OSEH
Occupational Safety & Environmental Health

University of Michigan
Occupational Safety & Environmental Health
Campus Safety Services Building
1239 Kipke Drive, Ann Arbor, MI 48109-1010
Phone: 734 647-1143 • Fax: 734 763-1185

Terrance Alexander, Executive Director

July 21, 2016

Regional Administrator
U.S. Nuclear Regulatory Commission, Region III
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

RE: **Request to Terminate Radioactive Material Use**
Dental Research Facility / 1210 Eisenhower Place / Ann Arbor, MI 48108
No Principal Activities for 24 Months in a Separate Building
University of Michigan
Materials License No. 21-00215-04 / Docket No. 030-01988

Materials Licensing:

In accordance with 10 CFR 30.36(d)(4), the University of Michigan (U-M) is notifying the Nuclear Regulatory Commission (NRC) Region III that no principal activities have been conducted for a period of 24 months in the Dental Research Facility located at 1210 Eisenhower Place, Eisenhower Commerce Center Ann Arbor, Michigan 48108.

The U-M is hereby requesting termination of further radioactive material use at this off-campus facility and the removal of this specific location from Condition 10 of Materials License No. 21-00215-04. Please find enclosed the radiological decommissioning report dated July 15, 2016 for this facility.

Licensed radioactive material was last used in the Dental Research Facility on June 3, 2014 and the U-M Radiation Safety Service /OSEH staff conducted comprehensive laboratory residual radioactivity close-out surveys June 10-11, 2014 (Room 106) and May 24, 2016 (Rooms 110 and 116), and a MARSSIM-style final status survey of all impacted areas (Rooms 106, 110, and 116) to finalize decommissioning of the facility on May 24, 2016.

Thank you for your time and consideration with respect to this notification. Please do not hesitate to contact Senior Health Physicist Dennis Palmieri (dapalm@umich.edu) or me (drisc@umich.edu) at Radiation Safety Service / OSEH [(734) 764-6200] should you have any questions or comments regarding this correspondence.

Sincerely,

Mark L. Driscoll
Director / Radiation Safety Officer
Radiation Safety Service / OSEH

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MLD/DAP/mld
NRCD&DNotification10CFR30.36DentalResearch.docx

cc: Terrance Alexander, Executive Director, Occupational Safety & Environmental Health
Ruthann Nichols, Ph.D., Chair, Radiation Policy Committee
Materials License (Broad Scope) No. 21-00215-04 Files

The University of Michigan
Occupational Safety and Environmental Health
Radiation Safety Service
Campus Safety Service Bldg
1239 Kipke Dr.
Ann Arbor, MI 48109

Radiological Decommissioning Report

for the

U-M Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI
July 15, 2016

University of Michigan
NRC License No.: 21-00215-04

1.0 Description of Facility

1.1 Facility Address

University of Michigan Dental Research Facility
1210 Eisenhower Place
Eisenhower Commerce Center
Ann Arbor, MI 48108

1.2 Description

The Dental Research Facility (DRF) is a small suite of rooms leased by the University of Michigan for use by the Dental School as research laboratory space. Three faculty researchers have been approved to use very low-levels of radioactive materials in the facility since the facility was added as a location of use under the U-M Broad Scope Byproduct Materials License No. 21-00215-04 in 2010. Historical details are summarized separately in Section 2.

It is one of several independent brick and glass, single-story structures located in a commerce park owned by a private entity. It is situated approximately 42 degrees 14' 33" N and 83 degrees 43' and 52" W (see Attachments 1 and 2 -- road and aerial maps).

1.2 Locations of Use

Radioactive materials use was confined to three areas in the facility. Refer to the floor plans attached in the survey records (not to scale):

Rm 106—which served as a general laboratory, storage and waste storage area with a floor area of roughly 1300 square feet;

Rm 116—a large main open lab suite that includes sub-rooms where radioactive materials could be used: a tissue culture room, a cold room, and a dark room. The two researchers approved to use radioactive materials in this room occupied approximately half of the floor area (east end), sharing the other half (west end) with another researcher who did not make use of radioactive materials. The entire floor area is roughly a little larger than 3000 square feet. But, radioactive materials use was confined to specific and defined areas within the east half of the suite;

Rm 110—which served primarily as a storage room, freezer storage and waste storage area with a floor area roughly 350 square feet.

Room 106 and Room 116 are adjacent and connected by a door with Room 106 at the south west end of Room 116. Room 110 is separate and located a short distance down a hallway south of Room 116 and east of Room 106.

2.0 Historical Site Assessment

2.1 Initial Approval

The University leased the premises from a private leasing company for use as laboratory space by the Dental School in 2002. The Dental School leased the space to accommodate the research needs of two new faculty who came to the University to conduct collaborative research in biological materials science. (The faculty members are husband and wife).

At the request of the researchers, the University applied for an amendment to the University's NRC License No. 21-00215-04 to include the premises as a location of use in a letter dated January 17, 2003. The Nuclear Regulatory Commission added the facility as a location of use in Amendment No. 89 dated April 9, 2003. The first use of radioactive materials began in August of 2003.

2.2 Authorized Users and Usage History

2.2.1 Authorized Users: Since being included as a location of use on the U-M Byproduct Materials License, there have been only three researchers approved to use licensed material at the Dental Research Facility:

- Prof. Jan C. C. Hu
- Prof. James Simmer
- Prof. John Drach

Note: Profs. Hu and Simmer are husband and wife and collaborate professionally in their work. Much of their use was for the same course of research and for the same types of experiments, conducted by shared staff using the same facilities in Dental Research (Rms. 116 and 110). For the purposes of a historical site assessment they will be considered as one joint operation using licensed material

2.2.2 Usage History: Table 1.0 lists the radionuclides received since the facility was approved for use on the U-M Byproduct Materials License in 2003. The table shows: i) the highest activity received in any single purchase of the listed radionuclide, ii) the chemical form of the material used at the DRF, iii) the date of the last receipt of that type of radionuclide at the DRF, and iv) the authorized user making that particular purchase. A complete history of material receipts since 2003 for all users is included as Attachment 3.

Table 1.0

Radionuclide	Half-Life	Maximum Activity (nominal)* Received at DRF (mCi)	Chemical Form	Last Date Radionuclide Received at DRF	Authorized User
C-14	5730 y	~ 0.5	Various stocks	5/8/2008**	Drach
H-3	12.3 y	1	Thymidine nucleosides (AZT or variants)	3/11/2014	Drach
P-32	14.2 d	0.5	Nucleotide	11/3/2011	Simmer
P-33	25.3 d	1	Nucleotide	5/2/2012	Hu
S-35	87.5 d	1	Nucleotide	3/26/2004	Simmer

** Nominal or "catalog" quantity. Actual activity can be higher for shorter-lived material due to batch date production methods used by vendors for commonly ordered labeled compounds depending on date order is filled by vendor relative to vendor's last batch production date for the compound ordered.*

*** Stocks transferred from Dental School to Dental Research Facility when lab relocated in May of 2008. Maximum activity in a single vial = 0.25 mCi as an amino acid mixture in ethanol (2.5 milliters).*

2.3 Timeline

October 2002 – initial application and conditional approval of Profs. Jan C. Hu and James Simmer to use radioactive materials in the Dental Research Facility at 1210 Eisenhower Place. Approvals conditioned upon amendment to U-M License No. 21-00215-04 to include 1210 Eisenhower Place as a location of use.

April 9, 2003 – NRC Amendment #89 to U-M license No. 21-00215-04 includes 1210 Eisenhower Place as a location of use

August 26, 2003 – first receipt of licensed radioactive material at the Dental Research Facility by Profs. Simmer and Hu. 0.5 mCi nominal of P-32 labeled nucleotide—GE Amersham, vendor.

May 8, 2008 – relocation of laboratory of Prof. John Drach from the Dental School to the DRF including transfer of H-3 and C-14 stocks (~ 1 mCi) along with ~ 25 g of uranyl acetate used in microscopy under general license.

December 3, 2008 – first purchase of licensed material by Prof. John Drach at the Dental Research Facility. 1 mCi nominal of H-3 thymidine—Moravek Biochemical, vendor.

May 2, 2012 – last receipt of licensed material by Profs. Simmer and Hu. 1 mCi nominal of P-33 nucleotide—Perkin Elmer, vendor.

March 11, 2014--last receipt of licensed material by Prof. John Drach. 0.5 mCi of H-3 gancyclovir (thymidine nucleoside)—Moravek Biochemical, vendor.

June 3, 2014—***last use of licensed material at the Dental Research Facility***. This was by Prof. John Drach with the preparation and transfer of all tritiated specimens and compounds to a colleague at Des Moines University in Des Moines, IA for analyses. The transfer and shipment was through the University of Michigan Occupational Safety and Environmental Health—Radiation Safety Service (OSEH-RSS). Prof. Drach retired afterward and his approval was terminated. There have been no receipts or use of licensed material by Profs. Hu or Simmer since.

June 10-11, 2014—Comprehensive Laboratory Residual Radioactivity Close-Out survey of Dr. John Drach's laboratory (Rm 106). No remaining residual radioactivity. (See Sec. 3.0 – Surveys)

May 24, 2016—Comprehensive Laboratory Residual Radioactivity Close-Out of Hu / Simmer laboratory (Rms. 116 and 110) due to 2-year Timeliness-in-Decommissioning Rule. No remaining residual radioactivity. (See Sec. 3.0 – Surveys)

May 24, 2016 -- Final Status Survey of all impacted areas (Rms 106, 110 and 116) to finalize decommissioning of the Dental Research Facility in anticipation of removal of the facility as a location of use from the U-M Byproduct Materials License. No remaining residual radioactivity. (See Sec. 3.0 – Surveys)

2.2.4 Contamination Incidents

There is no history of any contamination incidents at the facility nor any uses or other procedures that could result in the release of radioactive contaminants into the environment or spread of contaminants in the facility.

2.2.5 Radioactive Wastes and Transfers

The long-standing practice at the University of Michigan is for OSEH – Hazardous Materials Management (OSEH-HMM) to collect all radioactive wastes including all potentially contaminated liquid wastes for proper disposal by OSEH-HMM in accordance with the provisions of 10 CFR 20 and the U-M Byproduct Materials License. Individual researchers are not permitted to discharge radioactive liquids into sinks or other drains. OSEH-HMM maintains copies of radioactive waste manifests identifying wastes by form, radionuclide and estimated activity of wastes collected.

Table 2.0
Waste Collections from DRF (2003 – Present)

Collection Date	Manifest No.	Auth. User	Radionuclide(s)	Comment
7/6/2004	26510	Simmer / Hu	P-32	DAW, liquids, LS fluid
9/5/08	26646	Simmer / Hu	H-3, P-32	"
11/30/11	26647	Simmer / Hu	P-32	"
2/10/12	26648	Simmer / Hu	P-33	"
3/21/12	26649	Simmer / Hu	P-33	"
5/23/12	26511	Simmer / Hu	P-33	DAW, liquids
7/30/12	26512	Simmer / Hu	P-33	DAW, liquids, LS fluid
4/19/16	32785	Simmer / Hu	Uranyl Acetate	(trace electron microscopy wastes)
2/9/10	30380	Drach	H-3	DAW, liquids
3/8/10	30381	Drach	H-3	DAW, liquids, LS fluid
6/29/10	30382	Drach	H-3	DAW, liquids, LS fluid
7/10/13	30384	Drach	H-3	DAW, liquids, LS fluid
8/7/13	30385	Drach	H-3	DAW, liquids, LS fluid
7/1/14	30386	Drach	H-3, C-14. uranyl acetate	DAW, liquids, stock vials, LS fluid

Table 2.1
Material Transfers from DRF (2003 – Present)

Date	Auth. User	Radionuclide	Nominal Activity (mCi)	Recipient	L License No.
8/25/11	Drach	H-3	0.9	Microbiotix, Inc; Worcester, MA	N/A Exempt Quantity per 10 CFR 30.18
4/17/14	Drach	H-3	1.0	Microbiotix, Inc; Worcester, MA	N/A Exempt Quantity per 10 CFR 30.18
6/3/14	Drach	H-3	2.1	DesMoines Univ; DesMoines, IA	IA-0071-77-RD2

2.2.6 OSEH-Radiation Safety Service Inspections

OSEH-RSS technical staff visit laboratories approximately four times each year and conduct swipe surveys for removable contamination in labs approximately semi-annually. Routine survey results from 2012 through 2014 did not identify any significant removable contamination in the Dental Research Facility.

2.2.7 Nuclear Regulatory Commission Inspections

Inspectors from the NRC have visited the Dental Research Facility from time-to-time. The two most recent inspections were in October of 2015 and February of 2012. The inspectors did not identify any items non-compliance, identify any contamination or express any concerns about the condition of the facility or potential for contamination or residual radioactivity.

3.0 Comprehensive Close-Out Surveys

3.1 Rm 106 Comprehensive Close-out Survey for Residual Radioactivity – John Drach Lab

Date: 6/10 – 6/11/2014

A comprehensive survey of all work surfaces along with floors, air and fume hood ventilation ducts, and any drains (sink and floor when present).

Radiation survey methods: consisted of 1) approximately 60 paper swipe tests of work surfaces (**> 100 cm^2**), drains and vents for removable contamination, and 2) a calibrated meter survey using a Ludlum Model 44-142 plastic beta scintillator probe with Model 12 survey meter for fixed contamination. [Although the HSA records show lab used only tritium, a survey was still conducted using the survey meter to confirm there were no unexpected sources of radioactivity.] See Sec. 5.0 for instrumentation information.

Summary of Results: Only two paper swipes identified removable activity in slight excess of background counting levels. Extremely low-levels of removable H-3 contamination were noted in a fume hood (under 70 dpm net of background) and the inside of a radioactive materials storage freezer (under 210 dpm net of background). These areas were cleaned with soap and water and re-tested and shown to be at background after decontamination. The meter survey did not identify any statistically detectable radiation in excess of the minimum detectable activity and minimum detectable concentrations for the meter.

A copy of the survey results including descriptions and performance check information for the Ludlum survey meter is attached.

Conclusion: No significant residual radioactivity. The lab has not been occupied since Dr. Drach vacated and is used only for storage of records and some unused equipment left behind and being kept in storage by the Dental School.

3.2 Rooms 110 and 116 Comprehensive Close-out Survey for Residual Radioactivity

Date: 5/24/2016

A comprehensive survey of all work surfaces along with floors, air and fume hood ventilation ducts, and any drains (sink and floor when present).

Radiation survey methods: consisted of 1) approximately 150 paper swipe tests of work surfaces **(>100 cm^2)**, drains and vents for removable contamination, and 2) a calibrated meter survey using a Ludlum Model 44-142 plastic beta scintillator probe with Model 12 survey meter for fixed contamination. See Sec. 5.0 for instrumentation information.

Summary of Results: Paper swipes identified no removable activity in excess of background counting levels. The meter survey identified no statistically detectable radiation in excess of the minimum detectable activity and minimum detectable concentrations for the meter.

A copy of the survey results including descriptions and performance check information for the Ludlum survey meter is attached.

Conclusion: No significant residual radioactivity. The lab will remain occupied by Profs. Hu and Simmer for use as a research lab. They have terminated their authorization to use radioactive materials and do not intend to use licensed byproduct material in the future. The lab will retain 25 g of microscopy grade uranyl acetate (depleted uranium) manufactured and sold by Electron Microscopy Sciences of Hatfield, PA for use in electron microscopy of tissues used under general license (10 CFR 40.22). Because this use is under the provisions and restrictions of 10 CFR 40.22 it is independent of the U-M Broad Scope License or any other U-M specific license and is not considered residual radioactivity for the purposes of this decommissioning.

4.0 Final Status Survey for Rooms 106, 110 and 116

4.1 Designation of MARSSIM Class:

Based on the site operating history and previous radiological surveys, potentially impacted areas at the Dental Research Facility are not expected to contain any residual radioactivity or contain levels of residual radioactivity at only a very small fraction of the $DCGL_W$ and the entire site should be considered a Class 3 site:

1) The only long-lived radionuclide (half-life in excess of 90 days) is H-3.
2) All short-lived radionuclides (P-32, P-33, S-35) and, based on receipt records, would have all decayed to levels indistinguishable from background.
3) The $DCGL_W$ is 1.2E08 dpm/100 cm^2
4) Historical record supports benign record of use: amounts received, physical/chemical form received (non-reactive, non-volatile), infrequent use, usage protocols (simple in vitro work), no history of any contamination incidents.
5) Comprehensive close out surveys demonstrate no residual radioactivity in excess of detection limits in any potentially impacted areas.

4.2 Survey Unit and Survey Design

A survey unit is a portion of a facility with common contaminants and contamination potential and contiguous surfaces or areas. For Class 3 sites, MARSSIM recommends no limit on surface area for a survey unit. For the purposes of the Final Status Survey for the Dental Research Facility, non-contiguous rooms are considered to be survey units. Where rooms are contiguous, they were incorporated into a single survey unit. Table 3.0 summarizes the survey units, class, areas and recommended MARSSIM sampling and scanning survey point selections. The approximate area includes ceiling and wall surfaces subject to survey.

Table 3.0

Survey Unit	Description	Impact Class	Approx. Area (sq. meter)	Sampling Selection	Scanning Locations
Rms 106 & 116	Labs w/ ancillary support subrooms: cold room, tissue culture, & darkroom	3	885	Random	Judgmental
Rm 110	Storage and Equipment	3	151	Random	Random

4.3 Number of Data Points per Survey Unit

MARSSIM permits using a relative shift of 1.67 for preliminary survey design based on Type I and Type II errors of 5%. The relative shift is the range of the Gray Area divided by the standard deviation of sample point concentrations. MARSSIM recommends a Gray Area upper bound equal to the $DCGL_W$ and a lower bound (LBGR) equal to 50% of the $DCGL_W$. The recommended standard deviation for preliminary survey design is 30% of the $DCGL_W$. Thus 50% / 30% = 1.67.

From MARSSIM Table 5.5:

Relative Shift = 1.67
Type I Error = Type II Error = 0.05
Minimum Number of required data points: 17

4.4 Survey Locations and Methods

Survey maps were prepared for each survey unit in exploded format showing walls, floors, and ceilings. MARSSIM permits judgmental surveys for Class 3 locations. However, those were performed in the comprehensive close out surveys for each of the rooms with comprehensive scan surveys of all work surfaces and sampling swipe tests taken at over 150 judgmentally selected locations.

Randomly selected locations were selected for the purposes of the Final Status Survey in order to enhance confidence in the results of the comprehensive close out surveys. Twenty (20) sample points were chosen for the survey unit consisting of Rms. 106 and 116. Eighteen sample points were selected in Rm. 110.

Paper swipe tests were collected from each random sample point. The area surveyed at each sample point was **100 cm^2**. In addition, 1 - minute static meter survey counts covering **100 cm^2** of surface were taken at each of the random sample points using a Ludlum Model 12 meter with a 44-142 plastic scintillator probe. See Sec. 5.0 for instrumentation information.

5.0 Instrumentation

5.1 Portable Instrumentation

Table 4.0 lists the portable survey instrumentation used to conduct comprehensive close out and final status surveys of the potentially impacted areas (Rms. 106, 110 and 116). All meters and probes are manufactured by Ludlum Instruments. Additional response information including scanning MDC and static MDA when used is included in the survey worksheets that are attached.

5.2 Analysis of Swipe Test Samples

Swipe tests were analyzed using a Packard (Perkin-Elmer) Tri-Carb 2900TR liquid scintillation analyzer S/N 422606. This is calibrated annually to H-3 and C-14 quenched standards. In addition, it undergoes weekly performance checks using the Packard system Internal Performance Assessment (IPA).

Table 4.0
Survey Instrumentation

Meter Model & S/N	Probe Model & S/N	Date of Use	Date of Calibration	C-14 Efficiency	Usage
2221 / 234992	44-142 / PR242791	6/10/2014	1/2014	5.7%	Comprehensive Close-out
12 / 248042	44-142 / PR266943	5/24/16	8/2015	6.6%	Comprehensive Close-out
12 / 265115	44-142 / PR246236	5/24/16	8/2015	7.1%	Final Status Survey

6.0 Conclusion

All measurements were substantially below the $DCGL_W$ and the surveys did not identify any notable residual radioactivity of significance. No results approached the Lower Bound of the Gray Area (LBGR) which is 50% of the $DCGL_W$. Non-parametric statistical testing, therefore, is not necessary.

Based upon the complete historical site assessment, the comprehensive close-out surveys and the final status survey, we can conclude that the Dental Research Facility meets applicable criteria for full release to unrestricted use.

Table of Attachments

Attachment 1:	Road Map of Dental Research Facility (DRF) at 1210 Eisenhower Place
Attachment 2:	Aerial Map of Dental Research Facility (DRF) at 1210 Eisenhower Place
Attachment 3:	Radioactive Material Receipt History for DRF from 2003 to present
Attachment 4:	Comprehensive Close-Out Survey Record for Rm 106 DRF of June 10, 2014
Attachment 5:	Comprehensive Close-Out Survey Record for Rms. 110 and 116 of May 24, 2016
Attachment 6:	Final Status Survey Record for Rms. 106, 110 and 116 of May 24, 2016

Attachment 1

Road Map
Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI 48108

Attachment 1

Attachment 2

Aerial Map
Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI 48108

Google Maps 42°14'32.7"N 83°43'51.6"W

1210 Eisenhower Place

Attachment 2

Attachment 3

Radioactive Material
Receipt History
2003 - Present
Dental Research Facility
(DRF)
1210 Eisenhower Place
Ann Arbor, MI 48108

Received Material

Date Received	Clearance Code	Package ID	Isotope	Chemical Form	Physical Form	Catalog Number	Vender Name	Received Activity	Unit	Num Items	Comments
DRACH, JOHN											
Dental Research Facility Rm 106											
12/3/2008	12012008-009	P-12032008-002	H-3	UNSPECIFIED	Liquid	mt6039	MORAVEK Biochemical, I	1	mCi	1	
11/18/2009	10202009-004	P-11182009-007	H-3	UNSPECIFIED	Liquid	MT1925	MORAVEK Biochemical, I	0.25	mCi	1	3 vials in one box
11/18/2009	10202009-004	P-11182009-007	H-3	UNSPECIFIED	Liquid	MT725	MORAVEK Biochemical, I	0.5	mCi	1	3 vials in one box
11/18/2009	10202009-004	P-11182009-007	H-3	UNSPECIFIED	Liquid	MT1002231	MORAVEK Biochemical, I	1	mCi	1	3 vials in one box
3/27/2013	03112013-005	P-03272013-003	H-3	UNSPECIFIED	Liquid		Microbiotix, Inc	0.4	mCi	1	
3/11/2014	03032014-004	P-03112014-009	H-3	UNSPECIFIED	Liquid	n/a	MORAVEK Biochemical, I	0.5	mCi	2	
Hu, Jan C-C											
Dental Research Facility Rm 110											
10/6/2010	10042010-011	P-10062010-002	H-3	standards	Any	nc9298799	FISHER SCI	0.000045	mCi	1	For LSC (exempt qty)
Dental Research Facility Rm 116											
12/8/2011	12062011-007	P-12082011-002	P-33	dNTP	Any	NEG302H250UC	PERKIN-ELMER Life and	0.328	mCi	1	
1/24/2012	01232012-001	P-01242012-038	P-33	dNTP	Any	neg302h001mc	PERKIN-ELMER Life and	1.146	mCi	1	
2/7/2012	02032012-002	P-02072012-001	P-33	dNTP	Any	neg302h001mc	PERKIN-ELMER Life and	1.146	mCi	1	
2/22/2012	02202012-003	P-02222012-004	P-33	dNTP	Any	neg302h001mc	PERKIN-ELMER Life and	1.11	mCi	1	
4/24/2012	04232012-001	P-04242012-002	P-33	dNTP	Any	neg002h001mc	PERKIN-ELMER Life and	1.38	mCi	1	
5/2/2012	05012012-003	P-05022012-004	P-33	dNTP	Any	neg302h001mc	PERKIN-ELMER Life and	1.636	mCi	1	

Date Received	Clearance Code	Package ID	Isotope	Chemical Form	Physical Form	Catalog Number	Vender Name	Received Activity	Unit	Num Items	Comments
Simmer, James											
Dental Research Facility Rm 116											
8/26/2003	08252003-003	P-08262003-005	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.607	mCi	1	
8/26/2003	08252003-003	P-08262003-005	P-32	dNTP	Any	AA0005	AMER/ GE Healthcare	0.607	mCi	1	
10/1/2003	09302003-009	P-10012003-006	P-32	dNTP	Any	35001U	Icn	0.61	mCi	1	
11/14/2003	11122003-010	P-11142003-006	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.368	mCi	1	
12/17/2003	12162003-006	P-12172003-004	P-32	dNTP	Any	ICN35001U	FISHER SCI	0.61	mCi	1	
1/16/2004	01132004-009	P-01152004-010	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.368	mCi	1	
1/16/2004	01132004-009	P-01152004-010	P-32	dNTP	Any	AA005	AMER/ GE Healthcare	0.736	mCi	1	
1/26/2004	01232004-017	P-01262004-009	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.35	mCi	1	
2/4/2004	02022004-008	P-02042004-005	P-32	dNTP	Any	AA0005	AMER/ GE Healthcare	0.578	mCi	1	
2/27/2004	02252004-011	P-02272004-015	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.368	mCi	1	
3/26/2004	03252004-006	P-04202004-029	S-35	dNTP	Any	SJ1015	AMER/ GE Healthcare	1.035	mCi	1	
4/8/2004	04072004-006	P-04082004-051	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.275	mCi	1	
4/9/2004	04072004-005	P-04092004-067	P-32	dNTP	Any	38101X	FISHER/ICN	0.77	mCi	1	
4/9/2004	04072004-005	P-04092004-067	P-32	dNTP	Any	39313H	FISHER/ICN	0.77	mCi	1	
4/15/2004	04132004-012	P-04152004-002	P-32	dNTP	Any	AA0068	AMER/ GE Healthcare	0.275	mCi	1	
6/8/2005	06072005-009	P-06082005-001	P-32	dNTP	Any	AA0005	AMER/ GE Healthcare	0.289	mCi	1	
8/24/2005	08052005-003	P-08242005-002	P-32	dNTP	Any	aa005-250	AMER/ GE Healthcare	0.334	mCi	1	
10/6/2006	10052006-002	P-10062006-011	H-3	Thymidine	Any	u1631	Sigma-Aldrich Chemical	0.1	mCi	1	
11/17/2006	11102006-009	P-11172006-004	P-32	dNTP	Any	aa0005	AMER/ GE Healthcare	0.318	mCi	1	
2/26/2007	02222007-009	P-02262007-001	P-32	dNTP	Any	aa0005	AMER/ GE Healthcare	0.701	mCi	1	

Date Received	Clearance Code	Package ID	Isotope	Chemical Form	Physical Form	Catalog Number	Vender Name	Received Activity	Unit	Num Items	Comments
4/20/2007	04042007-001	P-04202007-007	P-32	dNTP	Any	aa0068	AMER/ GE Healthcare	0.318	mCi	1	
6/19/2007	06152007-006	P-06192007-013	P-32	dNTP	Any	aa0005	AMER/ GE Healthcare	0.606	mCi	1	
11/29/2010	11162010-005	P-11292010-002	P-32	dNTP	Any	NEG002H250Uc	PERKIN-ELMER Life and	0.368	mCi	1	
1/14/2011	01122011-003	P-01142011-005	P-32	dNTP	Any	neg002h250uc	PERKIN-ELMER Life and	0.275	mCi	1	
7/26/2011	07252011-005	P-07262011-005	P-32	dNTP	Any	neg0024250uc	PERKIN-ELMER Life and	0.318	mCi	1	
11/3/2011	11022011-002	P-11032011-006	P-32	dNTP	Any	neg002h250uc	PERKIN-ELMER Life and	0.289	mCi	1	
11/21/2011	11182011-004	P-11212011-006	P-33	dNTP	Any	neg302h250uc	PERKIN-ELMER Life and	0.376	mCi	1	
11/29/2011	11282011-008	P-11292011-009	P-33	dNTP	Any	NEG302h250uC	PERKIN-ELMER Life and	0.286	mCi	1	

Attachment 4

Comprehensive Close-Out
Survey Record for Rm 106
Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI
June 10, 2014

UNIVERSITY OF MICHIGAN
OCCUPATIONAL SAFETY & ENVIRONMENTAL HEALTH
RADIATION SAFETY SERVICE

LABORATORY CLOSE-OUT CHECKLIST

Authorized User	Room	Building	Date/Time	Conducted By:
Drach, John	106	Dental Research	10 Jun 2014/14:00	S. Weger

Reason for close-out: __ Inactive Status __ Termination __ Lab Relocation __ Other

IMPORTANT: ALL RADIOACTIVE MATERIAL AND WASTE MUST BE REMOVED PRIOR TO CLOSE-OUT SURVEYS:

	Survey Meter			
	Manufacturer Model / Serial Number	HV	Calibration Due Date	Instrument Efficiency
Survey Meter	Ludlum Model 2221 SN 234992	1150	1/15	C-14: 0.057 Si-32/P-32: ____
Probe	Ludlum Model 44-142 SN PR242791			
Performance checked?	**C-14:** Y N **Si-32:** Y N Other: _____ Y N			
Bkg 1 (cpm)	248			
Bkg 2 (cpm)	263			
Bkg 3 (cpm)	230			
Avg Bkg (cpm)	247			
Avg Bkg + MDCR	247 + 169 = 416 cpm			
Avg Bkg + L_D	247 + 77 = 324 cpm			

Scanning and Static Sensitivity: (see card attached to meter)

Scanning MDC:

MDCR = 169 **cpm** **MDC $_{scan}$ =** 16774 **dpm/100 cm^2**

Static MDA:

L_D = 77 **cpm** **MDA $_{static}$ =** 5370 **dpm/100 cm^2**

Location	Swipes Completed? (Y / N / NA)	Survey Meter 1 Reading Scan	Static
Floor	Y	<MDCR	<MDA
Shelves / Drawers/ Cabinets	Y	<MDCR	<MDA
Refrigerators / Freezers	Y	<MDCR	<MDA
Sinks /Sink Traps/Benchtops	Y	<MDCR	<MDA
Tables / Desks	Y	<MDCR	<MDA
Equipment / Devices	Y	<MDCR	<MDA
Fume Hoods / BSCs / etc	Y	<MDCR	<MDA
Vents	Y	<MDCR	<MDA
Floor drains/Ductwork/Other	Y	<MDCR	<MDA

(OVER) ➔

Comments:
RSS cleaned up all found contamination to below detectable levels.

AUTHORIZED USER NOTIFIED OF IDENTIFIED CONTAMINATION? N/A

DECONTAMINATION BY AUTHORIZED USER VERIFIED BY RSS? N/A

REMOVE:

Postings and Labels	Completed? (Y / N / NA)
"Radioactive Materials" Door Posting	Y
NRC Form 3 ("Notice to Employees")	Y
Contamination Monitoring Poster(s)	Y
Refrigerator / Freezer Labels	Y
Radioactive Material Warning Tape	Y
Miscellaneous Items	**Removed? (Y / N / NA)**
Lead Pigs / Storage Containers	Y
Radiation Safety Records Binder	Y
Other	

HEALTH PHYSICS TECHNICIAN [signature] **DATE** June 30, 2014
(Signature)

Task	Completed? (Y / N / NA)
Complete Room Change Form. Give to RSS Secretary	✓
Complete Departmental Notification Memorandum (Attach Maps, LSC Printouts) Give to RSS Secretary	✓
Notify Biological and Laboratory Safety (Notify ONLY if laboratory is COMPLETELY vacated)	✓

HEALTH PHYSICIST [signature] **DATE** 7/2/14
(Signature)

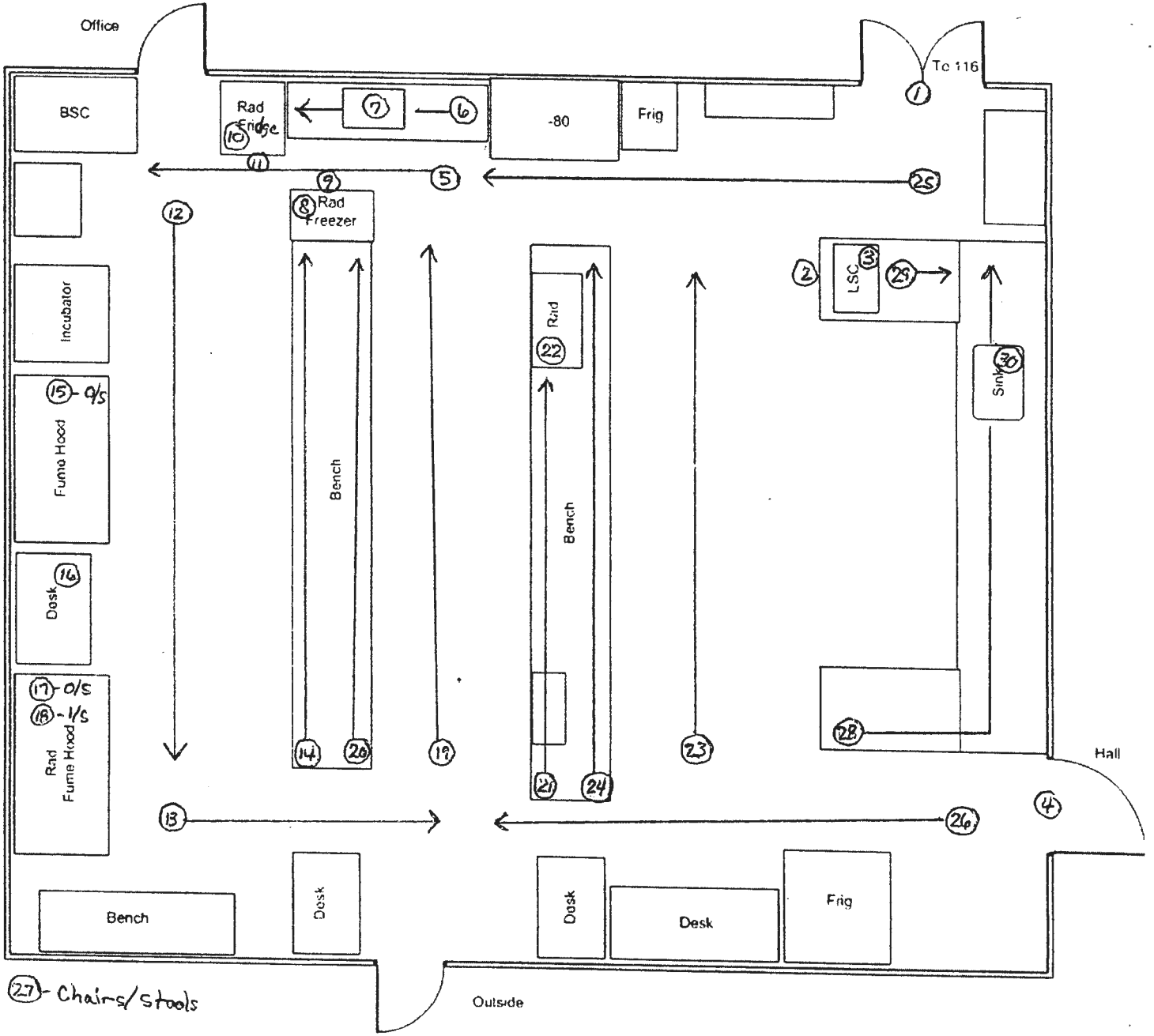
Task	Completed? (Y / N / NA)
Update Roomlist with Attached Room Change Form	y
Process Department Notification Memorandum	y
Update Decommission Database	y
Place Close-out Packet in File	

RSS SECRETARY [signature] **DATE** 7/31/14
(Signature)

Revision 8: 8/13 RSG S:\RSS\BLANK FORMS\Decommissioning Related\Lab close-Outs\Lab close-out checklist.docx
Original: 5/95 ATC/atc; Revision: 11/97 RDD/MLD/rdd; Revision2: 4/98 RDD/rdd; Revision3: 10/07 ATC/PQ/atc
Revision 4: 4/08 RSG/STU; Revision 5: 9/08 RSG; Revision 6: 11/08 RSG; Revision 7: 5/09 RSG;

Room 106
Dental Research Facility

John Drach



Drach

Protocol# 49 - Dennis.lsa User: Shannon

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Shannon\Shannon
Raw Results Path: C:\Packard\Tricarb\Results\Shannon\Shannon\20140602_0714.results
Assay File Name: C:\Packard\TriCarb\Assays\Shannon.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

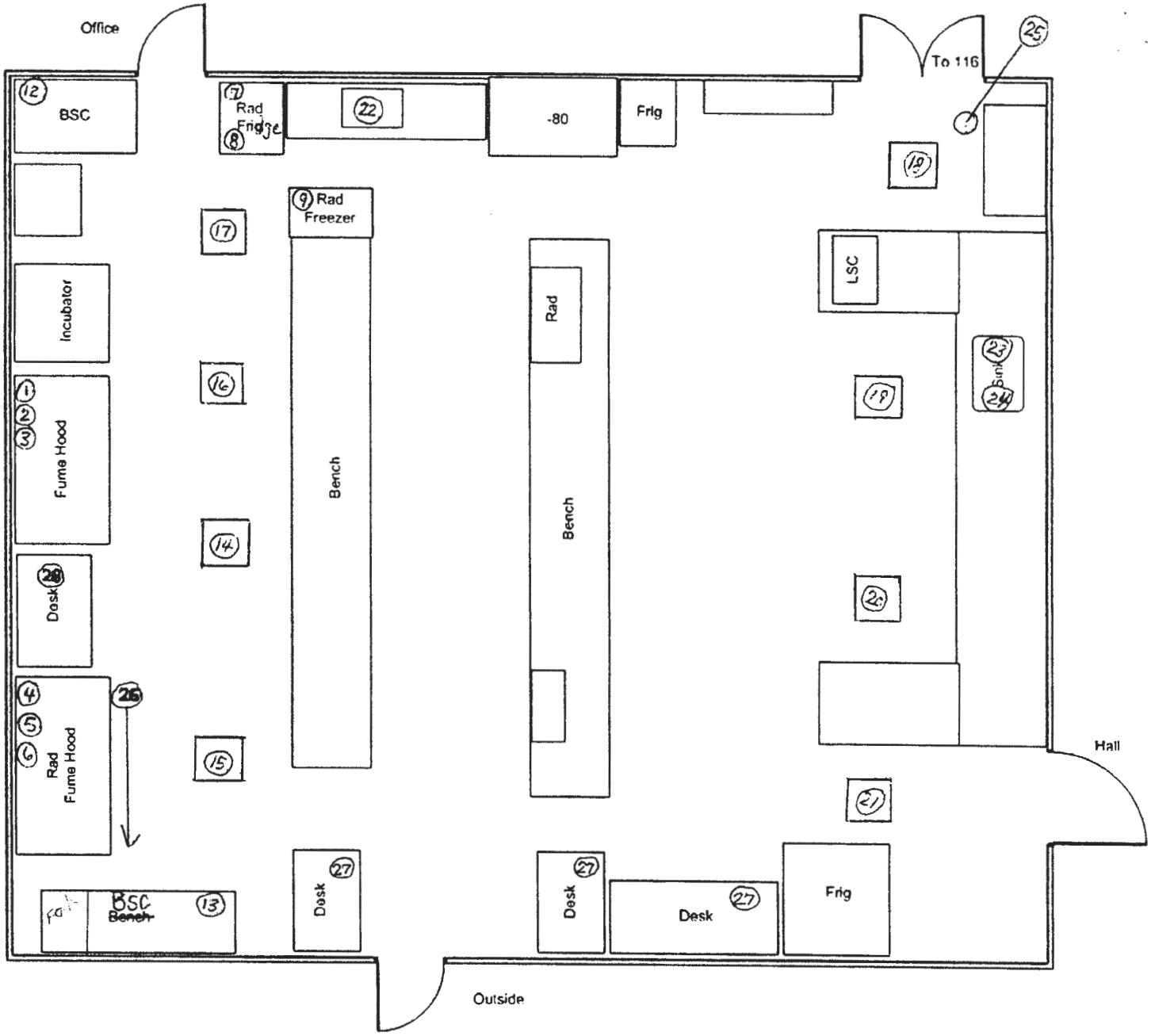
S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	38	1.0	21	53	12	18	10	12	422.5	0	
2	38	1.0	18	45	7	11	14	16	402.8	0	
3	38	1.0	18	46	12	17	17	20	411.2	0	
4	38	1.0	20	50	10	15	13	15	403.9	0	
5	38	1.0	16	39	6	10	18	21	395.6	0	
6	38	1.0	13	33	6	9	13	15	416.7	0	
7	38	1.0	22	55	12	18	12	14	405.5	0	
8	38	1.0	20	50	5	7	7	8	419.4	0	
9	38	1.0	9	23	9	13	16	19	423.5	0	
10	38	1.0	40	100	10	15	10	12	427.3	0	
11	38	1.0	12	31	12	18	14	16	377.6	0	

12	38	1.0	20	51	12	18	18	21	392.2	0	
13	31	1.0	22	55	3	4	16	19	396.4	0	
14	31	1.0	13	33	3	4	15	18	416.7	0	
15	31	1.0	12	30	10	14	16	19	423.0	0	
16	31	1.0	20	50	9	14	11	13	399.6	0	
17	31	1.0	13	33	13	19	17	20	384.2	0	
18	31	1.0	12	30	10	15	12	14	376.9	0	
19	31	1.0	8	20	11	16	14	16	403.3	0	
20	31	1.0	14	35	17	25	17	20	393.4	0	
21	31	1.0	19	48	10	15	15	18	415.6	0	
22	31	1.0	16	40	12	18	18	21	414.1	0	
23	31	1.0	17	43	16	24	9	11	417.9	0	
24	31	1.0	16	40	16	24	14	16	403.0	0	
25	13	1.0	15	38	15	22	10	12	388.4	0	
26	13	1.0	18	46	13	19	12	14	390.3	0	
27	13	1.0	12	30	13	19	18	21	402.9	0	
28	13	1.0	11	28	16	24	17	20	409.3	0	
29	13	1.0	19	48	13	19	15	18	367.9	0	
Missing vial 30.											
31	13	1.0	14	35	10	15	20	24	425.5	0	Bias
Missing vial 32.											
33	13	1.0	19	48	19	28	10	12	434.0	0	BKG
Missing vial 34.											
35	13	1.0	33488	83720	86846	129621	137	161	999.1	0	C-14 std
36	13	1.0	135175	337937	60	89	8	9	1016.7	0	H3 std
37	30	1.0	19	47	1	1	8	9	1011.0	0	BKG std

① V/s Floor
② V/s Sides/back Wall
③ V/s Ceiling
④ V/s Floor
⑤ V/s Sides / back Wall
⑥ V/s Ceiling
⑦ V/s Freezer
⑧ V/s Refrigerator
⑨ V/s Freezer
⑩ Lab Cabinets - o/s
⑪ Lab Cabinets - V/s
⑫ V/s BSC (floor, sides, back, ceiling)
⑬ V/s BSC (floor, sides, back, ceiling)
⑭-㉑ Ceiling Vents
㉒ Sink drain
㉓ Sink drain
㉔ Sink drain
㉕ floor drain
㉗ Desks in non-rad area
㉙ Shelves

Room 106
Dental Research Facility

John Drach



Drach Rm 106

Protocol# 52 - Dennis.lsa User: Shannon

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Shannon\Shannon
Raw Results Path: C:\Packard\Tricarb\Results\Shannon\Shannon\20140610_1647.results
Assay File Name: C:\Packard\TriCarb\Assays\Shannon.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Dental Research
John Drach
Rm. 106
Close-out

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	38	1.0	15	38	10	15	19	22	391.3	0	
2	38	1.0	10	26	12	18	13	15	406.6	0	
3	38	1.0	14	35	6	9	19	22	442.1	0	
4	38	1.0	41	103	12	17	15	18	393.0	0	See Sample Report*
5	38	1.0	11	28	13	19	18	21	405.7	0	
6	38	1.0	24	60	11	16	16	19	439.2	0	
7	38	1.0	97	242	27	40	10	12	392.0	0	See Sample Report*
8	38	1.0	23	58	13	19	14	16	412.4	0	
9	38	1.0	20	50	13	19	10	12	419.0	0	
10	38	1.0	19	49	16	23	12	14	392.6	0	
11	38	1.0	15	38	15	22	21	25	369.2	0	

12	38	1.0	13	33	15	22	11	13	421.2	0	
13	9	1.0	19	48	8	12	9	11	406.2	0	
14	9	1.0	30	75	10	15	17	20	414.4	0	See Sample Remark
15	9	1.0	14	35	11	16	15	18	384.1	0	
16	9	1.0	9	24	13	19	13	15	391.3	0	
17	9	1.0	20	50	11	16	11	13	367.0	0	
18	9	1.0	14	36	11	16	8	9	368.8	0	
19	9	1.0	21	52	11	16	18	21	359.2	0	
20	9	1.0	10	25	12	18	22	26	355.9	0	
21	9	1.0	11	28	7	10	14	16	366.7	0	
~~26~~ 22	9	1.0	17	43	5	7	21	25	427.3	0	
~~27~~ 23	9	1.0	20	50	12	18	15	18	424.7	0	
~~28~~ 24	9	1.0	17	43	11	16	16	19	403.3	0	
~~29~~ 25	34	1.0	21	54	18	26	18	21	412.1	0	
Missing vial 26.											
27	34	1.0	14	35	7	10	20	24	436.1	0	Blks
Missing vial 28.											
29	34	1.0	10	25	8	11	10	12	431.6	0	BKG
Missing vial 30.											
31	34	1.0	33325	83313	85743	127975	87	103	1005.3	0	C-14 Std
32	34	1.0	134261	335653	90	135	11	13	1019.7	0	H-3 Std
33	34	1.0	25	63	5	7	10	12	1010.6	0	BKG Std

Druck Rm. 106

Protocol# 52 - Dennis.lsa User: Shannon

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Shannon\Shannon
Raw Results Path: C:\Packard\Tricarb\Results\Shannon\Shannon\20140611_0641.results
Assay File Name: C:\Packard\TriCarb\Assays\Shannon.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Sample Reruns

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

* will clean & reswipe Samples # 4 & 7

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	34	1.0	40	101	8	12	16	19	385.2	0	Sample #4
2	34	1.0	97	243	22	33	14	16	391.1	0	Sample #7
3	34	1.0	17	43	13	19	12	14	408.2	0	Sample #14 - OK
Missing vial 4.											
5	34	1.0	10	25	16	24	22	26	432.3	0	Bias
Missing vial 6.											
7	34	1.0	18	45	11	16	12	14	427.7	0	BKG
Missing vial 8.											
9	34	1.0	33023	82558	86468	129056	115	135	1000.0	0	C-14 Std
10	34	1.0	134035	335088	73	109	6	7	1021.5	0	H-3 Std
11	34	1.0	18	45	10	15	10	12	1011.9	0	BKG Std

Protocol# 49 - Dennis.lsa User: Shannon

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Shannon\Shannon
Raw Results Path: C:\Packard\Tricarb\Results\Shannon\Shannon\20140612_1608.results
Assay File Name: C:\Packard\TriCarb\Assays\Shannon.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

John Brach
Dental Research
Rm 106
Rec wipes
(cleaned w/ Scrubbing Bubbles and Rec wiped)

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	13	1.0	15	38	18	27	15	18	420.6	0	I/S Hood Floor
2	13	1.0	29	72	13	20	13	15	443.6	0	I/S Freezer door
3	13	1.0	18	45	20	30	12	14	443.7	0	Freezer walls / Floor
4	13	1.0	24	60	8	11	15	18	419.8	0	Plastic Tub in Freezer
Missing vial 5.											
6	13	1.0	15	38	9	13	10	12	432.6	0	Bias
Missing vial 7.											
8	13	1.0	16	40	17	25	19	22	439.8	0	BKG
Missing vial 9.											
10	13	1.0	33159	82898	85842	128123	125	147	1000.9	0	C-14 Std
11	13	1.0	134675	336688	73	108	12	14	1018.7	0	H-3 Std

12	13	1.0	20	50	12	18	7	8	1016.4	0 Bkg. std

Drach Rm 106 (Drains)

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Shannon\Shannon
Raw Results Path: C:\Packard\Tricarb\Results\Shannon\Shannon\20140611_0718.results
Assay File Name: C:\Packard\TriCarb\Assays\Shannon.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Dental Research
John Drach
Rm 106
Close-out
Drains

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
22 1	31	1.0	12	30	14	21	13	15	401.9	0	
23 2	31	1.0	19	48	15	22	14	16	403.6	0	
24 3	31	1.0	16	39	17	26	12	14	376.4	0	
25 4	31	1.0	6	15	10	15	10	12	393.9	0	
Missing vial 5.											
6	31	1.0	15	38	11	17	22	26	415.2	0	Bias
Missing vial 7.											
8	31	1.0	26	65	10	15	10	12	412.1	0	BKG
Missing vial 9.											
10	31	1.0	33880	84700	86035	128411	114	134	1004.4	0	C14 std
11	31	1.0	134461	336153	66	99	7	8	1024.7	0	H-3 std

12	31	1.0	16	40	11	16	9	11	1015.2	0 BKG 3H

Attachment 5

Comprehensive Close-Out Survey Record
Rooms 110 & 116
Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI
May 24, 2016

UNIVERSITY OF MICHIGAN
OCCUPATIONAL SAFETY & ENVIRONMENTAL HEALTH
RADIATION SAFETY SERVICE

LABORATORY CLOSE-OUT CHECKLIST

Authorized User	Room	Building	Date/Time	Conducted By:
James Simmer Jan Hu	110, 116, 116A	Dental Research	5/24/2016/ 10:00	Philip Keavey

#116A = Tissue Culture room 116 Dept

Reason for close-out: **Termination**

IMPORTANT: ALL RADIOACTIVE MATERIAL AND WASTE MUST BE REMOVED PRIOR TO CLOSE-OUT SURVEYS:

	Survey Meter			
	Manufacturer Model / Serial Number	**HV**	**Calibration Due Date**	**Instrument Efficiency**
Survey Meter	Ludlum Model 12 SN 248042	750	8/16	C-14: 0.066 Si-32/P-32: 0.39
Probe	Ludlum 44-142 SN PR 266943			
Performance checked?	**C-14:** Y **Si-32:** Y			
Bkg 1 (cpm)	252			
Bkg 2 (cpm)	264			
Bkg 3 (cpm)	245			
Avg Bkg (cpm)	253.6 Use 250			
Avg Bkg + MDCR	419 cpm			
Avg Bkg + L_D	327 cpm			

Scanning and Static Sensitivity: (see card attached to meter)

Scanning MDC:

MDCR = 169 **cpm** **MDC $_{scan}$ =** 14486 **dpm/100 cm^2**

Static MDA:

L_D = 77 **cpm** **MDA $_{static}$ =** 4638 **dpm/100 cm^2**

Location	Swipes Completed? (Y / N / NA)	Survey Meter 1 Reading Scan	Static
Floor	Y	-	
Shelves / Drawers/ Cabinets	Y	< MDCR	
Refrigerators / Freezers	Y	< MDCR	
Sinks /Sink Traps/Benchtops	Y	< MDCR	
Tables / Desks	Y	< MDCR	
Equipment / Devices	Y	< MDCR	
Fume Hoods / BSCs / etc	Y	< MDCR	
Vents	Y	< MDCR	
Floor drains/Ductwork/Other	Y	< MDCR	

(OVER) ➔

Comments: Rm 116A = Tissue Culture room

AUTHORIZED USER NOTIFIED OF IDENTIFIED CONTAMINATION? NA

DECONTAMINATION BY AUTHORIZED USER VERIFIED BY RSS? NA

REMOVE:

Postings and Labels	Completed? (Y / N / NA)
"Radioactive Materials" Door Posting	Y
NRC Form 3 ("Notice to Employees")	Y
Contamination Monitoring Poster(s)	Y
Refrigerator / Freezer Labels	Y
Radioactive Material Warning Tape	Y
Miscellaneous Items	**Removed? (Y / N / NA)**
Lead Pigs / Storage Containers	Y
Radiation Safety Records Binder	Y
Other	

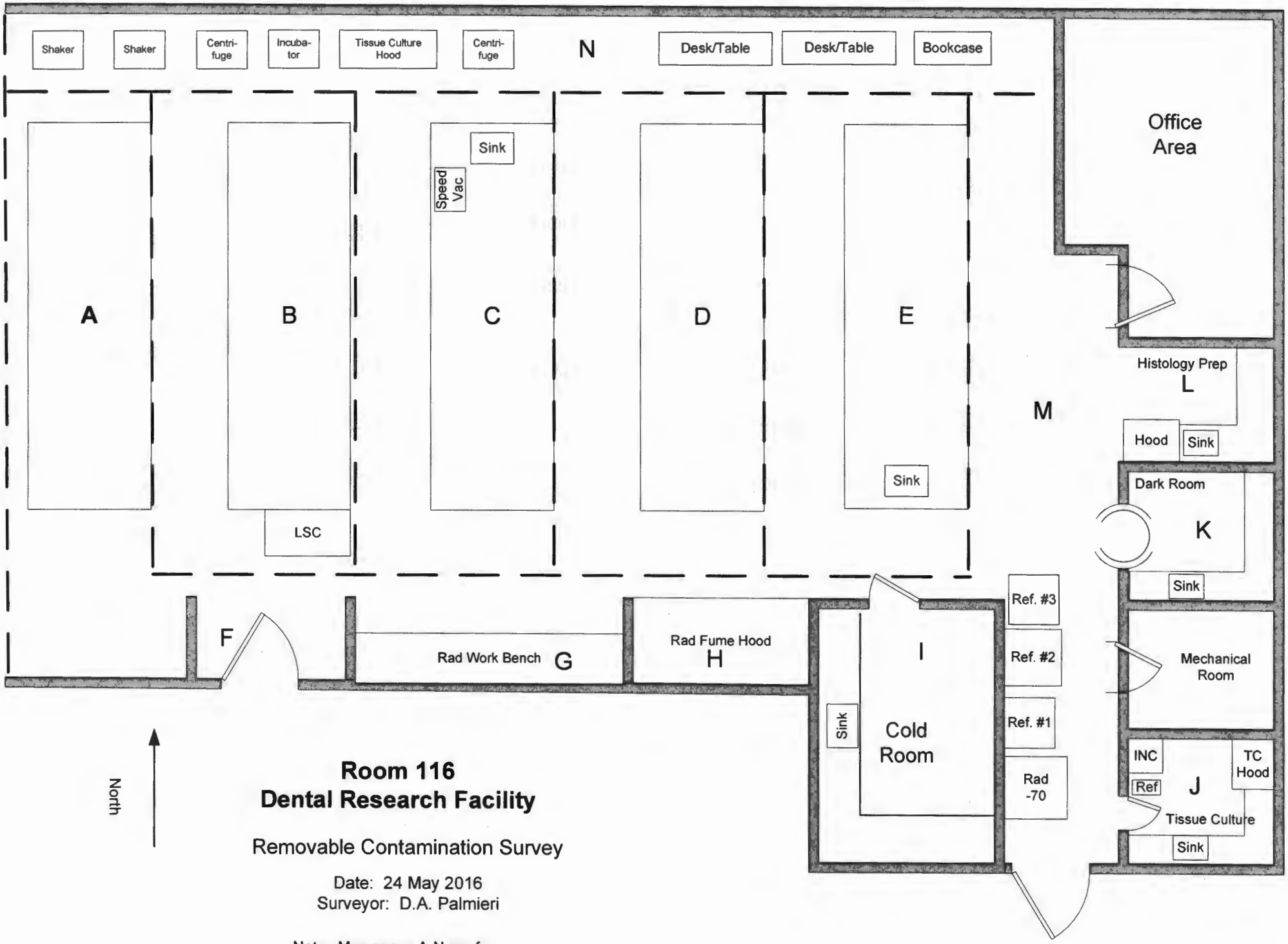
HEALTH PHYSICS TECHNICIAN Philip Keary **DATE** 5/25/2016
(Signature)

Task	Completed? (Y / N / NA)
Complete Room Change Form. Give to RSS Secretary	Y
Complete Departmental Notification Memorandum (Attach Maps, LSC Printouts) Give to RSS Secretary	Y
Notify Biological and Laboratory Safety (Notify ONLY if laboratory is COMPLETELY vacated)	Y

HEALTH PHYSICIST [signature] **DATE** 6-21-16
(Signature)

Task	Completed? (Y / N / NA)
Update Roomlist with Attached Room Change Form	
Process Department Notification Memorandum	
Update Decommission Database	
Place Close-out Packet in File	

RSS SECRETARY _____ **DATE** _____
(Signature)

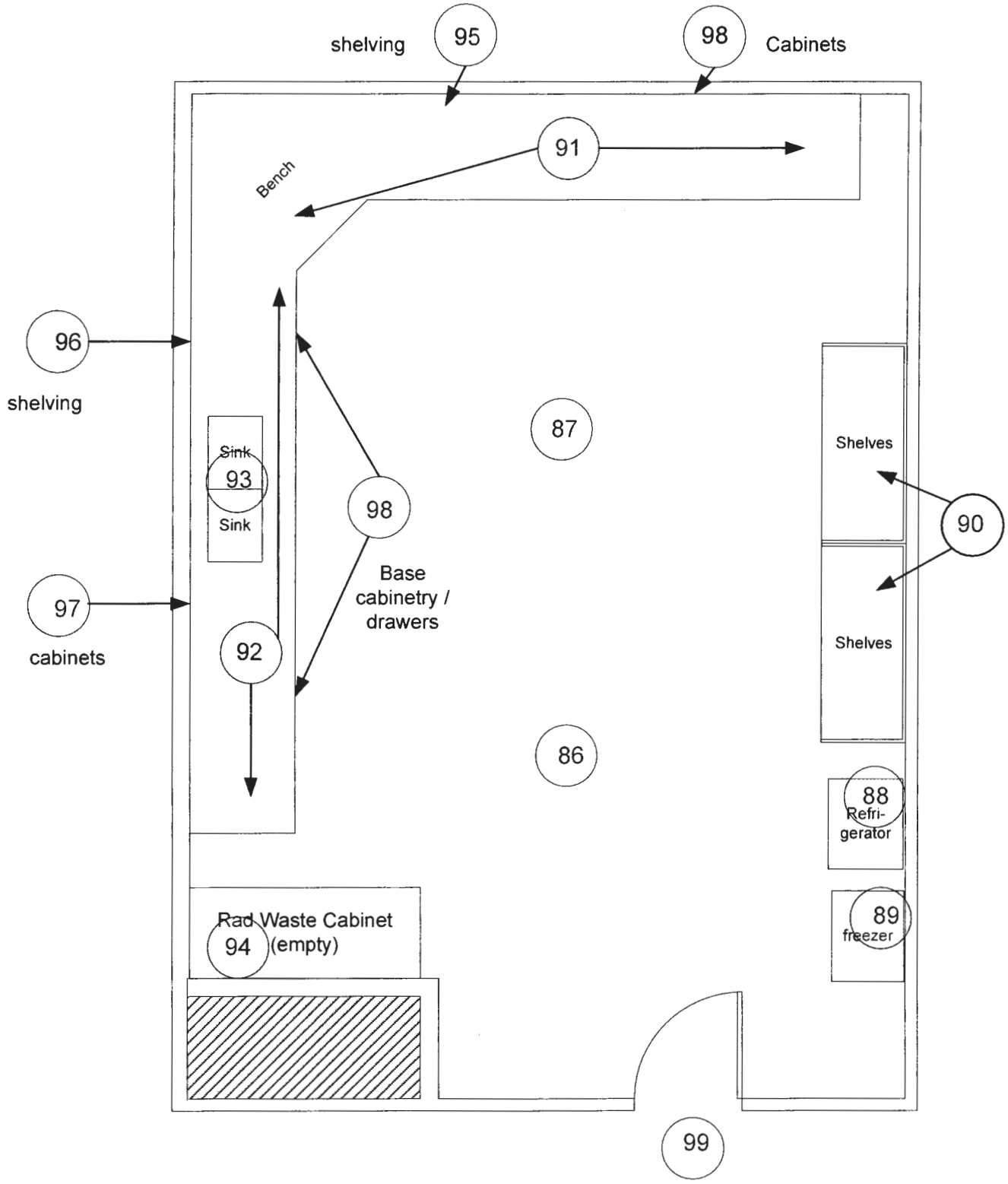


Room 116
Dental Research Facility

Removable Contamination Survey

Date: 24 May 2016
Surveyor: D.A. Palmieri

Note: Map zones A-N are for reference to LS Printout Swipe Results Table



north

n "n" = swipe I.D. Number

Room 110
Dental Research Facility

Removable Contamination Survey

Date: 24 May 2016
Surveyor: D.A. Palmieri

Map Zone "O"
(used to refer to LS
Printout Results)

University of Michigan Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI 48108
Removable Contamination Survey for Rooms 110 and 116
Locations and Descriptions

Date: 24-May-16
Surveyor: D.A. Palmieri

Swipe I.D. Number	LS Printout Sample Number (S#)	Room	Floor Map Zone	Location and Description
--	1	--	--	Clean Blank Swipe Control
--	--	--	--	<No sample -- Intentionally skipped>
--	3	--	--	"Bias background" Control (swipe of reference floor)
--	--	--	--	<No sample -- Intentionally skipped>
1	5	116	A	Bench A--Shelving over bench
2	6	116	A	Bench A--bench top
3	7	116	A	Bench A-- Cabinetry and Drawers
4	8	116	A	Bench A-- Floor on West Side
5	9	116	B	Bench B--Floor on West Side
6	10	116	B	Bench B--LS Counter at South End of Bench
7	11	116	B	Bench B--Shelving over bench
8	12	116	B	Bench B - bench top
9	13	116	B	Bench B--Cabinetry and Drawers
10	14	116	B	Bench B--Lab Benchtop Microfuge
11	15	116	C	Bench C--Floor on West Side of bench
12	16	116	N	Ultracentrifuge (free standing)
13	17	116	N	Carbon Dioxide (CO2) Incubator
14	18	116	N	Tissue Culture Hood
15	19	116	N	Ultracentrifuge (free standing)
16	20	116	C	Bench C--bench top (west side)
17	21	116	C	Bench C--Cabinets and Drawers (west side)
18	22	116	C	Bench C--Speed Vac
19	23	116	C	Bench C Lab Bench Top (east side)
20	24	116	C	Bench C--Shelving over bench
21	25	116	C	Bench C--Cabinets and Drawers (east side)
22	26	116	D	Bench D--Floor on West Side
23	27	116	C	Bench C--Undersink Cabinet
24	28	116	G	South Bench-- Top
25	29	116	G	South Bench--Cabinets and Drawers (west 1/2)
26	30	116	G	South Bench--Wall-Mounted Cabinets
27	31	116	G	South Bench--Floor in front of bench
28	32	116	G	South Bench Cabinets and Drawers (east 1/2)
29	33	116	D	Bench D Lab Bench Top (west side)
30	34	116	D	Bench D Lab Bench Top (east side)
31	35	116	D	Bench D --shelving over Bench Top
32	36	116	D	Bench D -- Cabinets and Drawers (west side)
33	37	116	D	Bench D -- Cabinets and Drawers (east side)
34	38	116	E	Bench E--Floor in front of bench (west side)
35	39	116	E	Bench E--Benchtop (west side)
36	40	116	E	Bench E--Shelving over benchtop
37	41	116	E	Bench E--Benchtop (east side)
38	42	116	E	Bench E--Cabinets and Drawers (west side)
39	43	116	E	Bench E--Cabinets and Drawers (east side)

Removable Contamination Survey for Rooms 110 and 116
Locations and Descriptions

Date: 24-May-16
Surveyor: D.A. Palmieri

Swipe I.D. Number	LS Printout Sample Number (S#)	Room	Floor Map Zone	Location and Description
40	44	116	M	Floor in Zone M--east of Bench E and along cold room
41	45	116	A	Bench A Sink
42	46	116	C	Bench C Sink
43	47	116	E	Bench E Sink
44	48	116	H	Fume Hood--equipment storage undercabinet
45	49	116	H	Fume hood--equipment stored including lucite shields
46	50	116	H	Fume hood--flammable liquids storage undercabinet
47	51	116	H	Fume hood--interior on left sidewall
48	52	116	H	Fume hood--interior on right sidewall
49	53	116	H	Fume hood--bench surface
50	54	116	H	Fume hood--back baffle plates
51	55	116	I	Cold Room--Bench along south wall
52	56	116	I	Cold Room--Bench along south wall
53	57	116	I	Cold Room--sink
54	58	116	I	Cold Room-floor
55	59	116	I	Cold Room--drain
56	60	116	I	Cold Room--shelves
57	61	116	L	Histological Work Area--sink
58	62	116	L	Histological Work Area--floor
59	63	116	L	Histological Work Area--workbench
60	64	116	L	Histological Work Area--Fume Hood (left sidewall)
61	65	116	L	Histological Work Area--Fume Hood (right sidewall)
62	66	116	L	Histological Work Area--Fume hood bench
63	67	116	L	Histological Work Area--Fume hood undercabinets
64	68	116	L	Histological Work Area--Shelves and Wall Cabinets
65	69	116	K	Darkroom--workbench
66	70	116	K	Darkroom--sink
67	71	116	K	Darkroom--floor
68	72	116	K	Darkroom--shelves
69	73	116	K	Darkroom-cabinets
70	74	116	D	Bench D--Enclosed Shaker / Rotor (south end)
71	75	116	M	-70 Storage Freezer
72	76	116	M	refrigerator 1
73	77	116	M	refrigerator 2
74	78	116	M	refrigerator 3
75	79	116a	J	Tissue Culture--bench south wall
76	80	116a	J	Tissue Culture--bench east wall
77	81	116a	J	Tissue Culture--Tissue Culture Hood
78	82	116a	J	Tissue Culture--Incubator
79	83	116a	J	Tissue Culture--floor
80	84	116a	J	Tissue Culture--Shelves
81	85	116a	J	Tissue Culture--Cabinets
82	86	116a	J	Tissue Culture--refrigerator
83	87	116a	J	Tissue Culture--sink
84	88	116	A	Flask Shaker--free standing
85	89	116	A	Flask Shaker--free standing

Removable Contamination Survey for Rooms 110 and 116
Locations and Descriptions

Date: 24-May-16
Surveyor: D.A. Palmieri

Swipe I.D. Number	LS Printout Sample Number (S#)	Room	Floor Map Zone	Location and Description
86	90	110	O	Storage / Unused Lab -- floor (west end)
87	91	110	O	Storage / Unused Lab -- floor (east end)
88	92	110	O	Storage / Unused Lab -- refrigerator
89	93	110	O	Storage / Unused Lab -- freezer
90	94	110	O	Storage / Unused lab -- Shelves (south wall)
91	95	110	O	Storage / Unsed Lab -- bench (east wall)
92	96	110	O	Storage / Unused Lab -- bench (west wall)
93	97	110	O	Storage / Unused Lab -- double sink
94	98	110	O	Storage / Unused Lab -- empty rad waste cabinet
95	99	110	O	Storage / Unused Lab -- shelves (east wall)
96	100	110	O	Storage / Unused lab -- Shelves (north wall)
97	101	110	O	Storage / Unused Lab -- wall cabinets
98	102	110	O	Storage / Unused Lab -- base cabinets
99	103	110	O	Floor at door to Rm 110 and out into hallway
100	104	116	F	Floor at door to Rm 116 and out into hallway
--	--	--	--	<No sample -- Intentionally skipped>
--	106	--	--	Perkin-Elmer C-14 LS reference standard
--	107	--	--	Perkin-Elmer H-3 LS reference standard
--	108	--	--	Perkin-Elmer LS reference background standard

Protocol# 56 - Dennis.lsa User: Dennis

Dennis' Swipe Test Results

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Dennis\dennis
Raw Results Path: C:\Packard\Tricarb\Results\Dennis\dennis\20160524_1607.results
Assay File Name: C:\Packard\TriCarb\Assays\dennis.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	10	1.0	17	42	10	15	17	20	462.9	4	
Missing vial 2.											
3	10	1.0	13	33	10	15	17	20	441.4	4	
Missing vial 4.											
5	10	1.0	8	20	8	12	4	5	435.5	6	
6	10	1.0	17	43	12	18	12	14	409.3	3	
7	10	1.0	12	30	8	12	12	14	468.5	5	
8	10	1.0	16	40	7	10	12	14	448.0	4	
9	10	1.0	15	38	12	18	14	16	448.2	4	
10	10	1.0	13	33	13	19	7	8	457.9	4	
11	10	1.0	19	48	9	13	8	9	439.9	3	

Protocol# 56 - Dennis.lsa User: Dennis

Dennis' Swipe Test Results

12	10	1.0	16	40	6	9	18	21	431.5	0
13	2	1.0	15	36	20	30	11	13	462.7	3
14	2	1.0	11	27	8	12	19	22	467.3	5
15	2	1.0	17	43	12	18	13	15	440.1	3
16	2	1.0	23	57	12	18	9	11	463.0	3
17	2	1.0	18	45	14	21	9	11	472.9	0
18	2	1.0	19	48	6	9	13	15	467.9	4
19	2	1.0	7	17	10	15	12	14	465.9	6
20	2	1.0	15	37	6	9	10	12	452.4	5
21	2	1.0	5	13	12	18	15	18	462.9	6
22	2	1.0	14	35	8	12	12	14	469.5	5
23	2	1.0	13	33	14	21	15	18	440.9	4
24	2	1.0	15	38	9	13	17	20	427.1	4
25	18	1.0	9	22	7	10	16	19	472.5	12
26	18	1.0	10	25	11	16	10	12	424.2	5
27	18	1.0	17	43	17	25	17	20	472.5	0
28	18	1.0	14	35	7	10	8	9	450.4	5
29	18	1.0	8	20	10	15	16	19	470.6	0
30	18	1.0	12	31	10	14	6	7	457.5	5
31	18	1.0	17	42	9	14	10	12	446.4	0
32	18	1.0	11	28	12	18	18	21	454.2	4
33	18	1.0	10	25	12	18	8	9	446.7	5
34	18	1.0	15	38	6	9	11	13	462.4	5
35	18	1.0	12	30	17	25	15	18	444.0	0
36	18	1.0	15	37	9	13	11	13	463.0	0
37	35	1.0	13	33	12	18	8	9	464.6	4
38	35	1.0	14	34	11	17	16	19	421.9	4
39	35	1.0	15	39	11	16	11	13	458.6	7
40	35	1.0	12	30	10	15	14	16	380.9	5
41	35	1.0	11	28	10	15	23	27	427.4	5
42	35	1.0	17	43	15	22	15	18	470.6	0
43	35	1.0	12	30	12	18	16	19	466.8	0
44	35	1.0	12	30	7	10	14	16	435.2	5
45	35	1.0	14	35	11	16	10	12	468.5	4
46	35	1.0	12	30	8	12	11	13	453.3	0
47	35	1.0	13	33	8	12	12	14	478.9	0
48	35	1.0	13	32	7	10	11	13	460.3	0
49	21	1.0	18	45	12	18	14	16	464.3	3
50	21	1.0	20	50	8	12	10	12	474.7	0
51	21	1.0	10	26	11	16	16	19	477.1	0
52	21	1.0	19	47	10	15	14	16	473.3	3
53	21	1.0	23	57	10	15	10	12	470.5	0
54	21	1.0	10	25	13	19	12	14	473.2	0
55	21	1.0	15	37	7	10	9	11	459.9	5
56	21	1.0	15	38	12	18	17	20	461.0	0
57	21	1.0	21	52	10	15	12	14	463.5	0
58	21	1.0	12	30	8	12	10	12	423.8	5
59	21	1.0	16	40	12	18	15	18	455.0	0
60	21	1.0	15	38	13	19	12	14	454.8	0
61	9	1.0	20	50	15	22	9	11	468.0	0
62	9	1.0	17	43	8	12	12	14	435.3	4
63	9	1.0	8	20	11	16	13	15	440.0	0
64	9	1.0	16	40	5	7	15	18	470.5	0
65	9	1.0	19	47	9	13	13	15	482.3	0
66	9	1.0	19	48	10	15	10	12	467.7	0
67	9	1.0	17	42	12	18	16	19	466.1	3
68	9	1.0	21	53	6	9	12	14	448.3	0
69	9	1.0	13	33	9	13	9	11	435.7	5
70	9	1.0	17	42	13	19	13	15	457.1	0
71	9	1.0	15	38	12	18	15	18	420.5	0
72	9	1.0	20	50	11	16	10	12	442.6	0
73	5	1.0	10	25	6	9	11	13	467.5	6

Protocol# 56 - Dennis.lsa User: Dennis

Dennis' Swipe Test Results

74	5	1.0	17	43	9	13	16	19	472.3	0
75	5	1.0	18	45	18	27	14	16	472.4	3
76	5	1.0	20	50	4	6	16	19	470.5	0
77	5	1.0	13	32	12	18	14	16	462.2	0
78	5	1.0	18	45	9	13	15	18	464.9	0
79	5	1.0	19	47	9	13	12	14	448.2	0
80	5	1.0	13	33	12	18	13	15	444.3	0
81	5	1.0	15	37	10	15	10	12	462.9	4
82	5	1.0	13	32	19	28	18	21	456.7	0
83	5	1.0	20	50	8	12	11	13	422.3	0
84	5	1.0	17	42	15	22	10	12	448.4	0
85	28	1.0	15	38	14	21	13	15	466.2	3
86	28	1.0	20	50	11	16	10	12	460.9	3
87	28	1.0	24	60	13	19	12	14	457.0	0
88	28	1.0	15	37	9	14	10	12	424.8	0
89	28	1.0	18	44	7	11	7	8	467.4	0
90	28	1.0	14	35	21	31	10	12	412.1	3
91	28	1.0	15	38	9	13	11	13	413.4	4
92	28	1.0	11	28	10	15	17	20	446.6	5
93	28	1.0	14	35	9	13	14	16	454.4	0
94	28	1.0	19	48	11	16	19	22	434.6	0
95	28	1.0	13	33	8	12	17	20	429.5	5
96	28	1.0	17	42	11	16	11	13	451.5	4
97	14	1.0	11	27	7	10	10	12	462.0	6
98	14	1.0	13	33	10	15	13	15	455.8	4
99	14	1.0	18	45	11	16	17	20	439.9	3
100	14	1.0	15	38	11	16	12	14	426.7	0
101	14	1.0	15	38	12	18	8	9	437.8	4
102	14	1.0	11	28	9	13	15	18	449.2	5
103	14	1.0	15	38	15	22	14	16	438.7	0
104	14	1.0	16	40	7	10	14	16	436.6	4
Missing vial 105.										
106	14	1.0	33424	83559	86145	128575	111	130	1004.3	0
107	14	1.0	119512	298779	80	119	6	7	1023.4	0
108	14	1.0	19	47	3	4	12	14	1013.2	4

University of Michigan Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI 48108
Removable Contamination Survey for Rooms 110 and 116
Ventilation Systems and Drains

Date: 24-May-16
Surveyor: Phil Keavey

Swipe I.D. Number	LS Printout Sample Number (S#)	Room	Location and Description
V1	1	116	Ceiling Ceiling Vent Soffit--Bench A
V2	2	116	Ceiling Ceiling Vent Soffit--Bench A
V3	3	116	Ceiling Ceiling Vent Soffit--Bench A
V4	4	116	Ceiling Ceiling Vent Soffit--Bench B
V5	5	116	Ceiling Vent Soffit--Bench B
V6	6	116	Ceiling Vent Soffit--Bench B
V7	7	116	Ceiling Vent Soffit--Bench C
V8	8	116	Ceiling Vent Soffit--Bench C
V9	9	116	Ceiling Vent Soffit--Bench C
V10	10	116	Ceiling Vent Soffit--S. Wall Bench (rad work bench)
V11	11	116	Ceiling Vent Soffit--Bench D
V12	12	116	Ceiling Vent Soffit--Bench D
V13	13	116	Ceiling Vent Soffit--Bench D
V14	14	116	Ceiling Vent Soffit--Bench E
V15	15	116	Ceiling Vent Soffit--Bench E
V16	16	116	Ceiling Vent Soffit--Bench E
V17	17	116	Ceiling Vent Soffit near cold room
V18	18	116	Ceiling Vent Soffit near Tissue Culture Room (Rm 116A)
V19	19	110	Ceiling Vent Soffit Southwest Corner
V20	20	110	Ceiling Vent Soffit near door to hallway
V21	21	110	Ceiling Vent Soffit near refrigerator
V22	22	110	Ceiling Vent Soffit Southeast near shelving
V23	23	110	Ceiling Vent Soffit Southeast near bench
V24	24	116a	Tissue Culture Room Ceiling Vent #1
V25	25	116a	Tissue Culture Room Ceiling Vent #2
V26	26	116a	Tissue Culture Room Ceiling Vent #3
--	--	--	<No sample -- Intentionally skipped>
--	--	--	Bias Background - reference vent
--	--	--	Bias Background - reference vent
--	--	--	Bias Background - reference vent
--	--	--	<No sample -- Intentionally skipped>
--	--	--	Perkin-Elmer C-14 LS reference standard
--	--	--	Perkin-Elmer H-3 LS reference standard
--	--	--	Perkin-Elmer LS reference background standard
--	--	--	<No sample -- Intentionally skipped>
--	--	--	<No sample -- Intentionally skipped>
Sink 1	37	116	Bench A - Sink Drain

Removable Contamination Survey for Rooms 110 and 116
Ventilation Systems and Drains

Date: 24-May-16
Surveyor: Phil Keavey

Swipe I.D. Number	LS Printout Sample Number (S#)	Room	Location and Description
Sink 2	38	116	Bench C- Sink Drain
Sink 3	39	116	Bench E - Sink Drain
Sink 4	40	110	Double Sink - Left Basin Drain
Sink 5	41	110	Double Sink - Right Basin Drain
Sink 6	42	116a	Tissue Culture Sink
Sink 7	43	116	South Wall Bench Sink (rad workbench)
Sink 8	44	116	Dark Room Sink
--	--	--	<No sample -- Intentionally skipped>
FD 1	46	116	Dark Room Floor Drain
FD 2	47	116	Tissue Cultuer Room Floor Drain
--	--	--	<No sample -- Intentionally skipped>
FH 1	49	116	S. Wall Fume Hood Vent Baffles (rad hood)
FH 2	50	116	Fume Hood Vent Baffles (Histology Prep)
--	--	--	<No sample -- Intentionally skipped>
--	--	--	Bias Background - reference sink
--	--	--	Bias Background - reference drain
--	--	--	Bias Background - reference hood
--	--	--	<No sample -- Intentionally skipped>
--	--	--	<No sample -- Intentionally skipped>
--	--	--	Centrifuge near rad work area (random swipe)
--	--	--	Blank Background
--	--	--	Blank Background
--	--	--	Blank Background

Protocol# 13 - Phil.lsa User: PKeavey

P. Keavey Assays

Dental Research

Rm 116, 116a, 110

Assay Definition-

Assay Description:

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\PKeavey\Phil
Raw Results Path: C:\Packard\Tricarb\Results\PKeavey\Phil\20160525_0750.results
Assay File Name: C:\Packard\TriCarb\Assays\Phil.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

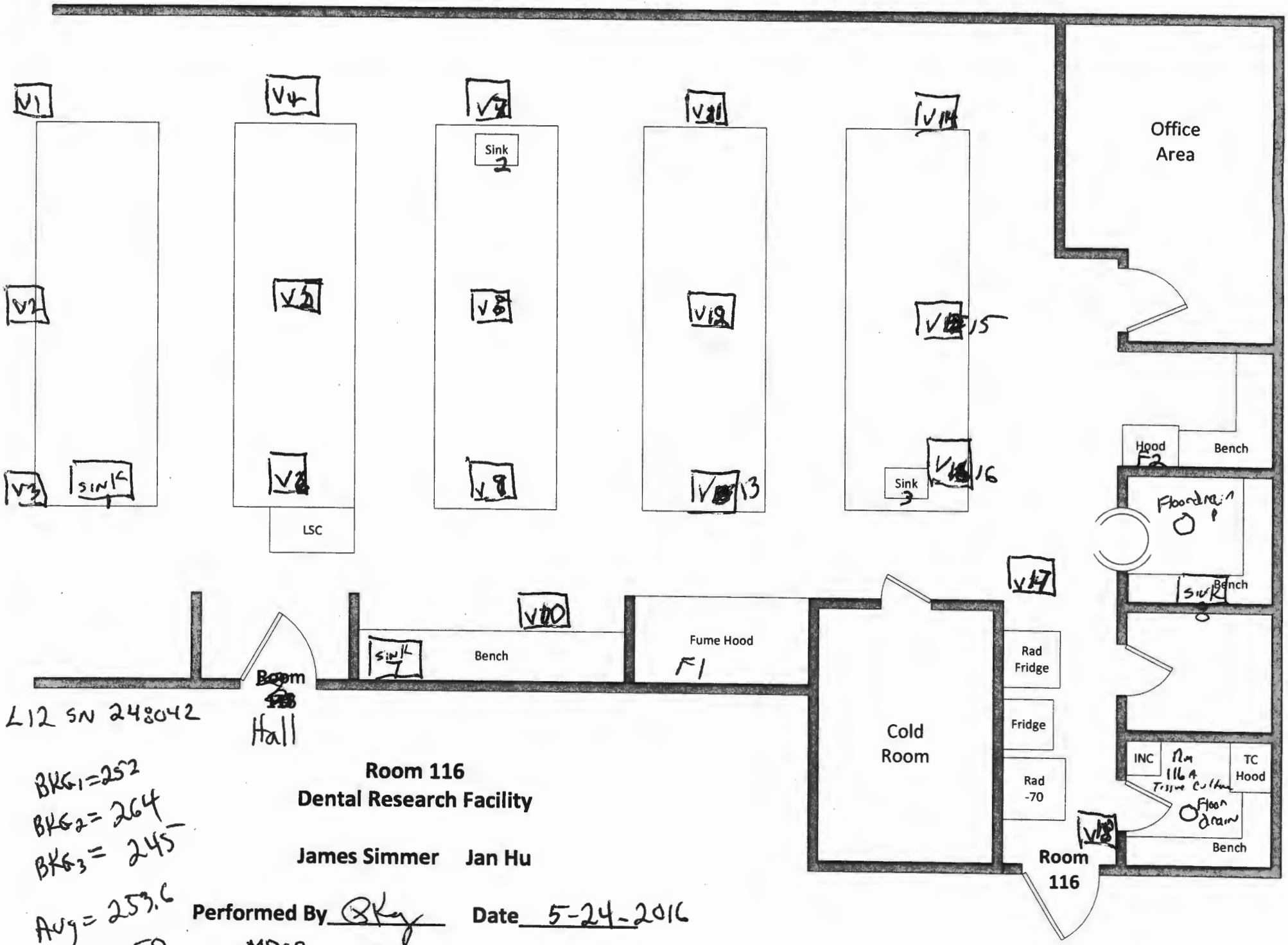
Cycle 1 Results

PID	S#	Count Time	CPMA	DPMA	CPMB	DPMB	CPMC	DPMC	tSIE	LUM	MESSAGES
32	1	1.00	20	53	8	12	8	10	453.53	0	
32	2	1.00	16	42	12	18	7	9	451.23	0	
32	3	1.00	17	46	10	15	13	16	455.38	0	Vents
32	4	1.00	16	42	10	15	6	8	446.42	0	
32	5	1.00	11	29	16	24	14	18	430.34	0	Room
32	6	1.00	19	50	6	9	8	10	449.25	0	
32	7	1.00	16	42	7	10	12	15	454.12	0	116
32	8	1.00	14	37	14	21	14	17	439.52	0	
32	9	1.00	15	40	12	18	13	16	440.74	4	
32	10	1.00	16	42	11	16	9	11	446.17	3	
32	11	1.00	14	37	10	15	8	10	463.41	0	
32	12	1.00	15	39	7	10	10	13	437.77	0	

Protocol# 13 - Phil.lsa User: PKeavey

P. Keavey Assays

15	V13	1.00	14	37	11	16	10	13	433.35	0	Vents
15	V14	1.00	9	24	8	12	6	8	421.51	0	
15	V15	1.00	15	39	14	21	9	11	423.19	0	Rm 116
15	V16	1.00	10	26	10	15	12	15	437.89	0	
15	V17	1.00	19	50	8	12	9	11	426.82	0	
15	V18	1.00	16	42	10	15	14	18	425.18	0	
15	V19	1.00	16	42	9	13	8	10	446.03	0	
15	V20	1.00	19	50	14	21	9	11	424.53	0	Vents
15	V21	1.00	16	42	9	13	13	16	452.14	0	
15	V22	1.00	18	47	3	4	8	10	444.15	0	Rm 110
15	V23	1.00	8	21	7	10	13	16	449.96	0	
15	V24	1.00	13	34	6	9	11	14	442.40	0	Vents
34	V25	1.00	13	34	6	9	9	11	438.38	0	
34	V26	1.00	16	42	4	6	11	14	456.74	0	Rm 116a Filtered Exhaust Sub Room
Missing vial 27.											
34	28 BKG	1.00	23	59	17	26	5	6	460.97	0	BKG
34	29 BKG	1.00	21	55	8	12	7	9	461.87	0	BKG > vent Background
34	30 BKG	1.00	17	44	10	15	15	19	465.87	0	BKG
Missing vial 31.											
34	32 C-14	1.00	33162	87267	86433	129649	136	170	1003.05	0	C-14 Std
34	33 H-3	1.00	119628	314809	71	106	7	9	1014.12	0	H-3 Std
34	34 BKG	1.00	15	39	12	18	12	15	1017.02	3	BKG Std
Missing vial 35.											
Missing vial 36.											
25	37	1.00	12	32	7	10	8	10	445.45	0	SINK 1 RM 116
25	38	1.00	13	34	13	20	5	6	444.46	4	SINK 2 RM 116
25	39	1.00	13	34	6	9	12	15	448.49	0	SINK 3 RM 116
25	40	1.00	14	37	17	25	13	16	442.61	0	SINK 4 Rm 110
25	41	1.00	16	42	3	4	4	5	452.48	0	SINK 5 Rm 110
25	42	1.00	20	53	10	15	7	9	447.96	0	SINK 6 RM 116a
25	43	1.00	17	45	7	10	7	9	457.53	0	SINK 7 Rm 116
25	44	1.00	18	47	7	10	11	14	448.87	0	SINK 8 Dark Room
Missing vial 45.											
25	46	1.00	12	32	8	12	8	10	438.28	0	Floor Drain Dark Room
25	47	1.00	11	29	13	19	13	16	410.37	0	Floor Drain RM 116a
Missing vial 48.											
40	49	1.00	14	37	11	16	12	15	414.06	0	Fume Hood 1 Rm 116
40	50	1.00	15	40	7	10	7	9	438.41	0	Fume Hood 2 Rm 116
Missing vial 51.											
40	52	1.00	13	34	15	23	10	13	444.30	0	BKG
40	53	1.00	10	26	8	12	16	20	446.56	5	BKG > sink drain BKG
40	54	1.00	14	37	9	13	14	18	423.56	0	BKG (Hood)
Missing vial 55.											
Missing vial 56.											
40	57	1.00	10	27	12	18	18	23	424.39	4	INSIDE Rad Cent Swipe
40	58	1.00	13	34	13	19	12	15	444.40	4	BKG
40	59	1.00	9	24	18	27	18	23	437.60	7	BKG > Swipe BKG
40	60	1.00	16	42	17	26	16	20	447.81	3	BKG



L12 SN 248042

BKG1=252
BKG2=264
BKG3=245

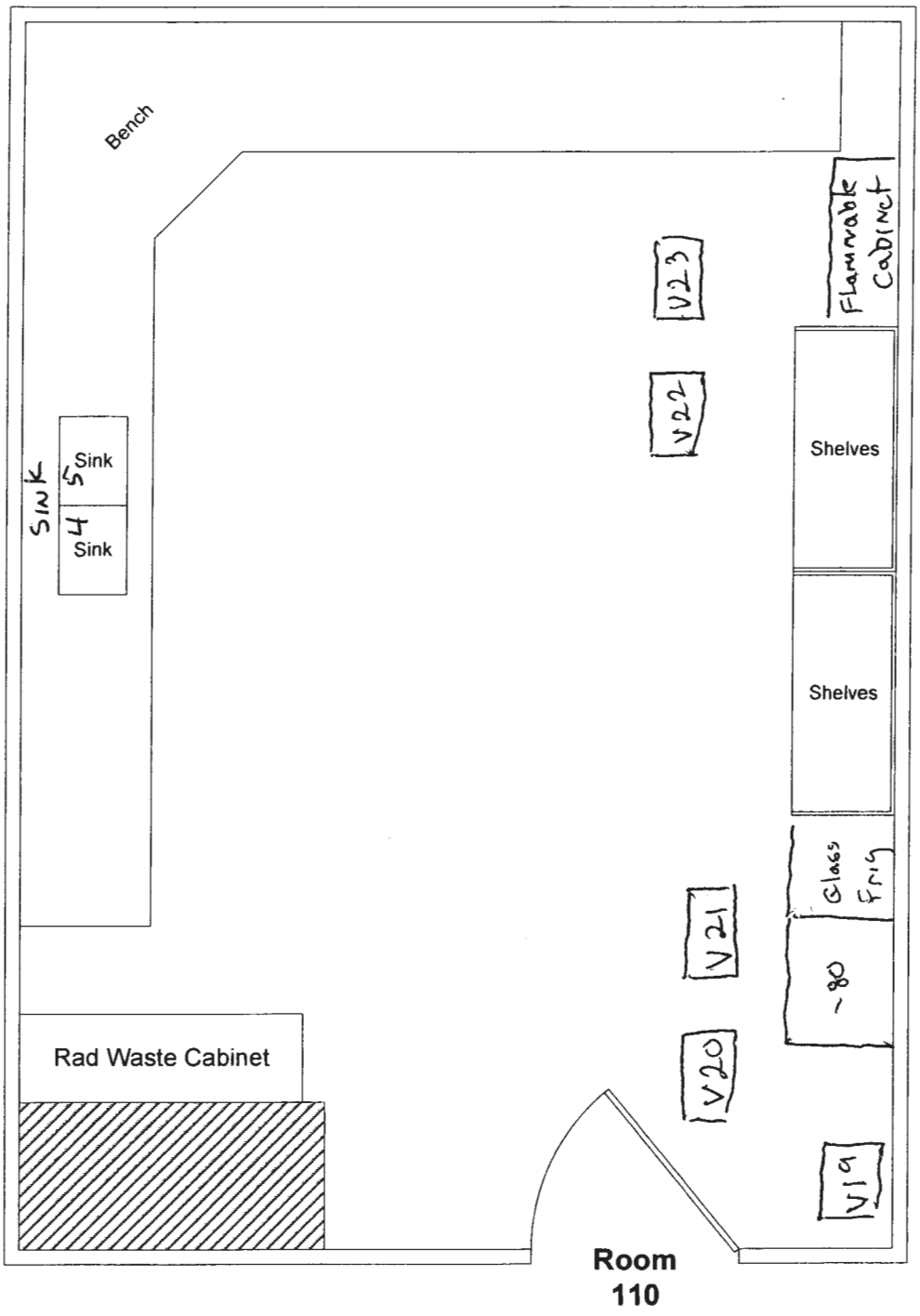
Avg=253.6
Use 250

Room 116
Dental Research Facility

James Simmer Jan Hu

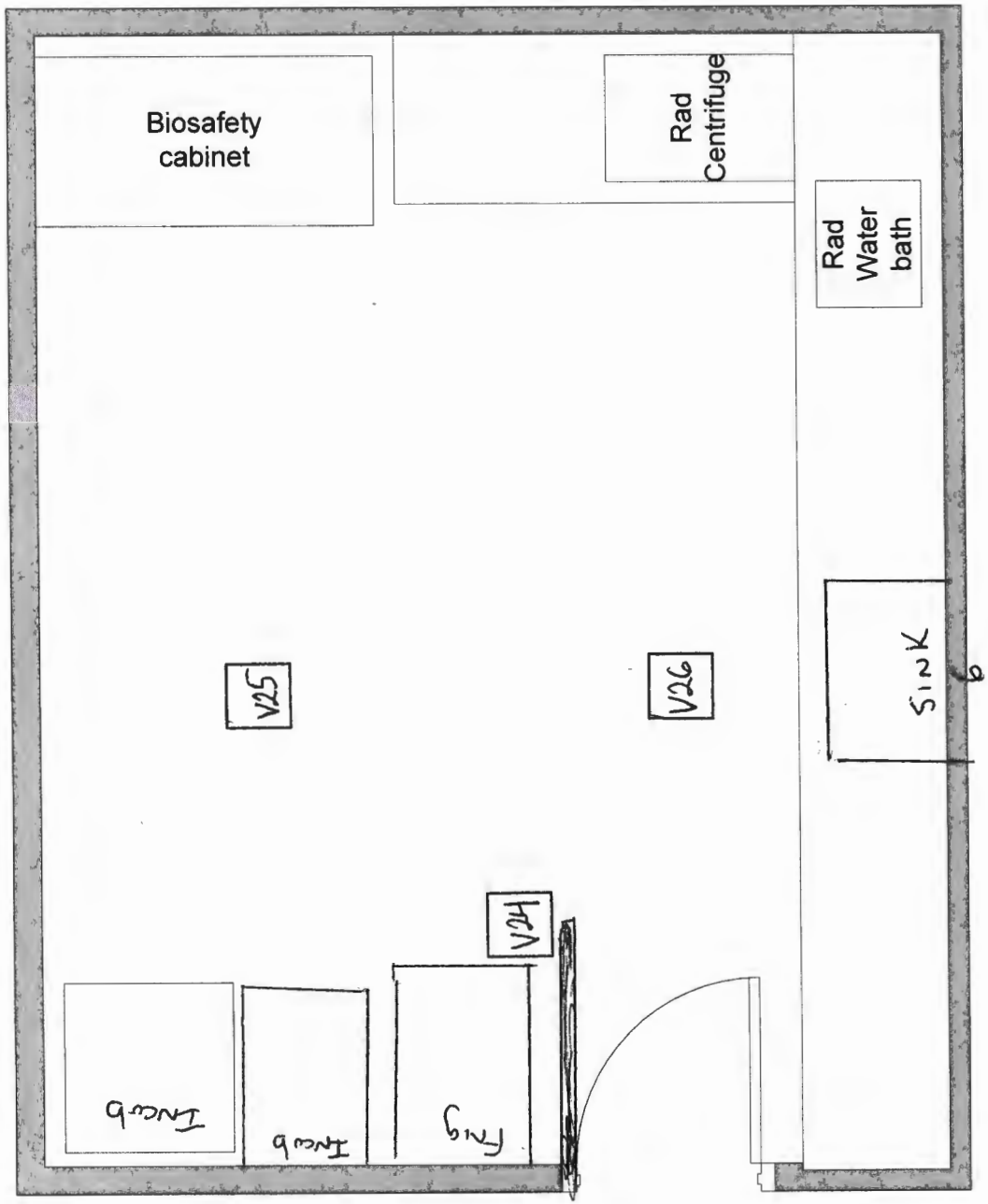
Performed By BKy **Date** 5-24-2016

MDCR	MDC	Ld	MDA
169	14486	77	4638



Room 110
Dental Research Facility

James Simmer Jan Hu



116a
Dental Research

Attachment 6

Final Status Survey Record
Rooms 106, 110 & 116
Dental Research Facility
1210 Eisenhower Place
Ann Arbor, MI
May 24, 2016

UNIVERSITY OF MICHIGAN
OCCUPATIONAL SAFETY ENVIRONMENTAL HEALTH
RADIATION SAFETY SERVICE

Radiological Survey Form
Building/Facility Decommissioning

Building	Room	Date	Time	Surveyor
DENTAL RESEARCH FACILITY	106 & 116	05/24/16	9:30 AM	JEFF WILSON

	Survey meter							
	Manufacturer Model/Serial Number		HV		Calibration Due Date		Instrument Efficiency	
Survey meter	LUDLUM MOD 12 S/# 265115		850		08-2016		C-14:	0.071
Probe							Si-32:	
Performance Checked? (Y/N)	C-14:	856	Si-32:	38253	Other:	—		
Background	Material		Material		Material		Material	
	FLOOR TILE		BENCH TOP		WALL		CELING TILE	
Bkg 1 (cpm)	293		232		272		458	
Bkg 2 (cpm)	289		258		266		464	
Bkg 3 (cpm)	277		260		261		449	
Avg Bkg (cpm)	286		250		266		457	

Scanning and Static Sensitivity[1]				
	Scanning Minimum Detectable Concentration (MDC)			
MDCR (cpm)	182	169	176	227
MDC*scan (dpm/100 cm2)*	14503	13466	13994	18067
Avg Bkg + MDCR (cpm)	468	419	442	684
	Static Minimum Detectable Activity (MDA)			
L*D (cpm)*	82	77	79	102
MDA*static (dpm/100 cm2)*	4630	4311	4474	5726
Avg Bkg + L_D (cpm)	368	327	345	559

[1] (see card attached to meter for sensitivity information)

Survey Results Above MDA / MDCR: *Check Here If All Survey Points Under MDA / MDCR:* ✓

Point	cpm	Point	cpm	Point	cpm	Point	cpm	Point	cpm
1		11		21		31		41	
2		12		22		32		42	
3		13		23		33		43	
4		14		24		34		44	
5		15		25		35		45	
6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

Comments:	Random confirmatory Final Status Survey locations. Floor plan attached.
Static Meter Survey with 1 minute counts over 100 cm2 per location.	
Contamination Swipe Survey (results attached) = 100 cm2 per location	

Surveyor: _____ Date: MAY 24, 2016
Reviewer: _____ Date: 5-25-16

UNIVERSITY OF MICHIGAN
OCCUPATIONAL SAFETY ENVIRONMENTAL HEALTH
RADIATION SAFETY SERVICE

Radiological Survey Form

Building/Facility Decommissioning

Building	Room	Date	Time	Surveyor
DENTAL RESEARCH FACILITY	110	05/24/16	9:30 AM	JEFF WILSON

	Survey meter							
	Manufacturer Model/Serial Number		HV		Calibration Due Date		Instrument Efficiency	
Survey meter	LUDLUM MOD 12 S/N 265115		850		08-2016		C-14:	0.071
Probe	PR-246236						Si-32:	
Performance Checked? (Y/N)	C-14:	856	Si-32:	38253	Other:	—		
Background	Material		Material		Material		Material	
	FLOOR TILE		BENCH TOP		WALL		CELING TILE	
Bkg 1 (cpm)	293		232		272		458	
Bkg 2 (cpm)	289		258		266		464	
Bkg 3 (cpm)	277		260		261		449	
Avg Bkg (cpm)	286		250		266		457	

Scanning and Static Sensitivity[1]				
	Scanning Minimum Detectable Concentration (MDC)			
MDCR (cpm)	182	169	176	227
MDC*scan (dpm/100 cm2)*	14503	13466	13994	18067
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	Static Minimum Detectable Activity (MDA)			
L*D (cpm)*	82	77	79	102
MDA*static (dpm/100 cm2)*	4630	4311	4474	5726
Avg Bkg + L_D (cpm)	368	327	345	559

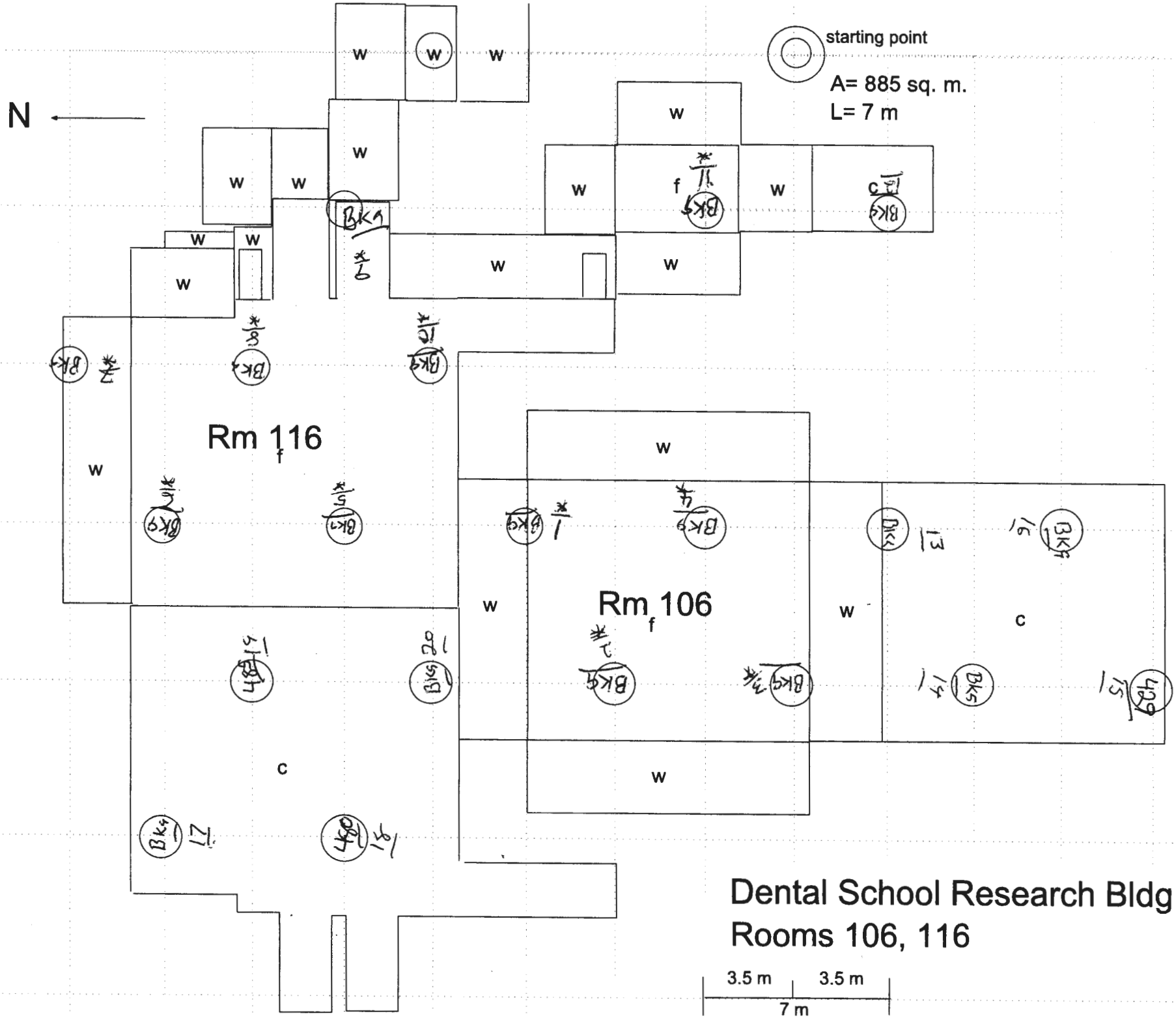
[1] (see card attached to meter for sensitivity information)

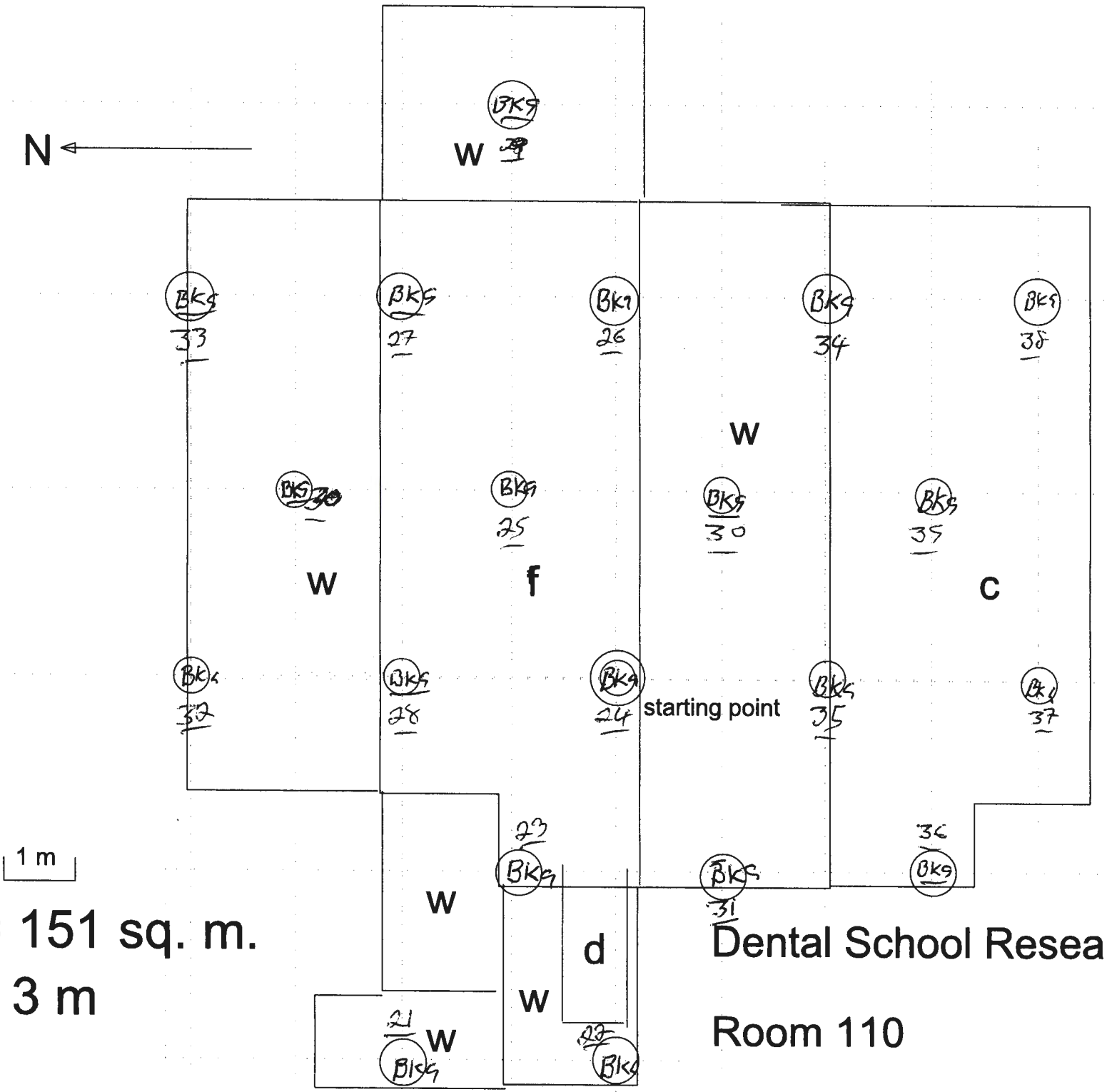
Survey Results Above MDA / MDCR: *Check Here If All Survey Points Under MDA / MDCR:* ✓

Point	cpm	Point	cpm	Point	cpm	Point	cpm	Point	cpm
1		11		21		31		41	
2		12		22		32		42	
3		13		23		33		43	
4		14		24		34		44	
5		15		25		35		45	
6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

Comments:	Random confirmatory Final Status Survey locations. Floor plan attached.
Static Meter Survey with 1 minute counts over 100 cm2 per location.	
Contamination Swipe Survey (results attached) = 100 cm2 per location	

Surveyor: _____ Date: MAY 24 2016
Reviewer: _____ Date: 5-25-16


starting point
A= 885 sq. m.
L= 7 m
N
Rm 116
Rm 106
Dental School Research Bldg
Rooms 106, 116
3.5 m
3.5 m
7 m



A= 151 sq. m.

L= 3 m

Dental School Research

Room 110

Protocol# 6 - Dennis.lsa User: DENNIS

D. Palmieri LSC Analysis Results

Assay Definition-

Assay Description:
SIMPLE FULL SPECTRUM ANALYSIS WITH 3 WINDOWS (H3, C14, P32). 1 MINUTE COUNT TIME, tSIE/AEC ON.

Assay Type: CPM
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\DENNIS\Dennis
Raw Results Path: C:\Packard\Tricarb\Results\DENNIS\Dennis\20160524_1455.results
Assay File Name: C:\Packard\TriCarb\Assays\Dennis.lsa

Count Conditions-

Nuclide: SMEARS
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Set: n/a
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	2.0	25.0
B	25.0	180.0
C	180.0	2000.0

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

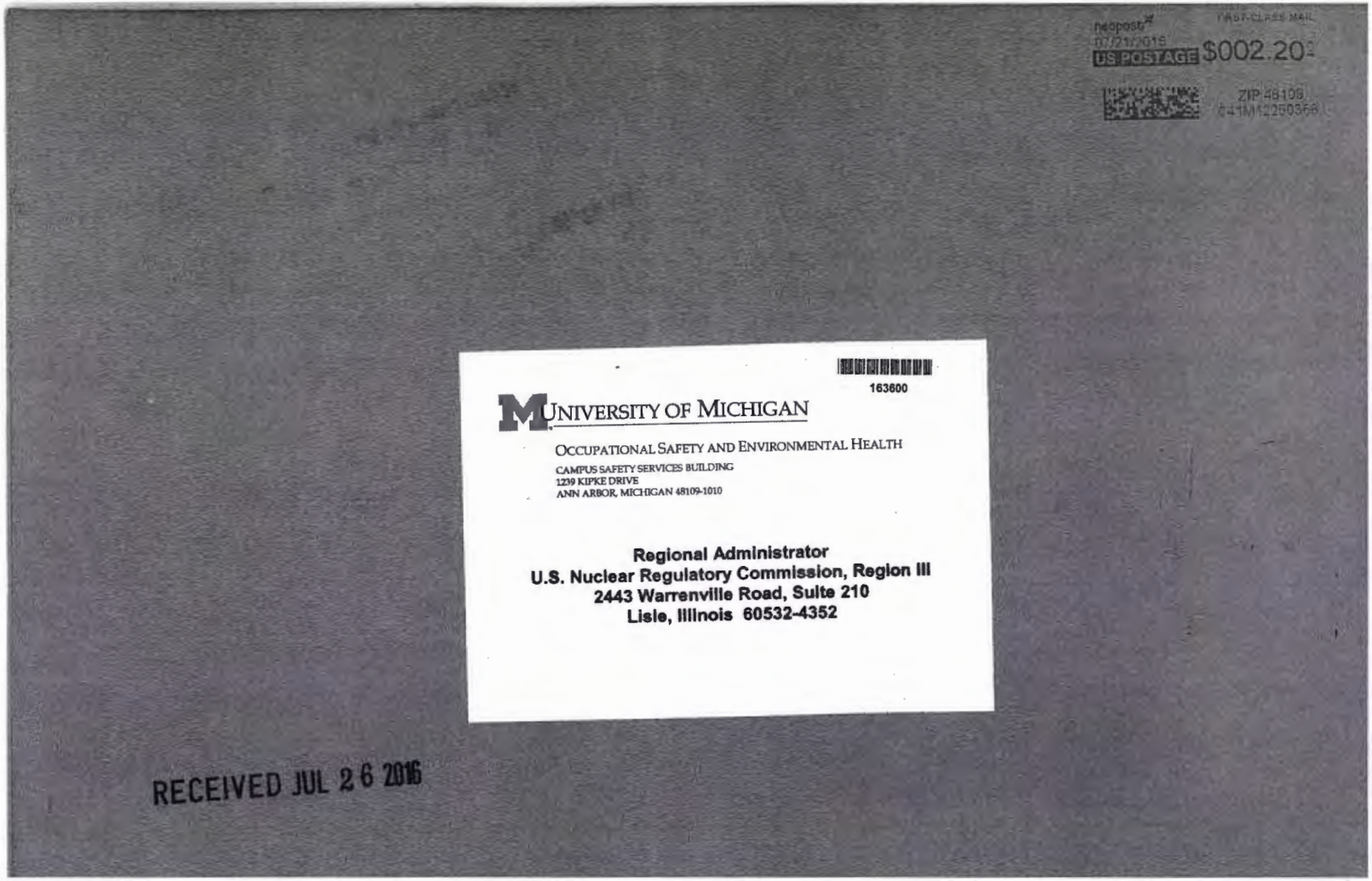
Cycle 1 Results

S#	PID	Time	CPMA	DPM A	CPMB	DPM B	CPMC	DPM C	tSIE	LUM	NOTES
1	32	1.0	23	57	13	19	5	6	456.0	0	
Missing vial 2.											
3	32	1.0	13	33	11	16	11	13	434.0	4	
Missing vial 4.											
5	32	1.0	10	25	7	10	14	16	475.5	6	
6	32	1.0	14	35	8	12	24	28	464.9	9	
7	32	1.0	15	38	12	18	13	15	471.4	4	
8	32	1.0	18	45	8	12	22	26	466.7	4	
9	32	1.0	11	27	4	6	17	20	472.1	7	
10	32	1.0	12	30	10	15	7	8	457.0	5	
11	32	1.0	24	59	9	13	14	16	478.8	3	

Protocol# 6 - Dennis.lsa User: DENNIS

D. Palmieri LSC Analysis Results

12	32	1.0	13	33	8	12	15	18	446.9	0
13	4	1.0	20	50	19	28	15	18	466.4	3
14	4	1.0	22	55	11	16	17	20	456.4	3
15	4	1.0	18	45	10	15	19	22	448.9	3
16	4	1.0	11	27	9	13	12	14	460.4	5
17	4	1.0	13	33	6	9	8	9	467.4	0
18	4	1.0	16	40	11	16	13	15	468.7	0
19	4	1.0	17	42	8	12	9	11	467.2	0
20	4	1.0	10	25	10	15	26	31	470.0	0
21	4	1.0	18	44	18	27	10	12	467.4	3
22	4	1.0	14	35	10	15	12	14	470.4	0
23	4	1.0	14	34	12	18	9	11	469.5	4
24	4	1.0	16	40	9	13	15	18	472.0	0
25	29	1.0	17	43	12	18	12	14	473.6	0
26	29	1.0	15	38	10	15	14	16	476.1	4
27	29	1.0	14	35	7	10	15	18	464.0	0
28	29	1.0	19	47	11	16	10	12	463.2	3
29	29	1.0	14	35	7	10	16	19	451.7	0
30	29	1.0	11	28	13	19	6	7	454.6	0
31	29	1.0	15	38	7	10	13	15	448.1	5
32	29	1.0	13	32	14	22	13	15	462.0	4
33	29	1.0	12	30	18	27	11	13	473.8	3
34	29	1.0	16	40	14	21	16	19	456.6	3
35	29	1.0	8	20	9	13	14	16	457.6	0
36	29	1.0	17	42	15	22	19	22	462.1	3
37	23	1.0	16	40	12	17	9	11	474.5	4
38	23	1.0	14	35	5	7	7	8	464.5	5
39	23	1.0	19	48	9	13	9	11	459.9	0
40	23	1.0	9	23	10	15	19	22	429.7	5
41	23	1.0	11	28	8	12	9	11	461.9	0
42	23	1.0	12	30	9	13	12	14	469.9	0
43	23	1.0	13	33	9	13	17	20	463.9	0
Missing vial 44.										
45	23	1.0	33831	84578	86140	128567	118	138	1006.9	0
46	23	1.0	118233	295583	74	111	11	13	1021.1	0
47	23	1.0	7	18	7	10	5	6	1010.2	0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1239 KIPKE DRIVE
ANN ARBOR, MICHIGAN 48109-1010
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Lisle, Illinois 60532-4352
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