

10-10146-01
030-04004

Greenhouse Soil Samples - composite

S1 and S2 are duplicate composite sample from greenhouse area. S3 is point sample taken up gradient of area.

Soil Sample a representative sample of one gram of soil was suspended in 20 ml of liquid scintillation fluid and counted for 2 minutes.

LSC Counts	Count	Net Count	Eff.	MDA
Soil				
Blank	45			
S1	98	53		31 dpm
S2	95	50		31 dpm
S3 - from up gradient on site	105	60		31 dpm
std C-14	124970	124925	1.00	

Water Extract, 1.0 ml sample of extract (100 grams with 100 ml of deionized water), counted in 20ml of LSF.

Blank	69			
S1	65	-4		31 dpm
S2	57	-12		31 dpm
S3 - from up gradient on site	51	-18		31 dpm
Std C-14	137372	137303	1.00	

581708

ATTACHMENT
D

#	GM Counter, CPM Ludlum 3, 254084 BDG <100	Gas Proportional Berthold LB122, CPM	Wipe Sample, DPM BDG = 27 dpm, duplicate analysis in red
1	<100		-2, 0 (BDG = 30)
2	<100		-7
3	<100		-1
4	<100		3
5	<100		-3
6	<100		5
7	<100		12
8	<100		1
9	<100		4
10	<100		0
11	<100		4, -4 (BDG = 30)
12	<100		-6
13	<100		-3
14	<100		5
15	<100		2
16	<100		0
17	<100		-7
18	<100		2
19	<100		0
20	<100		-3
21	<100		3, 0 (BDG = 30)
22	<100		19
23	<100		0
24	<100		3

RAD04152013

Radiological Readings Room: Room 2 Date: 11/21/13 Analyst(s): J. Bellah & J. Kitchens

#	GM Counter, CPM Ludlum 3, 254084 BDG <100	Gas Proportional Berthold LB122, CPM	Wipe Sample, DPM BDG = 27 dpm
25	<100		-3
26	<100		0
27	<100		3
28	<100		1
29	<100		10
30	<100		-2
31	<100		6, -3 (BDG = 30)
32	<100		2
33	<100		-3
34	<100		-9
35	<100		12
36	<100		-1
37	<100		1
38	<100		2
39	<100		1
40	<100		11
41	<100		-3, 1(BDG = 30)
42	<100		4
43	<100		5
44	<100		9
45			
46			

RAD04152013

Radiological Readings Room: 10 Vertical Date: 11/21/2013 Analyst(s): J. Bellah & J. Kitchens

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
45	<100 cpm		6
46	<100		1
47	<100		13
48	<100		-2
49	<100		-5
50	<100		29
51	<100		2, 0 (BDG = 30)
52	<100		10
53	<100		2
54	<100		5
55	<100		6
56	<100		9
57	<100		7
58	<100		20
59	<100		9
60	<100		0
61	<100		5, 4 (BDG = 30)
62	<100		3
63	<100		12
64	<100		-1
65	<100		15
66	<100		4
67	<100		-3
68	<100		5

RAD04152013

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
69	<100 cpm		8
70	<100		-2
71	<100		10, 3 (BDG = 30)
72	<100		5
73	<100		2
74	<100		2
75	<100		5
76	<100		8
77	<100		5
78	<100		6
79	<100		0
80	<100		9
81	<100		9, 3 (BDG = 30)
82	<100		8
83	<100		1
84	<100		-4
85	<100		7
86	<100		10
87	<100		5
88	<100		8
89	<100		2
90	<100		4
91	<100		4, 15 (BDG = 30)
92	<100		8

Radiological Readings Room: V 12 Date: 11/21/2013 Analyst(s): J. Bellah & J. Kitchens

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
105	<100 cpm		-9
106	<100		2
107	<100		-7
108	<100		-5
109	<100		10
110	<100		-5
111	<100		2, 1 (BDG = 30)
112	<100		-2
113	<100		11
114	<100		-8
115	<100		3
116	<100		3
117	<100		0
118	<100		0
119	<100		22
120	<100		-10
121	<100		-6 (BDG = 33), 18 (BDG = 30)
122	<100		4
123	<100		0
124	<100		3
125	<100		-6
126	<100		-4
127	<100		8
128	<100		-2

RAD04152013

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm
129	<100 cpm		-3
130	<100		0
131	<100		-3, -7 (BDG = 30)
132	<100		2
133	<100		0
134	<100		-1
135	<100		7
136	<100		-5
137	<100		1
138	<100		3
139	<100		27
140	<100		2
141	<100		5, 5(BDG = 30)
142	<100		6
143	<100		-5
144	<100		-7
145	<100		2
146	<100		0
147	<100		-4
148	<100		-3 (BDG = 33)
149	<100		-8
150	<100		3
151	<100		-2, -2 (BDG = 30)
152	<100		0

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm
153	<100 cpm		5
154	<100		-9 (BDG = 33)
155	<100		-3
156	<100		-1
157	<100		-2
158	<100		-1
159	<100		3
160	<100		2
161	<100		-8, -6 (BDG = 30)
162	<100		3

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
163	<100 cpm		-1
164	<100		1
165	<100		3
166	<100		10
167	<100		0
168	<100		-2
169	<100		-1
170	<100		4
171	<100		-2 (BDG = 33), 1 (BDG = 30)
172	<100		-1 (BDG = 33)
173	<100		2
174	<100		-4
175	<100		-2
176	<100		42
177	<100		-1
178	<100		-5
179	<100		-5
180	<100		0
181	<100		3, -4 (BDG = 30)
182	<100		2
183	<100		3
184	<100		-4
185	<100		5
186	<100		-5

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
187	<100 cpm		1
188	<100		6
189	<100		2
190	<100		2
191	<100		0, -1 (BDG = 30)
192	<100		18
193	<100		2

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#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
194	<100 cpm		18
195	<100		-5
196	<100		-7
197	<100		-6
198	<100		-3
199	<100		-2
200	<100		3
201	<100		9, -8 (BDG = 30)
202	<100		4
203	<100		11
204	<100		4
205	<100		2
206	<100		0
207	<100		-5
208	<100		4
209	<100		-1
210	<100		5
211	<100		1, 0 (BDG = 30)
212	<100		16
213	<100		2
214	<100		-1
215	<100		-4
216	<100		0
217	<100		1

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
220	<100 cpm		-7
221	<100		2, -7 (BDG = 30)
222	<100		2
223	<100		10
224	<100		4
225	<100		0
226	<100		-5
227	<100		9
228	<100		-3
229	<100		2
230	<100		3
231	<100		4, -8 (BDG = 30)
232	<100		3
233	<100		61
234	<100		-5
235	<100		0
236	<100		3
237	<100		-5
238	<100		-1
239	<100		7
240	<100		10
241	<100		4, -1 (BDG = 30)
242	<100		2
243	<100		6

#	GM Counter, Ludlum 3, 254084, BGD <100 cpm	Gas Proportional/ R Meter, CPM	Wipe Sample, DPM, BGD 27 dpm, duplicate analysis in red
244	<100 cpm		1
245	<100		7
246	<100		8
247	<100		7
248	<100		0
249	<100		-2
250	<100		-1
251	<100		-4, -2 (BDG = 30)
252	<100		2
253	<100		0
254	<100		-3
255	<100		8
256	<100		5
257	<100		-5
258	<100		1

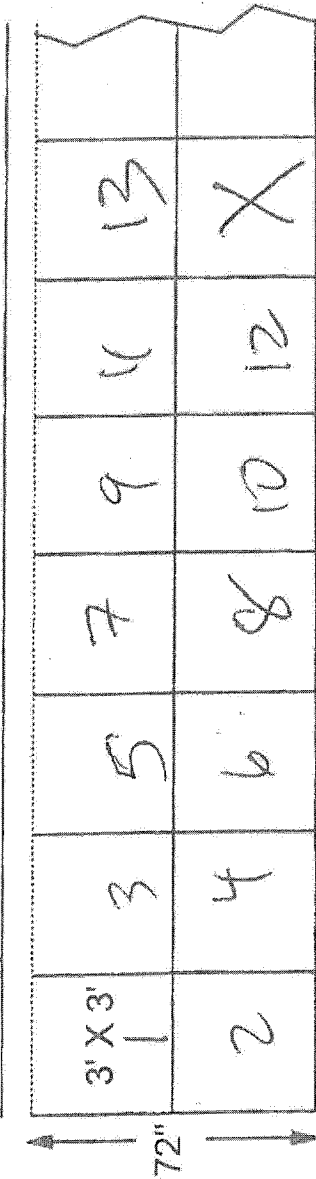
Radiological Readings Room: Greenhouse Date: 11/20/13 Analyst(s): J. Kitchens

#	GM Counter scan, Ludlum 3, 254084, BGD <100 cpm	Berthhold LB 122 Gas Proportional, DPM, BDG 1.14 beta	Berthhold LB 122 Gas Proportional, DPM, BDG 1.0 Cs-137
1	< 100	1.13, 1.14 Kdpm	1.1 Kdpm
2	< 100	1.16, 1.17, 1.18, 1.18	1.1
3	< 100	1.18, 1.18, 1.18, 1.20	1.1
4	< 100	1.20, 1.20, 1.21, 1.20	1.1
5	< 100	1.18, 1.20	1.1
6	< 100	1.18, 1.17, 1.17, 1.19	1.1
7	< 100	1.20, 1.17, 1.16, 1.15	1.0
8	< 100	1.14, 1.19, 1.18, 1.18	1.0
9	< 100	1.16, 1.15	1.1
10	< 100	1.17, 1.15, 1.15, 1.15	1.1
11	< 100	1.16, 1.17, 1.19, 1.16	1.1
12	< 100	1.15, 1.15, 1.15, 1.15	1.0
13	< 100	1.16, 1.14	1.0
14	< 100	1.16, 1.15, 1.14, 1.14	1.0
15	< 100	1.13, 1.13, 1.14, 1.15	1.0
16	< 100	1.16, 1.14, 1.18, 1.16	1.0
17	< 100	1.14, 1.14	1.0
18	< 100	1.14, 1.15, 1.16, 1.13	1.0
19	< 100	1.10, 1.23, 1.16, 1.17	1.0
20	< 100	1.20, 1.18, 1.18, 1.17	0.9
21	< 100	1.16	1.1
22	< 100	1.17, 1.16	1.0
23	< 100	1.16, 1.16	1.0
24	< 100	1.16, 1.16	0.9

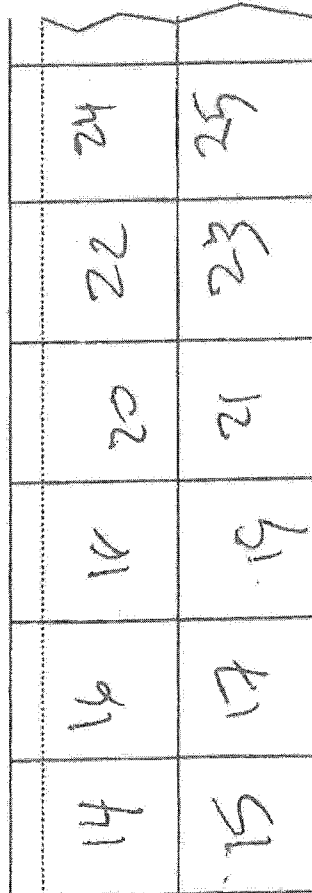
Room 2

North

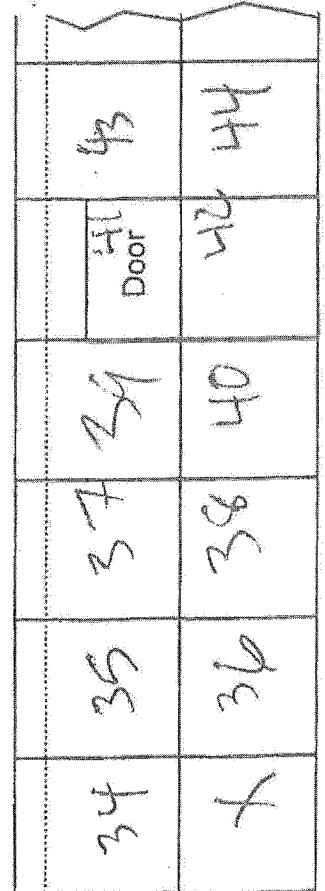
Metal Strip Border



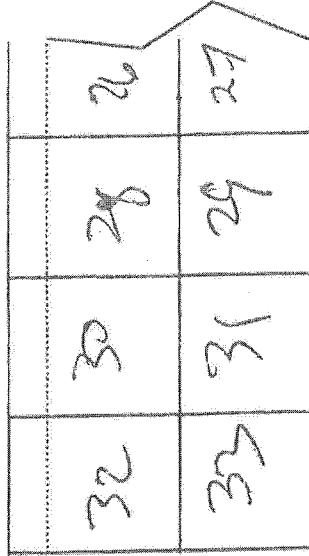
East



West



South



East

Metal Strip Border

45	47	49	51	53	55	57	59	61	63
46	48	50	52	54	56	58	60	62	64

West Right

51	53	55	57	59	61	63	65	67	69
52	54	56	58	60	62	64	66	68	70

North

43	45	47	49	51	53	55	57	59	61
44	46	48	50	52	54	56	58	60	62

Hallway
(not to scale)

South

65	67	69	71	73	75	77	79	81
66	68	70	72	74	76	78	80	82

West Left

33	35	37	39	41	43	45	47
34	36	38	40	42	44	46	48

East

121	121	121	119	117	115	113	111	109	107	105
121	121	121	Lfloor 121	111	111	111	112	121 110	108	106

West

151	149	147	145	143	141	139	137	135	134
152	150	148	146	144	142	140	138	136	X

North

131	131	129	127	125
131	132	130	128	126

South

161	161	159	157	155
161	162	160	158	156

West

178	160	152	17
179	161	163	2

East

163	164	166	
X	165	167	//

North

169	186	188	190	192	3
168	151	189	151	193	✓

South

168	170	172	174	176	4
169	171	173	175	177	7

over Room 17

East

1951	1961	1981	1991
1951	1961	1981	1991
1951	1961	1981	1991

West

2002	2022	2042	2062
2002	2022	2042	2062
2002	2022	2042	2062

North

213	216	212	
213	216	212	212
213	216	212	212

South

2002	2022	2042	2062
2002	2022	2042	2062
2002	2022	2042	2062

North

220	221	223	225	227
X	222	224	226	228

East

229	230	232	234	235	257
X	231	233	235	236	258

East Nook

257	258
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West

246	248	250	252	254
242	244	251	253	255

West Nook

246	248	250	252	254
242	244	251	253	255

South

236	238	240	242	244
237	239	241	243	245

255

Greenhouse Soil Samples - composite

S1 and S2 are duplicate composite sample from greenhouse area. S3 is point sample taken up gradient of area.

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MDA and Statistics for 11/21/2013 and 11/22/2013 - Supplemental Surveys

Greenhouse Scans

11/20/2013

LB-122 (Field calibrated with Sr-90 source, at 2.67 kdpm, bdg of 0.93)

Beta (background count of remote area averaged 1.14 kdpm (4 counts in 3' X3' square))

BKGD	Standard	MDA
LB122	LB122	LB122
0.93kdpm	2.67 kdpm	3.6 kdpm

Cs-137 window

BKGD	Standard	MDA
LB122	LB122	LB122
1.00kdpm	10.4kdpm	2.6kdpm

GM Counter

Assuming a minimum GM counter efficiency of 5% (for thin end window probe - greater for pancake probe used) and average counts of <100 cpm, the instrument should be able to detect 2000 dpm with reliability. This is much greater than the DCGL of 28,000 dpm allowed.

Liquid Scintillation MDAs

MDA (C-14) = 31dpm

MDA (H-3) = 33dpm

MDA and Statistics for 11/21/2013 and 11/22/2013 – Supplemental Surveys

Greenhouse Scans

11/20/2013

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BKGD	Standard	MDA
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