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Tritium Laboratory
20 March 2024

SWAB REPORT # 1084

SWAB DATE: 18 March 2024

R/V F.G. Walton Smith

James Happell Digitally signed by James Happell
Date: 2024.04.03 07:57:17 +08'00'

James D. Happell

Distribution:
SWAB Committee
Don Cucchiara
Clay Dundas

COMMENTS TO SWAB REPORTS 15 December 2021

The LSC is now a Quantulus GCT 6220, with the SWAB counting assay having background cpm of 0.3 & 1.2 for ^{3}H & ^{14}C. This replaces an LSC with background cpm of 1.6 & 5.5 for ^{3}H & ^{14}C.

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. All activities significantly above background will be in **bold**.

Criteria for SWAB Results

Category	^{3}H (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 Proceedure

Wearing ordinary household rubber gloves:

^{3}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}C: Wash with 1% sulfuric or 2% hydrochloric (muriatic) acid with good ventilation (will dissolve carbonates, releasing $^{14}CO_2$). Follow up with wash as if for ^{3}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 # 1084

LOCATION: Miami, FL
VESSEL: *R/V F.G. Walton Smith*

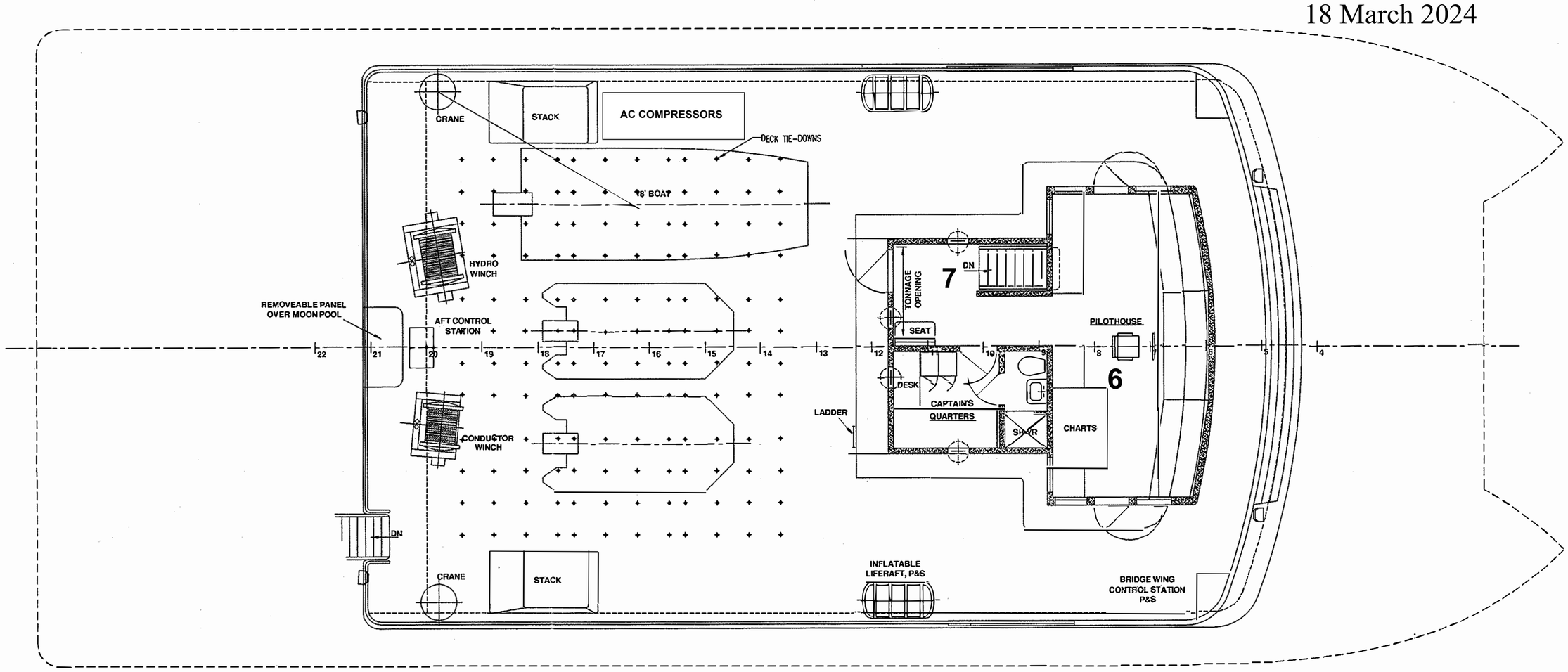
DATE: 18 March 2024
TECHNICIAN: Charlene Grall

Sample #	Sample Identification	^{3}H dpm/m^{2} activity	±	error	^{14}C dpm/m^{2} activity	±	error
1	1st Vial Bkgnd	0	±	0	0	±	0
2	Initial bucket blank	-4	±	8	30	±	13
	<u>Main deck (Figure 1)</u>						
3	Deck inside stateroom #3 (Chief Engineer quarters)	-321	±	22	***4250**	±	**86**
4	Deck inside stateroom #5 (Chief Scientist quarters)	-282	±	22	***3266**	±	**75**
5	Deck inside head shared by staterooms #3 and# 5	-27	±	150	***290**	±	**16774**
15	Deck of Mess between TV and dinner table	-1002	±	69	***5510**	±	**101**
	<u>Upper Deck (Figure 1)</u>						
6	Deck of wheelhouse starboard of Captain's chair	-4	±	4	72	±	1026
7	Deck at top of stairs to wheelhouse	-158	±	16	***2090**	±	**61**
	<u>Hull deck (Figure 2)</u>						
8	Deck in center of stateroom #2	-816	±	38	***9240**	±	**127**
9	Deck in center of laundry room by stairs	-494	±	32	***5065**	±	**94**
10	Deck in center of stateroom #4	-764	±	32	****10609**	±	**136**
11	Deck inside head	-203	±	14	***3630**	±	**79**
16	Deck at base of stairs in Electronics Shop	-95	±	11	***1369**	±	**50**
	<u>Main Lab (Figure 1)</u>						
12	Starboard computer benchtop	-37	±	12	***314**	±	**26**
13	Deck between starboard bench and center bench	-3522	±	148	****15304**	±	**170**
14	Deck between port bench and center bench	-318	±	22	***4198**	±	**86**
	<u>Wet Lab (Figure 1)</u>						
17	Deck between entrances	-13168	±	268	*****63327**	±	**342**
18	Deck in front of forward sink	-70701	±	575	*****381541**	±	**839**
	<u>Outside Main Deck (Figure 1)</u>						
19	Starboard deck forward of wooden aft deck	-16	±	4	***389**	±	**28**
20	Port deck, midship	14	±	17	***12**	±	**11**
21	Forward deck, center	-15	±	22	***66**	±	**15**
22	Final bucket blank	-5	±	0	-4	±	0

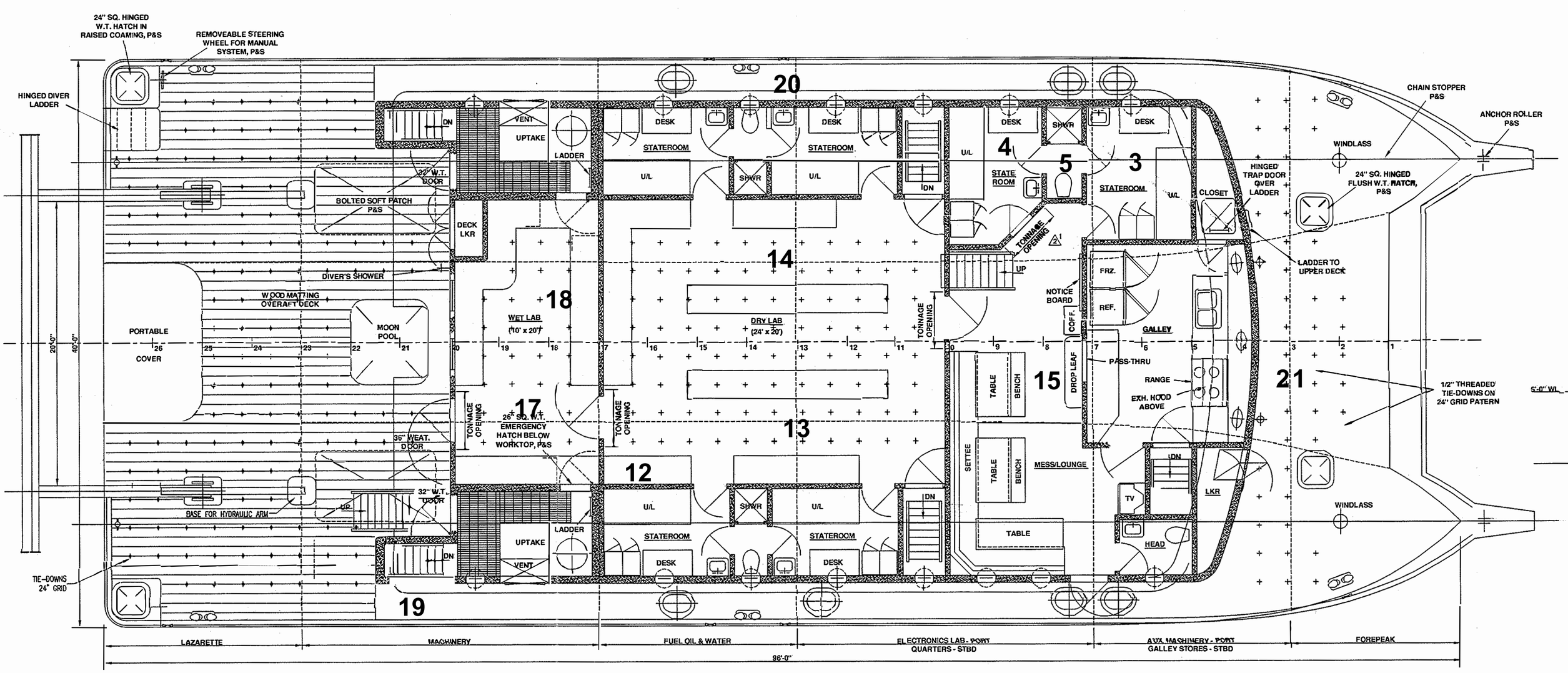
Comments

Please note that the error reported for each isotope is the two-standard deviation counting error. Reports may now contain values less than zero. 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. Please note that we are now using a Quantulus 6220 LSC which counts very near natural background. While the cleanup standards have not changed all values above background will now be in bold. This SWAB was conducted after the Walton Smith has undergone a second cleaning. This time in addition to countoff, a dilute solution of HCL was also used. If the contamination had been ^{14}C rather than ^{35}S, the HCL should have helped tremendously. While it may have helped in some areas the deck of the main lab and especially the wet lab were still very contaminated. Additional areas not tested in SWAB 1082 and 1083 were also tested. Some of these deck areas also had count rates well above background. Since HCl cleaning did not help much this is more evidence that ^{35}S rather than ^{14}C is the cause of this contamination. We will recount the samples from SWAB 1082 in June 2024, one half-life of ^{35}S, to help identify the contamination. We are unsure why extensive cleaning with count-off has not removed the contamination that we are observing.

Figure 1
SWAB #1084
18 March 2024

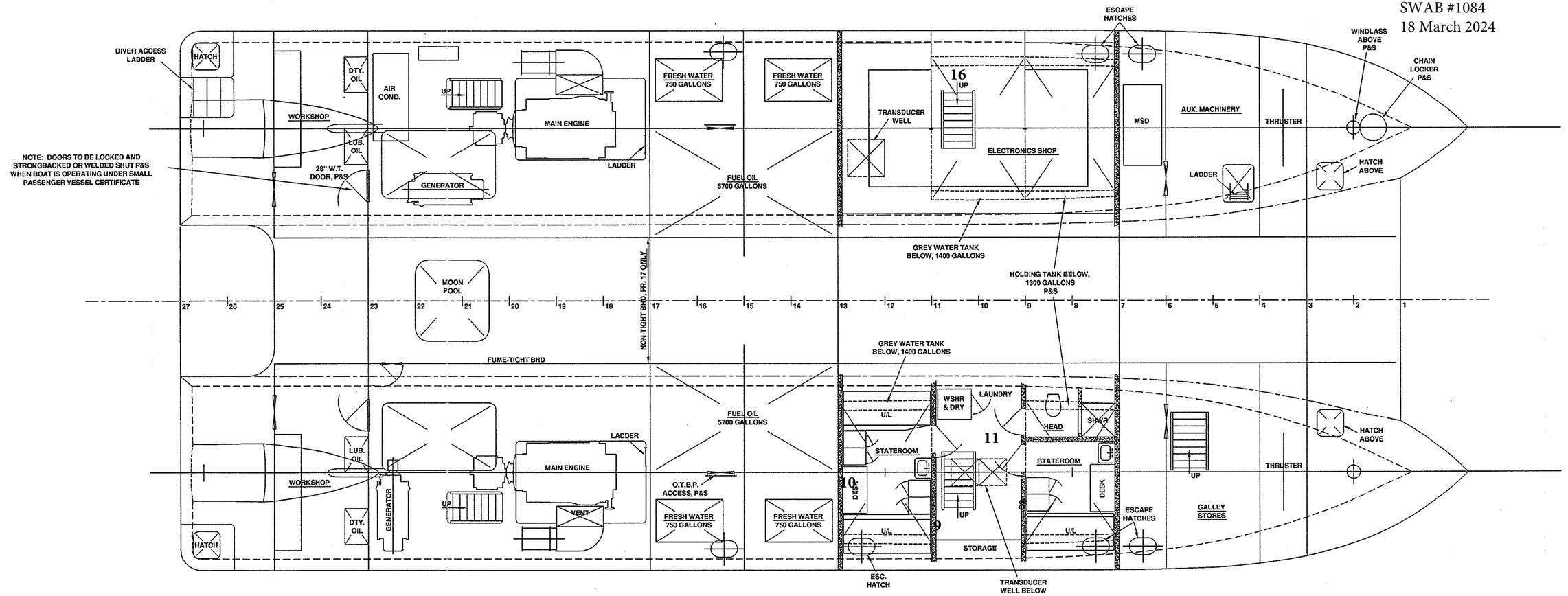


UPPER DECK PLAN



MAIN DECK PLAN

Figure 2
SWAB #1084
18 March 2024



HULL PLAN