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Tritium Laboratory

13 May 2015

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SWAB REPORT # 772

SWAB DATE: 5 May 2015

*R/V Endeavor*

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Distribution:  
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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 # 770

LOCATION: North Kingstown, RI  
VESSEL: R/V Endeavor

DATE: 5 May 2015  
TECHNICIAN: Jim Happell

| Sample #                              | Sample Identification                           | $^3\text{H}$ dpm/m <sup>2</sup> |       | $^{14}\text{C}$ dpm/m <sup>2</sup> |       |
|---------------------------------------|---|---------------------------------|-------|------------------------------------|-------|
|                                       |   | activity                        | error | activity                           | error |
| 1                                     | 1st Vial Bkgnd                                  | 0                               | ± 0   | 0                                  | ± 0   |
| 2                                     | Initial bucket blank                            | 16                              | ± 135 | -25                                | ± 134 |
| <u>Main Lab (Figure 1)</u>            |   |                                 |       |                                    |       |
| 3                                     | Deck in front of aft sink                       | -7                              | ± 28  | -11                                | ± 61  |
| 4                                     | Port sink area                                  | -7                              | ± 30  | 0                                  | ± 1   |
| 5                                     | Port benchtop                                   | 17                              | ± 68  | -11                                | ± 62  |
| 6                                     | Benchtop forward of port sink                   | 9                               | ± 528 | -18                                | ± 96  |
| 7                                     | Deck in front of port sink                      | -19                             | ± 79  | -4                                 | ± 20  |
| 8                                     | Deck at bottom of stairs                        | 13                              | ± 47  | -1                                 | ± 3   |
| 9                                     | Deck at top of stairs                           | -3                              | ± 14  | -17                                | ± 94  |
| 10                                    | Deck inside starboard door                      | 15                              | ± 61  | -8                                 | ± 43  |
| 11                                    | Forward port benchtop                           | 10                              | ± 41  | -29                                | ± 158 |
| 12                                    | Deck in front of forward port benchtop          | 23                              | ± 75  | -18                                | ± 96  |
| 13                                    | Aft starboard benchtop                          | -16                             | ± 66  | 5                                  | ± 42  |
| 14                                    | Inside refrigerator                             | 4                               | ± 16  | -19                                | ± 102 |
| <u>Wet Lab (Figure 2)</u>             |   |                                 |       |                                    |       |
| 15                                    | Deck inside aft door                            | -30                             | ± 122 | 0                                  | ± 2   |
| 16                                    | Benchtop aft of sink                            | -58                             | ± 241 | -12                                | ± 67  |
| 17                                    | Deck in front of sink                           | 0                               | ± 1   | -7                                 | ± 39  |
| 18                                    | Deck inside port entrance                       | -39                             | ± 159 | 2                                  | ± 10  |
| <u>Special Purpose Lab (Figure 2)</u> |   |                                 |       |                                    |       |
| 19                                    | Inside fume hood                                | -2                              | ± 9   | 4                                  | ± 36  |
| 20                                    | Inside black chest freezer                      | -9                              | ± 39  | -28                                | ± 153 |
| 21                                    | Inside Revco refrigerator                       | -31                             | ± 129 | 8                                  | ± 44  |
| 22                                    | Benchtop forward of sink                        | -10                             | ± 43  | -14                                | ± 77  |
| 23                                    | Benchtop in front of chest freezer              | 29                              | ± 81  | -28                                | ± 153 |
| 24                                    | Deck in front of sink                           | 33                              | ± 65  | -21                                | ± 113 |
| 25                                    | Benchtop aft of sink                            | -6                              | ± 25  | 7                                  | ± 37  |
| 26                                    | Deck in front of fume hood                      | -30                             | ± 123 | 4                                  | ± 57  |
| 27                                    | Deck outside of entrance to Special Purpose Lab | 1                               | ± 6   | -11                                | ± 62  |
| 28                                    | Intermediate bucket blank                       | -3                              | ± 14  | -15                                | ± 82  |

| 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 |
|          | <u>UNOLS Radioisotope Van # 6255020 (Figure 3)</u> |                                   |       |                                    |       |
| 29       | Benchtop across from refrigerator                  | -7                                | ± 29  | -6                                 | ± 35  |
| 30       | Top of LSC   | -5                                | ± 19  | -1                                 | ± 8   |
| 31       | Inside fume hood                                   | 39                                | ± 51  | -6                                 | ± 30  |
| 32       | Benchtop across from LSC                           | 103                               | ± 54  | -3                                 | ± 50  |
| 33       | Benchtop next to fume hood                         | 36                                | ± 57  | -13                                | ± 69  |
| 34       | Benchtop to the left of sink                       | 101                               | ± 52  | -1                                 | ± 8   |
| 35       | Sink area  | 42                                | ± 54  | -12                                | ± 67  |
| 36       | Inside refrigerator                                | 238                               | ± 53  | *107                               | ± 35  |
| 37       | Inside freezer                                     | 0                                 | ± 1   | -8                                 | ± 46  |
| 38       | Deck in front of fume hood                         | 93                                | ± 46  | 31                                 | ± 31  |
| 39       | Deck in center of van                              | 180                               | ± 56  | 12                                 | ± 20  |
| 40       | Benchtop across from sink                          | 2                                 | ± 9   | -9                                 | ± 47  |
| 41       | Deck at entrance next to sink                      | 50                                | ± 56  | -4                                 | ± 21  |
| 42       | Deck outside van entrance                          | 0                                 | ± 1   | -22                                | ± 119 |
| 43       | Final bucket blank                                 | -2                                | ± 4   | 47                                 | ± 37  |

### 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 negatives values to zero. Values are only significantly above background when they are positive and larger than the error.

All areas tested on the ship were free from contamination that requires cleaning.

Minor <sup>14</sup>C contamination was found in radioisotope van, but no action is required.