

MAGILL HALL FIRST FLOOR CENTRAL**(SURVEY UNITS 16 THROUGH 19)**

Magill Hall First Floor Central is broken up into two sections. The western section includes: Rooms 101, 107, 107A, 107B, 107C, 107D, 109, 109A, 109B, 109C, 109D, 111, 113, and 123. The eastern section includes: Rooms 124, 124A, 128A, 131, 135, 135A, 135B, 135C, 139, 141, 144, and 149. The floors, walls, and applicable ceiling tiles (Room 124) within these areas were classified as MARSSIM Class 3 areas (see Table A3.1). Figures (including sample locations) are included in Attachment A-3-1. Radiologically impacted areas were divided into SUs based on MARSSIM-recommended size constraints, resulting in a total of 4 SUs (SU-16 through SU-19) in the area identified herein as Magill Hall First Floor Central. Survey data from the floors, walls, and ceiling tiles are located in Tables A3.3 through A3.6.

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 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 A3.1. Magill Hall First Floor West Central^a

Room Number/ Description	Area (m ²)	Walls		Floors	
		Included (Yes/No)	MARSSIM Classification	Included (Yes/No)	MARSSIM Classification
Lab 101	43	Yes	Class 3 ^b	Yes	Class 3 ^b
Corridor 107	6				
Office 107A	10				
Office 107B	10				
Office 107C	8				
Office 107D	8				
Office 109	23				
Office 109A	7				
Office 109B	14				
Office 109C	10				
Office 109D	10				
Electric 111	12				
Closet 113	4				
Restroom 123	12				

^a The Ceiling tiles were removed and disposed of as radiological waste prior to the FSS.

^b Areas were combined for the MARSSIM Class 3 Survey.

Table A3.2. Magill Hall First Floor East Central^a

Room Number/ Description	Area (m ²)	Walls		Floors	
		Included (Yes/No)	MARSSIM Classification	Included (Yes/No)	MARSSIM Classification
Classroom 124	119	Yes	Class 3 ^b	Yes	Class 3 ^b
Storage 124A	9				
Storage 128A	26				
Classroom 131	88				
Office 135	24				
Storage 135A	7				
Storage 135B	14				
Lab 135C	20				
Storage 139	11				
Janitor 141	3				
Classroom 144	116				
Restroom 149	25				

^a The Ceiling tiles were removed and disposed of as radiological waste prior to the FSS for all rooms with the exception of Classroom 124.

^b Areas were combined for the MARSSIM Class 3 Survey.

Fixed-Point Measurements. Fixed-point measurements were obtained from 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 A3.3 through A3.7, and locations are shown on Figures A3.1 through A3.4. All alpha results were below the site-specific alpha DCGL of 1,160 dpm/100 cm² for Am-241. Residual beta activity was compliant with both the Cs-137 surface contamination level of 5,000 dpm/100 cm² specified in AEC Regulatory Guide 1.86 (AEC 1974) and the NRC screening level DCGL of 28,000 dpm/100 cm² cited in Table 5.19 of NUREG-5512 (NRC 1999) for Cs-137 on structures.

West Central Section. The rooms in the west central section include Rooms 101, 107, 107A, 107B, 107C, 107D, 109, 109A, 109B, 109C, 109D, 111, 113, and 123. These rooms were combined into one MARSSIM Class 3 area for the survey of the floor areas. The area of this SU is 177 m².

Table A3.3. SU-16 First Floor West Central Class 3 Floor Measurements

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)
2	Linoleum	107c	-7	790	-1	29
3	Linoleum	107b	7	810	-1	15
4	Linoleum	107a	22	431	-1	-12
5	Linoleum	107d	7	585	-1	6
6	Linoleum	107	22	831	-1	20
7	Linoleum	107	-7	995	-1	20
8	Linoleum	109d	22	615	3	9
9	Linoleum	109c	7	821	3	18
10	Linoleum	109b	7	892	-1	3
11	Linoleum	109a	7	1,169	-1	6
12	Linoleum	109	-7	892	-1	-23
13	Linoleum	109	7	615	-1	29
14	Linoleum	111	-7	687	-1	-38
15	Linoleum	113	7	831	6	-32
16	Linoleum	101	-7	903	-1	15
17	Linoleum	101	22	656	-1	-6
19	Linoleum	123	37	1,826	-1	-23
20	Linoleum	123	-7	2,123	-1	6

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 1-20 are 58 dpm/100 cm² (alpha) and 233 dpm/100 cm² (beta); and the MDCs for removable samples 1-20 are 15 dpm/100 cm² (alpha) and 75 dpm/100 cm² (beta).

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

The walls of the First Floor West Central Rooms were surveyed as one MARSSIM Class 3 SU. The area of this SU is 500 m².

Table A3.4. SU-17. First Floor West Central Class 3 Wall Measurements

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)
2	Drywall	101	7	1,826	-1	3
3	Drywall	107c	7	1,446	-1	-3
4	Drywall	107b	37	1,815	3	9
5	Drywall	107d	-7	2,062	3	9
6	Drywall	107a	7	2,287	-1	0
7	Drywall	109d	22	2,021	3	-9
8	Drywall	109c	-7	1,918	-1	-12
9	Drywall	109b	-7	1,662	-1	15
10	Drywall	109a	7	1,703	-1	-3
11	Drywall	109	22	1,959	-1	9
12	Drywall	111	7	1,744	-1	3
13	Drywall	113	7	2,174	-1	3
14	Drywall	123	-7	1,990	-1	12

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 1-20 are 21 dpm/100 cm² (alpha) and 257 dpm/100 cm² (beta); and the MDCs for removable samples 1-20 are 18 dpm/100 cm² (alpha) and 212 dpm/100 cm² (beta).

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

East Central Section. The Rooms in the east central section include Rooms 124, 124A, 128A, 131, 135, 135A, 135B, 135C, 139, 141, 144, and 149. These rooms were combined into one MARSSIM Class 3 area for the survey of the floor areas. The area of this SU is 462 m².

Table A3.5. SU-18 First Floor East Central Class 3 Floor Measurements

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	144	8	296	0	-13
2	Linoleum	144	20	559	0	6
3	Linoleum	144	-5	482	3	20
4	Ceramic Tile	149	33	2,192	0	-8
5	Ceramic Tile	149	8	2,170	0	-21
6	Concrete	141	83	1,359	3	-21
7	Concrete	139	-5	1,501	0	-13
8	Linoleum	135a	8	888	3	23
9	Linoleum	135b	71	833	0	-27
10	Linoleum	135	33	921	0	-2
11	Linoleum	135	-5	625	0	-19
12	Linoleum	135c	20	636	0	-41
13	Linoleum	135c	20	910	3	-10
14	Linoleum	131	8	636	3	-10
15	Linoleum	131	8	712	0	9
16	Linoleum	131	58	625	0	-16
17	Linoleum	124	8	822	0	40
18	Linoleum	124	8	482	0	-13
19	Concrete	124a	33	1,534	0	-2
20	Concrete	128a	71	570	0	-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 1-20 are 21 dpm/100 cm² (alpha) and 257 dpm/100 cm² (beta); and the MDCs for removable samples 1-20 are 18 dpm/100 cm² (alpha) and 212 dpm/100 cm² (beta).

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

The walls of the First Floor East Central Rooms were surveyed as one MARSSIM Class 3 SU. The area of this SU is 680 m².

Table A3.6. SU-19 First Floor East Central Class 3 Wall Measurements

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	144	-7	1,733	-1	6
2	Drywall	124	59	660	0	-21
3	Drywall	128a	59	936	0	23
4	Drywall	149	-7	297	-1	26
5	Drywall	135	52	769	-1	-9
6	Drywall	135c	22	954	-1	3
7	Drywall	131	-7	215	-1	18
8	Drywall	139	37	1,703	-1	12
9	Drywall	135b	37	215	3	12
10	Drywall	135a	7	482	-1	-3

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 82 dpm/100 cm² (alpha) and 234 dpm/100 cm² (beta); and the MDCs for removable samples 1-10 are 15 dpm/100 cm² (alpha) and 75 dpm/100 cm² (beta).

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

Summary. Residual levels of radioactivity in the Magill Hall First Floor Central Rooms clearly demonstrate that residual concentrations of radionuclide COPCs achieve the site-specific alpha DCGL of 1,160 dpm/100 cm² and the most restrictive beta DCGL of 5,000 dpm/100 cm² 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 First Floor Central Rooms exceeds DCGLs) is rejected. Review of survey data supports the conclusion that the Magill Hall First Floor Central Rooms 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 First Floor Central Rooms at Southeast were below the DCGL_w. As such, formal assessment using the Sign Test is not required.

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

ATTACHMENT A-3-1

FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

Delete this page and insert Figures A3.1 through A3.4 PDF