

UNIVERSITY OF MIAMI

ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



Tritium Laboratory

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SWAB REPORT # 937

SWAB DATE: 10 February 2019

R/V Laurence M. Gould and USAP Rad Vans #1, #3, & #4

Dr. James D. Happell
Associate Research Professor

Distribution:
SWAB Committee
Jamee Johnson

COMMENTS TO SWAB REPORTS

12 May 2014

Typical LSC instrument background values for ^3H and ^{14}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 dpm/m^2 . Bucket blank activities are not subtracted. Counting errors (2 standard deviations) are also reported in dpm/m^2 . An error larger than the activity indicates that the activity is not significantly different from zero.

Criteria for SWAB Results

Category	^3H (dpm/m^2)	^{14}C (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 dpm/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}C and ^{35}S have peak energies of 156 and 167 KeV, respectively; thus ^{35}S will be registered as ^{14}C by our counting techniques. Categories A, B and C are not a health hazard.

Recommended Cleaning Procedure

Wearing ordinary household rubber gloves:

^3H : 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}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 ^3H .

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 institution promptly by phone or email.

REPORT FOR SWAB #937

LOCATION: Punta Arenas, Chile
VESSEL: *R/V Laurence M Gould*

DATE: 10 February 2019
TECHNICIAN: D. Hutt

Sample # Sample Identification	³ H dpm/m ²			¹⁴ C dpm/m ²		
	activity	error		activity	error	
1 1st Vial Bkgnd	0	±	0	0	±	0
2 Initial bucket blank	-26	±	50	6	±	48
3 Floor under lounge table	-37	±	69	10	±	46
<u>01 Deck (Figure 1)</u>						
4 Deck by Hazardous waste drums	232	±	48	*92	±	35
5 Deck by incubator	168	±	45	48	±	32
<u>Enviro Room (Figure 2)</u>						
6 Deck below Autosol	-26	±	49	20	±	40
7 Deck in companionway just out side door	-55	±	103	37	±	41
<u>Electronics Lab (Figure 3)</u>						
8 Deck under forward computer desk	-60	±	111	33	±	42
9 Deck in front of work bench/lista cabinet	-62	±	116	23	±	44
10 Deck under aft desk	-46	±	85	47	±	41
<u>Hydro Lab (Figure 4)</u>						
11 Deck in front of mid sink	-47	±	87	13	±	45
12 Deck port forward corner	0	±	0	*68	±	39
13 Deck in front of Aqua Solutions DI system	-19	±	1556	36	±	39
14 Benchtop in board mid ships	-5	±	27	27	±	38
15 Benchtop aft across from AQ Solutions DI system	-5	±	77	15	±	38
16 Deck near door to Passageway	-31	±	57	30	±	40
<u>Dry Lab (Figure 5)</u>						
17 Deck in front of starboard -20 reezer	-9	±	43	13	±	39
18 Middle aft benchtop	5	±	134	-6	±	49
19 Deck of doorway to E-lab	4	±	26	10	±	37
20 Deck under computer desk (starboard bulkhead)	11	±	22	38	±	38
21 Deck between middle benches	-63	±	116	40	±	42
22 Deck in front of sink	-67	±	125	*53	±	43
23 Deck in passageway just outside of door.	-44	±	82	10	±	48

Sample #	Sample Identification	^3H dpm/m ²			^{14}C dpm/m ²		
		activity	±	error	activity	±	error
	<u>Wet Lab (Figure 6)</u>						
24	Deck near door to passageway	-54	±	100	9	±	53
25	Deck in front of E-pure DI water ystem	-40	±	75	25	±	41
26	Middle aft benchtop	25	±	47	12	±	33
27	Deck in front of mid sink	-38	±	70	21	±	41
28	Inside Percival incubator	277	±	46	*89	±	33
29	Deck just inside of door to aft deck	-17	±	33	13	±	40
30	Deck just outside of door to aft deck	-21	±	41	18	±	39
	<u>MT Shop and MLT office (Figure 1)</u>						
31	MT shop deck	-48	±	89	4	±	104
32	MT shop deck	15	±	37	15	±	35
33	MLT office deck	-31	±	57	9	±	44
	<u>Rad Van #4 (Figure 7)</u>						
34	Deck outside door	-68	±	127	31	±	42
35	Deck inside door	-69	±	22	*549	±	54
36	Deck near waste storage area	-58	±	6	*2143	±	87
37	Inside refrigerator	145	±	45	*163	±	41
38	Benchtop next to LSC	-50	±	30	*289	±	47
39	Benchtop next to fumehood	-20	±	5	*562	±	54
40	Inside fumehood	-44	±	24	*308	±	47
41	Deck between benches	-38	±	29	*220	±	45
	<u>Rad Van #1 (Figure 8)</u>						
42	Deck outside door	-40	±	75	18	±	42
43	Deck inside door	*521	±	95	*120	±	35
44	Deck in front of fumehood	401	±	94	*100	±	36
45	Benchtop above refrigerator	*1032	±	112	*67	±	23
46	Benchtop between sink and fume hood	*846	±	103	17	±	11
47	Inside Refrigerator	*747	±	92	42	±	20
48	Deck between benches	*1313	±	142	*104	±	27
49	Inside fume hood	421	±	80	16	±	16
50	Final bucket blank	10	±	47	2	±	29

Sample #	Sample Identification	^3H dpm/m ²			^{14}C dpm/m ²		
		activity	±	error	activity	±	error
	<u>Rad Van #3 (Figure 9)</u>						
51	Initial bucket blank	-25	±	47	2	±	164
52	Deck dry waste area	*947	±	181	*87	±	31
53	Deck inside door	475	±	93	48	±	27
54	Benchtop next to LSC	-17	±	33	-5	±	0
55	Benchtop next to sink	23	±	42	22	±	36
56	Deck in front of LSC	235	±	65	*66	±	33
57	Final bucket blank	-5	±	0	7	±	38

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. Minor ^{14}C contamination was found on the 01 Deck near the hazardous waste drum. Also take note that ^3H above background, but below cleanup limit was found on the 01 deck. Minor ^{14}C contamination was found in one spot each in the Dry, Wet and Hydro Labs. All contaminated areas in the ship should be cleaned ASAP. Van #4 had minor ^{14}C contamination. Vans #1 and #3 had minor ^3H and ^{14}C contamination. No action is necessary but we recommend cleaning of the decks to help prevent tracking contamination out of the vans.

Figure 1
SWAB 937
10 February 2019

The figure displays two detailed floor plans of the USNSC-937, a research vessel. The top plan is for the 01 Deck, and the bottom plan is for the Main Deck. Both plans are oriented with the bow of the ship to the right. The 01 Deck plan includes rooms such as the Emergency Generator Room, Gymnasium, Chief Scientist's Cabin, Sauna, Lounge, MPC Office, MPC Cabin, and various crew quarters (Crew, NSF, WC). The Main Deck plan includes the Ice Reamer, Galley, Mess, Laundry, Storage, WC, Electronics Lab, Hydro Lab, Wet Lab, Dry Lab, Balic Room/ Staging Area, Deck Container, and various storage tanks. The plans are overlaid with a large, faint circular pattern, possibly representing a search area or a specific operational zone.

Figure 1
SWAB 937
10 February 2019

The figure displays two detailed floor plans of the USNSC-937, a research vessel. The top plan is for the 01 Deck, and the bottom plan is for the Main Deck. Both plans are oriented with the bow of the ship to the right.

01 Deck: This deck features a variety of scientific and support spaces. At the bow, there is a Boat's Store. Moving aft, there are several crew quarters (labeled '2 NSF' and '4 Crew'), restrooms ('WC'), and a Chief Scientist's Cabin. A large central area includes a Gymnasium, Emergency Generator Room, Lounge, and a Sauna. The stern section contains more crew quarters and restrooms. A large circular area on the left side of the deck is labeled '4' and '5'.

Main Deck: This deck is primarily dedicated to scientific research and storage. It includes a large Deck Container area at the bow, a Mess, and a Galley. The central part of the deck is occupied by a Wet Lab, Hydro Lab, and Electronics Lab. A Dry Lab is located near the stern. Other areas include a Balic Room/Staging Area, a Deck Container Hinged Flush Container Hatch, and various storage and utility spaces. The stern section features a Mess, Laundry, and a WC. The ship's name 'USNSC-937' is visible on the bow.

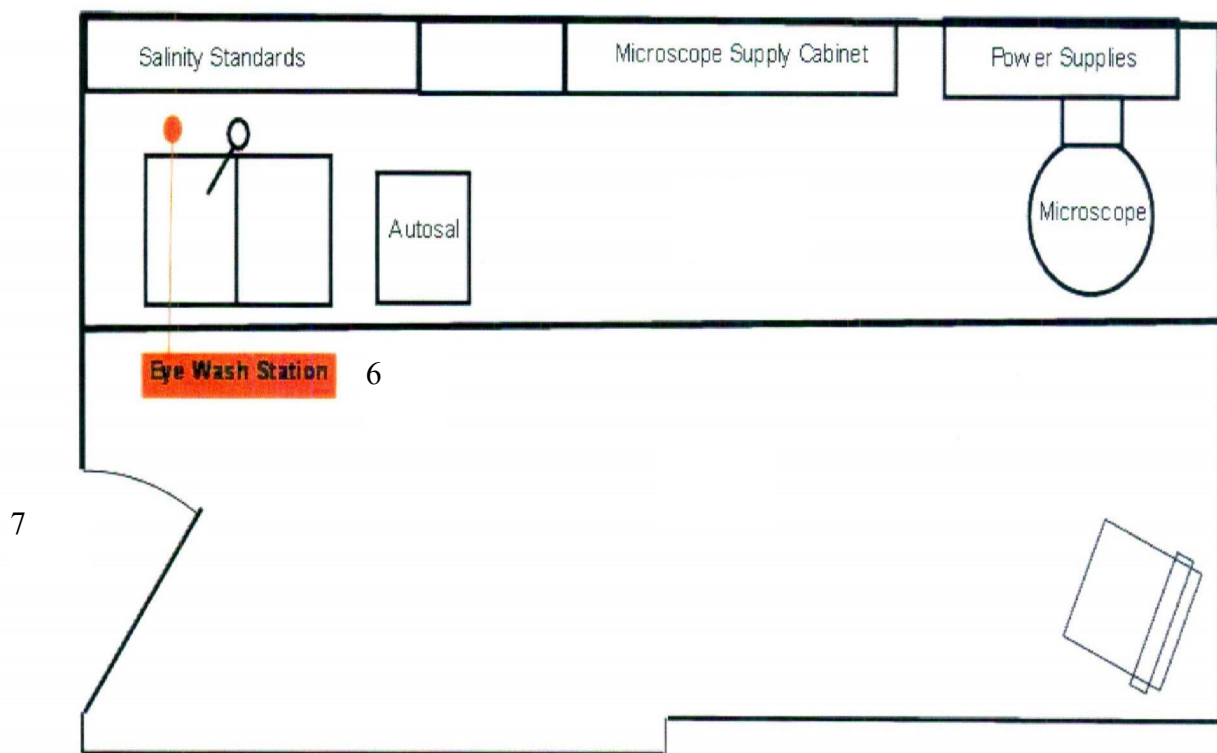
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Figure 2
SWAB # 937
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ENVIRONMENTAL ROOM

Electronics Lab

460 sq. ft.

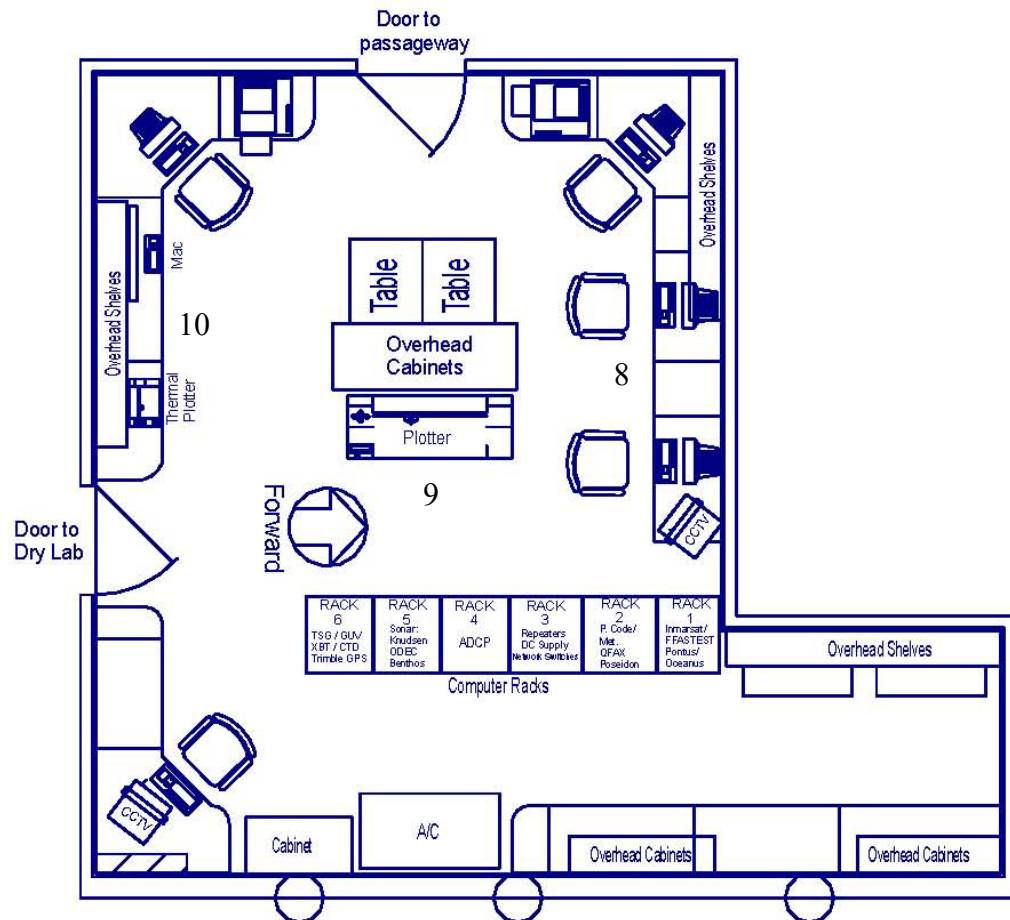


Figure 4
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Hydro Lab

526 sq. ft.

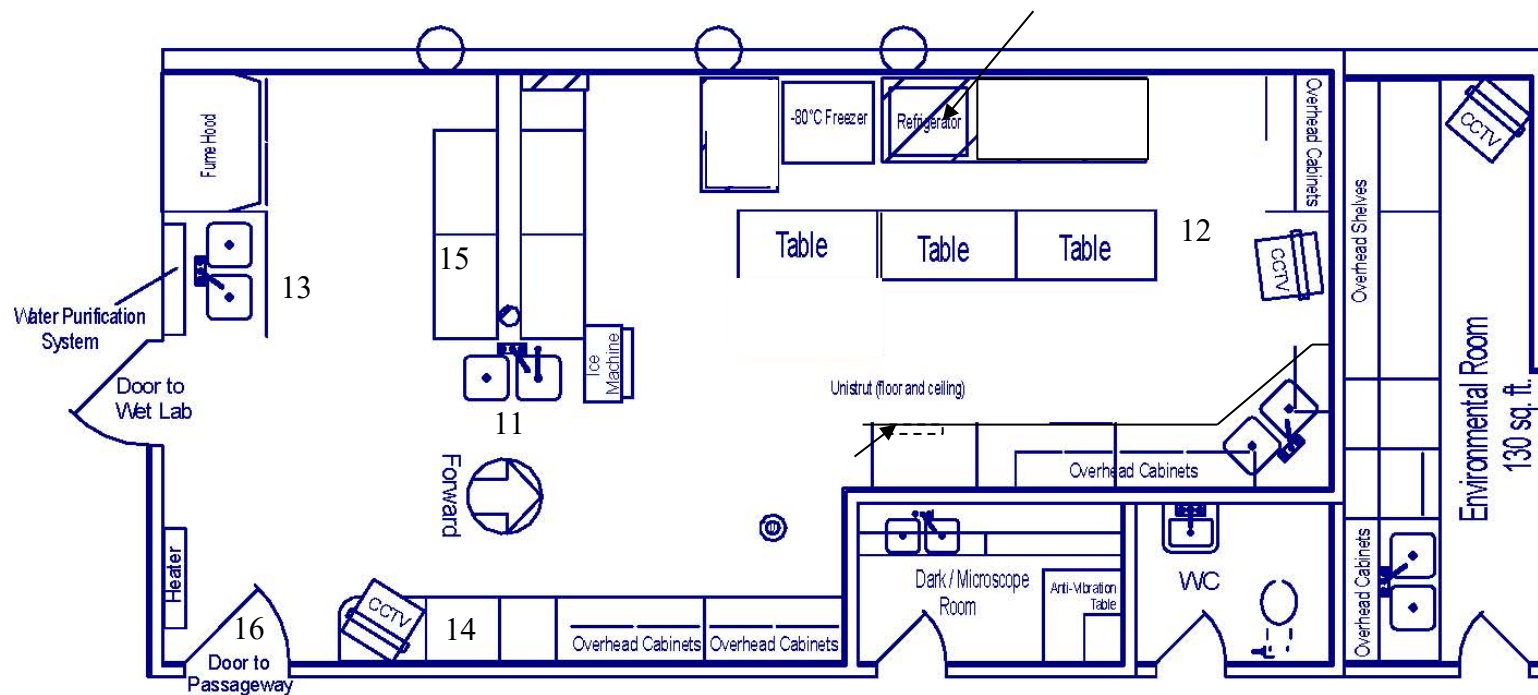


Figure 5
SWAB #937
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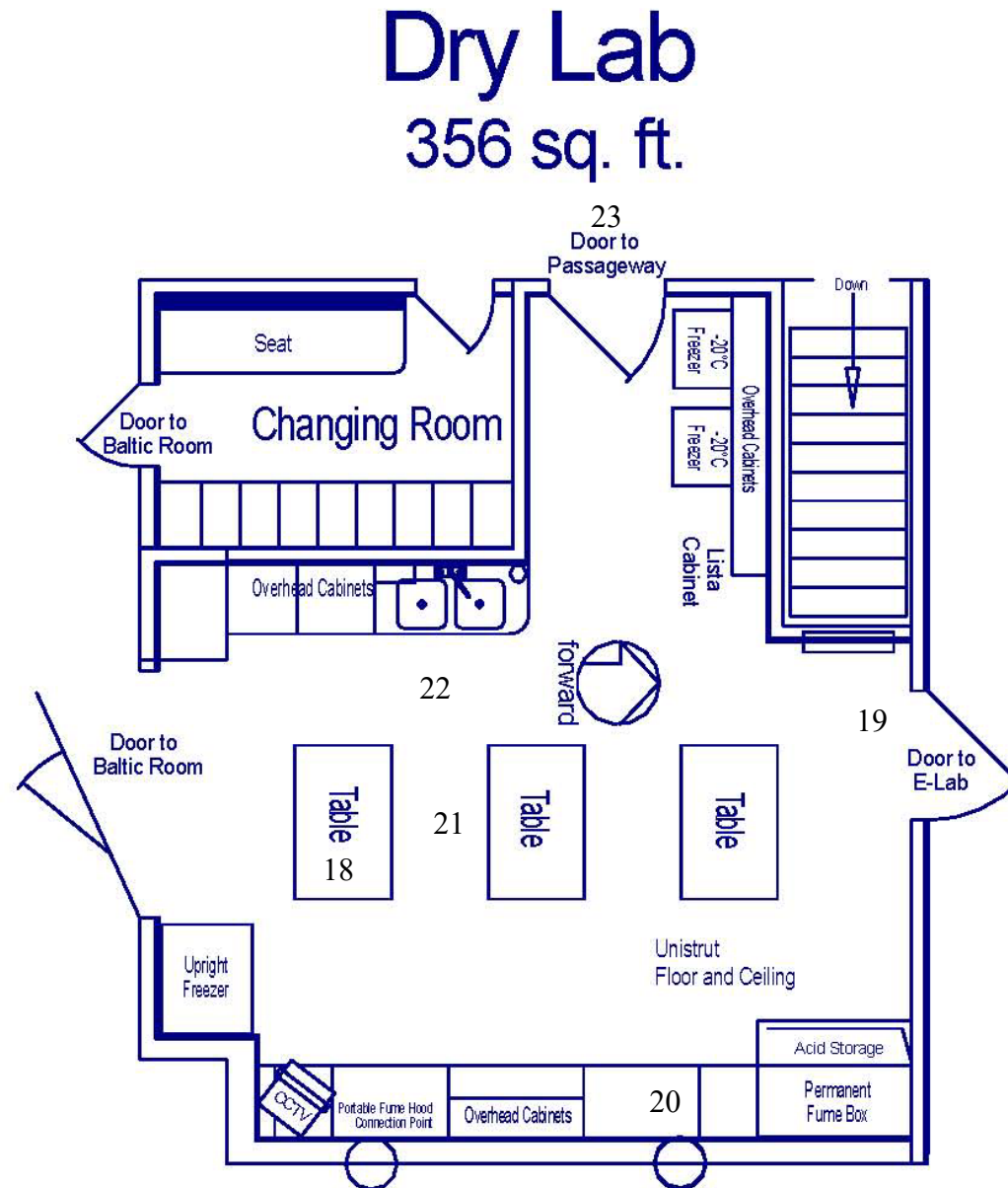
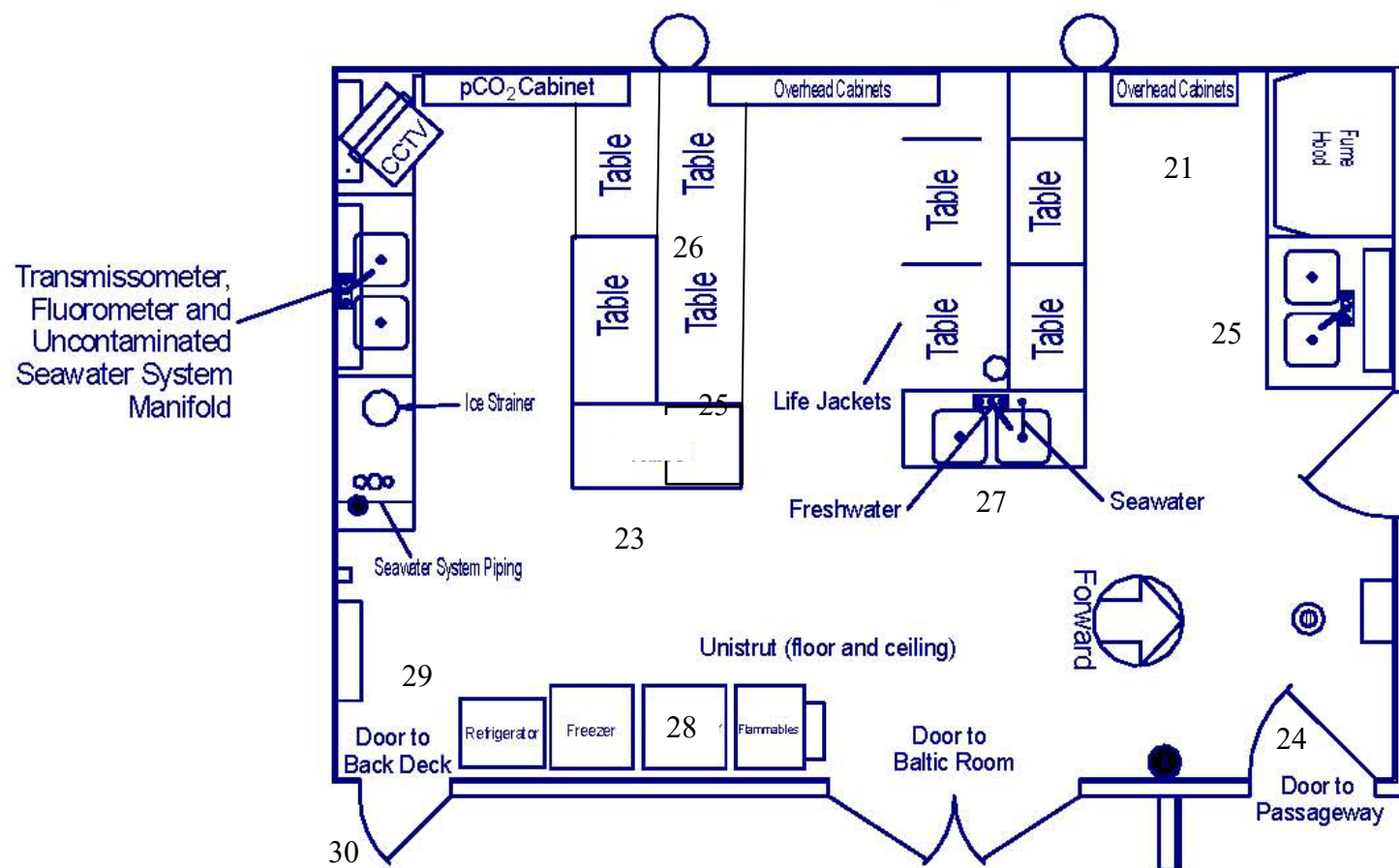
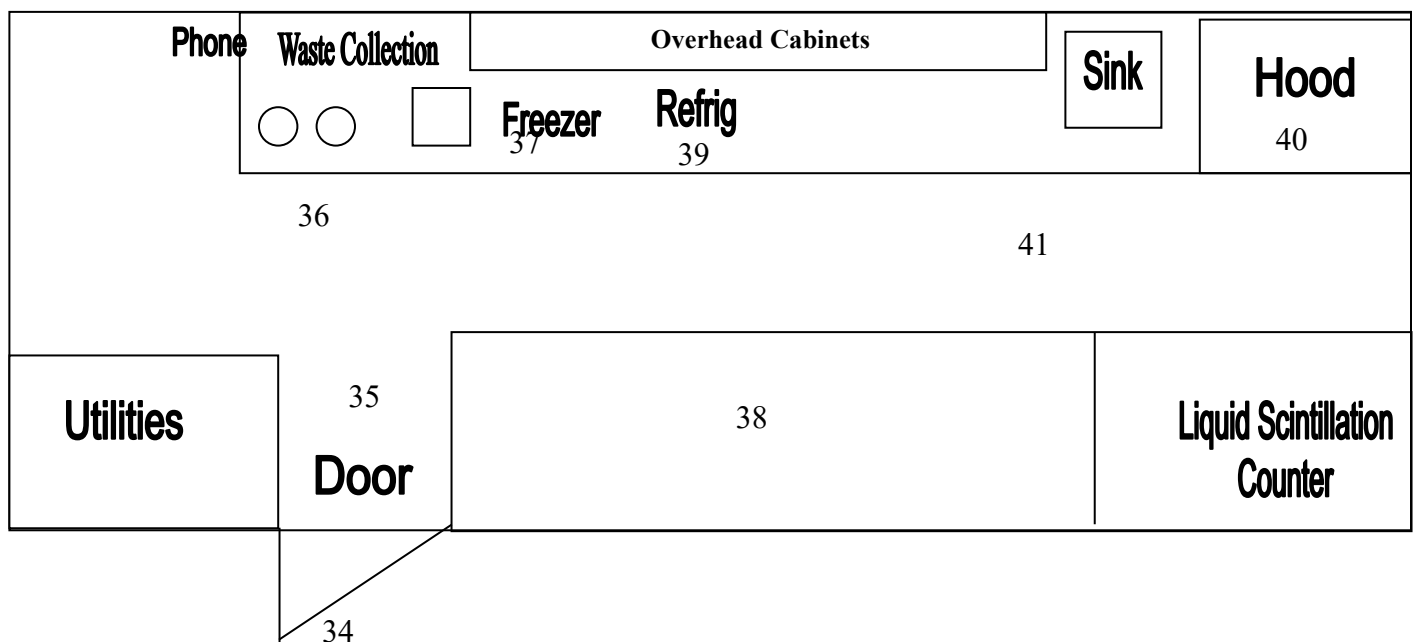


Figure 6
SWAB #937
10 February 2019

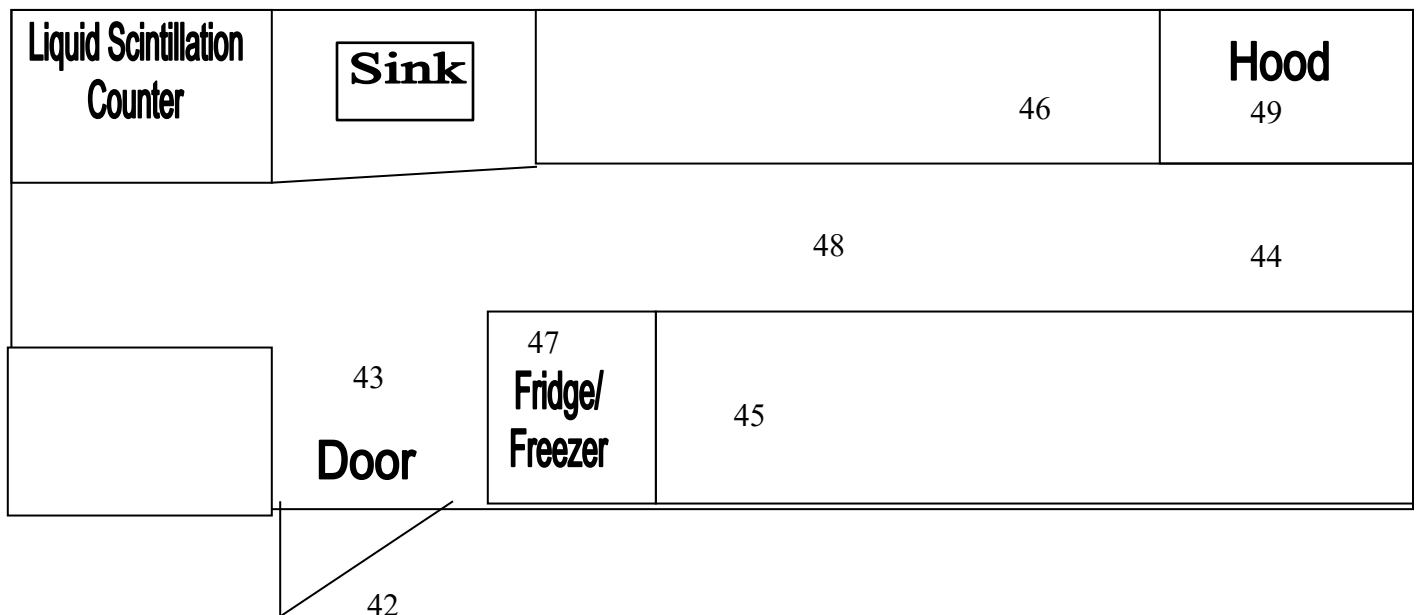
Wet Lab 425 sq. ft.



USAP Van # 4
Figure 7
SWAB #937
10 February 2019



USAP Van #1
Figure 8
SWAB #937
10 February 2019



USAP Van # 3
Figure 9
SWAB #937
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