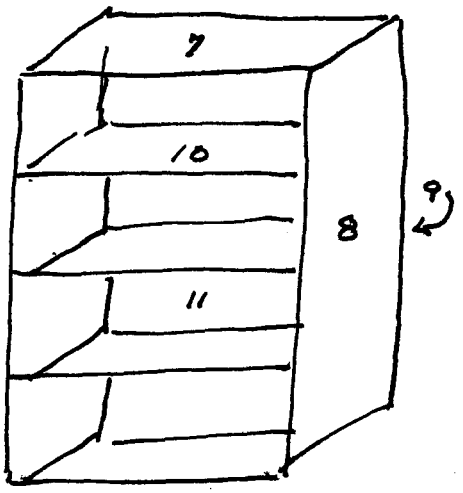
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 14Sep07
SURVEYOR R. Granlund
CONDITIONS F.S.S. Lab cabinets, bookcase
INSTRUMENT(S) Bicron Frisk-Tech__ Bicron Surveyor M__ Ludlum 3__ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
98	< 10	knee hole reg. R	8	< 10	bookcase sides
99	< 10	door front	9	< 10	" rear
100	< 10	" inside	10	< 10	" shelves
1	< 10	" front	11	< 10	" back
2	< 10	" inside			
3	< 10	base L			
4	< 10	base R			
5	< 10	sides			
6	< 10	rear			
7	< 10	bookcase top			

RCG 14Sep07

COMMENTS release bookcase 17 Sep 07

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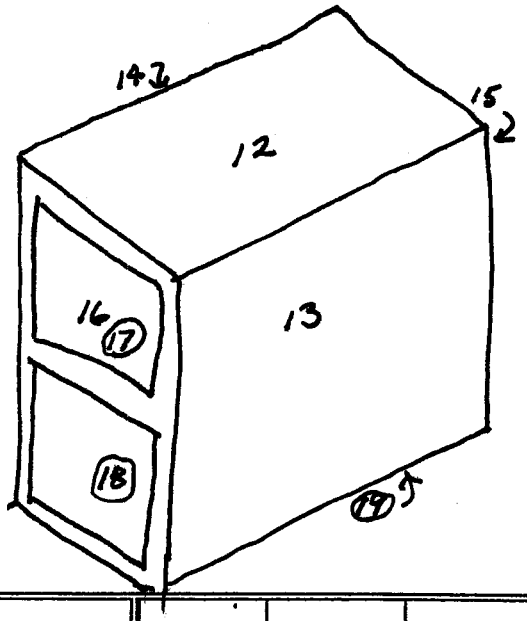
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 17 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S. File cabinet
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X

Ludlum 2360 S/N 177116
Ludlum 43-89 S/N PR184173
800V
^{14}C check 10,466 c/1min
13kg 278 cpm(10 min)



NO.	DPM	LOCATION	NO.	DPM	LOCATION
12	< 10	top			
13	< 10	side R			
14	< 10	" L			
15	< 10	rear			
16	< 10	front			
17	< 10	top drawer inside			
18	< 10	bottom " "			
19	< 10	bottom			
20	< 10	book case bottom			
		Rwg 18 Sep 07			Rwg 18 Sep 07

COMMENTS 1 min static count #18-283, #17-270, #12-
#87(p.19) 2970/10min bkg 2992c/10min, #12-291,
Release file cabinet 18 Sep 07

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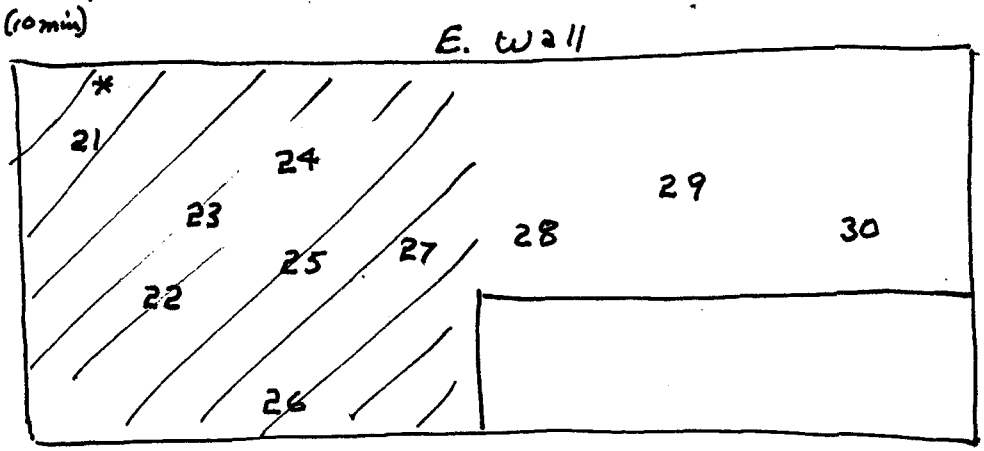
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 18 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S. walls
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC 1
Ludlum 2360 SIN 177116
Ludlum 43-89 SIN PR 184173
800V
^{14}C check 11,211, 11,147 cpm
9285, 9398 cpm
Bkg 270.1 cpm (10 min)
Harvey H-3



NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	E. wall	31	< 10	W. wall window
22	< 10	"	32	< 10	shade
23	< 10	"	33	< 10	window
24	< 10	"	34	< 10	shade
25	< 10	"	35	< 10	window
26	< 10	"	36	< 10	shade
27	< 10	"	37	< 10	window
28	< 10	"	38	< 10	shade
29	< 10	"	39	< 10	W. wall
30	< 10	"	40	< 10	"

COMMENTS *scanned area behind paper coating experiment.
No detectable contamination on wall w/scan

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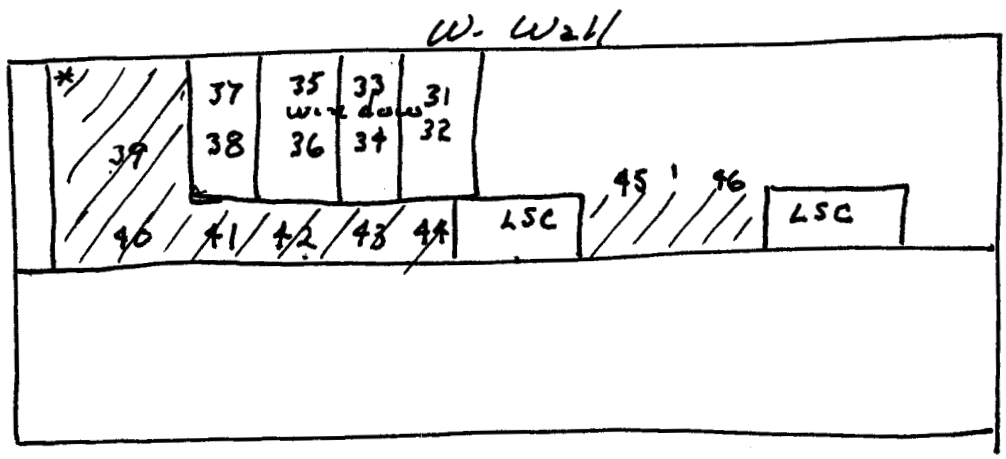
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 18 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S.
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___



NO.	DPM	LOCATION	NO.	DPM	LOCATION
41	< 10	W. wall	51	< 10	N. Wall
42	< 10	"	52	< 10	" door
43	< 10	"	53	< 10	"
44	< 10	"	54	< 10	"
45	< 10	"	55	< 10	"
46	< 10	"			
47	< 10	S. wall			
48	< 10	"			
49	< 10	"			
50	< 10	"			

RWG 18 Sep07

COMMENTS * scanned area

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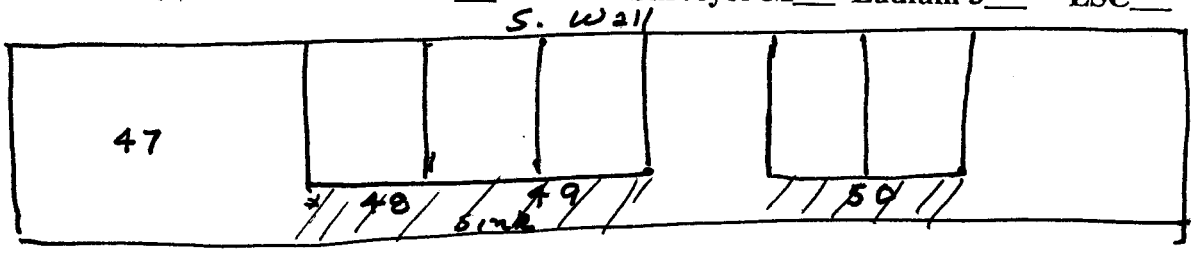
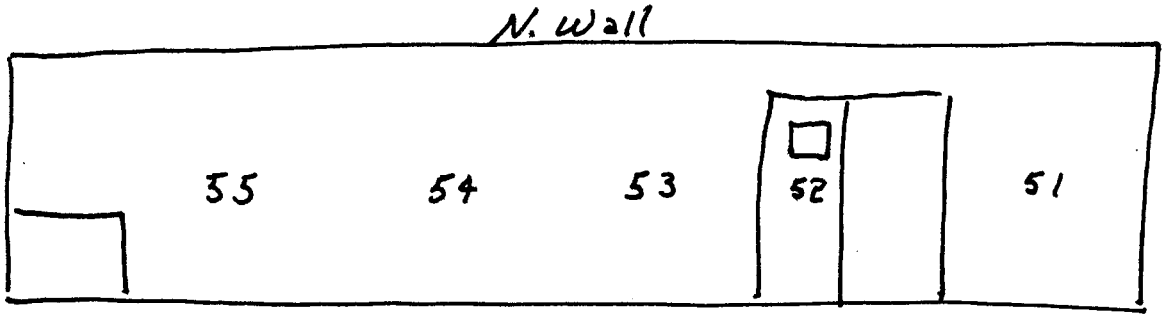
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 18Sep07
SURVEYOR R. Granlund
CONDITIONS F.S.S.
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC___





NO.	DPM	LOCATION	NO.	DPM	LOCATION
47					
48					
49					
50					
51					
52		Rwg			
53		18Sep07			
54					
.					

Rwg 18Sep07

COMMENTS # scanned area behind sink and extraction manifold.

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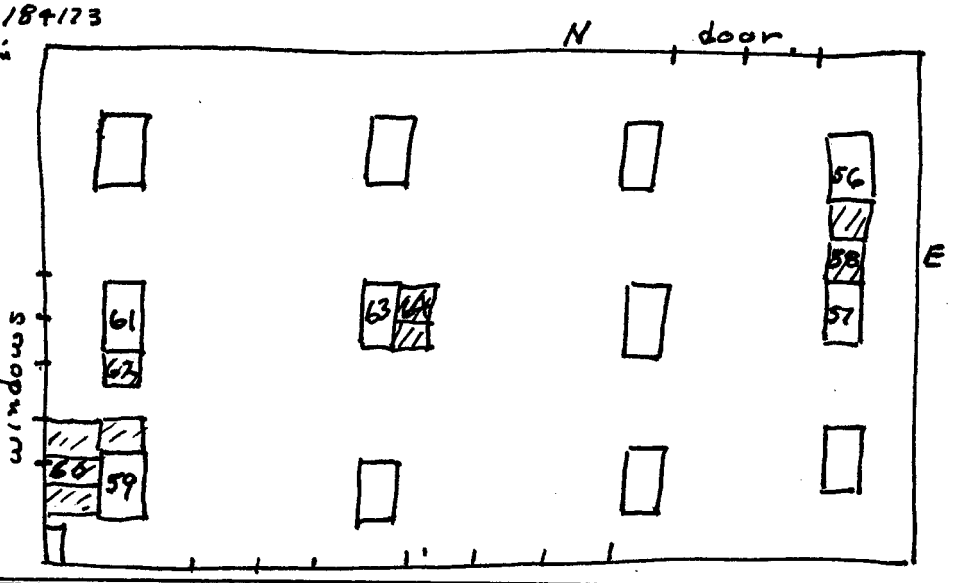
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 19 Sep 07
SURVEYOR R. Granlund
CONDITIONS F.S.S. ceiling
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X
Packard Altima
Ludlum 2360 S/N 177116
Ludlum 43-89 S/N PR184173
800 V Bkg 2684/10min
ITC check 10,644 dpm

light Fixture

scanned tile



NO.	DPM	LOCATION	NO.	DPM	LOCATION
56	< 10	Light cover			
57	< 10	" "			
58	< 10	tile			
59	< 10	Light cover			
60	< 10	tile			
61	< 10	light cover			
62	< 10	tile			
63	< 10	light cover			
64	< 10	tile			
		RWG 21 Sep 07			

RWG 21 Sep 07

COMMENTS No detectable contamination on scan of light covers or tile. Tile background is ~ 400 cpm from natural activity (^{232}Th). Normal background for other lab surfaces is 279 ± 10 (1σ)

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 1 Oct 07
SURVEYOR R. Granlund
CONDITIONS release survey
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ✓ Ludlum 3 ___ LSC ✓

NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 100	20-L carboy #3 outside	11	< 100	5-gal carboy #6 outside
2	7140	#3 inside	12	710	" " #6 inside
3	< 100	#4 outside	13	< 100	siphon hose outside
4	< 100	#4 inside	14	< 100	" " inside
5	< 100	10-L carboy #1 outside	15	< 100	" " tap
6	< 100	#1 inside	16	< 100	cap 1
7	< 100	#2 outside	17	< 100	2
8	< 100	#2 inside	18	< 100	3
9	< 100	5-gal carboy #5 outside	19	< 100	4
10	< 100	" " #5 inside	20	< 100	5, 6

COMMENTS

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RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 **DATE** 1 Oct 07
SURVEYOR R. Granlund
CONDITIONS release survey
INSTRUMENT(S) Bicron Frisk-Tech ✓ Bicron Surveyor M ✓ Ludlum 3__ LSC ✓

NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 100	carboy 3 - inside *			
22	< 100	" 6 " *			
23	< 100	sink tap			
24	< 100	poly chips from cutting			
25	< 100	waste bucket poly			
26	< 100	" " rubber			

RG 2 Oct 07

RG 2 Oct 07

COMMENTS * inside after cutting open and cleaning.
Carboy #3 & #6 discarded after cleaning.

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RADIOACTIVE CONTAMINATION SURVEY

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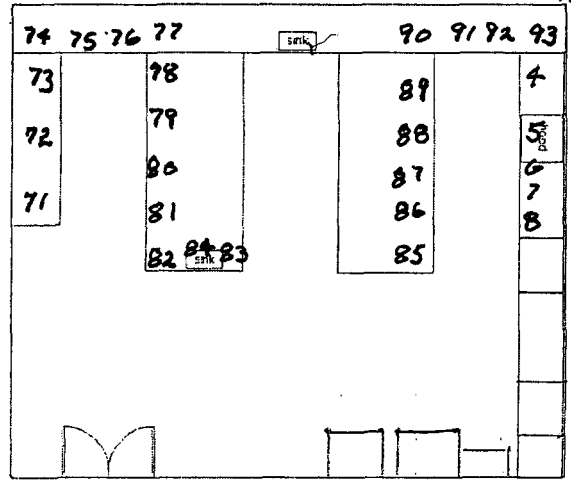
Location: Radioisotope Lab (B1-101) Date: 3 Oct 07
Surveyor: R. Granlund
Conditions: FSS Benchtops
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☒ LSC

Ludlum 2360/43-89 S/N 177116/PR 184123 800V Bkg - 2854/10 min
HP C 95509/10 min



No.	dpm	Location	No.	dpm	Location
71	< 10	benchtop	81	< 10	benchtop
72	< 10	"	82	< 10	"
73	< 10	"	83	< 10	"
74	< 10	"	84	< 10	"
75	< 10	"	85	< 10	"
76	< 10	"	86	< 10	"
77	< 10	"	87	< 10	"
78	< 10	"	88	< 10	"
79	< 10	"	89	< 10	"
80	< 10	"	90	< 10	"

Comments:
No detectable contamination w/ Ludlum 2364/43-89 on ~100% surface scan w/ 1 min integrate during scan.

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RADIOACTIVE CONTAMINATION SURVEY

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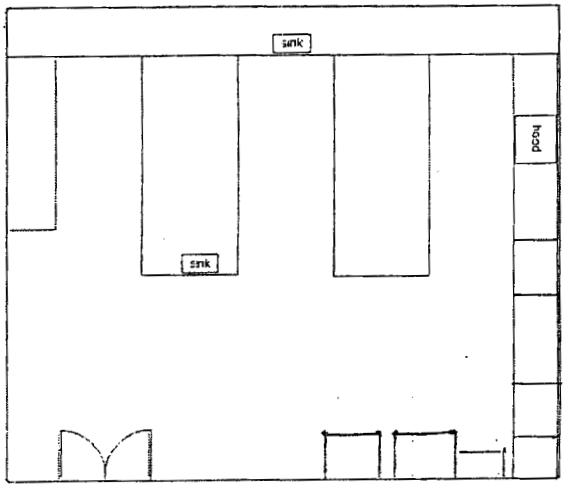
Location: Radioisotope Lab (B1-101) Date: 30oct07
Surveyor: R. Granlund
Conditions: FSS Benchtops
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☒ LSC
Ludlum 2360/43-89



No.	dpm	Location	No.	dpm	Location
91	< 10	benchtop			
92	< 10	"			
93	< 10	"			
4	< 10				
5	< 10				
6	< 10				
7	< 10				
8	< 10				

RLeng 30oct07

RLeng 30oct07

Comments:

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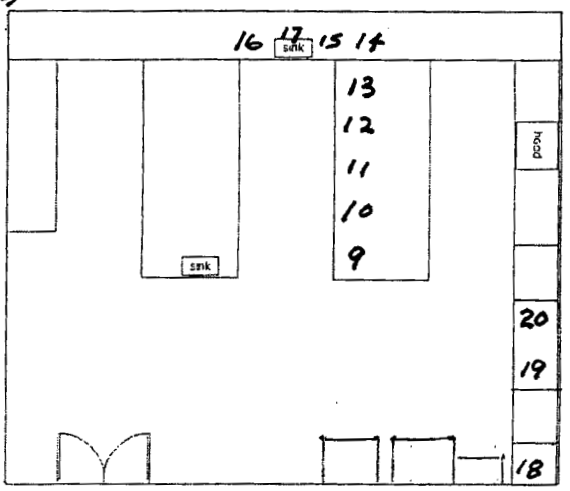
RADIOACTIVE CONTAMINATION SURVEY

Location: Radioisotope Lab (B1-101) Date: 4 Oct 07
Surveyor: R. Granlund
Conditions: FSS counter tops
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☒ LSC

Ludlum 2360/43-89 S/N 177116/PR184173
Bkg 275.5 cpm (10 min)
^{14}C 95096/10 min



No.	dpm	Location	No.	dpm	Location
9	< 10	benchtop	19	< 10	benchtop
10	< 10	"	20	< 10	"
11	< 10	"			
12	< 10	"			
13	< 10	"			
14	< 10	"			
15	< 10	"			
16	"	"			
17	< 10	sink			
18	< 10	benchtop			

Comments:
Sample #41 sink drain (S. wall) surface of trap, #42 bottom of trap 2 ml sample in 20 ml Packard opti-gold. #41 = 1.1×10^{-6} uCi/ml* #42 = 1.6×10^{-6} uCi/ml*
No detectable contamination w/ Ludlum 2360/93-89

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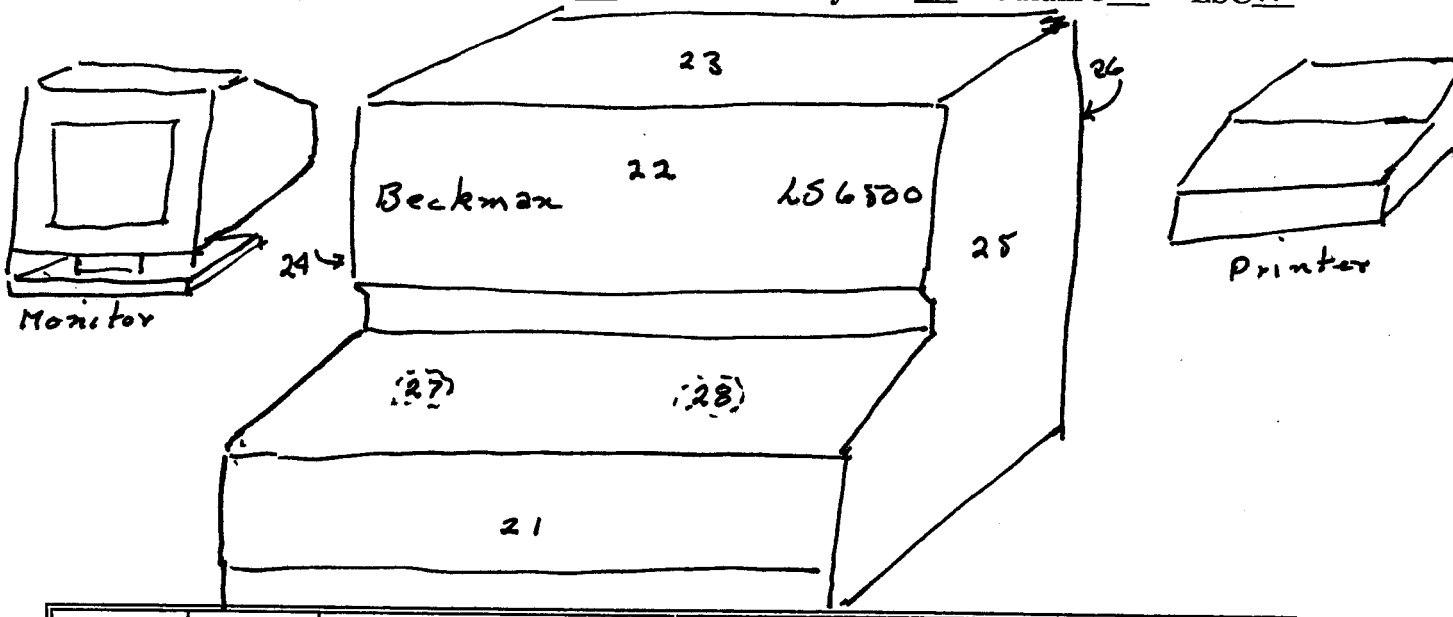
RADIOACTIVE CONTAMINATION SURVEY

LOCATION B1-101 DATE 4 Oct 07
SURVEYOR R. Granlund
CONDITIONS Release Survey LS Counters
INSTRUMENT(S) Bicron Frisk-Tech___ Bicron Surveyor M___ Ludlum 3___ LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
21	< 10	LSC # 2 front-lower	31	< 10	LSC # 1 - same as #2 front-lower
22	< 10	" upper+lid	32	< 10	" upper+lid
23	< 10	top	33	< 10	top
24	< 10	side L	34	< 10	side L
25	< 10	side R	35	< 10	side R
26	< 10	rear	36	< 10	rear
27	< 10	inside tray L	37	< 10	inside tray L
28	< 10	" " R	38	< 10	" " R
29	< 10	monitor	39	< 10	monitor
30	< 10	printer	40	< 10	printer

COMMENTS No detectable contamination on scan with Ludlum 2360/43-89

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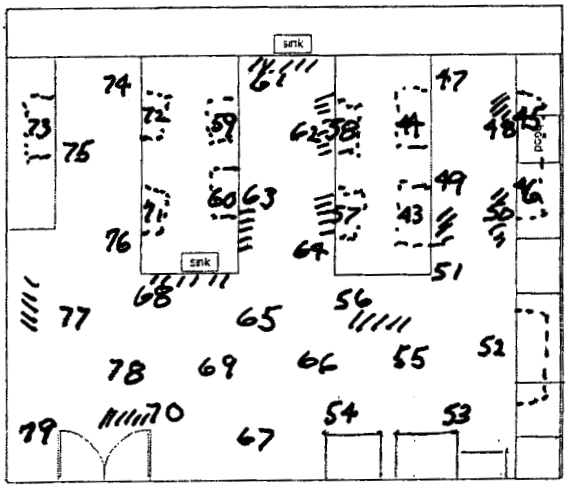
RADIOACTIVE CONTAMINATION SURVEY

Location: Radioisotope Lab (B1-101) Date: 10 Oct 07
Surveyor: R. Granlund
Conditions: FSS floor
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☐ LSC

Ludlum 2360/43-89
SN 177116/PR 184173
Bkg - 2849/10 min
^{14}C check - 97347/10 min



No.	dpm	Location	No.	dpm	Location
43	< 10	floor	53	< 10	floor
44	< 10	"	54	< 10	"
45	35	"	55	< 10	"
46	32	"	56	< 10	"
47	< 10	"	57	< 10	"
48	< 10	"	58	< 10	"
49	< 10	"	59	< 10	"
50	< 10	"	60	< 10	"
51	< 10	"	61	< 10	"
52	< 10	"	62	< 10	"

Comments:
Smears cover 1 ft^2 (1 tile) Shaded areas indicate scan (~10 ft^2 in 2 min) No detectable contamination in scan with Ludlum 2360/43-89.

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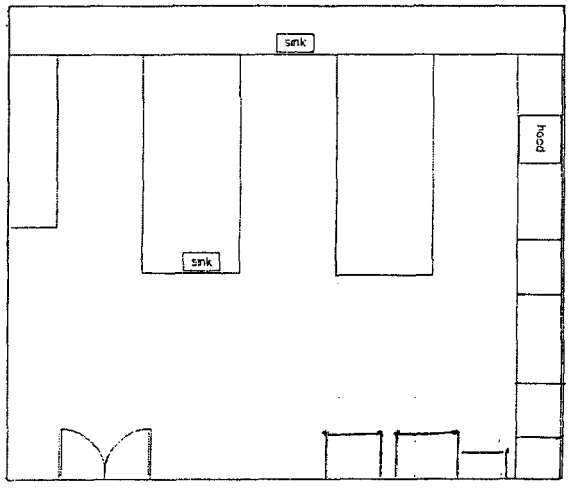
RADIOACTIVE CONTAMINATION SURVEY

Location: Radioisotope Lab (B1-101) Date: 10 Oct 07
Surveyor: R. Granlund
Conditions: FSS of floor
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☑ LSC



No.	dpm	Location	No.	dpm	Location
63	< 10	floor	73	< 10	floor
64	< 10	"	74	< 10	"
65	< 10	"	75	< 10	"
66	< 10	"	76	< 10	"
67	< 10	"	77	< 10	"
68	< 10	"	78	< 10	"
69	< 10	"	79	< 10	"
70	< 10	"			
71	< 10	"			
72	< 10	"			

Comments:

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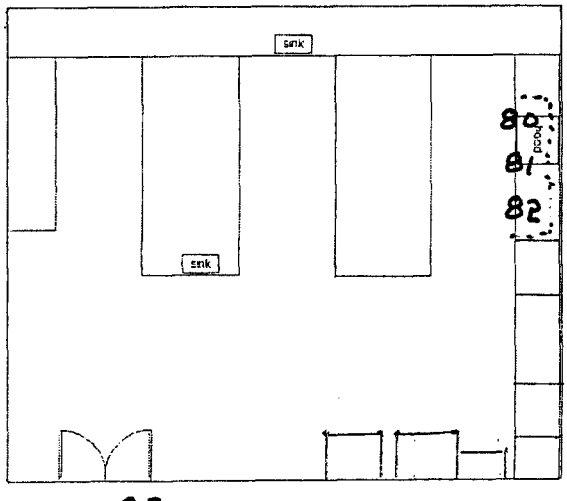
RADIOACTIVE CONTAMINATION SURVEY

Location: Radioisotope Lab (B1-101) Date: 11 Oct 07
Surveyor: R. Granlund.
Conditions: FSS floors
Instrument(s): ☐ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☒ LSC



85 84 83

No.	dpm	Location	No.	dpm	Location
80	< 10	floor	90	< 10	shelves freezer #10
81	< 10	"	91	28	Frost from freezer #35
82	< 10	"			
83	< 10	" hallway			
84	< 10	" "			
85	< 10	" "			
86	< 10	floor - walk in freezer room			
87	< 10	floor - inside freezer #10			
88	< 10	" " " "			
89	< 10	" " " "			

Key
10 Oct 07

Comments:
#80, 81, 82 @ locations #45, 46 in 10 Oct 07 survey after cleaning. #86 floor outside freezer #10, #91 2ml melted frost from -80°C freezer #35. Freezers #10 & #35 used at one time to store RAM samples.

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RADIOACTIVE CONTAMINATION SURVEY

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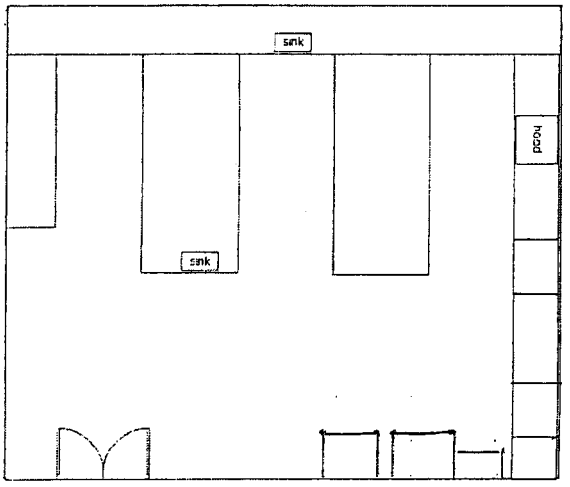
Location: Radioisotope Lab (B1-101) Date: 16 Oct 07
Surveyor: R. Granlund
Conditions: Release survey.
Instrument(s): ~~Bicron Frisk-Tech~~ ☒ Bicron Surveyor M
☐ Ludlum 3 ☒ LSC



No.	dpm	Location	No.	dpm	Location
92	< 10	Trash can 1 outside	66	< 10	trash can 2-inside
93	< 10	" " " inside	67	< 10	chair 2-upper
94	< 10	Chair 1- top	68	< 10	" 2 under
95	< 10	" " - under	69	< 10	" 2 base.
96	< 10	" " - base	70	< 10	Printer D196
97	< 10	5-gal hazmat pail outside	71	< 10	computer D1944
98	< 10	" " " inside	72	< 10	paper cutter
99	< 10	20-L carboy 2.98	73	< 10	letter trays
100	< 10	" " " 2.96	74	< 10	misc office supplies
65	< 10	Trash can 2-outside	75	< 10	balance

Comments:
No detectable contamination w/GMSM.

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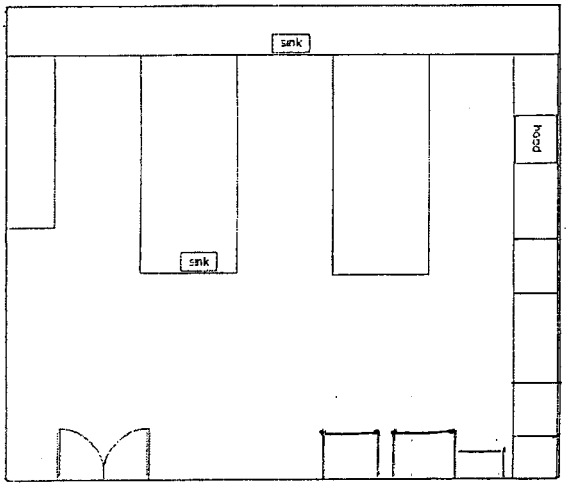
RADIOACTIVE CONTAMINATION SURVEY

Page 66

Location: Radioisotope Lab (B1-101) Date: 16 Oct 07
Surveyor: R. Granlund
Conditions: Release Survey
Instrument(s): ☑ Bicron Frisk-Tech ☐ Bicron Surveyor M
☐ Ludlum 3 ☑ LSC



No.	dpm	Location	No.	dpm	Location
76	< 10	balance cover	86	< 10	chair 3 - under
77	< 10	balance tray top	87	< 10	" " base
78	< 10	" " bottom	88*	< 10	pipetor IN480
79	< 10	pipetor IN516			
80	23	" IN480			
81	< 10	" IN484			Rusty
82	< 10	" IN482			31 oct 07
83	< 10	Trash can 3 - outside			
84	< 10	inside			
85	< 10	chair 3 - upper			

Comments:
* pipetor IN480 cleaned and rechecked 18 Oct 07.

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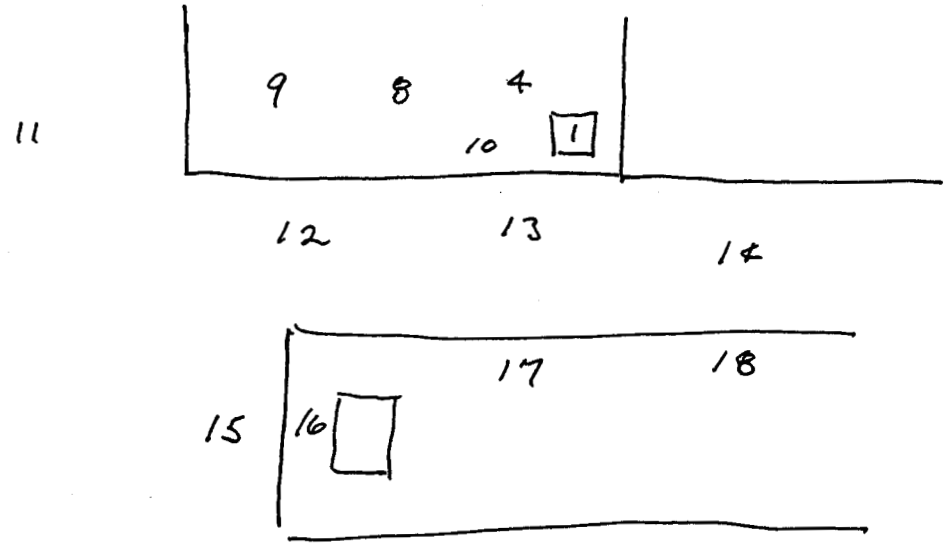
RADIOACTIVE CONTAMINATION SURVEY

LOCATION II-III **DATE** 26 May 05
SURVEYOR R.W. Granlund
CONDITIONS Survey after Hercules synthesis
INSTRUMENT(S) Bicron Frisk-Tech ~~—~~ Bicron Surveyor M ~~—~~ Ludlum 3 ✓ LSC ~~—~~



NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	<100	water bath	11	<100 <100	floor
2	<100	ring stand	12	< 100 <100	"
3	<100 <100	overhead stirrer	13	<100 <100	"
4	<100 <100	hood	14	<100 <100	"
5	<100	Thermos	15	<100 <100	"
6	<100	Lab Jack + Hotplate	16	<100	sink
7	<100	Trays	17	<100	benchtop
8	<100 <100	hood	18	<100	"
9	<100 <100	"			Rwg
10	<100	sash			27 May 05

COMMENTS GMSK check OK - count # 3, 4, 8, 9, 11-15 w/Frisk-Tech then count all overnight w/LSC

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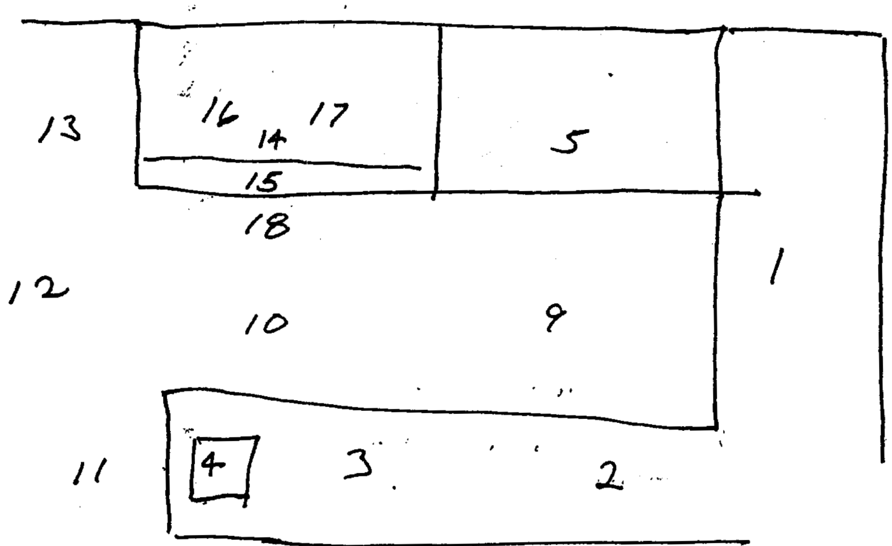
RADIOACTIVE CONTAMINATION SURVEY

LOCATION Bldg #2 - 111 DATE 14 Jun 05
SURVEYOR R.W. Granlund
CONDITIONS survey after ^{14}C synthesis by Hercules
INSTRUMENT(S) Bicron Frisk-Tech ___ Bicron Surveyor M ___ Ludlum 3 X LSC X



NO.	DPM	LOCATION	NO.	DPM	LOCATION
1	< 100	~~hood~~ benchtop (RWG 15 Jun 05)	11	< 100	floor
2	< 100	"	12	< 100	"
3	< 100	"	13	< 100	"
4	< 100	sink	14	< 100	hood
5	< 100	hood	15	< 100	hood apron
6	< 100	balance	16	< 100	hood
7	< 100	dI H2O table	17	< 100	"
8	< 100	back sink	18	< 100	floor
9	< 100	floor			RWG
10	< 100	"			15 Jun 05

COMMENTS GMSM check OK

\CAL\SURVEY/RWG REV. 14 Mar 2003

RWG

KEVIN LLOYD
(814) 231-8032
MPI RESEARCH - STATE COLLEGE
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