



Tritium Laboratory  
18 November 2019

SWAB REPORT #966

SWAB DATE: 12 November 2019

*R/V Atlantis and WHOI Rad Van #625.6.03*

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Distribution:  
SWAB Committee  
David Fisichella

## 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 institution promptly by phone or email.

REPORT FOR SWAB # 966

LOCATION: San Diego, CA  
VESSEL/LAB: R/V Atlantis

DATE: 1 November 2019  
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	-42	± 71	-30	± 47
	<u>Main Lab (Figure 1)</u>				
3	Port sink area	9	± 39	-24	± 46
4	Deck below mid-port entrance	11	± 49	-1	± 9
5	Deck below forward port entrance	-7	± 31	4	± 42
6	Inside freezer	8	± 34	-18	± 144
7	Inside refrigerator	7	± 148	-10	± 83
8	Deck in front of -80°C freezers	-31	± 0	1	± 7
9	Benchtop between ice machine & -80 freezer	42	± 64	-22	± 41
10	Benchtop across from port sink	7	± 33	-24	± 46
11	Starboard sink area	-3	± 15	-4	± 42
12	Inside fume hood	2	± 8	-21	± 40
13	Deck inside aft entrance	16	± 88	-15	± 32
14	Deck inside aft port entrance	-9	± 40	18	± 40
15	Center aft benchtop	13	± 110	-17	± 136
16	Benchtop across from port sink	5	± 234	-8	± 67
17	Deck in front of port sink	12	± 69	-8	± 65
18	Center benchtop	13	± 57	-31	± 58
19	Deck in front of starboard sink	54	± 91	-55	± 105
20	Deck near power station	-12	± 52	-12	± 23
	<u>Bio Analytical Lab (Figure 2)</u>				
21	Deck inside aft entrance	35	± 54	-7	± 61
22	Aft sink area	-6	± 28	-1	± 11
23	Inside fume hood	18	± 272	-32	± 62
24	Inside forward refrigerator	41	± 73	-30	± 58
25	Inside forward freezer	19	± 64	-11	± 36
26	Deck between fume hood & aft sink	20	± 32	23	± 37
27	Forward sink area	-2	± 7	-1	± 8
28	Forward benchtop	21	± 39	10	± 35
29	Deck inside starboard entrance	-16	± 72	32	± 40
30	Starboard benchtop	-4	± 34	21	± 39

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>Walk-in Coolers (Figure 3)</u>				
31	Deck of forward freezer	16 ±	81	-14 ±	48
32	Deck of aft freezer	34 ±	51	-2 ±	24
33	Deck at entrance to computer lab	-4 ±	17	-16 ±	54
	<u>Computer Lab (Figure 3)</u>				
34	Deck inside starboard entrance	-1 ±	3	-21 ±	39
	<u>Hydro Lab (Figure 4)</u>				
35	Deck below port sink	21 ±	87	-21 ±	39
36	Deck below starboard sink	26 ±	82	-22 ±	43
37	Inside fume hood	23 ±	52	-4 ±	46
38	Deck inside starboard entrance	-1 ±	5	-20 ±	68
39	Inside Frigidaire freezer	-3 ±	13	-2 ±	24
40	Inside Frigidaire refrigerator	71 ±	1678	-81 ±	154
41	Inside Cospoloch freezer	19 ±	45	4 ±	29
	<u>Wet Lab (Figure 5)</u>				
42	Forward sink area	11 ±	51	-25 ±	47
43	Port benchtop	28 ±	101	-32 ±	61
44	Starboard benchtop	20 ±	129	-28 ±	53
45	Deck in center of lab	21 ±	44	5 ±	31
46	Inside fume hood	37 ±	82	-33 ±	64
	<u>WHOI Rad Van 625.6.03 (Figure 6)</u>				
47	Intermediate bucket blank	58 ±	79	-50 ±	95
48	Deck outside port entrance	-30 ±	4	*1539 ±	76
49	Deck outside aft entrance	58 ±	21	*218 ±	45
50	Inside Haier refrigerator	402 ±	67	*59 ±	30
51	Benchtop across from sink	68 ±	19	*317 ±	48
52	Sink area	105 ±	13	*1228 ±	70
53	Benchtop adjacent to sink	379 ±	45	*734 ±	58
54	Inside fume hood	116 ±	27	*350 ±	49
55	Inside refrigerator	-123 ±	5	*8766 ±	162
56	Inside freezer	470 ±	61	*331 ±	46
57	Benchtop adjacent to LSC	79 ±	21	*320 ±	48
58	Benchtop across from Haier refrigerator	148 ±	24	*641 ±	57
59	Deck below fume hood	*1150 ±	43	*9222 ±	166
60	Deck between sink and entrance	446 ±	19	*7767 ±	153
61	Final bucket blank	16 ±	88	-17 ±	33

### 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  $^{14}\text{C}$  contamination was found on the deck outside both Rad Van doors. This areas should be cleaned. Minor  $^{14}\text{C}$  and  $^3\text{H}$  contamination was found in the Rad Van. While no action is necessary in the van the  $^{14}\text{C}$  contamination is widespread. Since contamination has been tracked out of the van, we recommend cleaning the deck of the van to help prevent tracking more contamination outside.





**KEY**









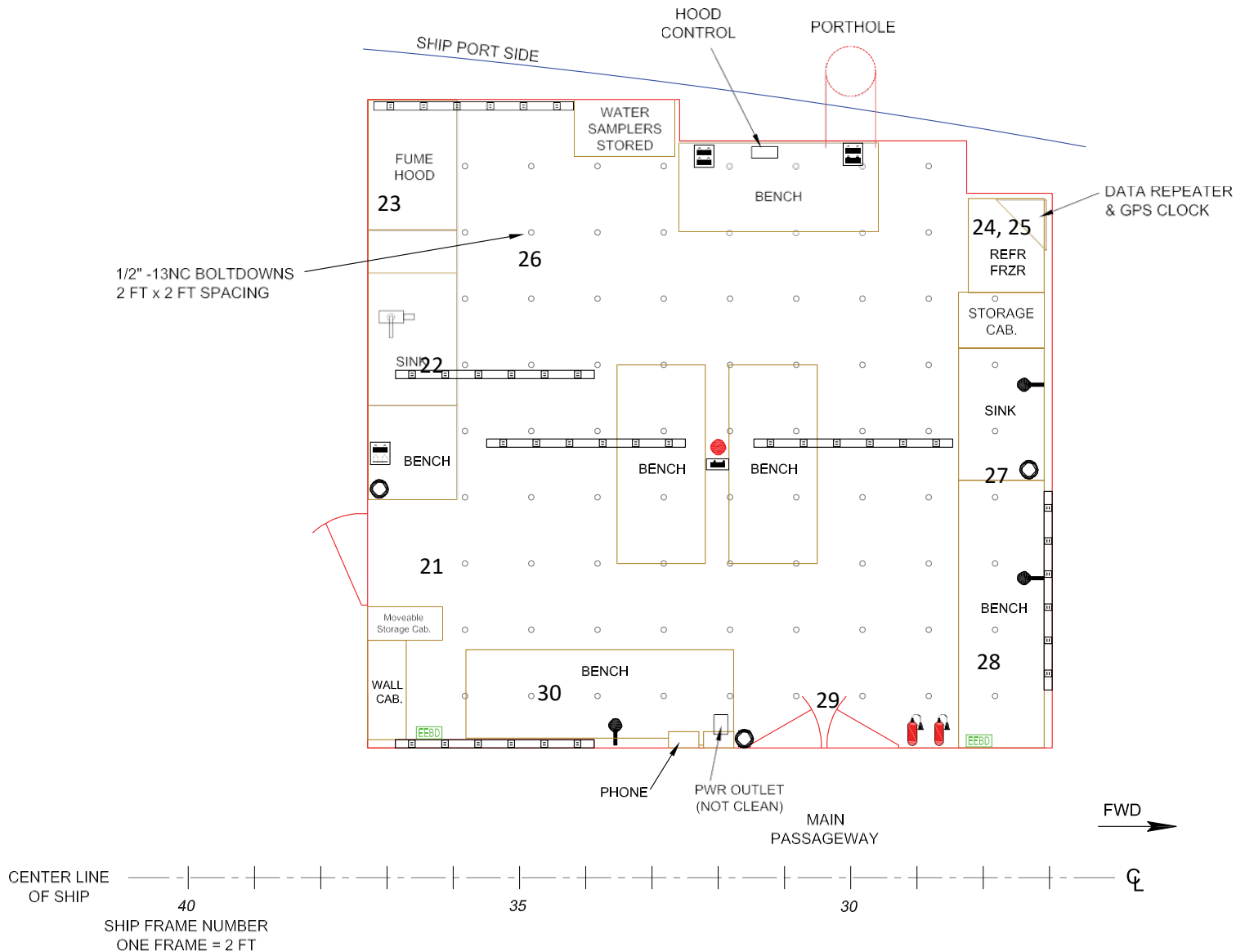
-  FIRE EXTINGUISHER
-  SCIENCE SEA WATER
-  COMPUTER HUB
-  CABLE PASS THRU
-  SHIP EQUIP -KEEP CLEAR
-  COMPRESSED AIR
-  EMERGENCY ESCAPE BREATHING DEVICE
-  72" POWER STRIP, 6 PLUGS

Figure 2  
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UNISTRUT:  
BULKHEADS  
2 FT SPACING  
OVERHEAD FORE/AFT,  
FULL LENGTH OF LAB

ALL POWER CLEAN UNLESS NOTED

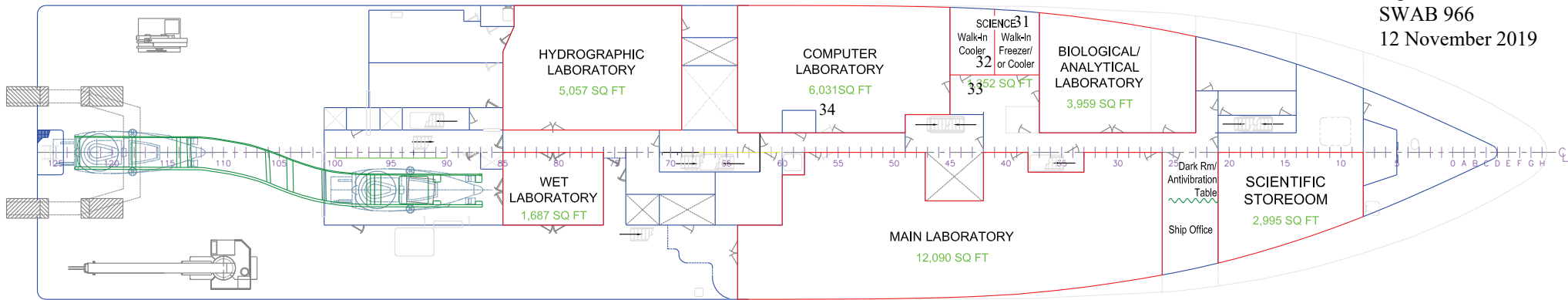


**BIOLOGICAL/ANALYTICAL CLEAN LABORATORY**  
*Atlantis Main Deck, Room 1-27-2*





Figure 3  
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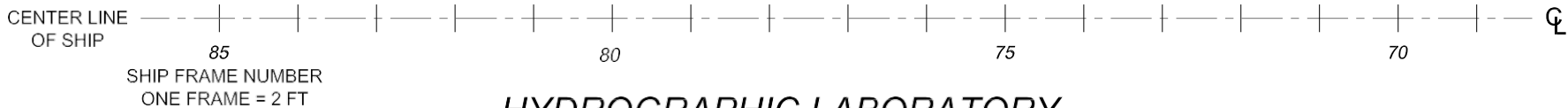
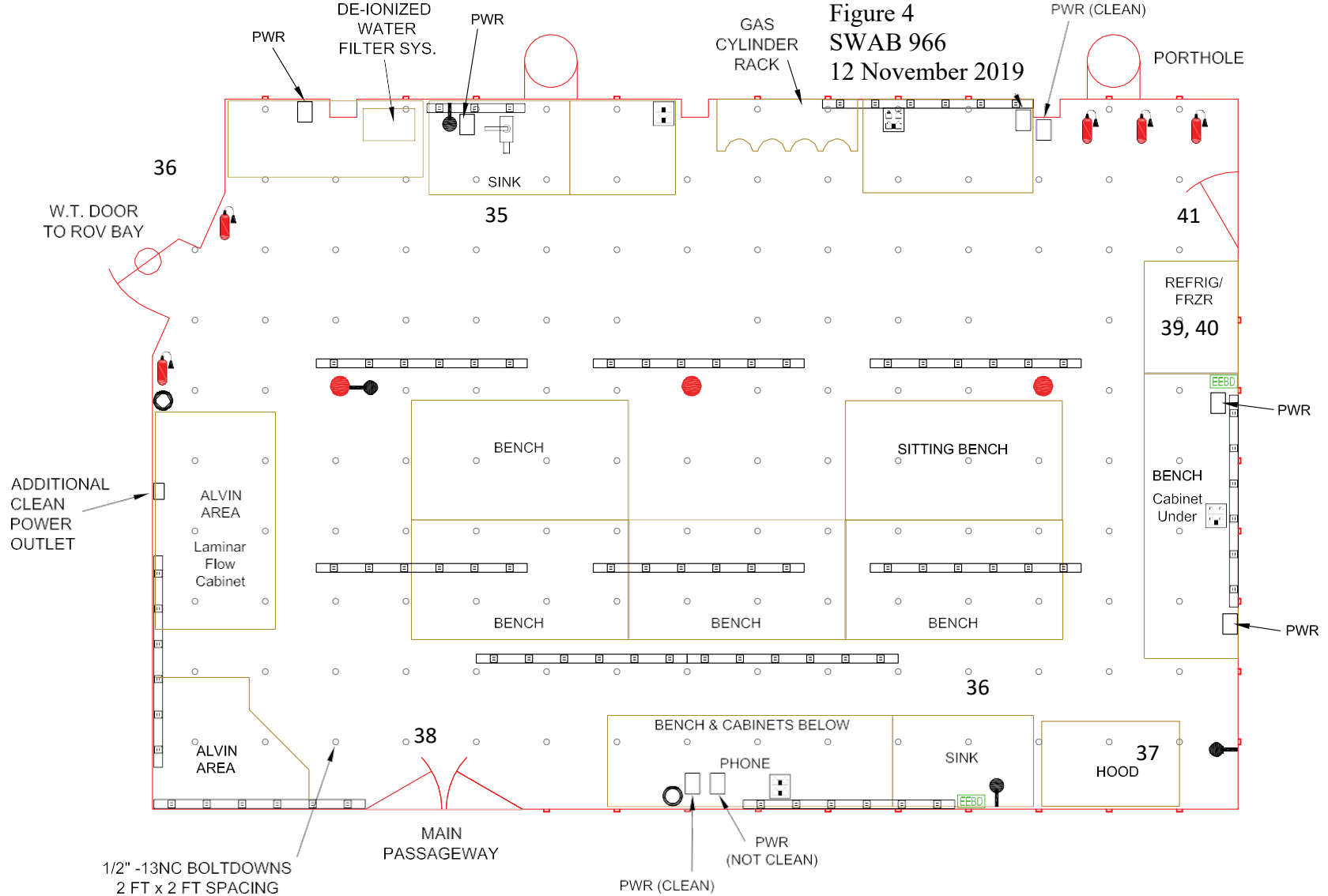


*Laboratories & Scientific Storeroom General Locations*  
*Atlantis Main Deck*











FULL LENGTH OF LAB  
ALL POWER CLEAN UNLESS NOTED

Figure 4  
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12 November 2019



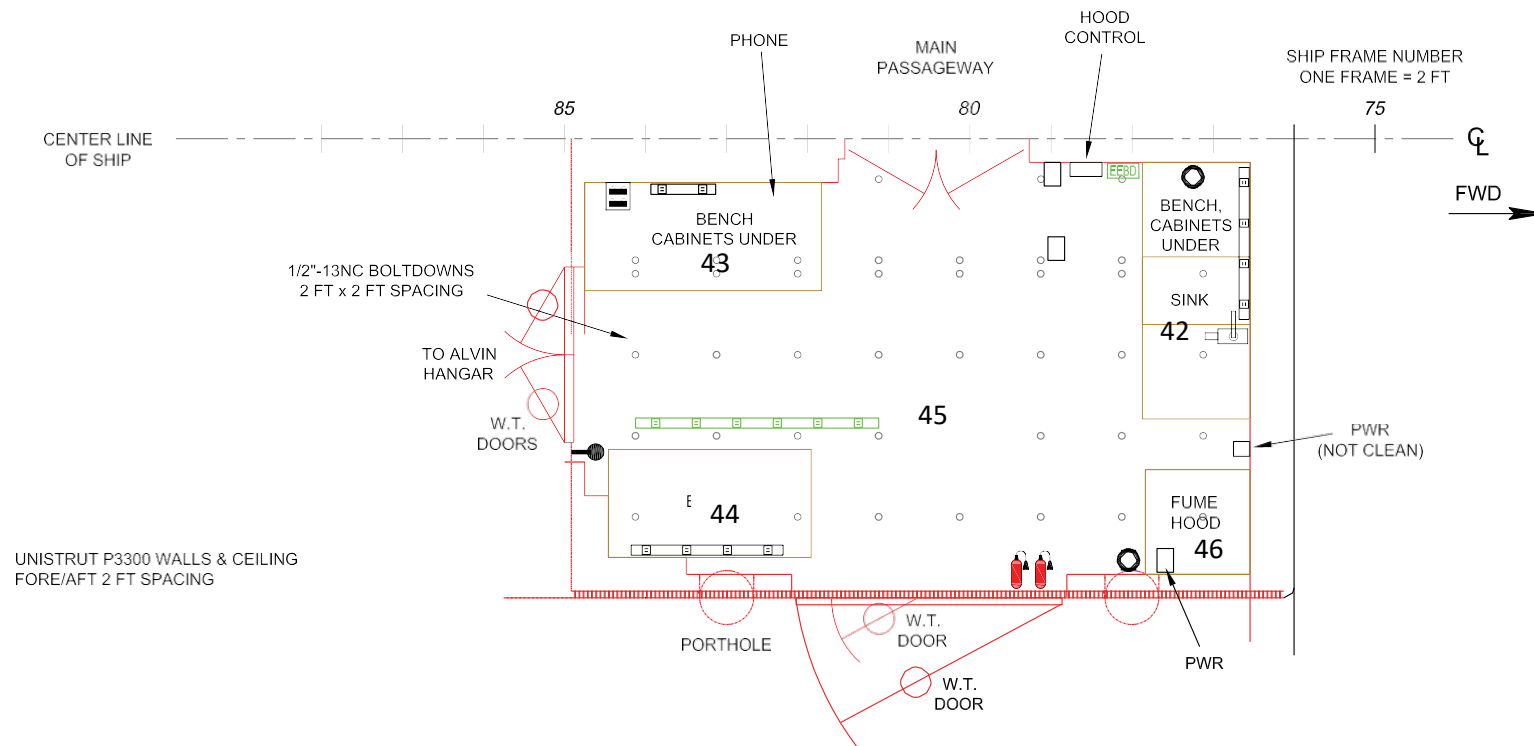
**HYDROGRAPHIC LABORATORY**  
*Atlantis Main Deck, Room 1-64-2*

**KEY**

-  COMPUTER HUB
-  SHIP EQUIP -KEEP CLEAR
-  EMERGENCY ESCAPE BREATHING DEVICE
-  72" POWER STRIP, 6 PLUGS
-  FIRE EXTINGUISHER
-  SCIENCE SEA WATER
-  CABLE PASS THRU
-  COMPRESSED AIR

UNISTRUT:  
 BULKHEADS  
 2 FT SPACING  
 OVERHEAD FORE/AFT,  
 FULL LENGTH OF LAB  
 ALL POWER CLEAN UNLESS NOTED

Figure 5  
 SWAB 966  
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UNISTRUT P3300 WALLS & CEILING  
 FORE/AFT 2 FT SPACING

**WET LABORATORY**  
 Atlantis Main Deck, Rm 1-76-1

# WHOI RADIOISOTOPE VAN

#625.6.03

Figure 6  
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