



# CONNECTICUT COLLEGE

October 23, 2017

Dennis Lawyer  
U.S. Nuclear Regulatory Commission, Region 1  
2100 Renaissance Boulevard, Suite 100  
King of Prussia, PA 19406-2713

RE: Mail Control No. 600932

Dear Mr. Lawyer

I am writing in response to your email dated October 4, 2017.

1a. Request: Submit records, or explain why such records are not applicable, for unsealed materials with half-lives greater than 120 days, records for disposal made pursuant to 10 CFR 20.2002 (alternate disposal procedures, including burial authorized prior to January 28, 1981), 20.2003 (disposals to the sanitary sewerage system), 20.2004 (incineration of wastes), 20.2005 (disposal of specific wastes including liquid scintillation cocktail and animal tissue), and 20.2103(b)(4), evaluations of effluent releases.

Response: No licensed radioactive materials were disposed of pursuant to 10 CFR 20.2002 or 20.2004. No evaluations of effluent releases were made pursuant to 20.2103(b)(4).

It is believed that small amounts of radioactive materials were disposed of pursuant to 10 CFR 2003. Any sanitary sewer disposal would have occurred prior to 1991 and unfortunately no records were able to be located which would indicate the isotopes and activities disposed of to the sanitary sewer system.

Liquid scintillation media was disposed of pursuant to 20.2005. This waste was typically removed for disposal by the College hazardous waste vendor and without knowing specific disposal dates, records indicating these disposals were not able to be located.

1b. Request: Submit records important for decommissioning as described in 30.35(g). Examples of such records include but are not limited to: records of contamination, identifying the radionuclides, quantities and concentrations; as-built drawings and modifications of structures and equipment in restricted areas and locations of inaccessible contamination such as buried pipes; a single list, updated at least every 2 years, of areas to which access is limited for the purpose of radiation protection (restricted areas); and records related to the provision of financial assurance.



Response: Regarding records related to 10 CFR 30.35(g), there were no documented spills or contamination of our facility. There were no restricted areas at the College and no known areas of inaccessible contamination such as buried pipes. The College never possessed quantities of radioactive material requiring decommissioning funding.

2a. Request: The decommissioning survey states that it was based upon NUREG-1575, however it is not clear that random points were obtained for the required fixed point measurements. The report states that fixed point measurements for total radioactivity based upon the surveyor's judgment. Later it states that 43 fixed point measurements were taken at randomly chosen locations. How were these random locations chosen? The survey shows only a total of 43 fixed points taken. NUREG-1575 states that these points must be chosen by a random method and not by judgment.

Response: The locations of the 43 fixed-point measurements were judgmental (biased). Based upon your comments, it was decided that an additional 23 measurements would be obtained from randomly chosen (systematic) locations.

In order to choose these locations, the five (5) Affected Areas were each drawn on a separate sheet of graph paper and were numbered Maps 1 – 5. Each map was then divided into 6 x 6 grids.

A die was used to first determine which map to use. If a roll of 6 was obtained this roll was ignored. Next, the die roll was used to determine the x- and y-axis values on the applicable map. The die rolls obtained are provided in Table 1 below.

**Table 1: Die Rolls**

Location No.	Map	X-Axis	Y-Axis	Location No.	Map	X-Axis	Y-Axis
1.	5	5	2	13.	4	4	1
2.	2	1	6	14.	5	4	2
3.	3	3	5	15.	1	4	1
4.	4	4	3	16.	1	6	2
5.	5	3	3	17.	1	3	5
6.	3	2	1	18.	5	3	6
7.	3	4	6	19.	2	6	5
8.	3	4	2	20.	5	1	4
9.	1	2	5	21.	2	2	5
10.	2	3	2	22.	4	6	6
11.	5	2	4	23.	3	5	4
12.	2	6	1				

The maps showing the gridded areas and random sample locations are provided in Attachment A.



On October 13, 2017, Radcor, LLC returned to the College to perform additional surveys. Background count rates were determined for the building interior by taking measurements in different unaffected locations near the affected areas. A total of five (5) 1-minute background measurements were obtained. This measurement data is provided in Table 2 below.

**Table 2: Background Levels**

Count No.	Counts per minute (cpm)
1.	233
2.	247
3.	198
4.	289
5.	261
<b>Average cpm</b>	246

Based upon these measurements, it was determined that the average background count rate was 246 cpm. Using this background count rate, an estimated instrument efficiency of 25%, a source efficiency of 0.54, a probe area of 126 cm<sup>2</sup>, and a count time of 1 minute, the MDC works out to be 447 dpm/100 cm<sup>2</sup>.

One-minute integrated surface measurements were obtained from an accessible area near the center of each established survey grid. The results of these measurements are provided in Table 3 below.

**Table 3: Sample Results**

Location No.	Results (cpm)	Location No.	Results (cpm)	Location No.	Results (cpm)
1.	207	9.	312	17.	271
2.	324	10.	241	18.	246
3.	190	11.	263	19.	232
4.	203	12.	206	20.	258
5.	202	13.	180	21.	219
6.	197	14.	226	22.	184
7.	169	15.	333	23.	183
8.	172	16.	330		

The Sign Test was used to evaluate the data. The results of this test are provided in Attachment B. The number of positive differences is equal to the number of measurements (N = 23); therefore the null hypothesis is rejected.

2b. Request: The survey states that selected surfaces and equipment were scanned for total radioactivity. What percentage of area was scanned for radioactivity?

Response: 100% of equipment and areas that were labeled with radioactive tape were scanned. Only about 10% of the remaining areas were scanned.

2c.Request: What is the scan rate for the survey scans?

Response: The scan speed was approximately 5 cm per second.

I hope that I have appropriately answered all of your questions. If you have any additional questions or if you require any additional information, please contact me.

Sincerely,

A handwritten signature in black ink that reads "Steven R. Langlois". The signature is written in a cursive style with a large, looped initial "S".

Steven Langlois  
Radiation Safety Officer

Attachments

## Attachment A

### Area Maps

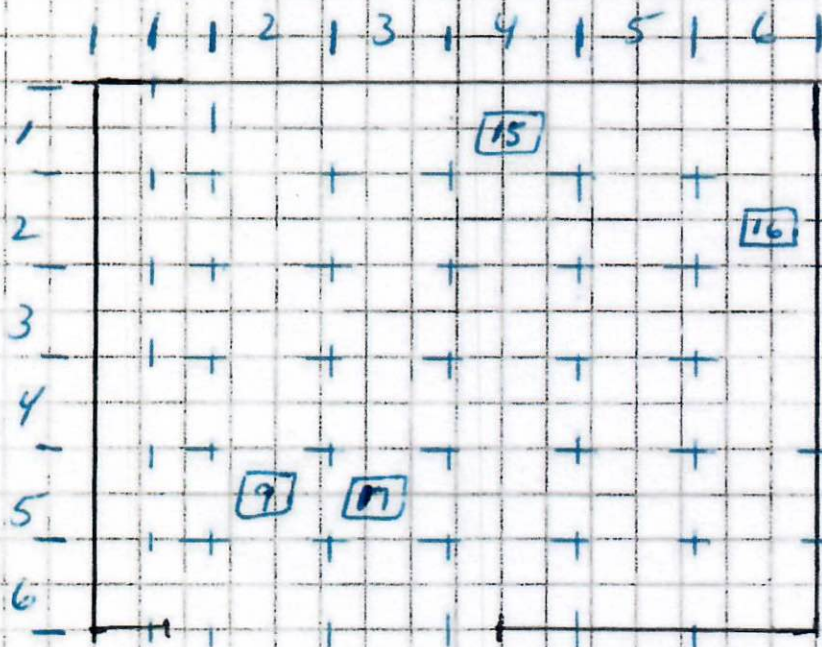


NEW LONDON HALL

Room 100.9

RAD WASTE AREA

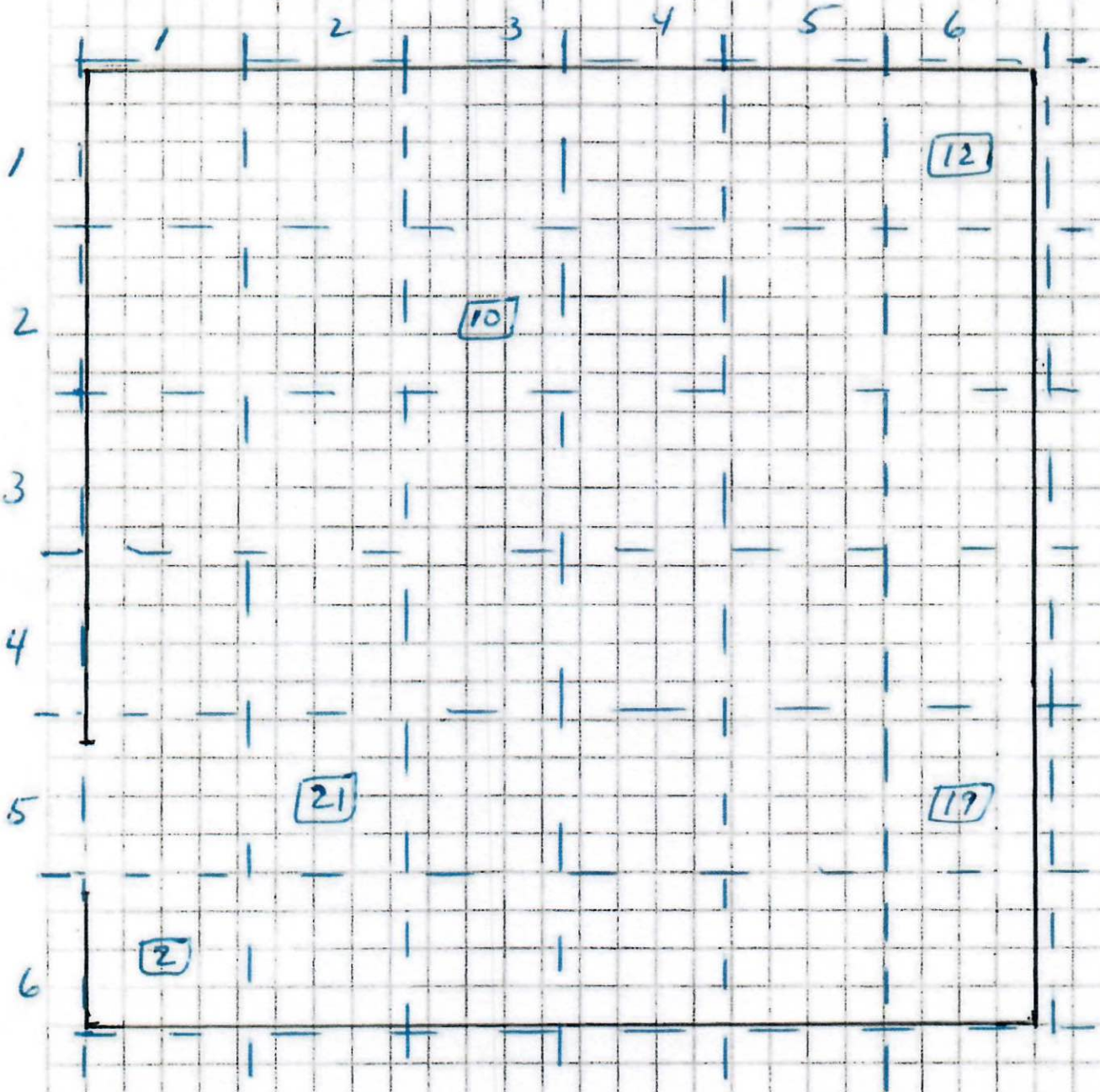
MAP 1





NEW LONDON HALL  
GREEN HOUSE (WEST)

MAP 2

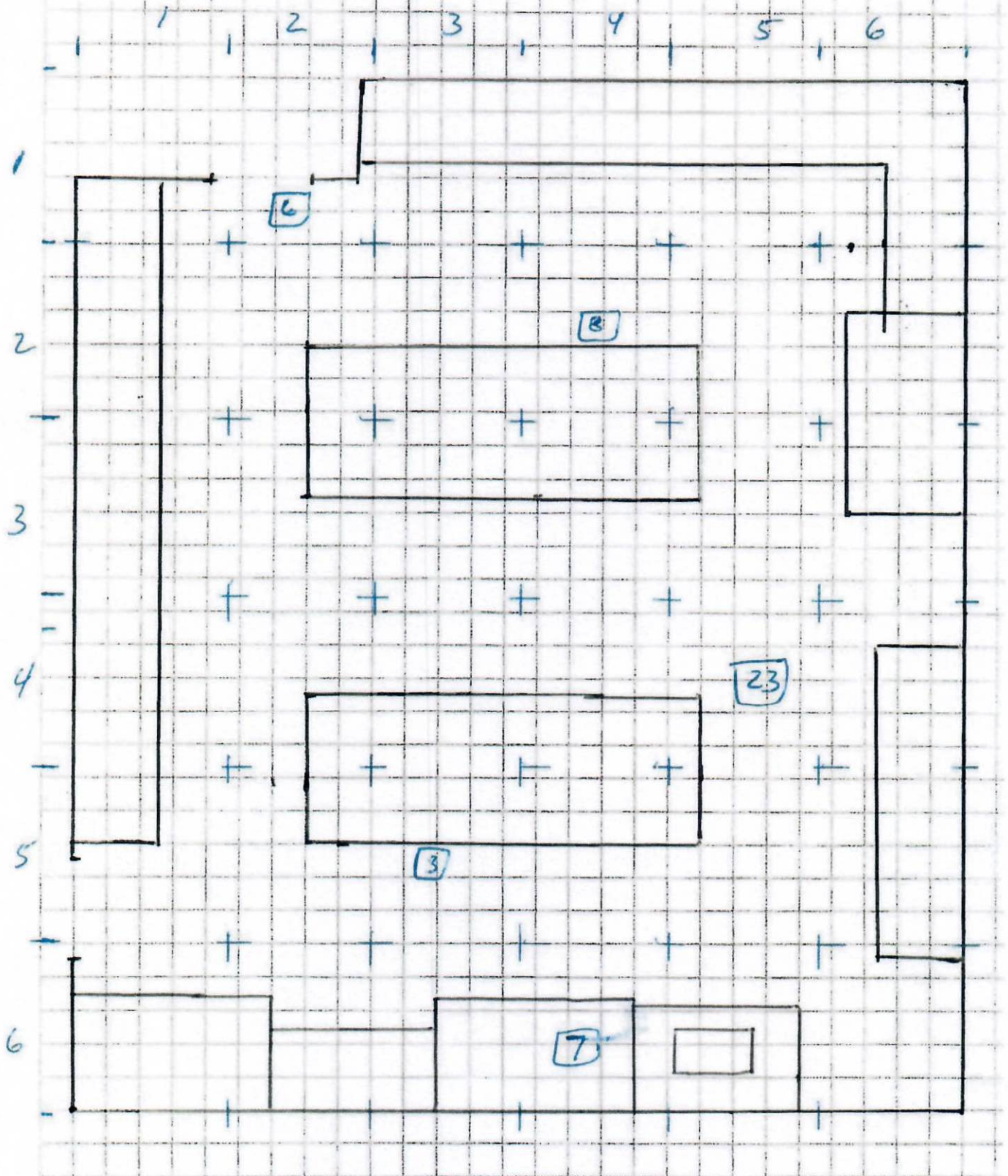




HARC Room 122

MHP 3

Biodynamic Research CNS

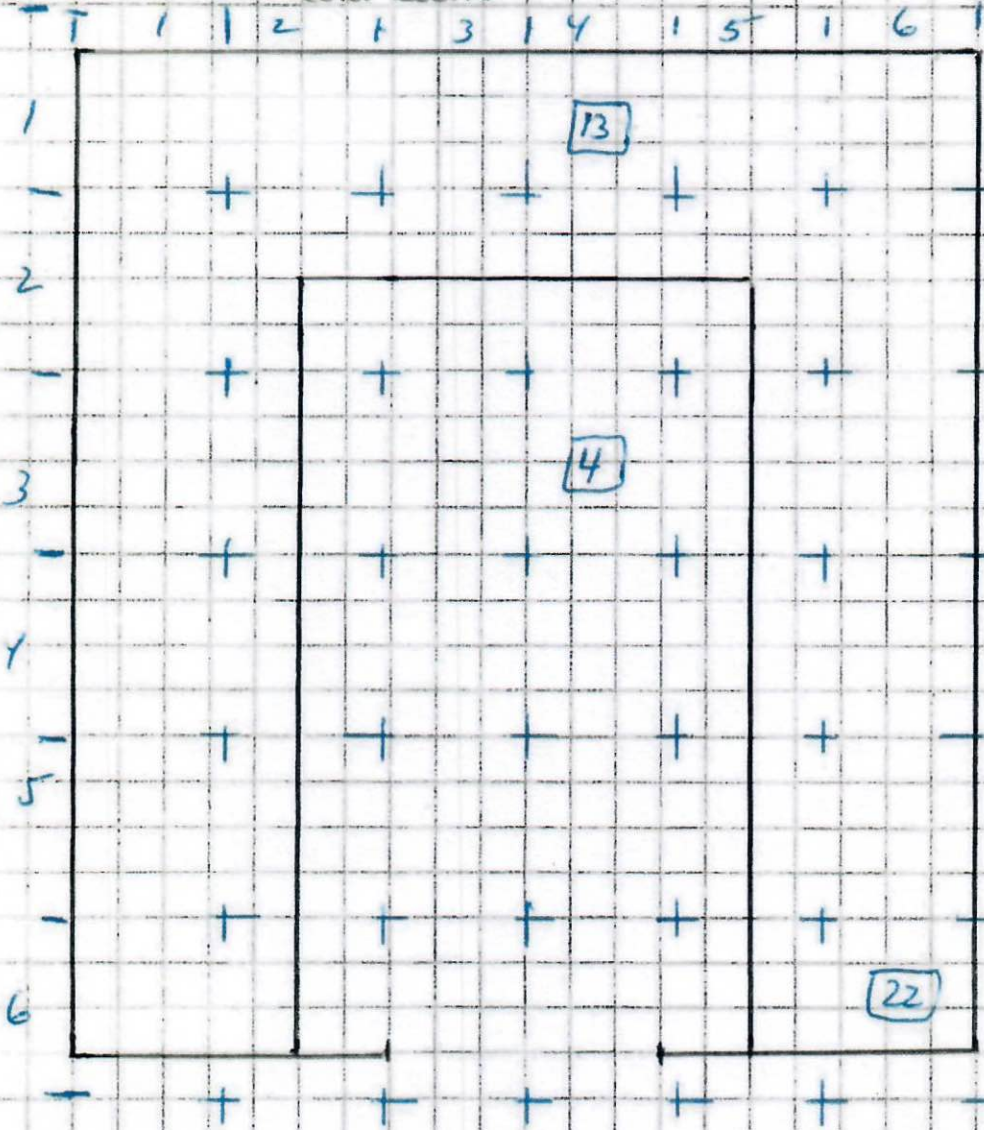




MAP 4

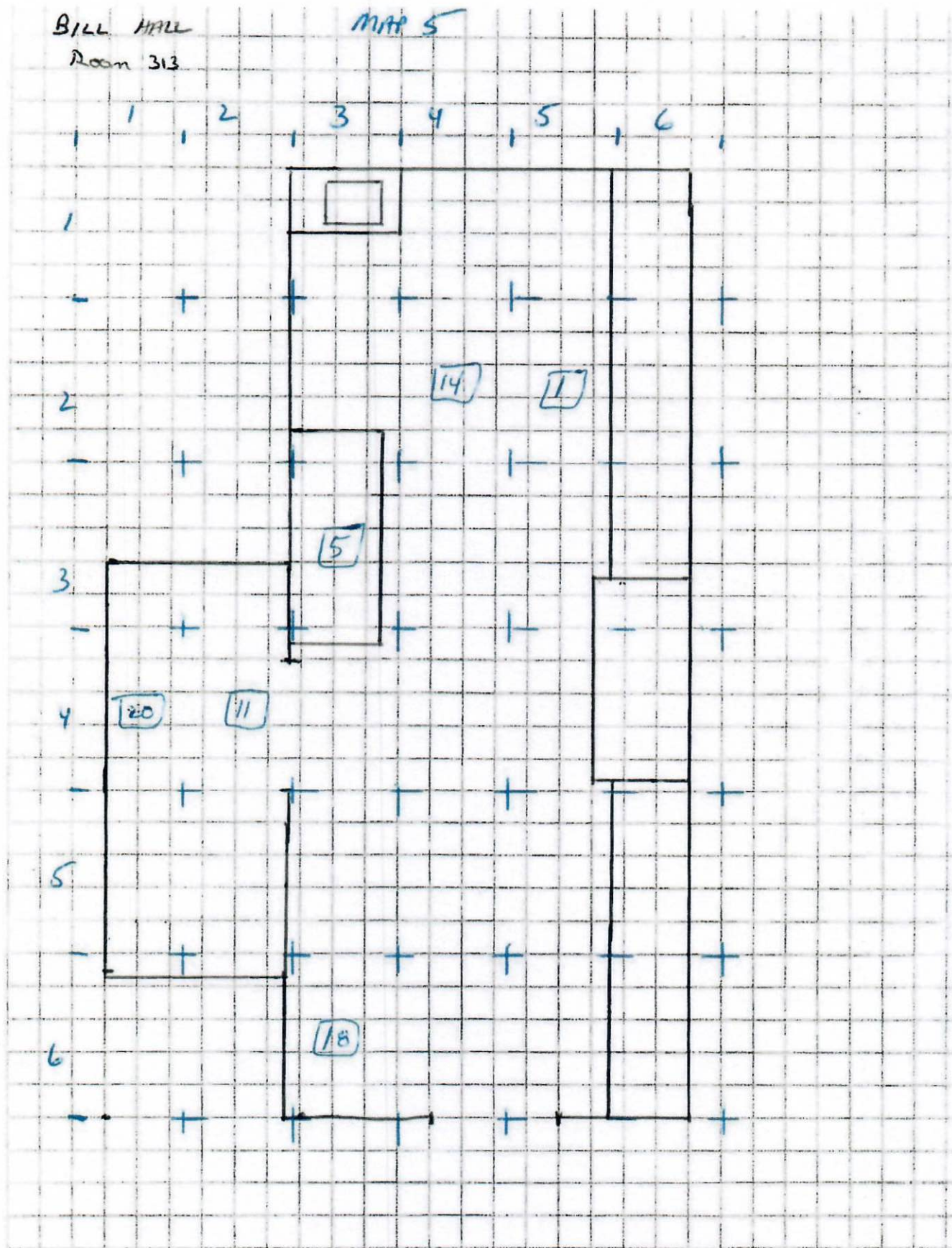
HALL ROOM 021

Cold Room



BILL HALL  
Room 313

MAP 5





Attachment B

Sign Test

### Sign Test Data

DCGL = 1631 cpm

	Data (cpm)	Net cpm	Adjusted Data (DCGL - net cpm)	Sign
1	207	-39	1670	1
2	324	78	1553	1
3	190	-56	1687	1
4	203	-43	1674	1
5	202	-44	1675	1
6	197	-49	1680	1
7	169	-77	1708	1
8	172	-74	1705	1
9	312	66	1565	1
10	241	-5	1636	1
11	263	17	1614	1
12	206	-40	1671	1
13	180	-66	1697	1
14	226	-20	1651	1
15	333	87	1544	1
16	330	84	1547	1
17	271	25	1606	1
18	246	0	1631	1
19	232	-14	1645	1
20	258	12	1619	1
21	219	-27	1657	1
22	184	-62	1693	1
23	183	-63	1694	1
	Number of positive differences S+ =			23