NATIONAL SCIENCE FOUNDATION SHIP INSPECTION PROGRAM

2017 RVTEC MEETING

Ted Colburn

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Recently Completed

- RV Atlantic Explorer
- RV Sproul
- RV Pelican
- RV Barnes
- RV KOK
- USCGC Healy
- RV Atlantis
- RV Langseth
- RV Falkor
- ARSV Gould
- RV Sharp

Upcoming Inspections

- RV Revelle
- RV Kilo Moana
- RV Thompson
- RV Walton Smith
- RVIB Palmer
- RV Savannah
- RV Blue Heron
- RV Endeavor
- RV Oceanus
- RV Armstrong
- RV Sikuliaq

Observations & Areas for Improvement:

- Effective safety briefs
- Realistic drills
- Lithium Battery policies and procedures
- Signage and Control Labeling
- ADA
- Use of Environmentally Acceptable Lubricants and Fluids.
- Overboard Handling Systems
- Appendix A
- Other Observations around the fleet

Safety and Orientation Briefs

More than just a preunderway safety brief is needed!

- Welcome aboard
- Safety Brief
  - Pre underway is best
- Shipboard policies
  - Sexual harassment, drug & alcohol, environmental, etc.
- General safety training information
  - RVOC Safety Training Manual & video
- Ship specific safety items
  - Use ship photos, PowerPoint or videos
- Reinforce in the Cruise Planning Manual, ship's web site, pre-boarding course, in labs and in staterooms

Realistic Drills

NTSB
SAFETY ALERT
National Transportation Safety Board

Mariners: Improve Your Chances of Survival When Abandoning Ship

Good preparation and proper use of safety equipment is key

The problem

The NTSB recently investigated an accident that required the crew to abandon a weather-damaged liftboat in near-hurricane-force conditions.[1] Several problems leading up to and during the vessel abandonment negatively impacted the 10 crewmembers' probability of survival once they were in the water, and four of them died as a result:

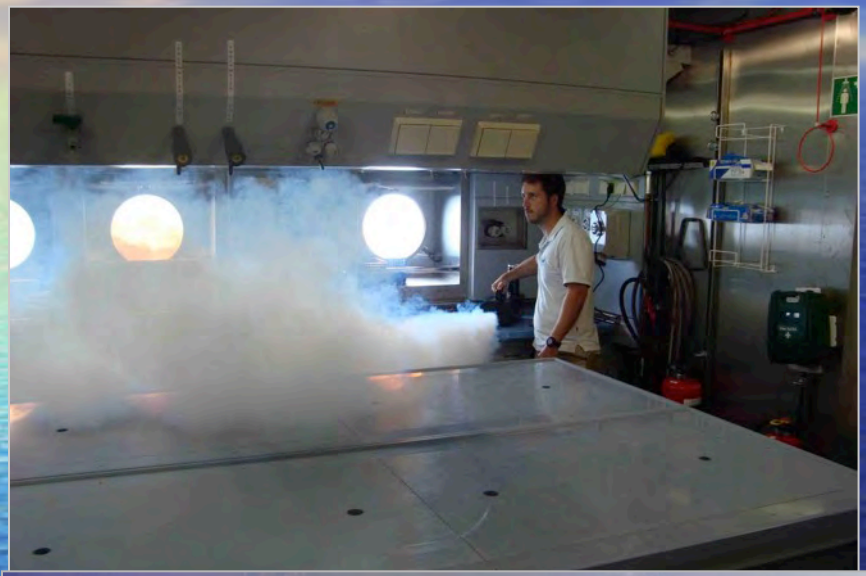
- The company hurricane plan did not account for rapidly and locally developing low pressure weather systems. This reduced the crewmembers' ability to properly plan for the developing storm and to make an early decision to leave the vessel through routine means before the onset of the storm.
- The vessel had recently been equipped with two new inflatable throw-over-type liferafts. However, the liferafts were inflated on deck instead of in the water when the crew prepared to abandon the vessel. This led to the liferafts blowing away from the vessel and vanishing in the high winds and seas. The crewmembers ended up clinging to a lifefloat, which, unlike the liferafts, did not provide out-of-water flotation, shelter from the elements, and nonperishable food and drinking water.
- Although the crewmembers had gathered additional food, drinking water, and other supplies while preparing to evacuate, they failed to take these with them.
- The vessel was equipped with an emergency position indicating radio beacon (EPIRB), which if activated would have quickly alerted authorities and narrowed the search area. However, the crewmembers did not take the EPIRB with them when they abandoned the vessel. As a result, they spent 3 days in the water before search and rescue assets were able to locate them.

[1] *Personnel Abandonment of Weather-Damaged US Liftboat* Trinity II, *with Loss of Life, Bay of Campeche, Gulf of Mexico, September 8, 2011.* The report is available at www.ntsb.gov, under report number NTSB/MAR-13/01.

What can mariners do?

- **Develop and execute a thorough weather preparedness plan.** Ensure that your plan takes into account surface low pressure systems, nontropical storms, and other weather systems that may form rapidly and locally. (For example, not all hurricanes approach from the east.)
- **Ensure you know how to use safety equipment.** Don't wait until a real emergency to find out whether you know how to properly use lifesaving equipment. Instead, include in your regular weekly or monthly drills a thorough step-by-step assessment of all such equipment, especially liferafts, which can't actually be deployed during drills.
- **Plan before evacuating.** Before an emergency, ensure you know your assigned duties and responsibilities—such as who's bringing what supplies—and ensure the responsible person is aware of the location of those items.
- **Drill as if it is a real emergency.** Conducting realistic drills gets the attention of crewmembers, builds their confidence and proficiency in emergency response procedures, and reinforces a strong safety culture. Review drill performance with crew to identify areas for improvement.
- **Even in coastal waters, plan for the worst.** Despite being close to shore and/or in a normally high-traffic waterway, don't assume that others will be able to come to your immediate aid, especially if your location changes. Be physically and mentally prepared for the possibility of a prolonged exposure situation.
- **Follow your plan.** In emergency situations involving high stress and exhaustion, ensure all aspects are covered by running through step-by-step emergency procedures in accordance with established checklists. Use shoreside support resources to assist you with this.
- **Don't forget the EPIRB.** The EPIRB is a vital piece of equipment that can significantly shorten the time necessary to locate and rescue you. Take it with you! In addition, carry a personal locator beacon (PLB); it is an inexpensive and effective device.
- **Stay together in the water.** Search and rescue personnel will more easily spot a group of people in the water than dispersed swimmers.

Realistic Drills



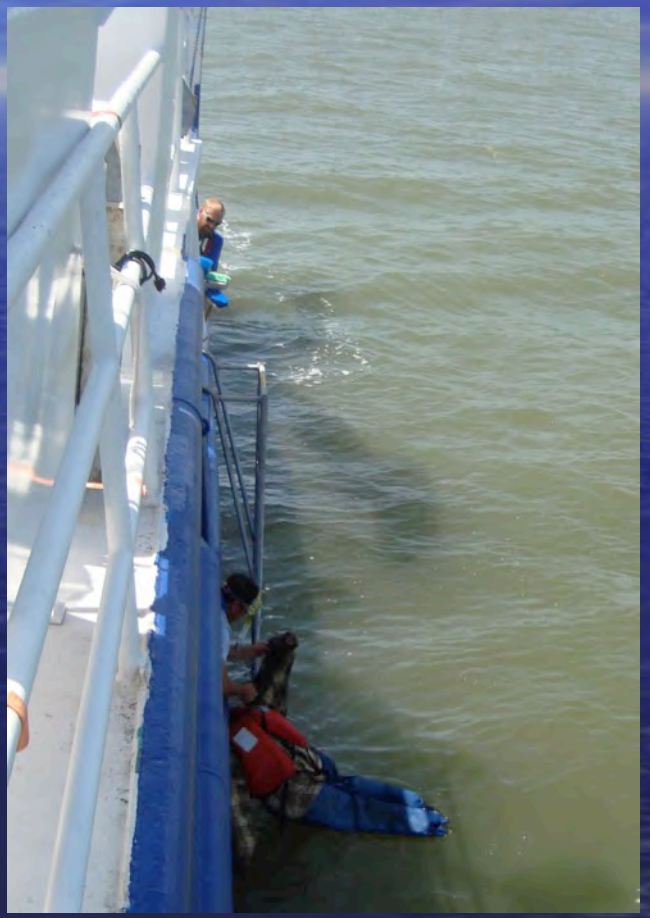
JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Realistic Drills

- Secure Power
- Secure Ventilation
- Close Fume Hood discharge vents
- Etc.

Realistic Drills

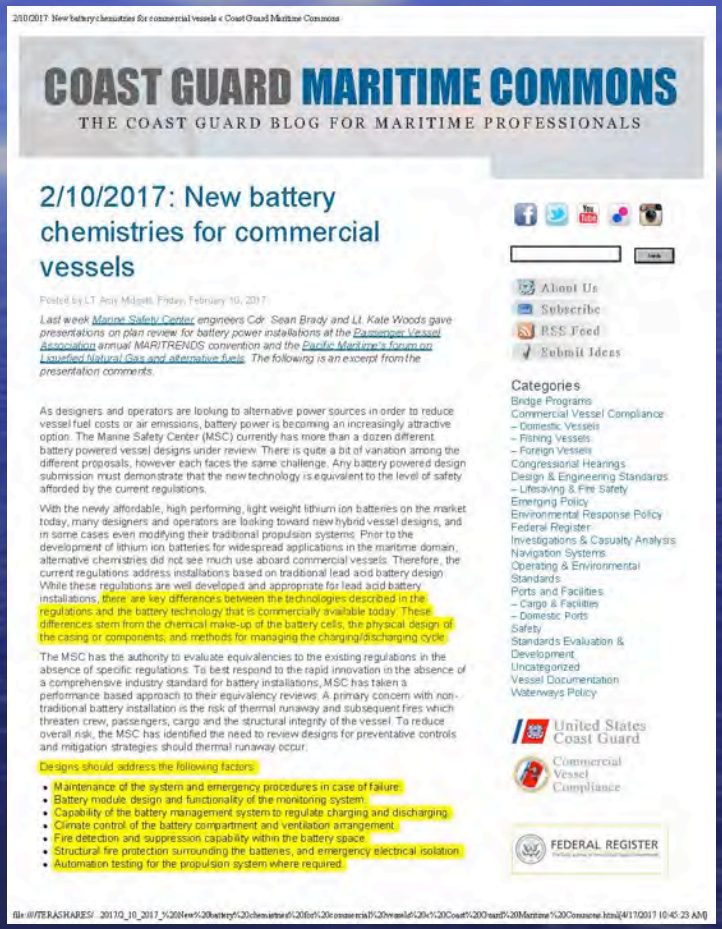


JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Lithium batteries

- Develop policy and procedures.
- The procedures should cover
  - usage
  - storage
  - disposal
  - how to respond to emergencies
- Incorporate into the cruise planning process.



2/10/2017 New battery chemistries for commercial vessels « Coast Guard Maritime Commons

COAST GUARD MARITIME COMMONS

THE COAST GUARD BLOG FOR MARITIME PROFESSIONALS

2/10/2017: New battery chemistries for commercial vessels

Posted by LT Andy Midgett, Friday, February 10, 2017

Last week Marine Safety Center engineers Cdr. Sean Brady and Lt. Kate Woods gave presentations on plan review for battery power installations at the Passenger Vessel Association annual MARTRENDS convention and the Pacific Maritime's forum on Liquefied Natural Gas and alternative fuels. The following is an excerpt from the presentation comments.

As designers and operators are looking to alternative power sources in order to reduce vessel fuel costs or air emissions, battery power is becoming an increasingly attractive option. The Marine Safety Center (MSC) currently has more than a dozen different battery powered vessel designs under review. There is quite a bit of variation among the different proposals, however each faces the same challenge. Any battery powered design submission must demonstrate that the new technology is equivalent to the level of safety afforded by the current regulations.

With the newly affordable, high performing, light weight lithium ion batteries on the market today, many designers and operators are looking toward new hybrid vessel designs, and in some cases even modifying their traditional propulsion systems. Prior to the development of lithium ion batteries for widespread applications in the maritime domain, alternative chemistries did not see much use aboard commercial vessels. Therefore, the current regulations address installations based on traditional lead acid battery design. While these regulations are well developed and appropriate for lead acid battery installations, there are key differences between the technologies described in the regulations and the battery technology that is commercially available today. These differences stem from the chemical make-up of the battery cells, the physical design of the casing or components, and methods for managing the charging/discharging cycle.

The MSC has the authority to evaluate equivalencies to the existing regulations in the absence of specific regulations. To best respond to the rapid innovation in the absence of a comprehensive industry standard for battery installations, MSC has taken a performance based approach to their equivalency reviews. A primary concern with non-traditional battery installation is the risk of thermal runaway and subsequent fires which threaten crew, passengers, cargo and the structural integrity of the vessel. To reduce overall risk, the MSC has identified the need to review designs for preventative controls and mitigation strategies should thermal runaway occur.

Designs should address the following factors:

- Maintenance of the system and emergency procedures in case of failure.
- Battery module design and functionality of the monitoring system.
- Capability of the battery management system to regulate charging and discharging.
- Climate control of the battery compartment and ventilation arrangement.
- Fire detection and suppression capability within the battery space.
- Structural fire protection surrounding the batteries, and emergency electrical isolation.
- Automation testing for the propulsion system where required.

About Us
Subscribe
RSS Feed
Submit Ideas

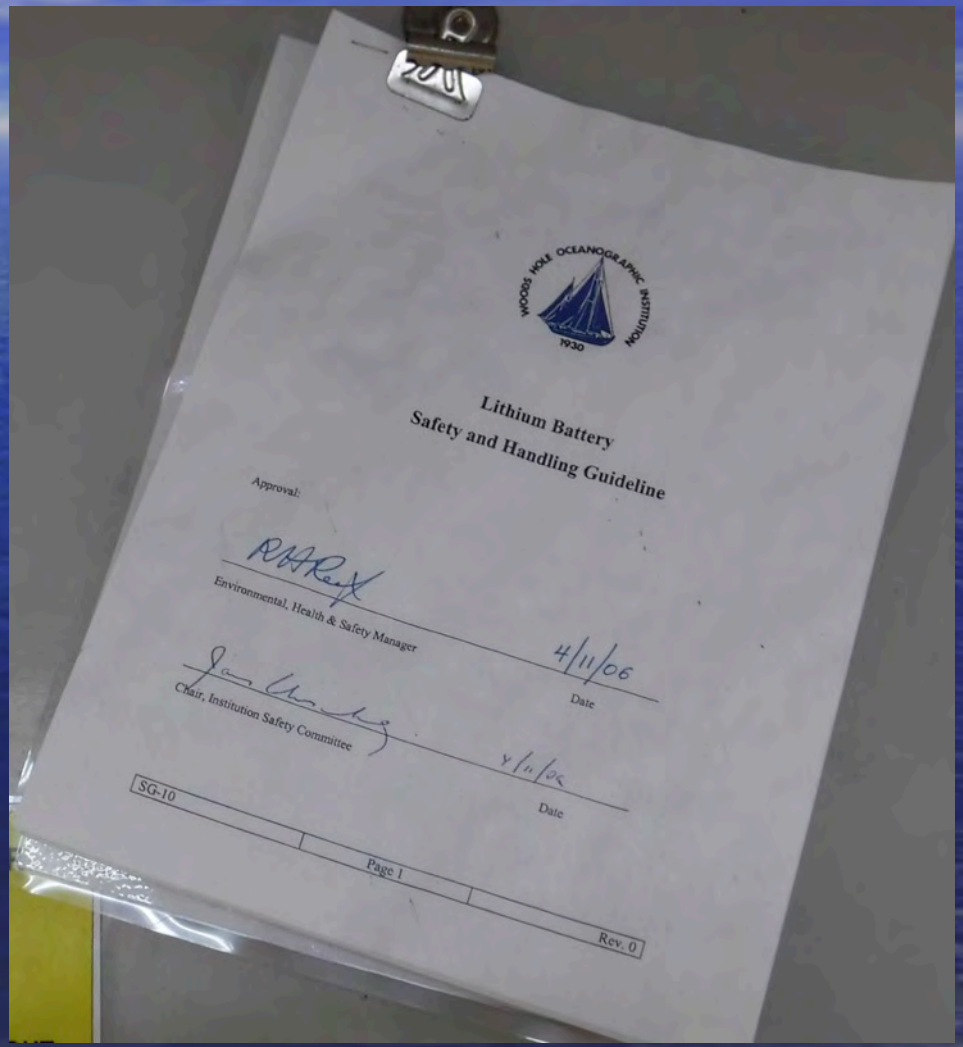
Categories
Bridge Programs
Commercial Vessel Compliance
– Domestic Vessels
– Fishing Vessels
– Foreign Vessels
Congressional Hearings
Design & Engineering Standards
– Lifesaving & Fire Safety
Emerging Policy
Environmental Response Policy
Federal Register
Investigations & Casualty Analysis
Navigation Systems
Operating & Environmental Standards
Ports and Facilities
– Cargo & Facilities
– Domestic Ports
Safety
Standards Evaluation & Development
Uncategorized
Vessel Documentation
Waterways Policy

United States Coast Guard
Commercial Vessel Compliance
FEDERAL REGISTER

file:///TERASHARES/...2017Q_10_2017_%20New%20battery%20chemistries%20for%20commercial%20vessels%20-%20Coast%20Guard%20Maritime%20Commons.html[4/17/2017 10:45:23 AM]

Lithium batteries

- Lithium Battery Safety and Handling Guidelines are posted in the labs.



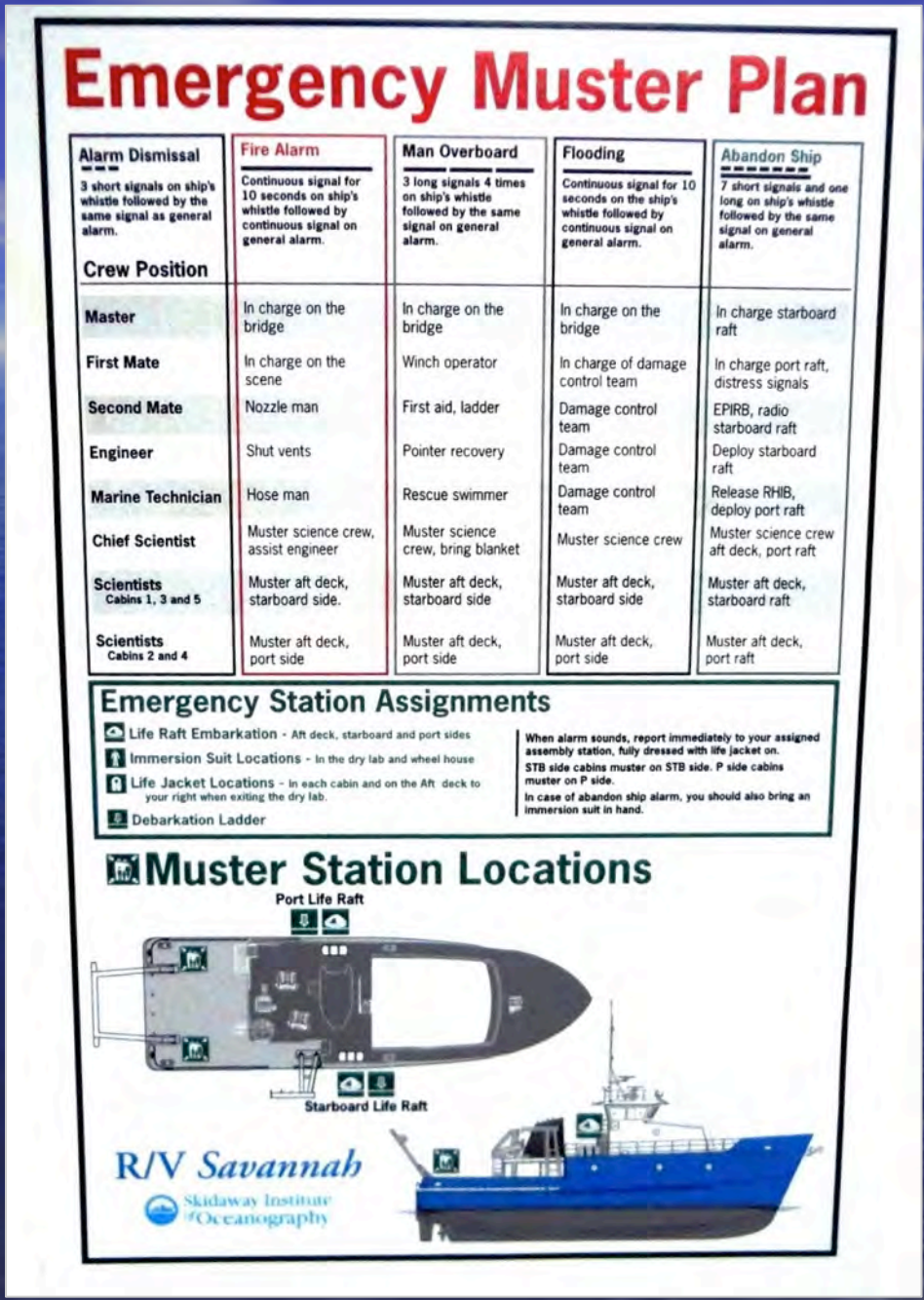
Lithium batteries: Spare & Expended

- Designated Location.
- Lithium batteries will be relocated and placed in a steel locker in the staging bay.

Lithium batteries

Signage & Controls

Muster List



Emergency Muster Plan

Crew Position	Alarm Dismissal 3 short signals on ship's whistle followed by the same signal as general alarm.	Fire Alarm Continuous signal for 10 seconds on ship's whistle followed by continuous signal on general alarm.	Man Overboard 3 long signals 4 times on ship's whistle followed by the same signal on general alarm.	Flooding Continuous signal for 10 seconds on the ship's whistle followed by continuous signal on general alarm.	Abandon Ship 7 short signals and one long on ship's whistle followed by the same signal on general alarm.
Master	In charge on the bridge	In charge on the bridge	In charge on the bridge	In charge starboard raft	
First Mate	In charge on the scene	Winch operator	In charge of damage control team	In charge port raft, distress signals	
Second Mate	Nozzle man	First aid, ladder	Damage control team	EPIRB, radio starboard raft	
Engineer	Shut vents	Pointer recovery	Damage control team	Deploy starboard raft	
Marine Technician	Hose man	Rescue swimmer	Damage control team	Release RHIB, deploy port raft	
Chief Scientist	Muster science crew, assist engineer	Muster science crew, bring blanket	Muster science crew	Muster science crew aft deck, port raft	
Scientists Cabins 1, 3 and 5	Muster aft deck, starboard side.	Muster aft deck, starboard side	Muster aft deck, starboard side	Muster aft deck, starboard raft	
Scientists Cabins 2 and 4	Muster aft deck, port side	Muster aft deck, port side	Muster aft deck, port side	Muster aft deck, port raft	

Emergency Station Assignments

- Life Raft Embarkation - Aft deck, starboard and port sides
- Immersion Suit Locations - In the dry lab and wheel house
- Life Jacket Locations - In each cabin and on the Aft deck to your right when exiting the dry lab.
- Debarkation Ladder

When alarm sounds, report immediately to your assigned assembly station, fully dressed with life jacket on.
STB side cabins muster on STB side. P side cabins muster on P side.
In case of abandon ship alarm, you should also bring an immersion suit in hand.

Muster Station Locations

Port Life Raft

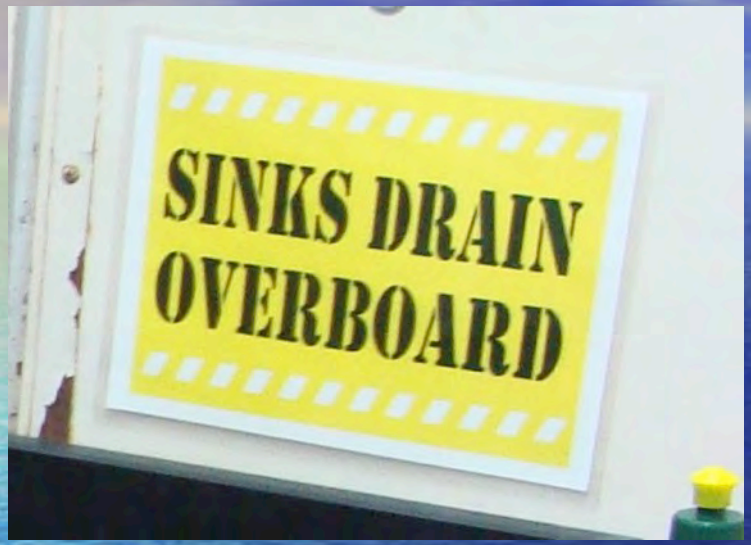
Starboard Life Raft

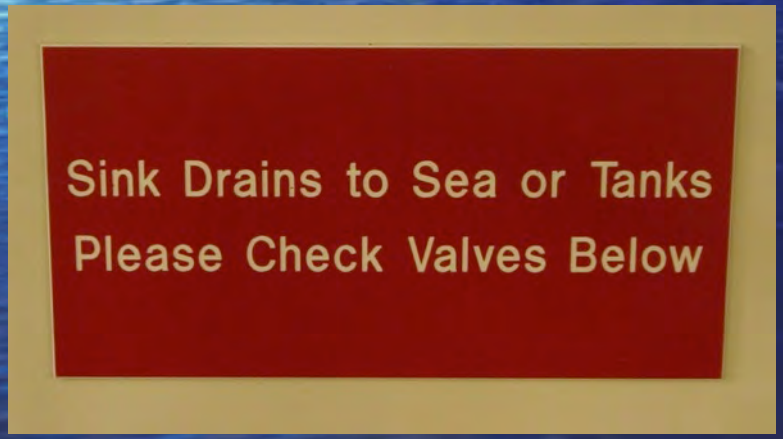
R/V *Savannah*

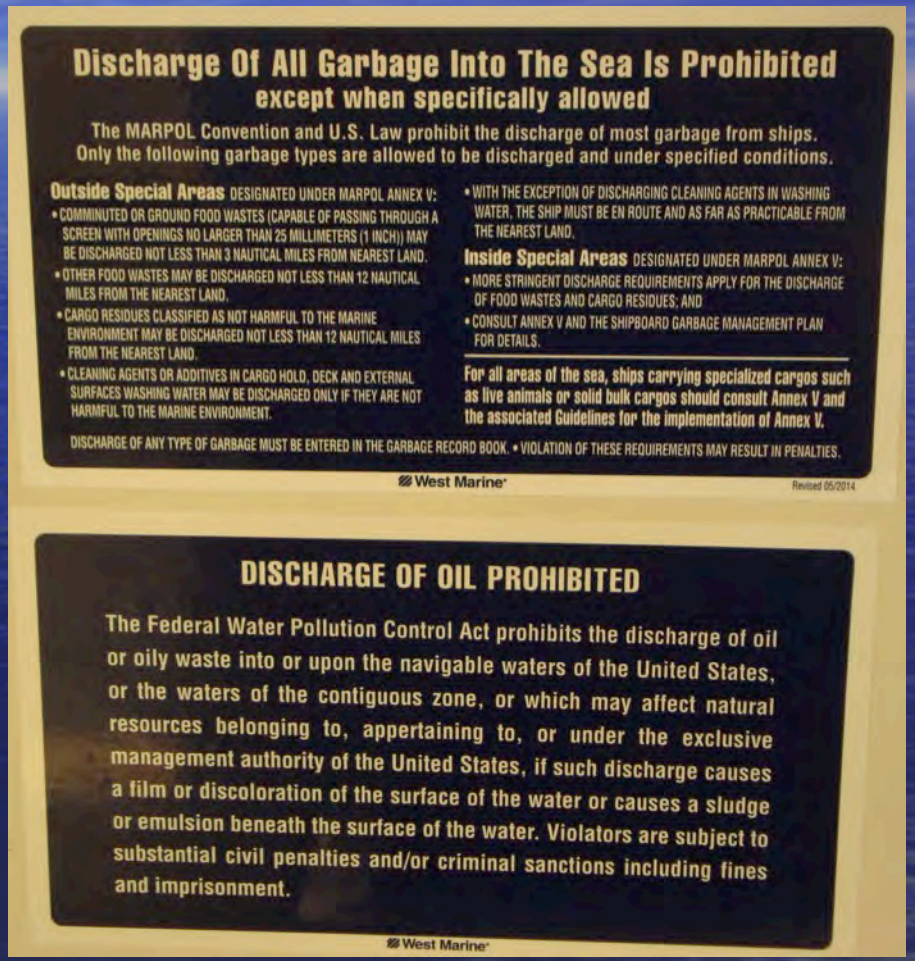
Skidaway Institute of Oceanography

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering







Control Labeling:

Each control and control setting should be labeled.

The label should describe the control function and the result of the control movement in words and/or symbols.

All deck equipment controls should be labeled consistently and be clearly visible by the operator with adequate lighting and a conspicuous format.

Labels

ADA

- In order to be more ADA capable vessels could make improvements in the following areas:
  - Incorporate ADA awareness into the pre-cruise planning process.
  - Improve lighting, handrails, and retro-reflective tape in stairwells and egress routes.
  - Install visual alarms to augment audible alarms.
  - Remove obstacles in the passageways.

ADA

Environmentally Acceptable Lubricants [EAL]

- All vessels (not only new vessels) must use environmentally acceptable lubricants (EALs) in all oil-to-sea interfaces, unless technically not feasible.
- EPA defines EALs as lubricants that are “biodegradable” and “minimally-toxic” and are “not bio-accumulative”.
- Vessels are not required to change to an EAL for above deck equipment, but EPA strongly encourages the use.

Oil-to-Sea Interfaces include:

- Controllable pitch propeller
- Thrusters
- Stern tubes
- Thruster bearings
- Stabilizers
- Rudder bearings (excluding head bearing)
- Azimuth thrusters
- Wire rope
- Mechanical equipment subject to immersion (including dredges and grabs)

Overboard Handling Systems:

UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Prevention Policy

June 20, 2012
Washington, DC

Alert 02-12

OVERLOADED LIFTING GEAR ON FISHING VESSELS

Recently, several catastrophic failures of masts, booms, and lift cables have occurred on purse seine fishing vessels that have resulted in loss of life and severe injuries. Over the years many casualties have occurred onboard all types of fishing vessels attempting to haul in catches that exceeded the capacity of their winches, hoists, and associated equipment. These types of casualties are not unusual. This alert serves to remind all purse seine fishing vessel owners/operators and other fishing segments to ensure safe use of the haul equipment particularly matching the size and the capacity of the nets to the rated size and capacity of the winch/haul/hoist equipment, taking into account safety factors for various species, and other concerns such as the variable platform that a rolling fishing vessel and variable catch presents.

Owners / operators, and vessel *Insurers* must ensure that vessel winch, haul and hoist systems are not modified by crew members to increase the lifting capacity beyond the rated design which in some cases can be done very easily. Such boosting of hydraulic systems must be prohibited and certain components should be protected with special seals. The machinery should be properly maintained and records kept in a historical log. It is imperative that owners / operators ensure every load bearing structure and its associated components are maintained in original condition, that they will be operated as designed using all appropriate safety margins for anticipated working conditions. All such equipment will experience fatigue over time and as result must be inspected and monitored routinely. Bearings, limit switches, brakes, safety devices, sheaves, cables and other components, should be routinely inspected by certified organizations.

Overloaded Lifting Gear:
Several catastrophic failures of masts, booms, and lift cables have occurred on vessels that have resulted in loss of life and severe injuries.

The Coast Guard strongly recommends:

- **Know the design limits of load bearing structures and winches, hoist, and haul components;**
- **Ensure they are inspected and tested on a regular basis;**
- **Evaluate and revise operational procedures as needed.**

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

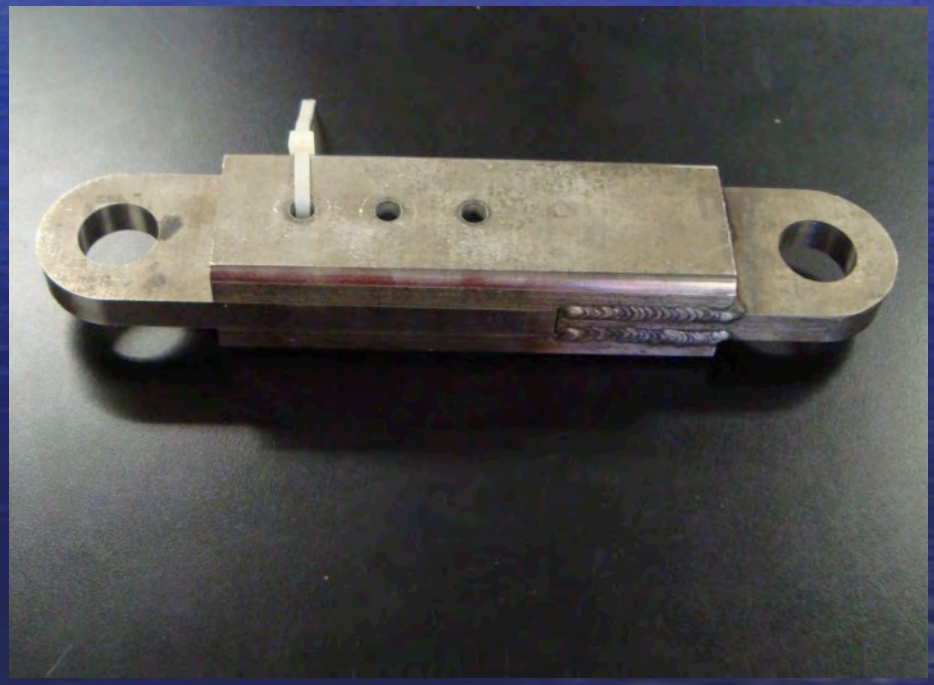
Overboard Handling Systems:

The BIG picture still applies:

The Overboard Handling System (OHS) should be designed to withstand and operate in excess of the breaking strength of the strongest section of tension member to be used in any condition of loading with an appropriate factor of safety.

Note that 46 CFR 189.35 does not specifically allow for weak links or render capability.

Weak Links:
Walton Smith & Palmer (SIO Style)



JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Independent Two-block safety devices are important

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

RVSS Appendix A Compliance:

Appendix A compliance appears to be coming along well.

- Almost all vessels are in compliance at a safety factor of 5.0.
- However, a factor of safety of 5.0 does not meet mission requirements for many vessels, particularly if the calculation method in the Appendix is used.
- Some of the vessels are limited to a factor of safety of 5.0 by sheave diameters and grooving. Also limited by roller diameters.

RVSS Appendix A:

Relation to the Wire Pool Maintenance Policy

These 2 items are evaluated during the inspections, but are not considered in the criteria for compliance. Identified as referenced in the Wire Pool Wire Maintenance Policy.

- **Lubricate tension member <12 months (A.5.8)**

  Lubricants must comply with EPA

- **Fresh Water Wash (lesser of: end of cruise or < 1 month) (A. 5.9)**

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

RVSS Appendix A Compliance:

Appendix A Assist Summary for Each Wire or Cable

Appendix A Assist Summary for Each Wire or Cable (updated 8_25_2015 JMS/wec)

Note: This is not all inclusive. See Appendix A RVSS Edition 10 for requirements.

Requirement or Attribute	Select Applicable Column FS: FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99	FS= ___	Comments
Post Cable/Wire SWL in clear view of the winch operator (RVSS 8.6)	Applies	Applies	Applies	Applies	Y/N	
General						
Determine Cable/Wire Safe Working Load (SWL) as: Assigned Breaking Load / Factor of Safety	Applies	Applies	Applies	Applies	Y/N	
Lubricate tension member <12 months (A.5.8)					Y/N	
Fresh Water Wash (lesser of: end of cruise or < 1 month) (A.5.9)					Y/N	
Develop Extenuating Circumstance Procedure (A.8.4)	Applies	Applies	Applies	Applies	Y/N	
Tension Monitoring						
Have ability to keep load < SWL: May be calculated w/"g" factor at least 0.75 or from Tensiometer	Applies				Y/N	
Have ability to keep load < SWL: Actual from monitoring system		Applies	Applies	Applies	Y/N	
Tensionometer display at operator's station with 3 Hz refresh rate		Applies			Y/N	
Tensionometer display at operator's station with 10 Hz refresh rate			Applies	Applies	Y/N	
Tension continuously monitored using a tension trending graph			Applies	Applies	Y/N	
Tensionometer logging at 3 Hz		Applies			Y/N	
Tensionometer logging at 20 Hz			Applies	Applies	Y/N	
Tensionometer Recalibration at least every 6 mo.		Applies	Applies	Applies	Y/N	
Tension measuring system maintained with 4% accuracy		Applies			Y/N	
Tension measuring system maintained with 3% accuracy			Applies	Applies	Y/N	
Alarms						
Audible and visual tension alarms w/data logging Alarm at < ABL/2.8		Applies			Y/N	
Audible and visual tension alarms w/data logging Alarm at <ABL/2.2			Applies		Y/N	
Audible and visual tension alarms w/data logging Alarm at <ABL/1.7				Applies	Y/N	
Alarm conditions automatically logged		Applies	Applies	Applies	Y/N	
Sheaves and Fairlead Rollers						
Sheaves & Rollers: As large as practical	Applies				Y/N	
Sheaves & Rollers: D/d ratio meet 40:1 or 400d1 whichever is greater		Applies	Applies	Applies	Y/N	
Sheaves: Groves as close to d as possible and no more than 1.5d		Applies			Y/N	
Sheaves: Groves per Ref A 1.1 (Groove size relative to nominal diameter of wire rope: 3/16" to 1/4" 3% to 6%; over 1/4" 2.5% to 5%)			Applies	Applies	Y/N	
Deck Safety						
Good safety practices	Applies				Y/N	
Establish danger zones / safety zones		Applies	Applies	Applies	Y/N	
Warning notices posted			Applies	Applies	Y/N	
Physical or visual barriers			Applies	Applies	Y/N	
Doors and accesses secured			Applies	Applies	Y/N	
Testing						
Tension testing up to SWL load every 2 years. Break testing not req'd at FS=5.0	Applies				Y/N	
Break Testing every 2 yrs		Applies			Y/N	
Break Testing every yr if 10% decrease in ABL or cutback		Applies			Y/N	
Break Testing every yrs			Applies	Applies	Y/N	
Break Testing every 6 mo. if 10% decrease in ABL or cutback			Applies	Applies	Y/N	
Logbooks: UNOLS wire identifier: Cable Inventory/History and Running Use						
Logs stay with the wires transfer with the wire	Applies	Applies	Applies	Applies	Y/N	
Log of Tension Testing to SWL	Applies				Y/N	
Log of wire Break Testing		Applies	Applies	Applies	Y/N	
Log Cutbacks	Applies	Applies	Applies	Applies	Y/N	
Log Spooling Operations	Applies	Applies	Applies	Applies	Y/N	
Log of Lubrication	Applies	Applies	Applies	Applies	Y/N	
Wire Train Description	Applies	Applies	Applies	Applies	Y/N	
Maximimum load and payout for each cast by calculation or monitoring.	Applies	Applies	Applies	Applies	Y/N	
Winch Operator						
Operator deemed competant in writing by master and owner	Applies				Y/N	
Operator "Certified Competent" in writing by master and owner renewed annually.		Applies	Applies	Applies	Y/N	
Master verify qualifications and designate approved operators.		Applies	Applies	Applies	Y/N	
Training record for formal operator training program for winch, handling apparatus, and monitoring system.		Applies	Applies	Applies	Y/N	

Suggestions: Please contact Ted@JMSnet.com

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

RVSS Appendix A Compliance:

Appendix A Assist Summary for Each Wire or Cable

- Self Assessment Completed

2016-09-22 R/V Sally Ride Appendix A Assist Sheet--Markey DETW-9-11 --> A-Frame, 9/16 3X19 Wire Rope						
	Select Applicable Column FS					
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99	Y/N	Comments
Post Cable/Wire SWL in clear view of the winch operator (good practice)	Applies	Applies	Applies	Applies	Y	
General						
Determine Cable/Wire Safe Working Load (SWL) as: Assigned Breaking Load / Factor of Safety	Applies	Applies	Applies	Applies	Y	ABL = 32,500 lb as of 9/20/16 FS = 2.5 ==> SWL = 13,000 lb
Lubricate tension member ≤ 12 months (A.5.8, Wirepool Policy)					Y	NSF-12-T44 lubricated 7/2016
Fresh water wash (lesser of: post cruise or monthly) (Wirepool Policy)					Y	Last done?
Extenuating Circumstance procedure (A.8.4)					Y	SMM 60,62,210
Tension Monitoring						
Have ability to keep load < SWL: May be calculated w/"g" factor at least 1.75 or from Tensiometer	Applies				N/A	
Have ability to keep load < SWL: Actual from monitoring system		Applies	Applies	Applies	Y	A functional LCI 90i Tensiometer @ the operator's station
Tensionometer display at operator's station with 3 Hz resolution		Applies			Y	Display refresh rate is 20Hz at the operator's station
Tensionometer display at operator's station with 10 Hz resolution			Applies	Applies	N/A	
Tension continuously monitored using a tension trending graph			Applies	Applies	N/A	
Tensionometer logging at 3 Hz		Applies			N	Logging data at no less than 20 hz.
Tensionometer logging at 20 Hz			Applies	Applies	Y	
Tensionometer Recalibration at least every 6 mo.		Applies	Applies	Applies	Y	Last done?
Tension measuring system maintained with 4% accuracy		Applies			Y	SMM Policy 965
Tension measuring system maintained with 3% accuracy			Applies	Applies	N/A	
Alarms						
Audible and visual tension alarms w/data logging Alarm at < ABL/2.8		Applies			Y	Audible and visual alarms should be set to sound before ABL/2.8 = 35,000/2.8 = 12,500 lb when 9/16" 3X19 is installed.
Audible and visual tension alarms w/data logging Alarm at <ABL/2.2			Applies		N/A	
Audible and visual tension alarms w/data logging Alarm at <ABL/1.7				Applies	N/A	
Alarm conditions automatically logged		Applies	Applies	Applies	Y	
Sheaves and Fairlead Rollers						
Sheaves & Rollers: As large as practical	Applies				N/A	
Sheaves & Rollers: D/d ratio meet 40:1 or 400d1 whichever is greater		Applies	Applies	Applies	Y	40d = 22.5", 400d1 = 27.2" Flagging Block: Ø48" Overboarding block (34-N): Ø30"
Sheaves: Groves as close to d as possible and no more than 1.5d		Applies			Y	d = 0.563", 1.5d = 0.844" Flagging Block: Ø.715" Overboarding block (34-N): Ø.590"
Sheaves: Groves per Ref A 1.1 (Groove size relative to nominal diameter of wire rope: 3/16" to 1/4" 3% to 6%; over 1/4" 2.5% to 5%)			Applies	Applies	N/A	1.025d = 0.577", 1.05d = 0.591" Flagging Block: Ø.715" Overboarding block (34-N): Ø.590"
Deck Safety						
Good safety practices	Applies				N/A	
Establish danger zones / safety zones		Applies	Applies	Applies	Y	
Warning notices posted			Applies	Applies	N/A	
Physical or visual barriers			Applies	Applies	N/A	
Doors and accesses secured			Applies	Applies	N/A	
Testing						
Tension testing up to SWL load every 2 years. (Break testing not req'd at FS=5.0)	Applies				N/A	
Break Testing every 2 yrs		Applies			Y	Last break test 5/5/2014
Break Testing every yr if 10% decrease in ABL, or cutback		Applies			N/A	We cut back and re-test when required.
Break Testing every yrs			Applies	Applies	N/A	
Break Testing every 6 mo. if 10% decrease in ABL, or cutback			Applies	Applies	N/A	
Logbooks: UNOLS wire identifier: Cable Inventory/History and Running Use						
Logs stay with the wires transfer with the wire	Applies	Applies	Applies	Applies	Y	
Log of Tension Testing to SWL	Applies				N/A	
Log of wire Break Testing		Applies	Applies	Applies	Y	
Log Cutbacks	Applies	Applies	Applies	Applies	Y	"Activity" Log
Log Spooling Operations	Applies	Applies	Applies	Applies	Y	
Log of Lubrication	Applies	Applies	Applies	Applies	Y	
Wire Train Description	Applies	Applies	Applies	Applies	Y	
Maximimum load for each cast by calculation or monitoring.	Applies	Applies	Applies	Applies	Y	"Use" Log
Winch Operator						
Operator deemed competent in writing by master and owner	Applies				N/A	SMM 950, 960, 963
Operator "Certified Competent" in writing by master and owner renewed annually.		Applies	Applies	Applies	Y	SMM 950, 960, 963
Master verify qualifications and designate approved operators.		Applies	Applies	Applies	Y	SMM 950, 960, 963
Training record for formal operator training program for winch, handling apparatus, and monitoring system.		Applies	Applies	Applies	Y	SMM 950, 960, 963

JMS NAVAL ARCHITECTS

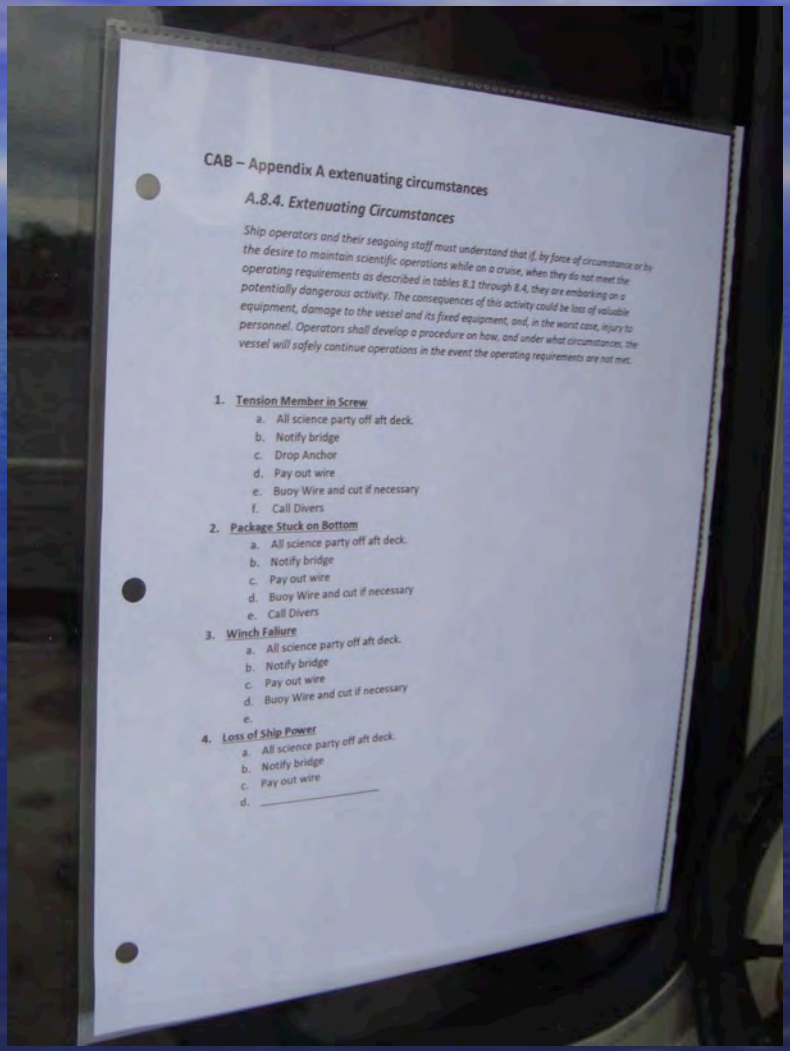
Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Appendix A
Extenuating Circumstance Procedures

- Operators shall develop a procedure on how, and under what circumstances, the vessel will safely continue operations in the event the operating requirements are not met .
- RV BARNES drafted 4 emergency scenarios while overboarding science gear including: tension member in propeller, package stuck on the bottom, winch failure, and loss of ship's power.
- RV SIKULIAQ drafted winch/overboard handling system electronic control failure (getting the gear aboard).

RVSS Appendix A:

Extenuating Circumstance Procedure posted



CAB – Appendix A extenuating circumstances

A.8.4. Extenuating Circumstances

Ship operators and their seagoing staff must understand that if, by force of circumstance or by the desire to maintain scientific operations while on a cruise, when they do not meet the operating requirements as described in tables 8.1 through 8.4, they are embarking on a potentially dangerous activity. The consequences of this activity could be loss of valuable equipment, damage to the vessel and its fixed equipment, and, in the worst case, injury to personnel. Operators shall develop a procedure on how, and under what circumstances, the vessel will safely continue operations in the event the operating requirements are not met.

1. Tension Member in Screw
   a. All science party off aft deck.
   b. Notify bridge
   c. Drop Anchor
   d. Pay out wire
   e. Buoy Wire and cut if necessary
   f. Call Divers
2. Package Stuck on Bottom
   a. All science party off aft deck.
   b. Notify bridge
   c. Pay out wire
   d. Buoy Wire and cut if necessary
   e. Call Divers
3. Winch Faliure
   a. All science party off aft deck.
   b. Notify bridge
   c. Pay out wire
   d. Buoy Wire and cut if necessary
   e.
4. Loss of Ship Power
   a. All science party off aft deck.
   b. Notify bridge
   c. Pay out wire
   d. _____

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

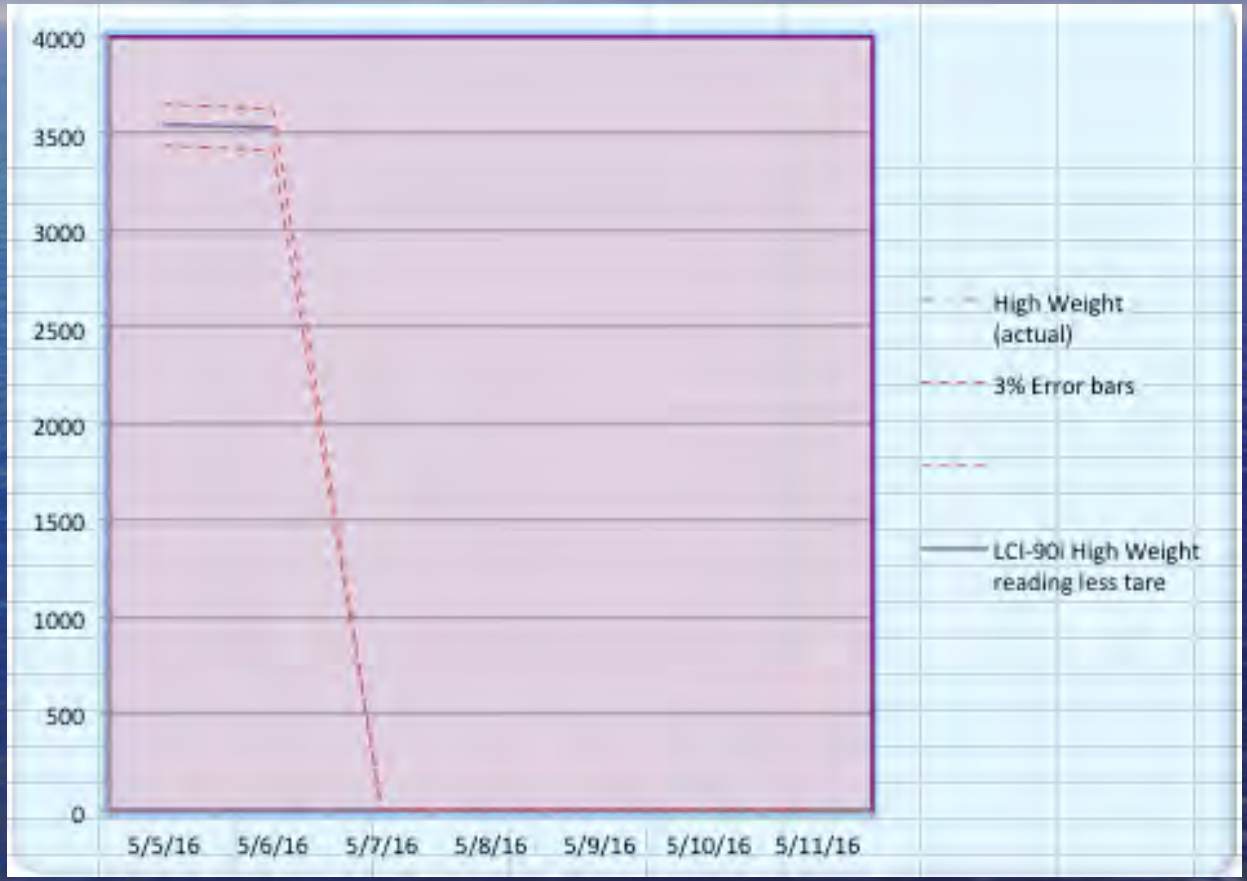
Maintaining Accuracy

.	Select Applicable Column FS			
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99
Tension Monitoring				
Tension measuring system maintained with 4% accuracy		Applies		
Tension measuring system maintained with 3% accuracy			Applies	Applies

One common weak area is the concept of "maintaining" calibrations within 4% or 3% depending on the factor of safety selected.

Equipment Requirements: Tension Monitoring

Is the monitoring system staying within tolerance limits?



RVSS Appendix A: Per Cast Data

- Log maximum payout and load for each cast by calculation or monitoring.
- It's also worth recording the payout where the maximum load occurred. If referenced from drum end, the location won't change with cut backs.

Wire Deployment Log: RV Sikuliaq

Cruise ID	Cast ID	Duration (HH:MM)	Max Wire Out (m)	Max LineSpeed (m/min)	Max Tension (lbs)	Time (@ max tension)	WireOut (@ max tension)	Events
SKQ201401S	1	2:23	1,011.1	51.0	1,802.9	11/27/14 23:43	-4.9	CTD
SKQ201401S	2	2:00	1,000.9	51.0	1,843.0	12/1/14 19:18	-9.5	CTD
SKQ201401S	3	1:30	1,000.0	54.2	1,642.6	12/2/14 13:44	-9.8	CTD
SKQ201401S	4	0:50	252.6	58.1	1,602.6	12/2/14 15:48	217.2	CTD
SKQ201401S	5	0:55	293.0	61.2	2,003.2	12/3/14 23:07	-4.6	CTD
SKQ201401S	6	1:45	1,385.2	51.0	2,003.2	12/4/14 1:28	-6.5	CTD
SKQ201401S	7	1:20	1,489.9	60.9	1,682.7	12/4/14 2:34	-11.0	CTD
SKQ201401S	8	1:42	1,232.3	60.9	2,003.2	12/6/14 7:03	-5.5	CTD
SKQ201401S	9	2:29	1,477.0	61.6	2,003.2	12/9/14 8:18	-6.1	CTD & wire wash

Common Findings: Sheave and Fairlead Roller Diameter

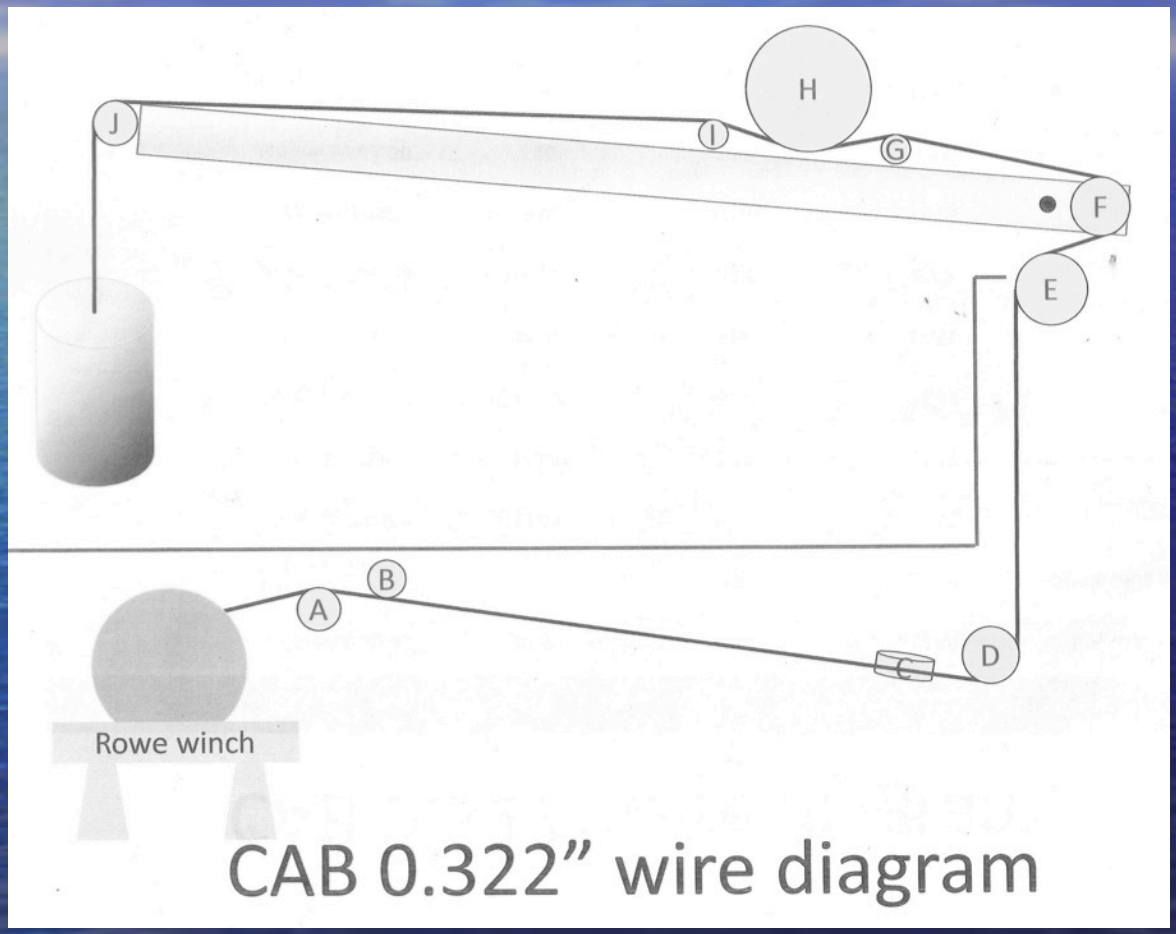
Most Older Levelwinds limit FS to 5.0

	Select Applicable Column FS			
Requirement or Attribute	FS of 5.0 or higher	FS from 2.5 to 4.99	FS from 2.0 to 2.49	FS from 1.5 to 1.99
Sheaves and Fairlead Rollers				
Sheaves & Rollers: As large as practical	Applies			
Sheaves & Rollers: D/d ratio meet 40:1 or 400d1 whichever is greater		Applies	Applies	Applies
Sheaves: Groves as close to d as possible and no more than 1.5d		Applies		
Sheaves: Groves per Ref A 1.1 (Groove size relative to nominal diameter of wire rope: 3/16" to 1/4" 3% to 6%; over 1/4" 2.5% to 5%)			Applies	Applies

Common Findings: Sheave and Fairlead Roller Diameter

Large rollers installed on RV OCEANUS

Wire Train Description: RV Barnes



CAB 0.322" wire diagram

Wire Train Description: RV Barnes

CAB 0.322” wire diagram

sheave	function & angle change	D (cm)	D (in)	D/d	grooving
A	level wind, 20-30°	10.50	4.14	12.84	slightly wide groove
B	tension switch, 0° (small force)	9.23	3.63	11.29	slightly wide groove
C	turning, 20-30°	14.01	5.51	17.12	wide groove
D	turning, 90°	14.01	5.51	17.12	wide groove
E	turning, 45-100°	17.67	6.96	21.60	
F	turning, 135°	14.32	5.64	17.51	
G	tension guide, 30°	7.16	2.82	8.76	
H	metering, 60°	30.88	12.16	37.75	
I	tension guide, 30°	7.16	2.82	8.76	
J	Berger Engineering fairlead, 90°+ (ovbd)	10.98	4.32	13.43	

Observations around the fleet: Chemical Storage: Atlantis

Observations around the fleet: Chemical Storage: Pelican

Observations around the fleet: Emergency Shower Flow Rate

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet: Emergency Shower Flow Rate

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet:
Scientific Systems Operator's Manual

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet: FST: Sharp

Observations around the fleet: SawStop: Palmer

Observations around the fleet: Open Van's 2nd Egress Periodically

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet: Tag Out

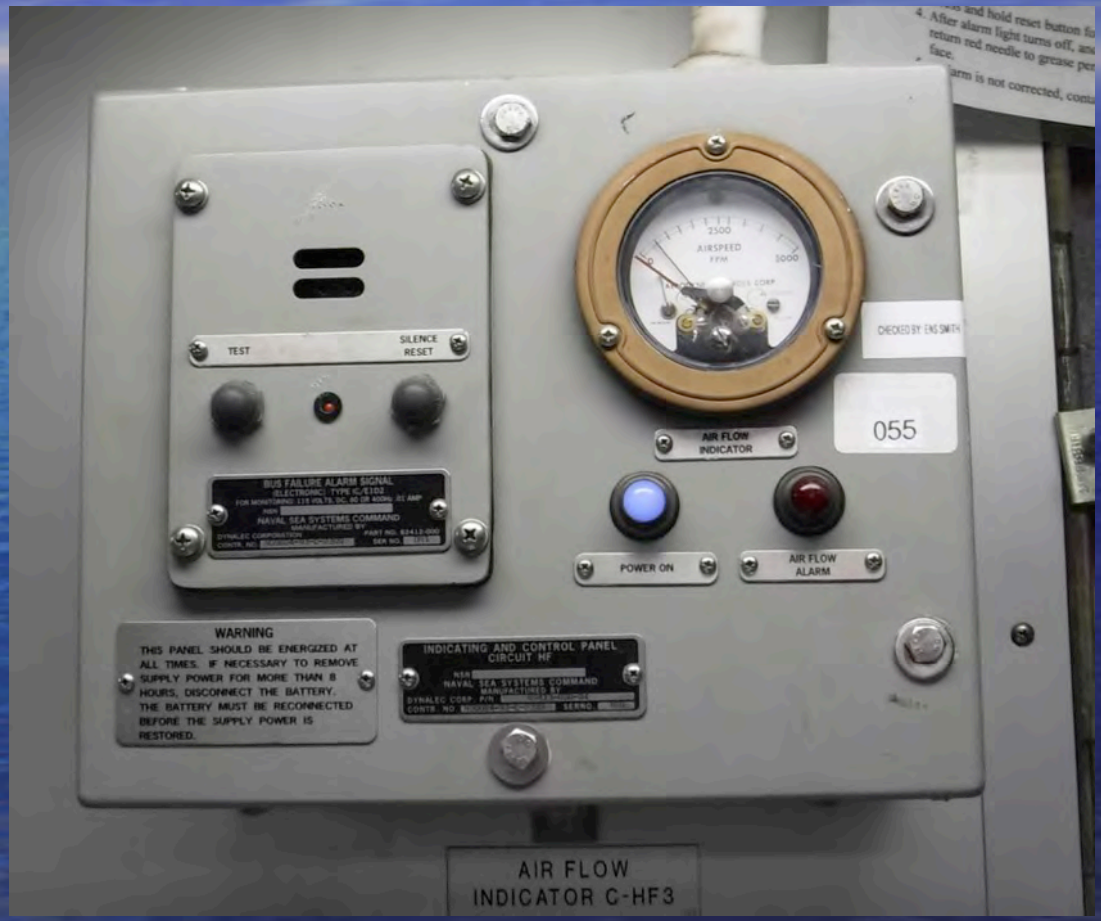
Observations around the fleet: Deck Socket Testing: Falkor

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet: Atmosphere Monitoring: Falkor

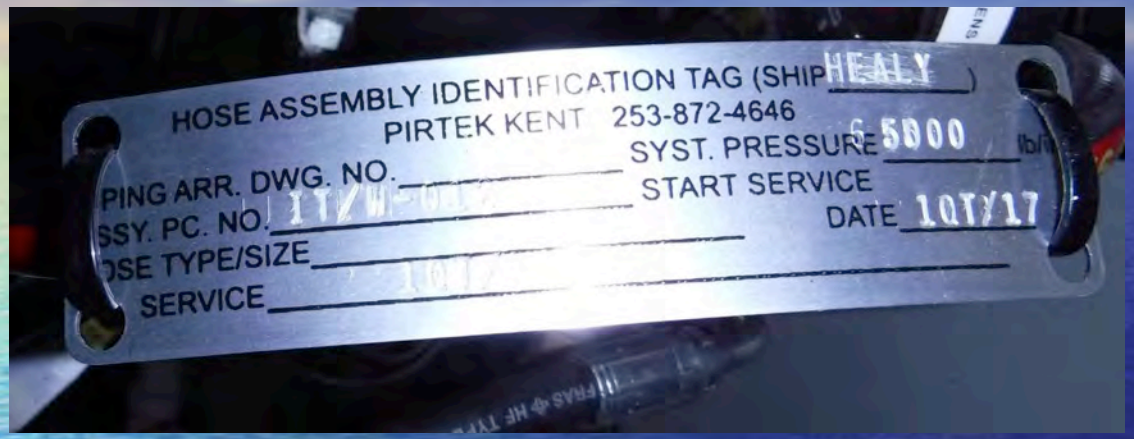
Observations around the fleet:
Airflow Monitoring in Hazmat Locker



JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

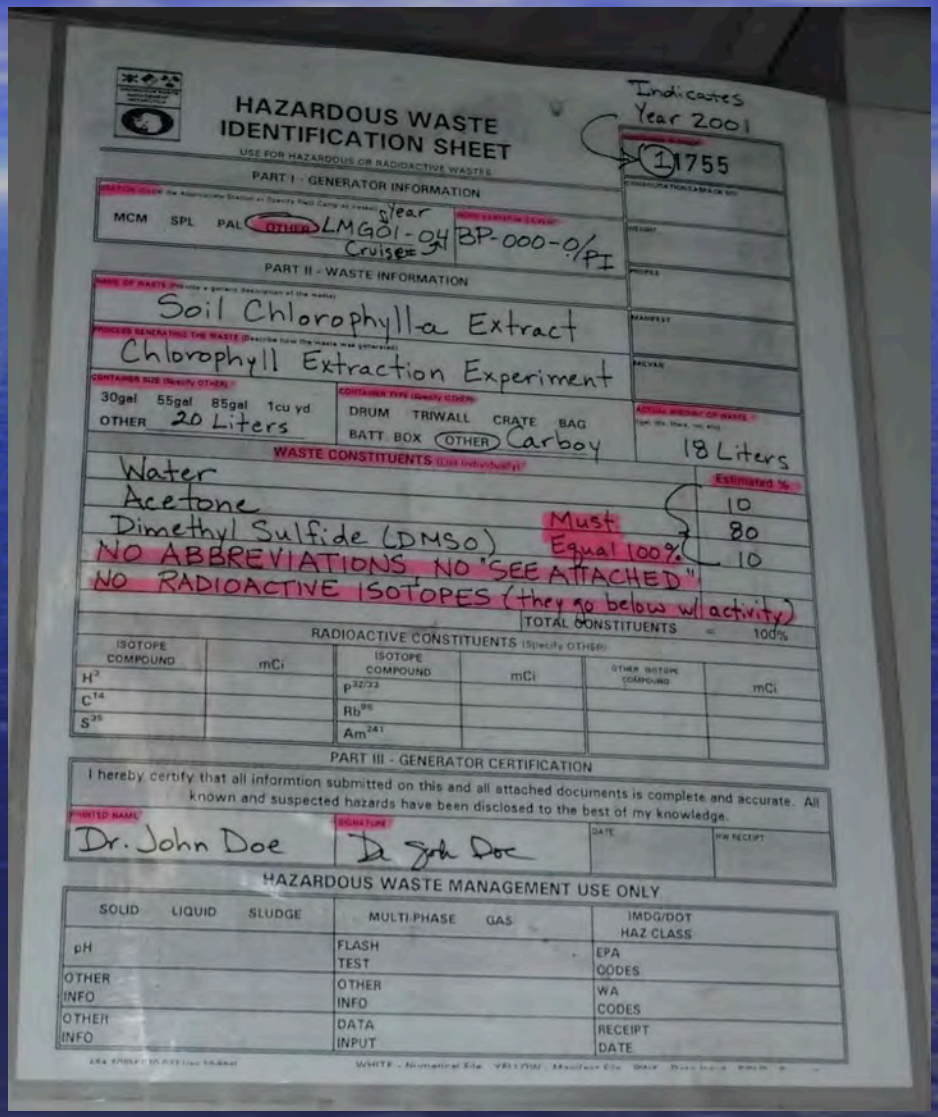
Observations around the fleet: Hydraulic Hose Tags:



JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Observations around the fleet: Hazardous Waste: Gould



HAZARDOUS WASTE IDENTIFICATION SHEET

USE FOR HAZARDOUS OR RADIOACTIVE WASTE

Indicates Year 2001

1755

PART I - GENERATOR INFORMATION

MCM SPL PAL OTHER LMG01-04 Year Cruise 04 BP-000-0/PI

PART II - WASTE INFORMATION

Soil Chlorophyll-a Extract

Chlorophyll Extraction Experiment

30gal 55gal 85gal 1cu yd OTHER 20 Liters

DRUM TRIWALL CRATE BAG BATT. BOX (OTHER) Carboy

18 Liters

WASTE CONSTITUENTS

Estimated %

Water 10

Acetone 80

Dimethyl Sulfide (DMSO) 10

Must Equal 100%

NO ABBREVIATIONS NO "SEE ATTACHED"

NO RADIOACTIVE ISOTOPES (they go below w/ activity)

TOTAL CONSTITUENTS 100%

RADIOACTIVE CONSTITUENTS (Specify OTHER)

ISOTOPE COMPOUND	mCi	ISOTOPE COMPOUND	mCi	OTHER ISOTOPE COMPOUND	mCi
H^3		$P^{32/33}$			
C^{14}		Rb^{86}			
S^{35}		Am^{241}			

PART III - GENERATOR CERTIFICATION

I hereby certify that all informtion submitted on this and all attached documents is complete and accurate. All known and suspected hazards have been disclosed to the best of my knowledge.

PRINTED NAME: Dr. John Doe

SIGNATURE: Dr. John Doe

DATE

MW RECEIPT

HAZARDOUS WASTE MANAGEMENT USE ONLY

SOLID LIQUID SLUDGE	MULTI-PHASE GAS	IMDG/DOT HAZ CLASS
pH	FLASH TEST	EPA CODES
OTHER INFO	OTHER INFO	WA CODES
OTHER INFO	DATA INPUT	RECEIPT DATE

WHITE - Numerical File YELLOW - Manifest File PINK - Data Input Back

JMS NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Questions?

JMS
NAVAL ARCHITECTS

Naval Architecture
Marine Engineering
Marine Surveying
Salvage Engineering

Purpose

The major purposes of the NSF Ship Inspection Program are:

1. To assure that the capabilities of the research vessel and technical support meet accepted scientific community standards and expectations;
2. To assure the seaworthiness and safety of research vessels supported by NSF meet or exceed the standards set forth by the *UNOLS Research Vessel Safety Standards (RVSS)*, and applicable requirements of the International Maritime Organization, American Bureau of Shipping (ABS), the Code of Federal Regulations (CFR), and the U.S. Coast Guard;
3. To ensure NSF-owned ships as capital assets, are being adequately maintained;
4. To ensure NSF-funded science is scheduled on properly outfitted and maintained vessels.