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Tritium Laboratory

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SWAB REPORT # 948 revised

SWAB DATE: 12 June 2019

*R/V Oceanus* and Vans

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## COMMENTS TO SWAB REPORTS

12 May 2014

Typical LSC instrument background values for  $^3\text{H}$  and  $^{14}\text{C}$  are 2 and 5 cpm, respectively. The LSC is a Tricarb 2910 TR with the low level counting option.

All samples are counted for 60 minutes, the instrument background is subtracted, and activities are reported in  $\text{dpm}/\text{m}^2$ . Bucket blank activities are not subtracted. Counting errors (2 standard deviations) are also reported in  $\text{dpm}/\text{m}^2$ . An error larger than the activity indicates that the activity is not significantly different from zero.

### Criteria for SWAB Results

Category	$^3\text{H}$ ( $\text{dpm}/\text{m}^2$ )	$^{14}\text{C}$ ( $\text{dpm m}^2$ )	Recommendations
A	<500	<50	No action
B*	500-10,000	50-10,000	Needs cleaning before any natural tracer work. Decks in radiation vans with activities above $1000 \text{ dpm}/\text{m}^2$ should be cleaned.
C**	10,000-100,000	10,000-50,000	Must be cleaned before any use.
D***	>100,000	>50,000	May be a health hazard. Notify local radiation safety official.

Note:  $^{14}\text{C}$  and  $^{35}\text{S}$  have peak energies of 156 and 167 KeV, respectively; thus  $^{35}\text{S}$  will be registered as  $^{14}\text{C}$  by our counting techniques. Categories A, B and C are not a health hazard.

### Recommended Cleaning Procedure

Wearing ordinary household rubber gloves:

$^3\text{H}$ : Wash and scrub with radioactive cleanup detergent such as COUNT-OFF (50 ml COUNT-OFF to 4 liters of water), using sponges to distribute solution and reabsorb it.

$^{14}\text{C}$ : Wash with 1% sulfuric or 2% hydrochloric (muriatic) acid with good ventilation (will dissolve carbonates, releasing  $^{14}\text{CO}_2$ ). Follow up with wash as if for  $^3\text{H}$ .

### Disposal of Cleaning Materials (gloves, sponges, etc)

Categories A & B dispose as ordinary garbage, C & D contact your institution's radiation safety office.

Note: If category C or D is encountered, we try to notify the insitution promptly by phone or email.

REPORT FOR SWAB # 948 revised

LOCATION: Newport, OR

DATE: 12 June 2019

VESSEL: *R/V Oceanus*

TECHNICIAN: Charlene Grall

Sample #	Sample Identification	<sup>3</sup> H dpm/m <sup>2</sup>		<sup>14</sup> C dpm/m <sup>2</sup>	
		activity	error	activity	error
1	1st Vial Bkgnd	0	± 0	0	± 0
2	Initial bucket blank	-13	± 56	-8	± 30
	<u>Cold Van #2409-02 (Figure 1)</u>				
3	Sink area	-2	± 9	3	± 3
4	Fume hood area	-14	± 62	1	± 13
5	Benchtop across from fume hood	-22	± 50	-13	± 41
6	Benchtop across from sink	-11	± 50	-18	± 16
7	Deck in front of fume hood	-18	± 80	-10	± 11
8	Deck in front of sink	-38	± 85	-12	± 3
9	Deck inside van entrance	-16	± 68	-40	± 35
	<u>Cold Van 625.201-3 (Figure 2)</u>				
10	Sink area	-25	± 55	13	± 61
11	Fume hood area	-55	± 124	8	± 94
12	Benchtop across from fume hood	-10	± 43	-8	± 81
13	Deck between fume hood and bench	-63	± 141	-9	± 18
14	Deck in front of sink	-35	± 78	18	± 58
15	Deck inside van entrance	-35	± 79	-12	± 55
	<u>Wet Lab (Figure 3)</u>				
16	Forward benchtop	30	± 69	-15	± 29
17	Port benchtop	-17	± 39	-17	± 39
18	Inside fume hood	-431	± 0	-93	± 42
19	Sink area	6	± 53	-26	± 19
20	Deck in center of lab	-35	± 79	-4	± 17
	<u>Main Lab (Figure 3)</u>				
21	Forward sink area	12	± 27	-14	± 42
22	Benchtop opposite of sink	-29	± 66	5	± 10
23	Center benchtop	-31	± 70	-55	± 12
24	Aft benchtop	-26	± 58	-12	± 38
25	Port benchtop under portholes	-30	± 68	-12	± 44
26	Deck at aft stairs down to Platform Deck	-51	± 115	-2	± 17
27	Deck at forward stairs to 01 Deck	-46	± 104	-9	± 22

Sample #	Sample Identification	$^3\text{H}$ dpm/m <sup>2</sup>		$^{14}\text{C}$ dpm/m <sup>2</sup>	
		activity	error	activity	error
	<u>Aft Deck (Figure 3)</u>				
28	Deck at base of aft stair leading to 01 Deck	-10	± 44	-43	± 61
29	Aft starboard deck where incubator stood	-32	± 73	-16	± 32
30	Aft port deck where incubator stood	-53	± 119	-14	± 41
31	Aft port deck aft of soft hatch	-33	± 75	-8	± 52
	<u>01 Deck (Figure 3)</u>				
32	Aft deck where rad storage barrel stood	24	± 77	-6	± 65
33	Aft deck near crane base where waste barrel stood	-54	± 122	-16	± 11
34	Aft deck by winch base where waste barrel stood	-46	± 104	-25	± 40
	<u>Upper Lab (Figure 3)</u>				
35	Deck inside aft entrance	-37	± 83	-6	± 42
36	Deck at entrance to Head	0	± 2	15	± 65
37	Deck starboard of stairs up from Main Lab	-24	± 54	-8	± 69
38	Deck in center of lab	-44	± 98	-21	± 71
	<u>Radioisotope Van 625.101-2 (Figure 4)</u>				
39	Sink area	-28	± 63.1	-20	± 60
40	Benchtop adjacent to LSC	-62	± 140	6	± 108
41	Fume hood area	3	± 15.1	0	± 11
42	Benchtop across from Fume hood	-35	± 79.7	-8	± 39
43	Benchtop across from LSC	-24	± 55.1	-28	± 74
44	Inside freezer under LSC	10	± 63	-28	± 69
45	Inside incubator	14	± 61	-13	± 52
46	Deck in front of Fume hood	4	± 25	-23	± 88
47	Deck in front of sink	-10	± 64	19	± 45
48	Deck outside van entrance	-27	± 62	-20	± 32
49	Final bucket sample	-52	± 118	-37	± 115

### Comments

Please note that the error reported for each isotope is the two-standard deviation counting error. The reports may now contain values less than zero. When decay counting background samples will be distributed about the background vial, which means that negative values are possible. In the past we rounded the negative values to zero. Values are only significantly above background when they are positive and larger than the error. All areas tested on the ship and in the vans were free of  $^{14}\text{C}$  contamination that requires cleaning. The  $^3\text{H}$  background count (2.13 cpm) was much higher than normal (1.5 cpm). We are recounting the samples and will issue a revised report when counting is complete. However at this

time we suspect that there are no  $^3\text{H}$  contamination issues. Sample 18 counting was highly colored even after centrifuging and this suppressed the counting rate for both isotopes. The  $^3\text{H}$  background was 1.59 cpm during the recount. This yielded more reasonable  $^3\text{H}$  counts in the samples.