Celsis | Analytical Services

September 28, 2011

US Nuclear Regulatory Commission
Materials Licensing Branch
Region III
2443 Warrenville Rd.
Suite 210
Lisle, IL 60532

To Whom It May Concern:

We have contracted R. M. Wester & Associates, Inc., located in St. Peters, Missouri, to assist us with termination of our USNRC Materials License. The Celsis laboratory has only used very small quantities of Hydrogen-3, for research purposes, and that which was used is accountable in our waste inventory logs.

Please find the enclosed closeout survey in support of our license termination for your review. If you have any questions or comments, please contact either myself, or R. M. Wester & Associates, Inc., as appropriate. Thank you for your assistance in this matter.

Sincerely,
Celsis Analytical Services

David Knysak
Radiation Safety Officer

RA 1-A5 5L

R. M. WESTER ***& ASSOCIATES, INC.***

215 INDACOM DRIVE - ST. PETERS, MISSOURI 63376
www.rmwester.com
(636) 928-9628 - FAX 928-9857

Radiation Survey Report

Celsis Analytical Services
St. Louis, Missouri

Closeout Survey in Support of USNRC License Termination

Performed By:

R. M. Wester & Associates, Inc.
Health Physicists: Kenneth Bachmann, Kenneth Barnes

Survey Dates: September 22, 23, 28, 2011

1. Overview

Celsis Analytical Services Laboratory, located in St. Louis, Missouri, was approved for milli-Curie quantities of Hydrogen-3 and Carbon-14, however, only Hydrogen-3 was used within the laboratory. The radioactive material was used for skin absorption studies. Currently, all materials received are located in waste drums within the Building C Skin Biology Laboratory and contain liquid, scintillation vials, and associated dry waste.

Areas where radioactive materials were received, stored, and used at the Celsis Analytical Services Laboratory were surveyed for removable radioactive surface contamination. The survey consisted of a total of 193 grid sections of building surfaces and removable equipment items, with one removable contamination sample in each grid section. A sampling of horizontal surfaces within the Building C Skin Biology Laboratory were also surveyed for any remaining fixed radioactive presence. Mr. Brian A. Dell, Associate Director of Biological Sciences and Mr. David Knysak, Radiation Safety Officer (RSO), were the on-site point of contacts during the survey. The size and geometry of the surface grid sections was approximately 1 meter square. Please see Enclosure 1 for applicable grid diagrams.

The areas surveyed were: Building C Skin Biology Laboratory, Building A Cytotoxicity Lab, Building A Receiving Area. Included in the survey were all accessible: wall surfaces up to 2 meters in height; floor surfaces; exterior and interior of fixed equipment items such as lab benches, fixtures, sinks, and drains; exterior and interior, where appropriate, of removable equipment items such as portable tables, lab refrigerators, drums, and miscellaneous lab supply items. Please see Enclosure 1 for a graphical representation of the rooms.

2. Fixed Contamination Radiation Survey

A Berthold, Model LB 6255 Tritium Probe (S/N - 623 calibrated on 9/28/11)) was used to survey surfaces for any evidence of fixed contamination. The above probe was paired with a Ludlum Measurements, Inc. Model 2350 (S/N -79049). The survey was conducted within one centimeter of the surface. Ambient background for the tritium detector was 160 CPM ± 25 CPM. Ambient background was sampled in grid section A1, just outside the Building C Skin Laboratory. Please see Enclosure 2 for fixed contamination, radiation survey data. Conclusion of the fixed contamination, radiation survey showed no net detectable readings of significance above the ambient background rate for the survey instrument used. The fixed contamination radiation survey was performed on September 28, 2011.

3. Removable Contamination Survey

The grid surfaces were wiped within each one-square-meter grid, designated. In some cases, a smaller grid size was used, where applicable. The approximate area of each wipe coverage was 100 cm^2 within each grid section. See Enclosure 3 for removable contamination survey data. The removable contamination survey was performed on September 22 and September 23, 2011.

4. Removable Contamination Analysis

The wipes were analyzed using a Packard Instrument Company, Tri-Carb 2100TR, Liquid Scintillation Analyzer (S/N 416174) sensitive to beta and alpha radiation. Conclusion of the contamination survey showed no net detectable readings of significance above the control background for the liquid scintillation testing. Activities of all wipes samples were measured below the applicable Minimal Detectable Activity (MDA). See enclosure 3 for details regarding the removable contamination survey results.

Surveyor: Kenneth Barnes, Health Physicist Date: September 22, 23, 28, 2011

Surveyor: Kenneth Bachmann, Health Physicist Date: September 22, 2011

Reviewer: Kevin McCann, Health Physicist Date: September 28, 2011

Enclosure 1: Facility Layout and Grid Locations

Figure 1: Building C Skin Biology Laboratory Layout

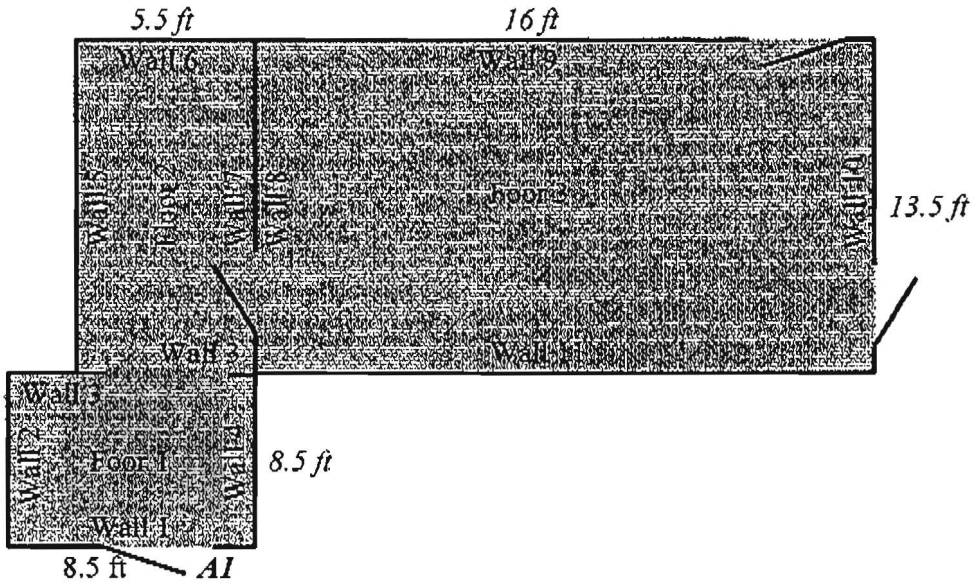
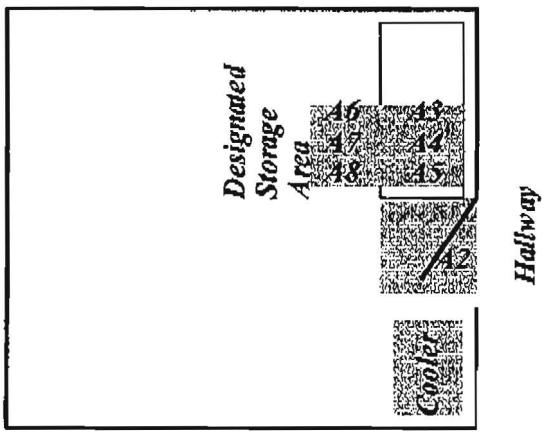


Figure 2: Building A Storage Room Grid



Cooler:

Back, Interior:	***A9***
Right Side, Interior:	***A10***
Interior Shelves:	***A11***
Bottom, Interior:	***A12***

Drawings not to scale. Dimensions are approximate. Shaded areas indicate surveyed regions. Grid locations are given in bold.

Figure 3: Building A Receiving Area Grid

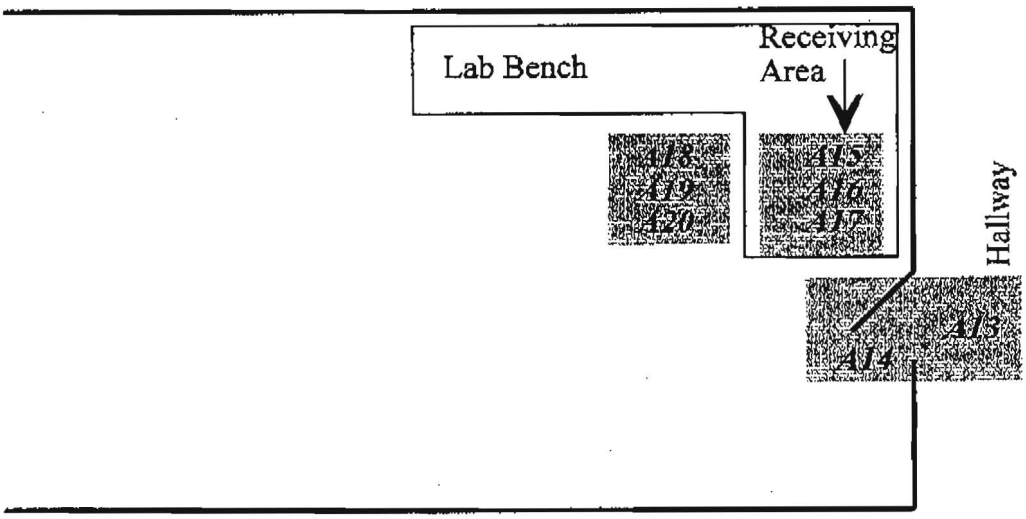
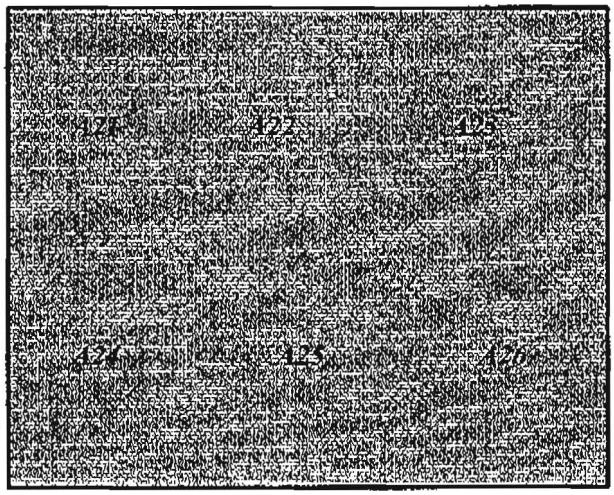


Figure 4: Skin Biology Lab, Floor 1 Grid



Enclosure 1

Figure 5: Skin Biology Lab, Wall 1 Grid

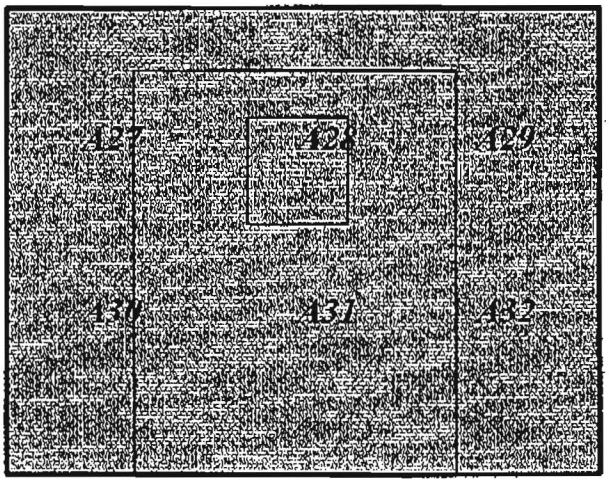


Figure 6: Skin Biology Lab, Wall 2 Grid

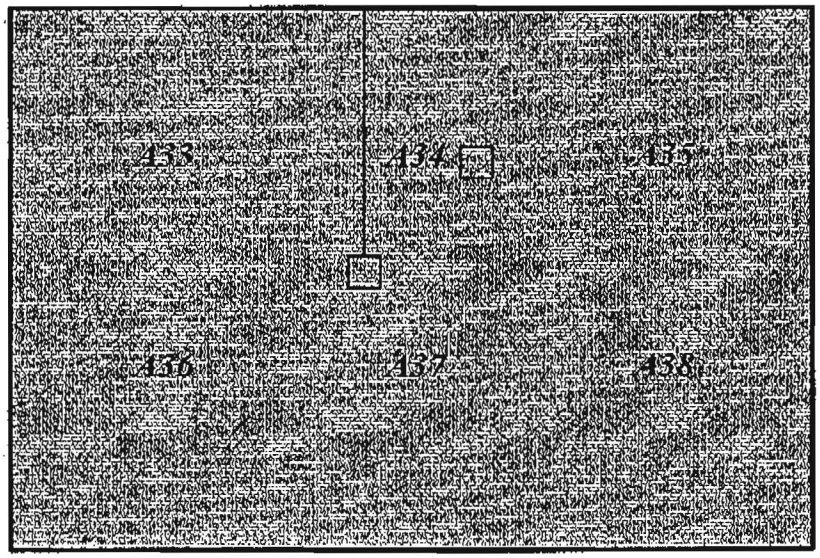
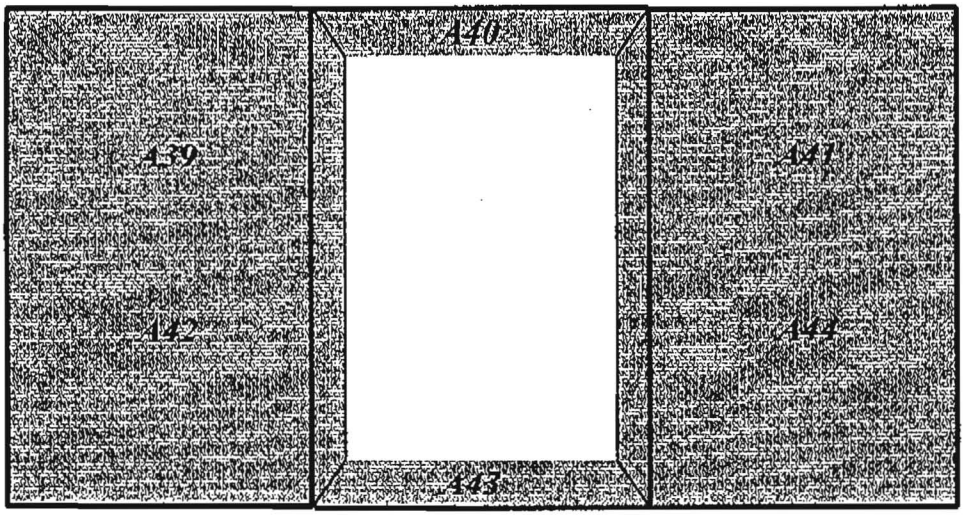


Figure 6: Skin Biology Lab, Wall 3 Grid



Adjoining wall behind this wall was included in survey grids

Figure 7: Skin Biology Lab, Wall 4 Grid

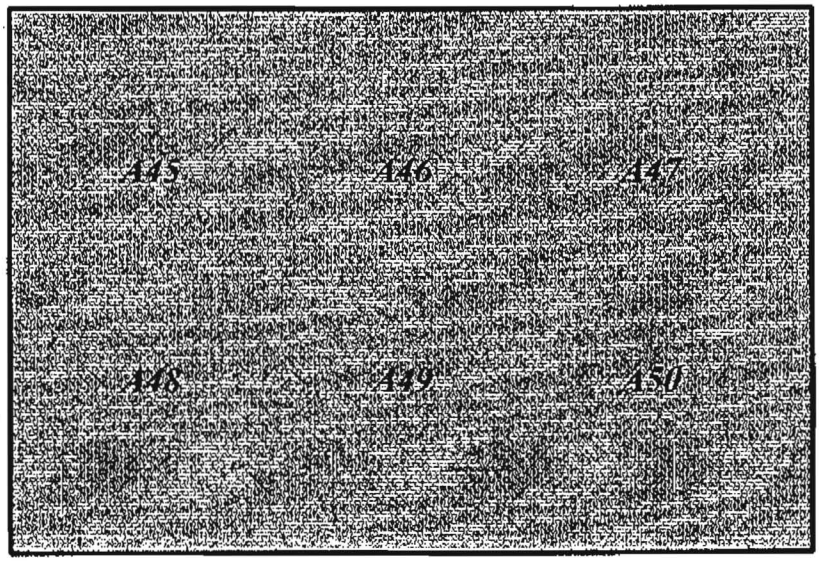


Figure 8: Skin Biology Lab, Floor 2 Grid

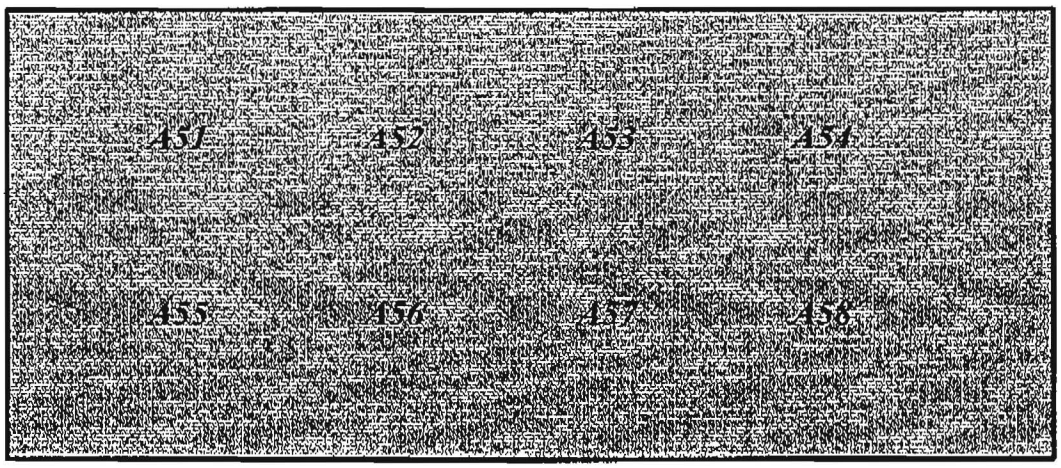


Figure 9: Skin Biology Lab, Wall 5 Grid

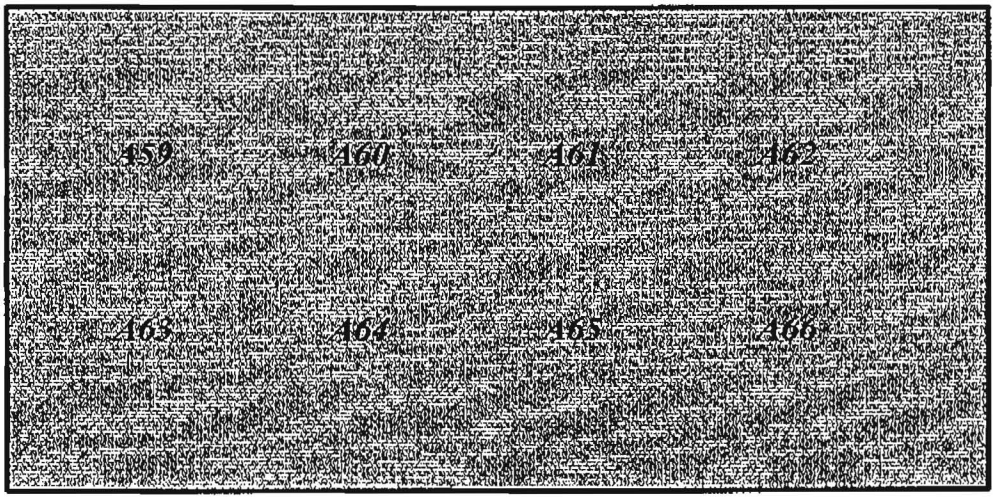


Figure 10: Skin Biology Lab, Wall 6 Grid

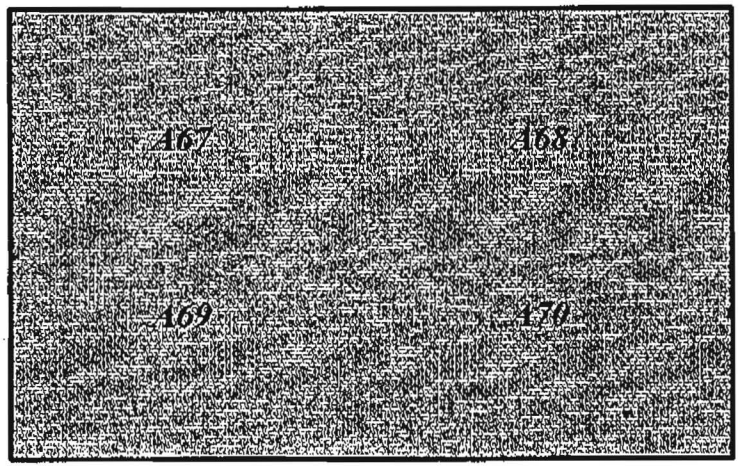
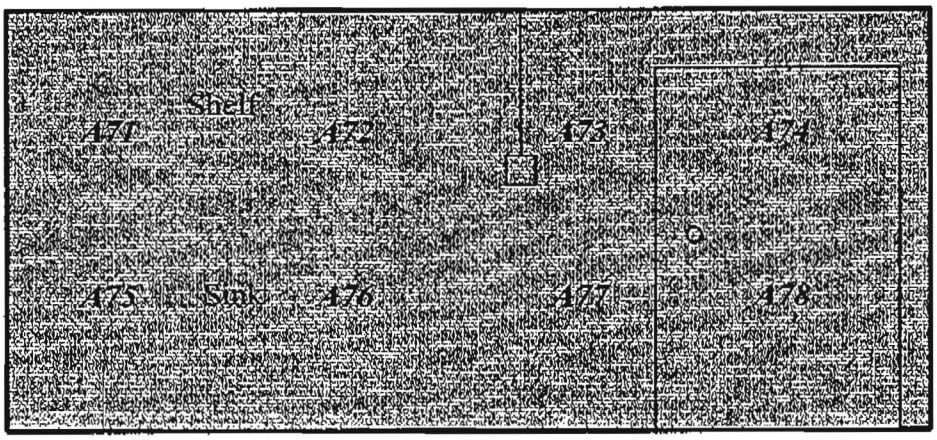


Figure 11: Skin Biology Lab, Wall 7 Grid



Shelf:	***A79, A80, A81***	Rad. Fridge Exterior:	***A89, A90, A91***
Sink Exterior:	***A82, A83***	Rad. Fridge Interior:	***A92, A93, A94***
Sink Drain:	***A84, A85***	Storage Container:	***A95, A96***
Misc. Items on Shelf:	***A86***		
Misc. Items on Sink:	***A87***		
Misc. Items on Floor:	***A88***		

Figure 12: Skin Biology Lab, Floor 3 Grid

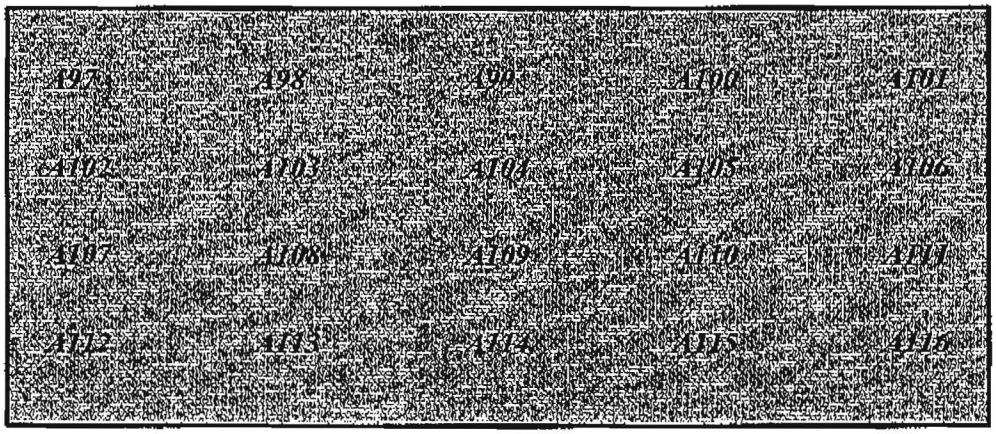


Figure 13: Skin Biology Lab, Wall 8 Grid

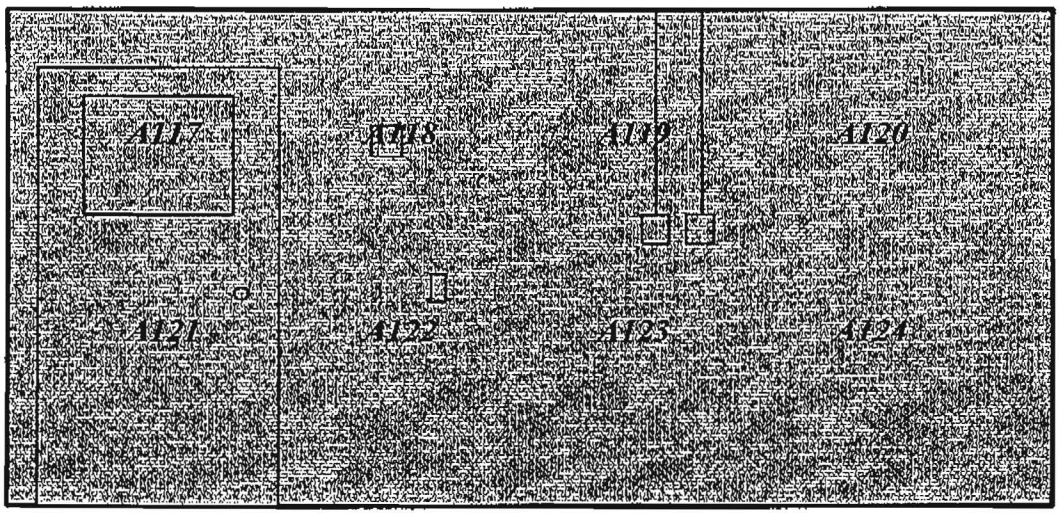


Figure 14: Skin Biology Lab, Wall 9 Grid

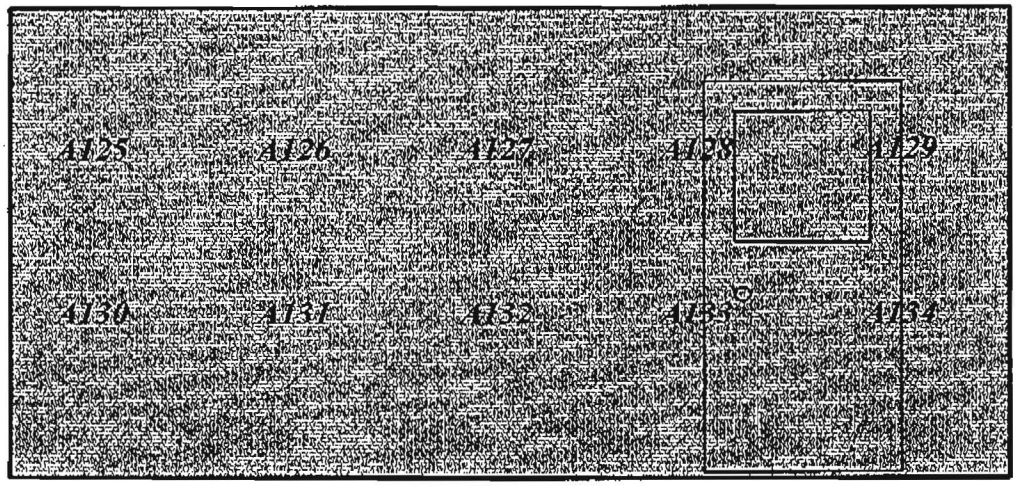


Figure 15: Skin Biology Lab, Wall 10 Grid

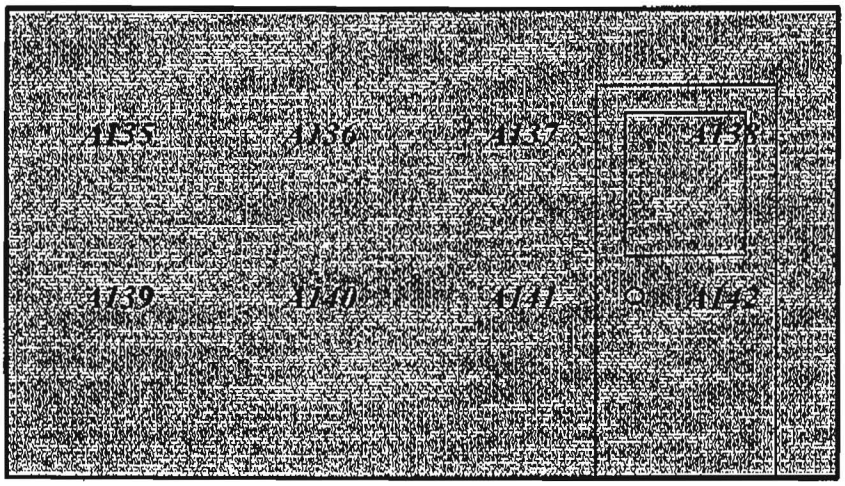
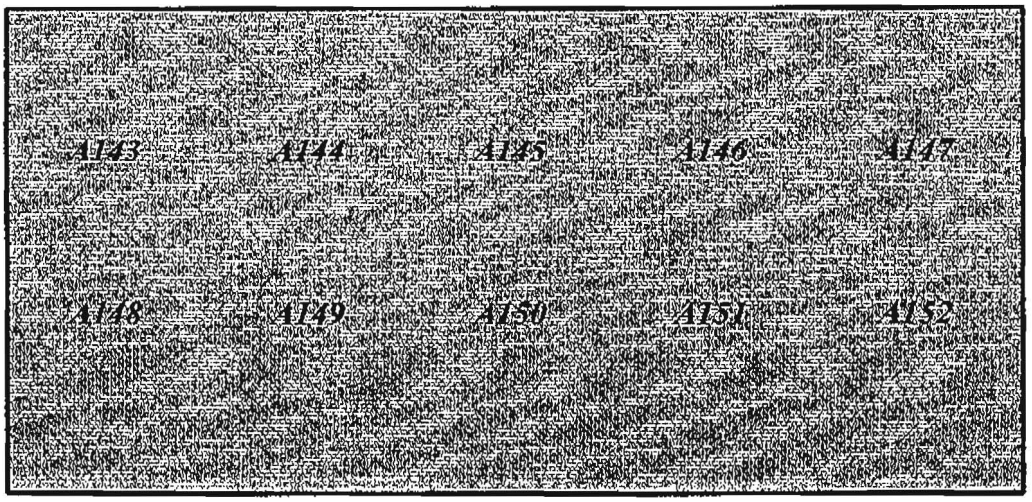


Figure 16: Skin Biology Lab, Wall 11 Grid



Removable Equipment in Lab

Table	***A153, A154, A155, A156***
Items on Table:	***A157, A158, A159***
Titration Table:	***A160, A161, A162, A163, A164***
Items on Titration Table:	***A165, A166, A167***
LSA Table:	***A168, A169, A170, A171, A172, A173, A174***
LSA Exterior:	***A175, A176***
LSA Interior:	***A177, A178***
LSA Monitor:	***A179***
LSA Printer:	***A180***
Supplies on LSA Table:	***A181, A182***
Dry Rad. Waste Drum Exterior:	***A183, A184***
Scintillation Vial Drum Exterior:	***A185, A186***
Liquid Rad. Waste Drum Exterior:	***A187, A188***
Misc. Bucket (Ext, Int)	***A189, A190***
Lab Coats:	***A191***
Small Table:	***A192***
Towel Rack:	***A193***

Enclosure 2: Fixed Contamination, Radiation Survey Data

Berthold Model LB 6255

Grid No.	Raw CPM	Avg. Bkg CPM	Net CPM	eff.	Net DPM
A97	158.00	160.00	0.00	0.056	0.00
A98	163.00	160.00	3.00	0.056	53.57
A99	167.00	160.00	7.00	0.056	125.00
A100	158.00	160.00	0.00	0.056	0.00
A101	155.00	160.00	0.00	0.056	0.00
A102	155.00	160.00	0.00	0.056	0.00
A103	168.00	160.00	8.00	0.056	142.86
A104	160.00	160.00	0.00	0.056	0.00
A105	156.00	160.00	0.00	0.056	0.00
A106	164.00	160.00	4.00	0.056	71.43
A107	156.00	160.00	0.00	0.056	0.00
A108	155.00	160.00	0.00	0.056	0.00
A109	182.00	160.00	22.00	0.056	392.86
A110	184.00	160.00	24.00	0.056	428.57
A111	141.00	160.00	0.00	0.056	0.00
A112	152.00	160.00	0.00	0.056	0.00
A113	176.00	160.00	16.00	0.056	285.71
A114	118.00	160.00	0.00	0.056	0.00
A115	146.00	160.00	0.00	0.056	0.00
A116	148.00	160.00	0.00	0.056	0.00
A153	151.00	160.00	0.00	0.056	0.00
A154	135.00	160.00	0.00	0.056	0.00
A160	144.00	160.00	0.00	0.056	0.00
A161	134.00	160.00	0.00	0.056	0.00
A162	166.00	160.00	6.00	0.056	107.14
A168	118.00	160.00	0.00	0.056	0.00
A169	131.00	160.00	0.00	0.056	0.00
A170	146.00	160.00	0.00	0.056	0.00
A175	199.00	160.00	39.00	0.056	696.43
A176	192.00	160.00	32.00	0.056	571.43

160 CPM +/- 25 CPM Background; 5.6% C-14 eff (2 Pi); 22 cm2 Window Area

Enclosure 3: Removable Contamination Survey Data

Liquid Scintillation Analysis, Packard Tri-Carb 2100TR

Grid No.	Net CPM	Net DPM
A1	0.00	≤ 21.4
A2	1.53	≤ 21.4
A3	0.64	≤ 21.4
A4	0.00	≤ 21.4
A5	0.00	≤ 21.4
A6	0.04	≤ 21.4
A7	3.29	≤ 21.4
A8	1.44	≤ 21.4
A9	0.09	≤ 21.4
A10	0.44	≤ 21.4
A11	2.49	≤ 21.4
A12	0.64	≤ 21.4
A13	0.24	≤ 21.4
A14	0.00	≤ 21.4
A15	2.33	≤ 21.4
A16	0.04	≤ 21.4
A17	0.64	≤ 21.4
A18	11.13	≤ 21.4
A19	0.00	≤ 21.4
A20	0.00	≤ 21.4
A21	0.64	≤ 21.4
A22	0.00	≤ 21.4
A23	2.53	≤ 21.4
A24	0.84	≤ 21.4
A25	0.00	≤ 21.4
A26	0.00	≤ 21.4
A27	0.84	≤ 21.4
A28	0.24	≤ 21.4
A29	0.49	≤ 21.4
A30	0.04	≤ 21.4
A31	0.69	≤ 21.4
A32	0.00	≤ 21.4
A33	3.18	≤ 21.4
A34	0.89	≤ 21.4
A35	0.00	≤ 21.4
A36	2.04	≤ 21.4
A37	1.04	≤ 21.4
A38	0.00	≤ 21.4
A39	0.44	≤ 21.4
A40	1.49	≤ 21.4
A41	0.00	≤ 21.4
A42	0.00	≤ 21.4
A43	0.00	≤ 21.4
A44	0.00	≤ 21.4
A45	0.00	≤ 21.4
A46	0.00	≤ 21.4
A47	0.00	≤ 21.4

Liquid Scintillation Analysis, Packard Tri-Carb 2100TR

Grid No.	Net CPM	Net DPM
A48	0.69	≤ 21.4
A49	0.00	≤ 21.4
A50	1.24	≤ 21.4
A51	12.09	≤ 21.4
A52	0.00	≤ 21.4
A53	0.00	≤ 21.4
A54	0.24	≤ 21.4
A55	29.29	≤ 21.4
A56	0.64	≤ 21.4
A57	0.24	≤ 21.4
A58	0.00	≤ 21.4
A59	0.00	≤ 21.4
A60	0.00	≤ 21.4
A61	0.04	≤ 21.4
A62	1.29	≤ 21.4
A63	0.00	≤ 21.4
A64	0.00	≤ 21.4
A65	0.24	≤ 21.4
A66	0.00	≤ 21.4
A67	0.44	≤ 21.4
A68	0.00	≤ 21.4
A69	0.00	≤ 21.4
A70	0.89	≤ 21.4
A71	0.00	≤ 21.4
A72	0.04	≤ 21.4
A73	0.00	≤ 21.4
A74	0.24	≤ 21.4
A75	0.00	≤ 21.4
A76	0.44	≤ 21.4
A77	0.00	≤ 21.4
A78	0.44	≤ 21.4
A79	0.04	≤ 21.4
A80	0.04	≤ 21.4
A81	0.44	≤ 21.4
A82	0.00	≤ 21.4
A83	3.11	≤ 21.4
A84	0.00	≤ 21.4
A85	0.24	≤ 21.4
A86	0.00	≤ 21.4
A87	0.89	≤ 21.4
A88	0.04	≤ 21.4
A89	1.64	≤ 21.4
A90	0.04	≤ 21.4
A91	2.29	≤ 21.4
A92	2.42	≤ 21.4
A93	0.00	≤ 21.4
A94	0.69	≤ 21.4

LSA: 0.925 eff C-14; 0.574 eff H-3; 30.78 Background CPM; 21.4 DPM MDA, Window 0 - 2000 keV

Liquid Scintillation Analysis, Packard Tri-Carb 2100TR

Grid No:	Raw CPM	Net DPM
A95	0.04	≤ 21.4
A96	0.24	≤ 21.4
A97	2.29	≤ 21.4
A98	0.84	≤ 21.4
A99	0.00	≤ 21.4
A100	6.93	≤ 21.4
A101	0.00	≤ 21.4
A102	0.00	≤ 21.4
A103	0.00	≤ 21.4
A104	1.64	≤ 21.4
A105	0.04	≤ 21.4
A106	0.00	≤ 21.4
A107	1.44	≤ 21.4
A108	1.24	≤ 21.4
A109	0.89	≤ 21.4
A110	0.00	≤ 21.4
A111	0.24	≤ 21.4
A112	0.00	≤ 21.4
A113	0.44	≤ 21.4
A114	0.24	≤ 21.4
A115	0.00	≤ 21.4
A116	0.44	≤ 21.4
A117	0.00	≤ 21.4
A118	0.24	≤ 21.4
A119	0.04	≤ 21.4
A120	0.00	≤ 21.4
A121	0.00	≤ 21.4
A122	0.64	≤ 21.4
A123	0.00	≤ 21.4
A124	3.93	≤ 21.4
A125	0.84	≤ 21.4
A126	0.00	≤ 21.4
A127	0.00	≤ 21.4
A128	3.64	≤ 21.4
A129	0.00	≤ 21.4
A130	0.00	≤ 21.4
A131	0.64	≤ 21.4
A132	0.00	≤ 21.4
A133	0.00	≤ 21.4
A134	0.00	≤ 21.4
A135	4.24	≤ 21.4
A136	0.00	≤ 21.4
A137	0.24	≤ 21.4
A138	0.00	≤ 21.4
A139	0.44	≤ 21.4
A140	0.00	≤ 21.4
A141	0.04	≤ 21.4

Liquid Scintillation Analysis, Packard Tri-Carb 2100TR

Grid No.	Raw CPM	Net DPM
A142	0.00	≤ 21.4
A143	0.00	≤ 21.4
A144	0.44	≤ 21.4
A145	0.00	≤ 21.4
A146	2.29	≤ 21.4
A147	1.04	≤ 21.4
A148	0.00	≤ 21.4
A149	0.04	≤ 21.4
A150	0.04	≤ 21.4
A151	0.00	≤ 21.4
A152	0.04	≤ 21.4
A153	0.00	≤ 21.4
A154	0.00	≤ 21.4
A155	0.00	≤ 21.4
A156	0.04	≤ 21.4
A157	0.00	≤ 21.4
A158	1.69	≤ 21.4
A159	0.84	≤ 21.4
A160	0.29	≤ 21.4
A161	0.44	≤ 21.4
A162	0.00	≤ 21.4
A163	0.24	≤ 21.4
A164	1.29	≤ 21.4
A165	0.00	≤ 21.4
A166	0.44	≤ 21.4
A167	0.44	≤ 21.4
A168	0.00	≤ 21.4
A169	15.29	≤ 21.4
A170	0.00	≤ 21.4
A171	0.09	≤ 21.4
A172	0.00	≤ 21.4
A173	1.84	≤ 21.4
A174	0.00	≤ 21.4
A175	0.00	≤ 21.4
A176	0.00	≤ 21.4
A177	0.00	≤ 21.4
A178	0.00	≤ 21.4
A179	0.73	≤ 21.4
A180	0.00	≤ 21.4
A181	0.49	≤ 21.4
A182	0.00	≤ 21.4
A183	0.44	≤ 21.4
A184	0.64	≤ 21.4
A185	0.00	≤ 21.4
A186	1.24	≤ 21.4
A187	0.00	≤ 21.4
A188	0.00	≤ 21.4

LSA: 0.925 eff C-14; 0.574 eff H-3; 30.78 Background CPM; 21.4 DPM MDA, Window 0 - 2000 keV

Liquid Scintillation Analysis, Packard Tri-Carb 2100TR

Grid No.	Raw CPM	Net DPM
A189	0.00	≤ 21.4
A190	0.00	≤ 21.4
A191	0.04	≤ 21.4
A192	0.00	≤ 21.4
A193	0.00	≤ 21.4

LSA: 0.925 eff C-14; 0.574 eff H-3; 30.78 Background CPM; 21.4 DPM MDA, Window 0 - 2000 keV

R. M. WESTER & ASSOCIATES, INC.

215 INDACOM DRIVE - ST. PETERS, MISSOURI 63376
www.rmwester.com
(636) 928-9628 - FAX (636) 928-9857

COVER SHEET

FAX

To: NRC Region III - Materials Licensing Branch
Fax #: 630-515-1078
Date: September 29, 2011
Pages: 18, including this cover sheet.

COMMENTS:

Please review at your earliest convenience regarding termination of Celsis USNRC License.

Kevin McCann
R. M. Wester & Associates, Inc.
215 Indacom Drive
St. Peters, Missouri 63366-2434

Cell: 636-448-1141
Office: 636-928-9628
Fax: 636-928-9857