MARILL HALL SECOND FLOOR CORRIDORS

(SURVEY UNITS 32 THROUGH 36)

Magill Hall Second Floor Corridors includes Corridor 209, Corridor 225, Lab 218A, Vestibule 232, Office 232B, Corridor 237, Corridor 250, Office 244A, and Vestibule 244C. The floors and walls within these areas were classified as MARSSIM Class 2 and Class 3 areas, respectively (see Table A5.1). Figures (including sample locations) are included in Attachment A-5-1. Radiologically impacted areas were divided into SUs based on MARSSIM-recommended size constraints, resulting in a total of 5 SUs (SU-32 through SU-36) in the area identified herein as Magill Hall Second Floor Corridors. Survey data from the floors, walls, and ceiling tiles are located in Tables A5.2 through A5.6.

Overview of Surveys Performed. Ludlum Model 43-89 dual phosphor ZnS detectors coupled with Ludlum Model 2360 scalers were used for the collection of quantitative alpha/beta scan surveys and fixed-point (i.e., static) measurements. The alpha/beta static measurements were performed at systematic locations for MARSSIM Class 2 areas and at randomly generated locations for Class 3 areas. Given that scan surveys did not detect the presence of activity that was elevated with respect to the investigation level, biased fixed-point measurements were not necessary. Removable contamination measurements (i.e., swipes) were also collected at each static location to quantify residual removable activity. The swipes were counted using a Ludlum Model 43-10-1 alpha/beta sample counter. QA/QC information relative to the instruments used is contained in Section 5.0 of the main text and in Appendix C.

Table A5.1. Magill Hall Second Floor Corridors Summary Table

Room Number/ Description	Floor Area (m^2)	Walls[a]		Floors	
		Included (Yes/No)	MARSSIM Classification	Included (Yes/No)	MARSSIM Classification
Corridor 209	69	Yes	Class 2	Yes	Class 2
Corridor 225	89			Yes	Class 2
Lab 218A	20			Yes	Class 2
Vestibule 232	7			Yes	Class 2
Office 232B	20			Yes	Class 2
Corridor 237	69			Yes	Class 2
Corridor 250	113			Yes	Class 2
Office 244A	20			Yes	Class 2
Vestibule 244C	7			Yes	Class 2

[a] All areas were combined for the MARSSIM Class 3 Wall Survey.

Fixed-Point Measurements. Fixed-point measurements were obtained from MARSSIM Class 2 (systematic - random start triangular grid) or MARSSIM Class 3 (random) locations. Class 3 fixed-point measurements were obtained from random locations, with emphasis on areas with a greater likelihood of residual activity. Results of the static measurements are listed in Tables A5.2 through A5.5, and locations are shown on Figures A5.1 through A5.5. All alpha results were below the site-specific alpha DCGL of 1,160 dpm/100 cm^2 for Am-241. Residual beta activity was compliant with both the Cs-137 surface contamination level of 5,000 dpm/100 cm^2 specified in AEC Regulatory Guide 1.86 (AEC 1974) and the NRC screening level DCGL of 28,000 dpm/100 cm^2 cited in Table 5.19 of NUREG-5512 (NRC 1999) for Cs-137 on structures.

Table A5.2. SU-32 Corridor 209 Class 2 Floor Measurement Results

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
1	Linoleum	209	-5	416	0	-44
2	Linoleum	209	8	581	0	-30
3	Linoleum	209	-5	373	0	-49
4	Linoleum	209	-5	866	0	-27
5	Linoleum	209	8	449	0	-58
6	Linoleum	209	-5	362	0	-24
7	Linoleum	209	-5	482	0	-30
8	Linoleum	209	-5	767	0	-41
9	Linoleum	209	-5	581	0	-69
10	Linoleum	209	33	175	0	-49
11	Linoleum	209	-5	712	3	-10
12	Linoleum	209	33	559	3	-30

The MDC is the minimum detectable concentration on a surface that an instrument is expected to detect with 95 percent confidence.

The instrument MDCs for fixed measurements 1-12 are 21 dpm/100 cm^2 (alpha) and 257 dpm/100 cm^2 (beta); the MDCs for removable samples 1-12 are 18 dpm/100 cm^2 (alpha) and 212 dpm/100 cm^2 (beta); and the MDCs for QC measurement #8 are 54 dpm/100 cm^2 (alpha) and 223 dpm/100 cm^2 (beta).

Negative results indicate results that are below background for the respective building material.

N/A – Not Applicable

Table A5.3. SU-33 Lab 218A, Corridor 225, Vestibule 232 and Office 232B Class 2 Floor Measurement Results

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
1	Concrete	218a	46	1,490	0	-27
2	Concrete	218a	-5	307	0	-30
3	Concrete	225	-5	570	3	-35
4	Concrete	225	-5	636	0	-41
5	Concrete	225	-5	515	3	-52
6	Concrete	225	20	581	0	-60
7	Concrete	225	-5	526	3	-27
8	Concrete	225	33	855	3	4
9	Concrete	232	-5	548	0	-19
10	Concrete	232b	-5	997	6	-19

The MDC is the minimum detectable concentration on a surface that an instrument is expected to detect with 95 percent confidence.

The instrument MDCs for fixed measurements 1-10 are 21 dpm/100 cm^2 (alpha) and 257 dpm/100 cm^2 (beta); the MDCs for removable samples 1-10 are 18 dpm/100 cm^2 (alpha) and 212 dpm/100 cm^2 (beta); and the MDCs for QC measurement #8 are 54 dpm/100 cm^2 (alpha) and 223 dpm/100 cm^2 (beta).

Negative results indicate results that are below background for the respective building material.

N/A – Not Applicable

Table A5.4. SU-34 Corridor 237 Class 2 Floor Measurement Results

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
1	Linoleum	237	-5	581	0	-41
2	Linoleum	237	-5	548	0	-5
3	Linoleum	237	8	701	6	-38
4	Linoleum	237	8	756	0	-13
5	Linoleum	237	8	526	0	-38
6	Linoleum	237	20	636	0	-58
7	Linoleum	237	-5	581	0	-27
8	Linoleum	237	20	603	0	-52
9	Linoleum	237	-5	581	0	-30

Table A5.4. SU-34 Corridor 237 Class 2 Floor Measurement Result (Continued)

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
10	Linoleum	237	8	548	0	4
11	Linoleum	237	8	482	0	-33
12	Linoleum	237	8	712	3	-55

The MDC is the minimum detectable concentration on a surface that an instrument is expected to detect with 95 percent confidence.

The instrument MDCs for fixed measurements 1-12 are 21 dpm/100 cm^2 (alpha) and 257 dpm/100 cm^2 (beta); the MDCs for removable samples 1-12 are 18 dpm/100 cm^2 (alpha) and 212 dpm/100 cm^2 (beta); and the MDCs for QC measurement #10 are 54 dpm/100 cm^2 (alpha) and 223 dpm/100 cm^2 (beta).

Negative results indicate results that are below background for the respective building material.

N/A – Not Applicable

Table A5.5. SU-35 Corridor 250, Vestibule 244C and Office 244A Class 2 Floor Measurement Results

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
1	Linoleum	250	8	274	0	-2
2	Linoleum	250	-5	855	0	-58
3	Linoleum	250	-5	942	0	4
4	Linoleum	250	8	942	0	-58
5	Linoleum	250	-5	712	0	-21
6	Linoleum	250	8	1,063	0	-21
7	Linoleum	250	-5	570	0	-44
8	Linoleum	250	-5	307	0	-27
9	Linoleum	250	8	690	1	-38
10	Linoleum	250	8	712	0	-19
11	Linoleum	244c	8	537	0	-46
12	Linoleum	244a	-5	636	0	-52

The MDC is the minimum detectable concentration on a surface that an instrument is expected to detect with 95 percent confidence.

The instrument MDCs for fixed measurements 1-12 are 21 dpm/100 cm^2 (alpha) and 257 dpm/100 cm^2 (beta); the MDCs for removable samples 1-12 are 18 dpm/100 cm^2 (alpha) and 212 dpm/100 cm^2 (beta); and the MDCs for QC measurement #10 are 54 dpm/100 cm^2 (alpha) and 223 dpm/100 cm^2 (beta).

Negative results indicate results that are below background for the respective building material.

N/A – Not Applicable

The wall area (from the floor to 3 m [10 ft] in height) for the Second Floor Corridors is 970 m^2. This area excludes windows and ventilation openings that were present within the walls of the corridors.

Table A5.6. SU-36 Corridor 209, Lab 218A, Corridor 225, Vestibule 232, Office 232B Corridor 237, Corridor 250 Vestibule 244C and Office 244A Class 2 Wall Measurement Results

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
1	Drywall	250	6	1,897	0	20
2	Drywall	250	17	1,947	0	-13
3	Drywall	250	27	2,164	0	-13
4	Drywall	250	17	2,289	0	43
5	Drywall	250	69	1,120	0	-24
6	Drywall	250	90	702	0	-2
7	Drywall	250	38	2,222	0	-19
8	Drywall	250	48	2,348	0	6
9	Drywall	250	101	1,303	0	23

Table A5.6. SU-36 Corridor 209, Lab 218A, Corridor 225, Vestibule 232, Office 232B Corridor 237, Corridor 250 Vestibule 244C and Office 244A Class 2 Wall Measurement Results (Continued)

Sample Number	Survey Surface	Location	Total Alpha Activity (dpm/100 cm^2)	Total Beta Activity (dpm/100 cm^2)	Removable Alpha Activity (dpm/100 cm^2)	Removable Beta Activity (dpm/100 cm^2)
10	Drywall	250	59	585	0	29
11	Drywall	237	38	710	0	-16
12	Drywall	237	48	635	3	-10
13	Drywall	237	27	577	0	1
14	Drywall	237	48	602	0	-13
15	Drywall	237	48	560	0	-16
16	Drywall	237	27	652	0	12
17	Drywall	225	59	618	0	-33
18	Drywall	225	17	2,022	3	12
19	Drywall	225	-4	602	0	-8
20	Drywall	225	69	351	3	18
21	Drywall	225	48	668	0	40
22	Drywall	209	27	343	0	-8
23	Drywall	209	48	702	0	-24
24	Drywall	209	17	401	0	59
25	Drywall	209	38	493	0	-30
26	Drywall	209	69	560	0	-19
27	Drywall	209	80	627	3	-21
28	Drywall	244a	22	585	3	0
29	Drywall	232b	7	523	3	18
30	Drywall	218a	-7	564	-1	9

The MDC is the minimum detectable concentration on a surface that an instrument is expected to detect with 95 percent confidence.

The instrument MDCs for fixed measurements 1-27 are 54 dpm/100 cm^2 (alpha) and 233 dpm/100 cm^2 (beta); and the MDCs for removable samples 1-27 are 18 dpm/100 cm^2 (alpha) and 212 dpm/100 cm^2 (beta).

Negative results indicate results that are below background for the respective building material.

Summary. Residual levels of radioactivity in the Magill Hall Second Floor Corridors clearly demonstrate that residual concentrations of radionuclide COPCs achieve the site-specific alpha DCGL of 1,160 dpm/100 cm^2 and the most restrictive beta DCGL of 5,000 dpm/100 cm^2 for Cs-137. In addition, the actual percentage of removable activity was determined to be approximately 3 percent.

Given these results, it is clearly demonstrated that the null hypothesis (i.e., that the Magill Hall Second Floor Corridors exceeds DCGLs) is rejected. Review of survey data supports the conclusion that the Magill Hall Second Floor Corridors contain an adequate number of samples; a sufficient percentage have been scanned; and they have been appropriately classified consistent with MARSSIM requirements using the process noted in Section 4.0 of the main text of this document. All scan and fixed measurement results collected from the Magill Hall Second Floor Corridors at Southeast were below the $DCGL_W$. As such, formal assessment using the Sign Test is not required.

Conclusion. Levels of radioactivity in the Magill Hall Second Floor Corridors achieve criteria for unrestricted release consistent with the provisions of 10 *CFR* 20, Subpart E.

ATTACHMENT A-5-1

FIGURES

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