

The OCC Mission Guide

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Preface



Why Bookdown for the OKB?

Version Control

we can maintain version control via github

“You’ve gotta get the end member.”

— Chip Young

Multiple Output Formats

We can export an agile HTML version locally, a .pdf, or publish the book to R Studio Connect to be accessed via the internet.

Chapter 1

Preparing for a Research Cruise

Planning for a cruise begins several months before it sails.

1.1 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.

1.2 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.

1.3 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

1.4 Software Needed at Sea

| Software | Team Lead Only | Manufacturer | Needed For | Instrument | Download 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 | | Microsoft | mooring and CTD databases | NA | request from ITS |
| Excel | | Microsoft | spreadsheets | NA | you must have this already |
| DNR Garmin | | Minnesota DNR | download of GPS Waypoints | GPS | http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html |
| DNR GPS | | Minnesota DNR | upload 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 | Aquadopp ADCP | http://www.nortek-as.com/en/support/software |
| SoundTrap Host Software Version 2.0.9.x | x | Ocean Instruments | instrument interface | Sound Trap | http://www.oceaninstruments.co.nz/downloads/ |
| Basic Stamp Editor | | Parallax Inc. | instrument interface | PUC | https://www.parallax.com/downloads/basic-stamp-editor-software-windows |

| Software | Team Lead Only | Manufacturer | Needed For | Instrument | Download Location |
|---|----------------|--------------|--|----------------------|---|
| 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 R and R Studio for STR processing | | SeaBird | CTD cast processing | SBE CTDs | https://www.seabird.com/software-updates |
| Ruskin | | R | data processing | all | https://www.rstudio.com/products/rstudio/download/ |
| | | RBR | STR, PAR, DO | RBR Solo | https://rbr-global.com/products/software |

Chapter 2

CTD and DIC Water Sampling

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 (HgCl_2) 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 wear 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 pCO_2 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 HgCl_2 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 HgCl_2 with the water sample and 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](#)

SECTION 4: First aid measures

Mercuric Chloride, Saturated

Safety Data Sheet

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

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Absorb spillage to prevent material damage.

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses. Protective clothing. Gloves.
Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.
Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other 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 been read and understood. Avoid breathing mist.
Hygiene measures : Do not eat, drink or smoke when using this product. Wash exposed skin thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container closed when not in use.
Incompatible products : Strong bases. Strong acids. Strong oxidizers.
Incompatible materials : Sources of ignition. Direct sunlight.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| Mercuric Chloride, Saturated | | |
|-------------------------------|------------------------|-------------|
| ACGIH | Not applicable | |
| OSHA | Not applicable | |
| Mercuric Chloride (7487-94-7) | | |
| ACGIH | ACGIH TWA (mg/m³) | 0.025 mg/m³ |
| OSHA | OSHA PEL (TWA) (mg/m³) | 0.1 mg/m³ |
| Water (7732-18-5) | | |
| ACGIH | Not applicable | |
| OSHA | Not applicable | |

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation.
Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Wear protective gloves.
Eye protection : Chemical goggles or safety glasses.
Skin and body protection : Protective clothing.

03/30/2015

EN (English US)

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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 |
| pH | : No data available |
| Melting point | : No data available |
| Freezing point | : No data available |
| Boiling point | : No data available |
| Flash point | : No data available |
| Relative evaporation rate (butyl acetate=1) | : No data available |
| Flammability (solid, gas) | : No data available |
| Explosion limits | : No data available |
| Explosive properties | : No data available |
| Oxidizing properties | : No data available |
| Vapor pressure | : No data available |
| Relative density | : No data available |
| Relative vapor density at 20 °C | : No data available |
| Solubility | : Soluble in water. Water: Solubility in water of component(s) of the mixture : • Mercuric Chloride: 6.9 g/100ml |
| Log Pow | : No data available |
| Log Kow | : No data available |
| Auto-ignition temperature | : 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

No additional information available

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

11.1. Information on toxicological effects

| | |
|---------------------------|------------------------|
| Likely routes of exposure | : Skin and eye contact |
|---------------------------|------------------------|

03/30/2015

EN (English US)

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Mercuric Chloride, Saturated**Safety Data Sheet**

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 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 |
| Water (7732-18-5) | |
| LD50 oral rat | ≥ 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 |
| Specific target organ toxicity (repeated exposure) | : May cause damage to organs (nervous system) through prolonged or repeated 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. Fatal 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 | : Fatal if swallowed. |
| Chronic symptoms | : Impairment of the nervous system. |

SECTION 12: Ecological information**12.1. Toxicity**

Ecology - water : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

| | |
|--------------------------------------|---------------------------------------|
| Mercuric Chloride, Saturated | |
| LC50 fish 1 | 0.46 mg/l 96 hr. |
| EC50 Daphnia 1 | 0.05 mg/l 48 hr. |
| Mercuric Chloride (7487-94-7) | |
| LC50 fish 1 | 0.03 mg/l (96 h; Poecilia reticulata) |
| EC50 Daphnia 1 | 0.0081 mg/l (24 h; Daphnia magna) |
| LC50 fish 2 | 0.04 mg/l (96 h; Cyprinus carpio) |
| EC50 Daphnia 2 | 0.003 mg/l (48 h; Daphnia magna) |
| TLM fish 1 | 0.82 mg/l (168 h; Carassius auratus) |
| Threshold limit algae 1 | 0.08 mg/l (Selenastrum capricornutum) |
| Threshold limit algae 2 | 0.07 mg/l (Scenedesmus quadricauda) |

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

| | |
|--------------------------------------|--|
| 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 ($500 \leq \text{BCF} \leq 5000$). |
| Water (7732-18-5) | |
| Bioaccumulative potential | Not established. |

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. |

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 |
| UN-No.(DOT) | : UN2024 |
| Proper Shipping Name (DOT) | : Mercury compounds, liquid, n.o.s. |
| Transport hazard class(es) (DOT) | : 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132 |
| Hazard labels (DOT) | : 6.1 - Poison inhalation hazard |



| | |
|-------------------------------|----------------------|
| Packing group (DOT) | : II - Medium Danger |
| Dangerous for the environment | : Yes |

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Marine pollutant

: Yes



DOT Packaging Non Bulk (49 CFR 173.xxx)

: 202

DOT Packaging Bulk (49 CFR 173.xxx)

: 243

DOT Symbols

: G - Identifies PSN requiring a technical name

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.

ADR

No additional information available

Transport by sea

No additional information available

Air transport

No additional information available

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

500 lb

List of Lists)

SARA Section 302 Threshold Planning

500 lb

Quantity (TPQ)

SARA Section 311/312 Hazard Classes

Immediate (acute) health hazard

Delayed (chronic) health hazard

15.2. International regulations**CANADA**

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| Mercuric Chloride (7487-94-7) | |
|---|--|
| Listed on the Canadian DSL (Domestic Substances 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 Substances 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 (7487-94-7) | | | | |
|---|---|---|---|-----------------------------------|
| 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

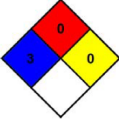
Other information : None.

Full text of H-phrases: see section 16:

| | |
|-----------------------|---|
| Acute Tox. 1 (Dermal) | Acute toxicity (dermal) Category 1 |
| Acute Tox. 1 (Oral) | Acute toxicity (oral) Category 1 |
| Acute Tox. 2 (Oral) | Acute toxicity (oral) Category 2 |
| Acute Tox. 3 (Dermal) | Acute toxicity (dermal) Category 3 |
| Aquatic Acute 1 | Hazardous to the aquatic environment - Acute Hazard Category 1 |
| Aquatic Chronic 1 | Hazardous to the aquatic environment - Chronic Hazard Category 1 |
| Aquatic Chronic 2 | Hazardous to the aquatic environment - Chronic Hazard Category 2 |
| Carc. 2 | Carcinogenicity Category 2 |
| Repr. 2 | Reproductive toxicity Category 2 |
| STOT RE 2 | Specific target organ toxicity (repeated exposure) Category 2 |
| H300 | Fatal if swallowed |
| H310 | Fatal in contact with skin |
| H311 | Toxic in contact with skin |
| H351 | Suspected of causing cancer |
| H361 | Suspected of damaging fertility or the unborn child |
| H373 | May cause damage to organs through prolonged or repeated exposure |
| H400 | Very toxic to aquatic life |
| H410 | Very toxic to aquatic life with long lasting effects |
| H411 | Toxic to aquatic life with long lasting effects |

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| | | |
|---------------------|---|--|
| 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 is 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 NOT 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)

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

LabChem **Mercuric Chloride, Saturated**
 performance through chemistry 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
 T 412-826-5230 - F 724-473-0647
info@labchem.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 H400
 Aquatic Chronic 2 H411

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)



Signal word (GHS-US)

: Danger

Hazard statements (GHS-US)

: H300 - Fatal if swallowed
 H311 - Toxic in contact with skin
 H351 - Suspected of causing cancer
 H361 - Suspected of damaging fertility or the unborn child
 H373 - May cause damage to organs (nervous system) through prolonged or repeated exposure
 H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US)

: P201 - Obtain special instructions before use
 P202 - Do not handle until all safety precautions have been read and understood
 P260 - Do not breathe mist
 P264 - Wash exposed skin thoroughly after handling
 P270 - Do not eat, drink or smoke when using this product
 P273 - Avoid release to the environment
 P280 - Wear protective gloves, protective clothing, eye protection, face protection
 P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor
 P302+P352 - IF ON SKIN: Wash with plenty of soap and water
 P308+P313 - IF exposed or concerned: Get medical advice/attention
 P312 - Call a POISON CENTER/doctor if you feel unwell
 P330 - If swallowed, rinse mouth
 P361 - Remove/Take off immediately all contaminated clothing
 P363 - Wash contaminated clothing before reuse

Chapter 3

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)
```

2. 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 “hannahbarkley” 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)
```


Chapter 4

Diel Suite

4.1 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

Chapter 5

Instruments

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

5.1 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 re-calibrate 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.

Chapter 6

Field Checklists

6.1 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 retrievals 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 waypoint 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

6.2 Where to Save Data

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