OMG

The OCC Knowledge Base

NVP

2019-12-12

Contents

Pre	Preface 5					
	How	to Edit this Book	6			
1	Prep	aring for a Research Cruise	7			
	1.1	Determine Goals	7			
	1.2	Spatial Data Preparation	7			
	1.3	Garmin 78 Handheld GPS Preparation	7			
	1.4	Datasheet Preparation	8			
	1.5	Software Needed at Sea	8			
2	CTD :	and DIC Water Sampling Field Guide	11			
	2.1	Waypoint and metadata collection	11			
	2.2	CTD CAST	11			
	2.3	Water Sample Collection	12			
	2.4	Water sample Processing	12			
	2.5	Mercuric Chloride Emergency Procedures	14			
3	Data	Processing and the Occ Package	25			
4	Softv	vare Needed at Sea	27			
5	Diel S	Suite	29			
	5.1	Diel Suite Underwater Checklist	29			
6	Instr	uments	31			
		0.70				

4	CONTENTS

7	Field	Checklists	33
	7.1	Daily Tasks for the Team	33
	7.2	Where to Save Data	35
8	Data	How To	37
	8.1	How to Gain Access to the OCC Database	37
9	How	to Archive Data	39
10	Vario	ous Underway resources	41
11	CAU	Processing	43

Preface



Welcome to the online knowledge base of the OCC Team. This started as the OCC Mission Guide, a reference manual to help consolidate best practices for conducting OCC team operations at sea. As of 2020, it has evolved into an online living book, written in R Markdown and compiled into book with bookdown,published via GitHub Pages. The current live version of the book that you can bookmark is here. All OCC team members are encouraged to not only use it as a resource but help it grow by adding and editing content as OCC projects, methods and missions continue to change and grow. Anyone may suggest edits to the contents of the OMG by forking the OMG repository from Noah via GitHub, pushing any changes back to GitHub, after which they may be approved for incorporation into the master copy of the OMG.

Once you have forked the repo onto your local machine, the HTML version of the OMG may be accessed offline by simply opening the index.html file in the folder "OMG/docs" A .PDF file of the book is also generated every time the book is built, that also ends up in the "OMG/docs" folder.

6 CONTENTS

How to Edit this Book

- 1. Fork the repo from Noah via GitHub.
- 2. Edit any existing chapter by simply editing its .Rmd file in R studio or create a new chapter by creating a new .Rmd file in the root OMG folder. Build the book to see your edits in the form of the built book.
- 3. Commit your changes via GitHub Desktop (or via R if you have setup GitHub to play nicely with R.)
- 4. In GitHub, open a Pull Request to have your edits considered for integration into the master branch.

Preparing for a Research Cruise

1.1 Determine Goals

Determine the team's goals in the region the research cruise is scheduled to visit. Identify all planned retreivals, deployments and specialty projects (such as the diel suite), and the number of days, staff, and boats needed to accomplish these goals.

1.2 Spatial Data Preparation

- Create a single .kml file that includes all planned instrument retrievals and any planned additional deployments and other necessary points (collectively all called "planning points". .kml files are more agile than ArcGIS files; they are easier to use in Google Earth for day to day planning.
- Create an ArcGIS map project that contains the locations of all planning points.

1.3 Garmin 78 Handheld GPS Preparation

- Ensure each handheld unit is setup properly
 - Time to UTC
 - LAT and LONG in decimal degrees
- Test each handheld GPS to be taken on the cruise prior to sailing: take it outside and ensure that it collects waypoints.
- Upload planning points to both the primary and secondary GPS units.

1.4 Datasheet Preparation

- Prepare Field Data Binders
 - Print enough data sheets for all activities, including mooring, CAU, CTD/H2O for the OCC team in addition to enough CTD/H2O data sheets for any other team on CTD/H2O Ops.
 - Attach sharp pencils to field binders

1.5 Software Needed at Sea

	Team Lead				
Software	Only	Manufac	t N leed For	Instrume	en D ownload Location
ARCMap	Х	ESRI	planning operations and generating maps	NA	see Tomoko
Google Earth		Google	planning operations	NA	
Keyspan USA Software		Keyspan	serial to USB adapter cable	GPS	https://www.tripplite. com/support/USA19HS
Microsoft Access 2010		Microsof	tmooring and CTD databases	NA	request from ITS
Excel		Microsof	tspreadsheets	NA	you must have this already
DNR Garmin		Minneso DNR	t d ownload of GPS Waypoints	GPS	http://www.dnr.state.mn. us/mis/gis/tools/arcview/ extensions/DNRGarmin/ DNRGarmin.html
DNR GPS		Minneso DNR	tapload of GPS planning points from Google Earth	GPS	http://www.dnr.state.mn. us/mis/gis/DNRGPS/ DNRGPS.html
Aquadopp Software - AquaPro v1.37.08		Nortek	instrument interface	Aquadop ADCP	ophttp://www.nortek-as. com/en/support/software
SoundTrap	x	Ocean	instrument	Sound	http:
Host Software Version 2.0.9.x		Instrume	en its erface	Trap	//www.oceaninstruments. co.nz/downloads/

	Team Lead				_
Software	Only	Manufac	tNireerded For	Instrume	en D ownload Location
Basic Stamp Editor		Paralax Inc.	instrument interface	PUC	https://www.parallax.com/ downloads/ basic-stamp-editor-software-wind
Python 2.51		Python	scripts that are part of mooring and CTD databases	NA	https://www.python.org/download/releases/2.5.1/
SeaFETCOM 2		Satlantic	instrument interface	SeaFet	http: //satlantic.com/seafetcom
Seaterm 1.59		SeaBird	instrument interface	SBE39, SBE19, SBE19+	http://www.seabird.com/ software/software
Seaterm V2		SeaBird	instrument interface	sbe19+ V2, SBE56	http://www.seabird.com/ software/software
SBE Data Processing		SeaBird	CTD cast processing	SBE CTDs	https://www.seabird.com/ software-updates
R and R Studio for STR processing		R Studio	data processing	all	https://www.rstudio.com/ products/rstudio/ download/
Ruskin		RBR	STR, PAR, DO	RBR Solo	https://rbr-global.com/ products/software

CTD and DIC Water Sampling Field Guide

If available hands on deck and conditions allow, please conduct the CTD downcast and the water sample collection simultaneously.

2.1 Waypoint and metadata collection

Use the OCC provided GPS unit to collect a waypoint when the CTD downcast begins. Record all metadata on provided data sheet.

2.2 CTD CAST

- 1. Ensure that the CTD line is connected to the top of the CTD frame by 1 shackles.
- 2. Tie non-CTD end of the CTD line to the boat with a bowline or clip off with carabiner.
- 3. Flake CTD line on deck.
- 4. When the coxswain says the CTD can go over the side, raise the CTD switch to the "ON" position, and loudly say, "ON!" then lower it over the side until the top of the frame is 1 meter below the surface of the water to begin the 1 minute soaking period, either holding the line or cleating off the line to maintain the CTD at soaking depth.
- 5. After 1 minute soak, ask the coxswain for the current depth so you know how far you can lower the CTD without it hitting the bottom (5-10 feet less line than the bottom depth). Un-cleat the CTD line if it was cleated and begin the CTD cast by pulling the CTD frame up until the top ring of the frame emerges from the water, then begin gradually lowering at a consistent rate, hand over hand, until the CTD gets to the target depth (using the markings on the line to estimate depth). Once the target depth is reached, pull the CTD back on board.

6. Once the CTD is back on board, lower the switch to "OFF", and loudly say "OFF!"

2.3 Water Sample Collection

- 1. Prime the Niskin Bottle, ensuring the petcock and the air bleed valve are closed.
- 2. Clip off the boat side of the niskin line to the boat.
- 3. Near the end of the the CTD soaking time, lower the weight and the open Niskin bottle over the side so the top of the Niskin is at 1m depth (surface of water at the BLACK mark drawn on Niskin line).
- 4. Clip the messenger on to the line
- 5. When the CTD begins its downcast, send the messenger to trigger the Niskin to close. Ensure no air bubbles are trapped inside the Niskin and bottle sits vertically in the water column before firing the messenger.

2.4 Water sample Processing

- 1. Designate roles: bottle filler, mercuric chloride (HgCl2) handler, data recorder. NOTE: Supersaturated mercuric chloride solution is extremely dangerous; use the utmost caution when dealing with the chemical. All personnel working with it are required to wear eye protection. The mercuric chloride handler is also required to where disposable nitrile gloves. In the event of contact with any part of the body, wash the area profusely. If contact is made with eyes, abort operations, rinse continuously with fresh water (or salt if fresh has run out), alert the ship and return ASAP.
- 2. Remove a bottle and its stopper from the storage tote and insert the tygon tubing to the bottom of the bottle. With the tygon tubing attached to the Niskin bottle dispensing nipple, open the Niskin bottle valve and allow for three complete flushings of the bottle to occur before stopping the sample collection (i.e. start the collection and count how long it takes for the bottle to overflow and then allow that to occur for 2x the required fill time...ie. if the bottle fills in 20 seconds, allow the sample water flow to flush the bottle for 60 seconds). Attention must be given to how the sample water enters the bottle. Care should be given to ensure that smooth water flow into the bottle is maintained and that no bubbles are created during the dispensing of sample. Any bubbles introduced to the sample will alter the pCO2 within the sample water and produce inaccurate DIC results.
- 3. After the appropriate flushing time, shut off the Niskin valve to stop the water flow, while at the same time ensuring the tygon tubing doesn't come off the bottom of the sample bottle. Once the flow is shut off, pinch the tubing and in one motion remove it from the bottle. This "pinch and remove" action with the tubing should establish a consistent head-space in all the sample bottles. The meniscus



of the sample should be about 1 cm below the neck of the bottle (see picture.)

- 4. a. Once the proper head space is established, pipette 200ul of HgCl2 saturated solution into the sample bottle
 - b. Use the syringe containing vacuum grease to make 3-5 vertical "stripes" of grease on a clean, dry stopper. Insert the greased stopper until fully seated in the bottle, then twist until the grease completely seals the bottle contents. The vertical stripes of grease allow for gases to escape the bottle neck while the stopper is being inserted. Having the stopper clean/dry ensures that other than sample water isn't introduced into the bottle. Twisting the stopper, once it has been fully seated into the neck of the bottle, ensures a smooth distribution of grease within the sample bottle's neck and an air tight seal.
 - c. Use the rubber band and plastic collar to lock down the stopper inside the bottle. Once secured, softly invert the bottle 1-2x to mix the HgCl2 with the water sampleand secure the sample bottle in the field container.
 - d. Complete data sheet including REA Site name or OCC Site Name (if it exists), waypoint name (default), UTC date and time, lat and long, sample depth and

DIC bottle #.

2.5 Mercuric Chloride Emergency Procedures

- Eyes: Irrigate immediately with large quantity of water for at least 15 minutes.
- Skin: Immediately flush with plenty of water for at least 15 minutes. Remove any contaminated clothing.
- Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
- Ingestion: Only induce vomiting if directed to do so by medical personnel.
- The MSDS can be seen from any NOAA Google Account via this google drive link

2.5.1 Mercuric Chloride Safety Data Sheet (SDS)

LabChem

Mercuric Chloride, Saturated

Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 03/30/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form Mixture

Mercuric Chloride, Saturated Product name

Product code LC16620

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : For laboratory and manufacturing use only.

1.3. Details of the supplier of the safety data sheet

LabChem Inc Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court

Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@abchem.com - www.labchem.com
1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 2 (Oral) H300 Acute Tox. 3 (Dermal) H311 Carc. 2 H351 Repr. 2 H361 STOT RE 2 H373 Aquatic Acute 1 Aquatic Chronic 2

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)







Signal word (GHS-US)

Precautionary statements (GHS-US)

Hazard statements (GHS-US)

H300 - Fatal if swallowed

1500 - Frail in swaniowed 14311 - Toxic in contact with skin 1531 - Suspected of causing cancer 14361 - Suspected of damaging fertility or the unborn child 14373 - May cause damage to organs (nervous system) through prolonged or repeated

exposure H410 - Very toxic to aquatic life with long lasting effects

H410 - Very toxic to aquatic life with long lasting effects
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breather mist
P264 - Wash exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid nelease to the environment
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P301+P310 - IF SWALLOWED immediately gall a POISON CENTER/doctor
P302+P352 - IF ON SKIN. Wash with plenty of soap and water
P308+P315 - IF exposed or concerned: Get medical advice/attention
P312 - Call a POISON CENTER/doctor if you feel unwell
P330 - If swallowed, nines mouth
P381 - Remove/Take of timmediately all contaminated clothing
P363 - Wash contaminated clothing before reuse

03/30/2015 EN (English US)

Mercuric Chloride, Saturated

Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

P391 - Collect spillage
P405 - Store locked up
P501 - Dispose of contents/container to comply with local, state and federal regulations

2.3. Other hazards

Other hazards not contributing to the classification : None under normal conditions.

2.4. Unknown acute toxicity (GHS US)

Not applicable SECTION 3: Composition/information on ingredients

Not applicable

3.2. Mixture				
Name	Product identifier	%	Classification (GHS-US)	
Water	(CAS No) 7732-18-5	93.5	Not classified	
Mercuric Chloride	(CAS No) 7487-94-7	6.5	Acute Tox. 1 (Oral), H300 Acute Tox. 1 (Dermal), H310 Carc. 2, H351 Repr. 2, H361 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Oranje 1, H410	

Full text of H-phrases: see section 16 SECTION 4: First aid me

Mercuric Chloride, Saturated Safety Data Sheet

SECTION 6: Accidental				
6.1. Personal precaution	s, protective equipment and emergency p	rocedures		
General measures	: Evacuate area. Absorb	spillage to prevent material damage.		
6.1.1. For non-emergency	personnel			
Protective equipment	: Safety glasses. Protecti	ve clothing. Gloves		
Emergency procedures	: Evacuate unnecessary			
	-			
6.1.2. For emergency resp				
Protective equipment	: Equip cleanup crew with	proper protection.		
Emergency procedures	: Ventilate area.			
6.2. Environmental preca				
Prevent entry to sewers and put	olic waters. Notify authorities if liquid enters s	ewers or public waters. Avoid release to the environment.		
6.3. Methods and materia	al for containment and cleaning up			
Methods for cleaning up		solids, such as clay or diatomaceous earth as soon as possible. Collect		
	spillage. Store away fro	n other materials.		
6.4. Reference to other s				
See Heading 8. Exposure contri	ols and personal protection.			
SECTION 7: Handling at	ıd storage			
7.1. Precautions for safe	handling			
Precautions for safe handling		exposed areas with mild soap and water before eating, drinking or		
		smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Obtain special instructions before use. Do not handle until all safety precautions have		
		od. Avoid breathing mist.		
Hygiene measures	: Do not eat, drink or smo	: Do not eat, drink or smoke when using this product. Wash exposed skin thoroughly after		
	handling.			
7.2. Conditions for safe s	storage, including any incompatibilities			
Storage conditions	: Keep container closed v	when not in use.		
Incompatible products	: Strong bases. Strong a	: Strong bases. Strong acids. Strong oxidizers.		
Incompatible materials	: Sources of ignition. Dire	ct sunlight.		
7.3. Specific end use(s)				
No additional information availa	ole			
SECTION 8: Exposure of	ontrols/personal protection			
8.1. Control parameters	entropologia, protection			
Mercuric Chloride, Saturated	1			
ACGIH	Not applicable			
OSHA	Not applicable			
Mercuric Chloride (7487-94-7	,			
ACGIH	ACGIH TWA (mg/m³)	0.025 mg/m ³		
OSHA	OSHA PEL (TWA) (mg/m³)	0.1 mg/m ³		
Mater (7722 40 E)				
Water (7732-18-5) ACGIH	Not applicable			
	**			
OSHA	Not applicable			
0.0				
8.2. Exposure controls				
Appropriate engineering control		untains and safety showers should be available in the immediate exposure. Ensure adequate ventilation.		
Personal protective equipment	: Avoid all unnecessary e	·		
Hand protection	: Wear protective gloves.			
Eye protection		: Chemical goggles or safety glasses.		
		: Protective clothing.		
Skin and body protection	: Protective clothing.			

03/30/2015

Mercuric Chloride, Saturated Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations Respiratory protection Wear appropriate mask. Other information : Do not eat, drink or smoke during use. SECTION 9: Physical and chemical properties 9.1. Information on basic physical and chemical properties Physical state Liquid Color Colorless Odor None. Odor threshold No data available No data available рΗ Melting point No data available No data available Freezing point No data available Boiling point Flash point No data available Relative evaporation rate (butyl acetate=1) No data available No data available Flammability (solid, gas) Explosion limits No data available Explosive properties No data available No data available Oxidizing properties No data available Vapor pressure Relative density No data available Relative vapor density at 20 °C No data available Soluble in water.

Water: Solublity in water of component(s) of the mixture:

Mercuric Chloride: 6.9 g/100ml Solubility Log Pow No data available Log Kow Auto-ignition temperature No data available No data available Decomposition temperature No data available Viscosity No data available Viscosity, kinematic No data available Viscosity, dynamic No data available 9.2. Other information SECTION 10: Stability and reactivity 10.1. Reactivity No additional information available 10.2. Chemical stability Stable under normal conditions. 10.3. Possibility of hazardous reactions Not established. 10.4. Conditions to avoid Direct sunlight. Extremely high or low temperatures. 10.5. Incompatible materials Strong acids. Strong bases. Strong oxidizers. 10.6. Hazardous decomposition products Hydrogen chloride, mercury. SECTION 11: Toxicological information Likely routes of exposure : Skin and eye contact

EN (English US)

Mercuric Chloride, Saturated

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

cording to rederar register / vol. //, No. 36/ Monday,	march 20, 2012 / Rules and Regulations
Acute toxicity	: Oral: Fatal if swallowed. Dermal: Toxic in contact with skin.
Mercuric Chloride, Saturated	
LD50 oral rat	15.4 mg/kg
LD50 dermal rat	631 mg/kg
ATE US (oral)	15.400 mg/kg body weight
ATE US (dermal)	631.000 mg/kg body weight
Mercuric Chloride (7487-94-7)	
LD50 oral rat	1 mg/kg (Rat)
LD50 dermal rat	41 mg/kg (Rat)
ATE US (oral)	1.000 mg/kg body weight
ATE US (dermal)	41.000 mg/kg body weight
	- The transfer of the transfer
Water (7732-18-5) LD50 oral rat	> 00000
	≥ 90000 mg/kg
ATE US (oral)	90000.000 mg/kg body weight
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Suspected of causing cancer.
Mercuric Chloride (7487-94-7)	
IARC group	2B - Possibly carcinogenic to humans
Reproductive toxicity	: Suspected of damaging fertility or the unborn child.
Specific target organ toxicity (single exposure)	: Not classified
exposure) Aspiration hazard	: Not classified
Potential Adverse human health effects and symptoms	: Based on available data, the classification criteria are not met. Toxic in contact with skin. Fata if swallowed.
Symptoms/injuries after inhalation	: No data available.
Symptoms/injuries after skin contact	Repeated exposure to this material can result in absorption through skin causing significant health hazard. Toxic in contact with skin.
Symptoms/injuries after eye contact	: No data available.
Symptoms/injuries after ingestion	
Chronic symptoms	: Fatal if swallowed.
onionic symptoms	: Fatal if swallowed. : Impairment of the nervous system.
- '	: Impairment of the nervous system.
SECTION 12: Ecological information	: Impairment of the nervous system.
SECTION 12: Ecological information 12.1. Toxicity	: Impairment of the nervous system.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water	: Impairment of the nervous system.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long fasting effects.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7)	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7)	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr. 0.05 mg/l 48 hr.
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7) LC50 fish 1	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long fasting effects. 0.46 mg/l 96 hr. 0.05 mg/l 48 hr. 0.03 mg/l (96 h; Poecilia reticulata)
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7) LC50 fish 1 EC50 Daphnia 1	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr. 0.05 mg/l 48 hr. 0.03 mg/l (96 h; Poecilia reticulata) 0.0081 mg/l (24 h; Daphnia magna)
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7) LC50 fish 1 EC50 Daphnia 1 LC50 fish 1 LC50 fish 2	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr. 0.05 mg/l 48 hr. 0.03 mg/l (96 h; Poecilia reticulata) 0.0081 mg/l (24 h; Daphnia magna) 0.04 mg/l (96 h; Cyprinus carpio)
SECTION 12: Ecological information 12.1. Toxicity Ecology - water Mercuric Chloride, Saturated LC50 fish 1 EC50 Daphnia 1 Mercuric Chloride (7487-94-7) LC50 fish 1 EC50 Daphnia 1 LC50 fish 2 EC50 Daphnia 2	: Impairment of the nervous system. : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects. 0.46 mg/l 96 hr. 0.05 mg/l 48 hr. 0.03 mg/l (96 h; Poecilia reticulata) 0.0981 mg/l (24 h; Daphnia magna) 0.04 mg/l (96 h; Cyprinus carpio) 0.003 mg/l (48 h; Daphnia magna)

Mercuric Chloride, Saturated

Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

12.2. Persistence and degradability				
Mercuric Chloride, Saturated				
Persistence and degradability May cause long-term adverse effects in the environment.				
Mercuric Chloride (7487-94-7)				
Persistence and degradability	Biodegradability: not applicable. No test data on mobility of the substance available.			
Biochemical oxygen demand (BOD)	Not applicable			
Chemical oxygen demand (COD)	Not applicable			
ThOD	Not applicable			
BOD (% of ThOD) Not applicable				
Water (7732-18-5)				
Persistence and degradability Not established.				
12.3. Bioaccumulative potential				

2.3. Bioaccumulative potential				
2.3. Bloaccumulative potential				
Mercuric Chloride, Saturated				
Bioaccumulative potential Not established.				
Mercuric Chloride (7487-94-7)				
BCF fish 1 10000 (Pisces)				
BCF fish 2	500 - 4620 (Cyprinus carpio; Test duration: 10 weeks)			
BCF other aquatic organisms 1 10000 (Ostreidae)				
Log Pow 0.1 - 0.22 (Calculated)				
Bioaccumulative potential Potential for bioaccumulation (500 ≤ BCF ≤ 5000).				
Water (7732-18-5)				

Bioaccumulative potential 12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming : No known ecological damage caused by this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste disposal recommendations

Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.

Ecology - waste materials : Hazardous waste due to toxicity. Avoid release to the environment.

Not established.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT
Transport document description : UN2024 Mercury compounds, liquid, n.o.s. (Mercuric chloride), 6.1, II

UN2024 UN-No.(DOT)

Proper Shipping Name (DOT) Mercury compounds, liquid, n.o.s.

Transport hazard class(es) (DOT) Hazard labels (DOT) 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132 6.1 - Poison inhalation hazard

Packing group (DOT) : II - Medium Danger

Dangerous for the environment Yes

Mercuric Chloride, Saturated

Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Marine pollutant



G - Identifies PSN requiring a technical name

243

DOT Packaging Non Bulk (49 CFR 173.xxx)

DOT Packaging Bulk (49 CFR 173.xxx)

DOT Symbols

DOT Special Provisions (49 CFR 172.102)

IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. DOT Packaging Exceptions (49 CFR 173.xxx) : 153
DOT Quantity Limitations Passenger aircraft/rail : 5 L
(49 CFR 173.27)

DOT Quantity Limitations Cargo aircraft only (49 : 60 L CFR 175.75)

DOT Vessel Stowage Location

: B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Additional information

Other information : No supplementary information available

No additional information available

Transport by sea

No additional information available

Air transport

SECTION 15: Regulatory information

15.1. US Federal regulations

Mercuric Chloride, Saturated		
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard	
	Delayed (chronic) health hazard	

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

Mercuric Chloride		CAS No 7487-94-7	6.5
Mercuric Chloride (7487-94-7)			
Listed on the United States SARA Section 302 Listed on United States SARA Section 313			
RQ (Reportable quantity, section 304 of EPA's List of Lists)	500 lb		
SARA Section 302 Threshold Planning Quantity (TPQ)	500 lb		
SARA Section 311/312 Hazard Classes	Immediate (acut Delayed (chroni	e) health hazard c) health hazard	

15.2. International regulations

CANADA

Mercuric Chloride, Saturated
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<u> </u>	
Mercuric Chloride (7487-94-7)	
Listed on the Canadian DSL (Domestic Substance	es List)
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class E - Corrosive Material
Water (7732-18-5)	
Listed on the Canadian DSL (Domestic Substance	es List)
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP] No additional information available

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD] Not classified

National regulations

······································
Mercuric Chloride (7487-94-7)
Listed on the Canadian IDL (Ingredient Disclosure List)
Water (7732-18-5)
Not listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

Mercuric Chloride (748)	7-94-7)			
U.S California - Proposition 65 - Carcinogens List	U.S California - Proposition 65 - Developmental Toxicity	U.S California - Proposition 65 - Reproductive Toxicity - Female	U.S California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
No	Yes	No	No	

SECTION 16: Other information Other information

: None.

Full text of H-phrases: see section 16:

Acute toxicity (dermal) Category 1 Acute toxicity (oral) Category 1 Acute toxicity (oral) Category 2 Acute toxicity (dermal) Category 3
Acute toxicity (oral) Category 2 Acute toxicity (dermal) Category 3
Acute toxicity (dermal) Category 3
Harmadaya ta tha a saida and Asia Harmad Octavia d
Hazardous to the aquatic environment - Acute Hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 2
Carcinogenicity Category 2
Reproductive toxicity Category 2
Specific target organ toxicity (repeated exposure) Category 2
Fatal if swallowed
Fatal in contact with skin
Toxic in contact with skin
Suspected of causing cancer
Suspected of damaging fertility or the unborn child
May cause damage to organs through prolonged or repeated exposure
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects
Toxic to aquatic life with long lasting effects

Mercuric Chloride, Saturated Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / Monday, March 28, 2012 / Rules and Regulations

NFPA health hazard	: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	: 0 - Materials that will not burn.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
HMIS III Rating	
Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment given
	*- Chronic (long-term) health effects may result from repeated overexposure
Flammability	: 0 Minimal Hazard - Materials that will not burn
Physical	: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NC react with water, polymerize, decompose, condense, or self-react. Non-Explosives.
Personal Protection	: D
	D - Face shield and eye protection, Gloves, Synthetic apron

SDS US (GHS HazCom 2012)



03/30/2015

Mercuric Chloride, Saturated

Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Date of issue: 03/30/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier Product form Mixture Product name Mercuric Chloride, Saturated Product code : LC16620 1.2. Relevant identified uses of the substance or mixture and uses advised against Use of the substance/mixture : For laboratory and manufacturing use only. 1.3. Details of the supplier of the safety data sheet LabChem Inc Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court Zellenople, PA 16063 - USA 7 412-826-5230 - F 724-473-0847 info@labchem.com - www.labchem.com 1.4. Emergency telephone number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887 Emergency number SECTION 2: Hazards identification 2.1. Classification of the substance or mixture Classification (GHS-US) Acute Tox. 2 (Oral) H300 Acute Tox. 3 (Demal) H311 Carc. 2 H351 Repr. 2 H361 STOT RE 2 H373 Aquatic Acute 1 Aquatic Chronic 2 Full text of H-phrases: see section 16 2.2. Label elements GHS-US labeling Hazard pictograms (GHS-US) OHS06 UHS08 UF1000OHS06 UHS08 UF1000OHS06 UHS08 UF1000OHS06 UHS08 UHS08 UF1000OHS07 UHS08 UHS0 Signal word (GHS-US) Danger Hazard statements (GHS-US) Precautionary statements (GHS-US)

EN (English US)

Data Processing and the Occ Package

The occ package is uploaded to GitHub and can be downloaded directly in R.

1. Open the devtools library.

library(devtools)

To download the occ package, use the install_github command. The repository name is in the form "username/repo". For the occ package, the username is "hannah-barkley" and the repo is "occ". This install only need to occur once; however, the occ package will need to be reinstalled if there are updates to the package (which is likely).

install_github("hannahbarkley/occ")

3. Once installed, load the occ package.

library(occ)

Software Needed at Sea

Software	Team Lead Only	Manufac	t N iœerded For	Instrum	en D ownload Location
ARCMap	X	ESRI	planning operations and generating maps	NA	see Tomoko
Google Earth		Google	planning operations	NA	
Keyspan USA Software		Keyspan	serial to USB adapter cable	GPS	https://www.tripplite. com/support/USA19HS
Microsoft Access 2010		Microsof	ftmooring and CTD databases	NA	request from ITS
Excel		Microsof	ftspreadsheets	NA	you must have this already
DNR Garmin			ot d ownload of GPS Waypoints	GPS	http://www.dnr.state.mn. us/mis/gis/tools/arcview/ extensions/DNRGarmin/ DNRGarmin.html
DNR GPS		Minneso DNR	otapload of GPS planning points from Google Earth	GPS	http://www.dnr.state.mn. us/mis/gis/DNRGPS/ DNRGPS.html
Aquadopp Software - AquaPro v1.37.08		Nortek	instrument interface	Aquado ADCP	pphttp://www.nortek-as. com/en/support/software

Software	Team Lead Only	ManufactNæeded For		Instrumen D ownload Location	
SoundTrap Host Software Version 2.0.9.x	х	Ocean Instrume	instrument n its terface	Sound Trap	http: //www.oceaninstruments. co.nz/downloads/
Basic Stamp Editor		Paralax Inc.	instrument interface	PUC	https://www.parallax.com/ downloads/ basic-stamp-editor-software-wind
Python 2.51		Python	scripts that are part of mooring and CTD databases	NA	https://www.python.org/download/releases/2.5.1/
SeaFETCOM 2		Satlantic	instrument interface	SeaFet	http: //satlantic.com/seafetcom
Seaterm 1.59		SeaBird	instrument interface	SBE39, SBE19, SBE19+	http://www.seabird.com/ software/software
Seaterm V2		SeaBird	instrument interface	sbe19+ V2, SBE56	http://www.seabird.com/ software/software
SBE Data Processing		SeaBird	CTD cast processing	SBE CTDs	https://www.seabird.com/ software-updates
R and R Studio for STR processing		R Studio	data processing	all	https://www.rstudio.com/ products/rstudio/ download/
Ruskin		RBR	STR, PAR, DO	RBR Solo	https://rbr-global.com/ products/software

Diel Suite

5.1 Diel Suite Underwater Checklist

PUC

- 1. Tubes cleared of air and water with swipe of pump
- 2. Tubes connected to valves
- 3. Valves opened one full turn

ADCP

- 1. Ensure ADCP has unobstructed view of the surface
- 2. Get compass bearing on ADCP head direction after final installation

30 CHAPTER 5. DIEL SUITE

Instruments

Guidance on instrumentation in the OMG is not intended to replace the instruction manual

6.1 STRs

All STRs must be programmed prior to deployment and have fresh batteries and dessicant installed. See manual's for specific programming guidance.

STR - RBR Solo V3 Temperature Sensor

Find the user manual in "Reference" section of OCC files at sea.

Physical Preparation for Deployment

- Use brand new Tadiran Lithium Thionyl Chloride 3.6v batteries
- Wrap instrument housing with "PVC floor marking tape", leaving the serial number exposed

Programming

- 1. Open Ruskin
- 2. Connect to the instrument with the supplies USB C cable, it should appear in the "Navigator" view after a few seconds
- 3. Ensure that your computer is connected to the internet so that the program can get the correct time from your computer.
- 4. Click UTC to set the instrument's time to UTC
- 5. Click on the "Information" tab and confirm that the battery has 3.6v

- 6. After programming each instrument, disconnect the USB cable, install a fresh desiccant and close the instrument in a short period of time so that the desiccant does not absorb ambient moisture in the air
- 7. Parameters
- a. Sampling Interval: 1 sample every 5 minutes
- b. Sampling mode: Continuous
- "Ruskin_instrument.log" keeps a text file that includes the parameters of each instrument programmed
- · .rsk files are sqlight data files which are open source and non-proprietary

Downloading Data from Solo 3

- 1. Connect to the instrument
- 2. Select the dataset and download it

Processing RBR Solo 3 Data Files

see Data Processing with the OCC Package

Factory Recalibration of the Solo 3

- Call RBR to arrange the re-calibration of each Solo 3, which will cost approx. \$120
- Instrument drift over 3 years should be less than .006 C, thus there is no need to recalibrate the data set with post-cruise calibration coefficients
- In Ruskin, by default, the name of a data file is composed of the following information:
 - The first six digits represent the logger serial number.
 - The next eight digits represent the current year, month, and day.
 - The next four digits represent the current time to the minute.
 - The file extension indicates the file format and should not be changed. If you change it, the file extension that you specify becomes part of the name, and the required extension is appended. For example, the file named 911936_20090522_1613.rsk contains data for a logger with a serial number of 911936 whose data was downloaded in 2009 on May 22 at 4:13 pm.

Field Checklists

7.1 Daily Tasks for the Team

Find Excel version here via Google Drive

STR

- Before Ops
 - assemble, program and stage needed STRs
 - confirm 10 36" cable ties for each STR planned
 - write serial numbers of planned STR deployments on tomorrow's data sheet
- After Ops
 - download strs
 - enter deployments and retreivals into mooring database
 - import waypoints into mooring database
 - clean STRs, put weights and brackets on fantail or in DD bath

CAU

- Before Ops
 - Pack supplies for planned CAU site swaps
 - write down deploy CAU SNs on tomorrow's data sheet
- · After Ops
 - scrape/record CAU SN's, re-bag and freeze with cruise & site label
 - dispose of old clips and stakes
 - after CTD/H2O data is entered, give data sheets to data manager

Water Sampling and CTD

- Before Ops
 - DIC bottles and all supplies in each kit
 - Niskin, line, messenger, weight staged for each CTD
- After Ops
 - rinse and stage CTDs
 - Swap full bottles for empties, dispose of waste
 - restock all supplies
 - replace and label any worn ziplocs
 - enter CTD and water sample log into CTD/H2O Database (hopefully this is not a necessary step on MARAMP 2020!)

GPS Units (for OCC and benthic/fish GPS)

• Drop off GPS units with data manager for waypoiont download

Cameras

- · Before Ops
 - Ensure cameras are set to UTC time
 - Ensure cameras have memory cards
 - charge camera batteries
 - clean camera housings
 - bake desiccants and install them
- After Ops
 - download and sort photos
 - download and sort photoquad photos
 - charge cameras or swap charged batts for used batts
 - install new dessicants

Stage all Gear

- Action packer packed for day of ops
- Pam float and reel staged
- If deep STR: Marker Float and drop weight
- 1 full bag of large cable ties (keep on boat)
- CTDs and lines

Other

• gauge tanks

7.2 Where to Save Data

Checkout this Excel file on Google Drive for details on where to save data

Data How To

8.1 How to Gain Access to the OCC Database

As of January 2020, the OCC team is in the process of working with the data management team to migrate all OCC Team data and metadata to an Oracle database. In order to access this database, a new user must submit an ITS support ticket to request an Oracle account in addition to requesting an install of SQL Developer. If you'd like to access data via R, you'll also need to request to have ODBC drivers setup.

How to Archive Data

After data is qc'd it mus be archived. As of January 2020, the best place to look for all information and guidance related to archiving data is in a google drive folder setup by Annette.

Various Underway resources

Where to Save Various Data Streams Checkout this google drive file showing the paths of where to save various things

CAU Processing

Ari this section is for you!!!!!