

UNIVERSITY OF MIAMI  
ROSENSTIEL  
SCHOOL of MARINE &  
ATMOSPHERIC SCIENCE



Tritium Laboratory  
4600 Rickenbacker Causeway  
Miami, Florida 33149-1031

Ph: 305-421-4100  
Fax: 305-421-4112  
E-mail: Tritium@rsmas.miami.edu

Tritium Laboratory  
10 September 2012

SWAB REPORT # 644

SWAB DATE: 29 August 2012

*R/V Melville*

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James D. Happell

Distribution:  
SWAB Committee  
Gary Lain

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	$^3\text{H}$ ( $\text{dpm}/\text{m}^2$ )	$^{14}\text{C}$ ( $\text{dpm}/\text{m}^2$ )	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 dispose in radiation waste system.

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

REPORT FOR SWAB # 642

LOCATION: San Diego, CA  
VESSEL: R/V Melville

DATE: 29 August 2012  
TECHNICIAN: Jim Happell

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 #1	0	± 0	0	± 0
	<u>Main Lab (see figure 1)</u>				
3	Benchtop across and aft of port sink	0	± 0	8	± 0
4	Benchtop aft of port sink	0	± 0	8	± 34
5	Aft deck in front of phone	0	± 0	1	± 42
6	Deck in aft hanger outside main lab	6	± 27	9	± 32
7	Deck in front of aft stairs	0	± 0	5	± 41
8	Deck next to -80°C freezer	0	± 0	4	± 46
9	Deck between starboard entrance and Kelvinator	12	± 53	0	± 0
10	Deck in front of forward passage	15	± 56	0	± 0
11	Deck in front of computer benchtops	0	± 0	0	± 0
12	Deck across from starboard entrance	0	± 0	0	± 0
13	Center benchtop	0	± 0	0	± 0
14	Starboard benchtop	0	± 0	21	± 34
15	Center benchtop	0	± 0	0	± 0
	<u>Analytical Lab (see figure 1)</u>				
16	Deck inside aft entrance	0	± 0	0	± 0
17	Fume hood	14	± 43	0	± 0
18	Forward benchtop	0	± 0	22	± 36
19	Port benchtop forward of sink	0	± 0	12	± 36
20	Deck next to starboard door	0	± 0	0	± 0
21	Deck in front of sink	35	± 38	0	± 0
22	Starboard aft benchtop	0	± 0	0	± 0
	<u>01 Deck (see figure 1)</u>				
23	Benchtop in aft hanger	0	± 0	0	± 0
24	Deck near res tech shop	0	± 0	15	± 37
25	Deck near starboard A-frame	42	± 36	0	± 0
26	Deck under aft A-frame	0	± 0	0	± 0

Sample #	Sample Identification	$^3\text{H}$ dpm/m <sup>2</sup>		$^{14}\text{C}$ dpm/m <sup>2</sup>	
		activity	error	activity	error
	<u>02 Deck (see figure 1)</u>				
27	Deck at stairs to 01 deck	0	± 0	0	± 0
28	Deck near rad van entrance	0	± 0	0	± 0
	<u>Dark Room (see figure 1)</u>				
29	Sink area	9	± 24	9	± 31
30	Benchtop across from sink	0	± 0	0	± 0
31	Deck inside aft entrance	5	± 90	0	± 0
	<u>Misc. Areas (see figure 1)</u>				
32	Deck at aft entrance to mess hall	1	± 0	0	± 0
33	Deck at forward entrance to mess hall	0	± 0	0	± 0
34	Upper lab deck in front of printer	7	± 0	0	± 0
35	Deck outside library	1	± 0	0	± 0
36	Final bucket blank #1	19	± 56	0	± 0
37	Initial Bucket blank #2	34	± 53	0	± 0
	<u>SIO Radiation Van #12 (see figure 2)</u>				
38	Benchtop opposite sink	71	± 44	0	± 0
39	Fume hood	295	± 53	26	± 21
40	Freezer	164	± 44	43	± 29
41	Refrigerator	177	± 46	18	± 22
42	Bench top above refrigerator	346	± 54	43	± 24
43	Benchtop above freezer	**25487	± 364	*642	± 25
44	Sink area	336	± 54	27	± 20
45	Deck near entrance by hood	454	± 61	*120	± 32
46	Deck near entrance by sink	*536	± 61	*626	± 52
47	Deck in center of van	*637	± 69	*184	± 35
48	Final bucket blank #2	15	± 68	0	± 0
	<u>SIO Radiation Van after cleaning (see figure 2)</u>				
49	Initial bucket blank #3	22	± 50	0	± 0
50	#39 Fume hood after cleaning	54	± 38	19	± 29
51	#43 Benchtop above freezer after cleaning	159	± 49	0	± 0
52	#44 Sink area after cleaning	69	± 40	9	± 23
53	#45 Deck near entrance by hood after cleaning	86	± 43	15	± 25
54	#46 Deck near entrance by sink after cleaning	334	± 54	*154	± 35
55	#47 Deck in center of van after cleaning	393	± 59	*103	± 31
56	Final bucket blank #3	50	± 45	0	± 0

### Comments

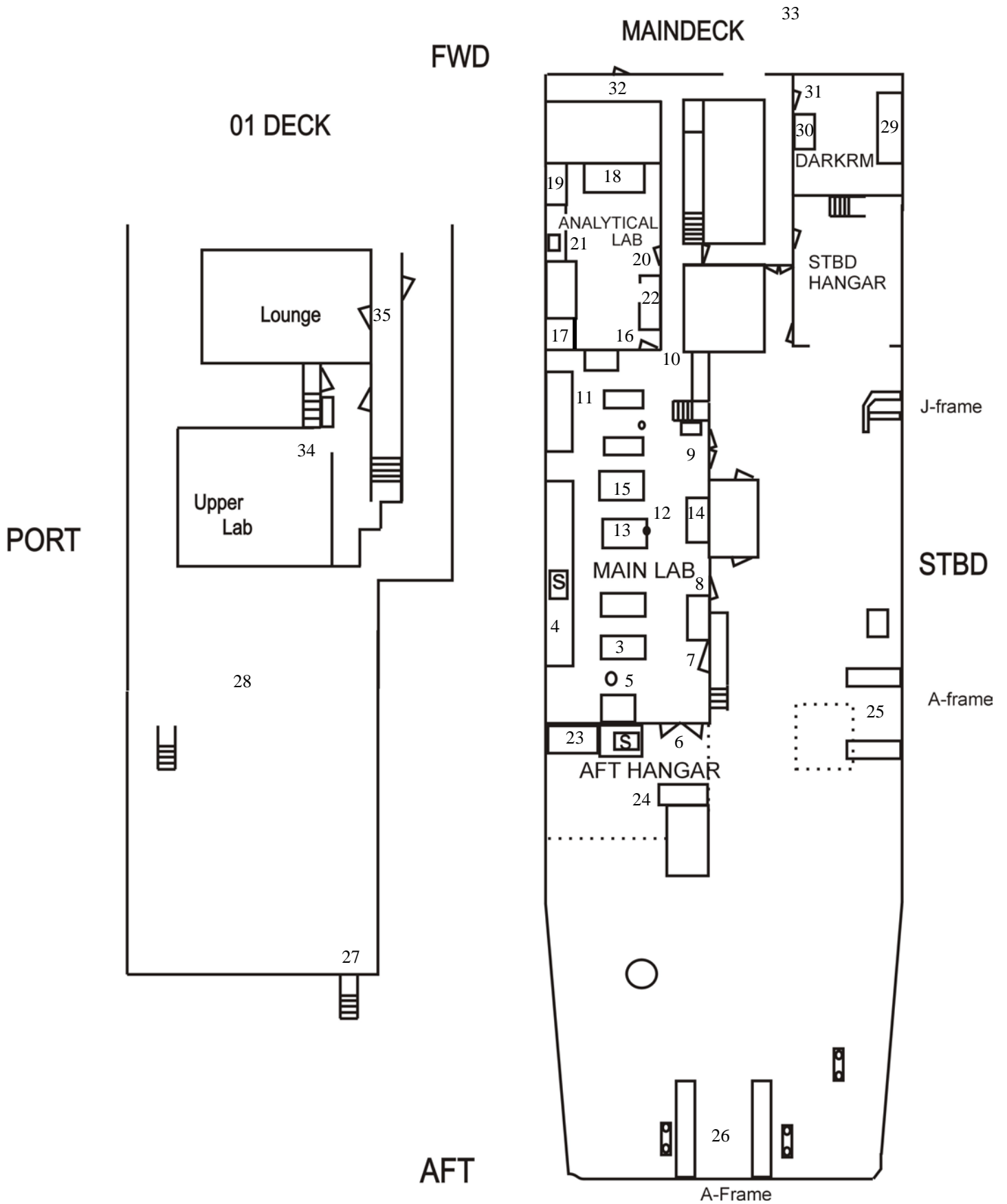
Please note that the error reported for each isotope is the two-standard deviation counting error.

All areas tested on ship were free from isotope contamination that required cleaning.

Radiation van #12 had minor  $^{14}\text{C}$  and minor to moderate  $^3\text{H}$  contamination. The benchtop above the freezer needs to be cleaned before any further use. An aliquot of samples 1 through 48 were left with Gary Lain at SIO. These aliquots were counted on 8/30 by Gary at SIO and it was noted that samples #39, and 43 through 47 had counts above background. The areas were cleaned and re-sampled by Gary on 8/31 and the samples were sent to Univ of Miami for counting. Based on the results of these reruns (samples 50 through 55) the cleaning successfully removed the contamination down to levels that do not require any further action.

# R/V MELVILLE

Figure 1  
SWAB #644  
29 August 2012



# SIO RADIOISOTOPE VAN #12

Figure 2  
SWAB #644  
29 August 2012

