

APPENDIX E2

Rebreather Evaluation Protocol

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Consigned by: _____ Title: _____ Date: _____

Address: _____

Case # _____ Decedent: _____

Step 1: Inventory (Photograph all components) Inspection date: _____

CCR Manufacturer: _____ Model: _____ Serial #: _____

CCR Computer No. 1 Serial #: _____ No. 2 Serial #: _____

Description of exterior condition: _____

Attachments and ancillary equipment (*NOTE: Begin noting this data now, but continue to add to it during later inspection steps as access to items becomes available.*):

1: _____ Condition: _____ S/N: _____

2: _____ Condition: _____ S/N: _____

3: _____ Condition: _____ S/N: _____

4: _____ Condition: _____ S/N: _____

5: _____ Condition: _____ S/N: _____

6: _____ Condition: _____ S/N: _____

7: _____ Condition: _____ S/N: _____

8: _____ Condition: _____ S/N: _____

9: _____ Condition: _____ S/N: _____

10: _____ Condition: _____ S/N: _____

11: _____ Condition: _____ S/N: _____

12: _____ Condition: _____ S/N: _____

13: _____ Condition: _____ S/N: _____

Component Testing (Videotape all steps.)

Step 2: Counterlung Gas Sampling

Using a syringe or other sampling device, collect and analyze gas samples from existing volumes within the rebreather BEFORE disassembly or gas additions are made.

Location	Oxygen	Helium	CO ₂	H ₂ O
Inhalation counterlung				
Exhalation counterlung				
Inhalation hose				
Exhalation hose				
Canister				
Other (note location)				

Step 3: Functionality Testing

Positive Pressure Test

Before any disassembly or modification is done to the unit, use the diluent cylinder (or a replacement gas supply, if the diluent cylinder is empty or low on gas) to perform a positive pressure test of the breathing loop. Pay particular attention to any connections and seals, looking for leaks of any type. Snoop may be necessary to complete this evaluation.

Results:

- No leaks observed.
- Minor leaks observed at _____
- Major leaks observed at _____

Cylinders

Diluent: Valve operational _____ cylinder hydro _____ VIP _____

S/N: _____ Contents: gas type _____ % gas pressure _____ psi / bar

Oxygen: Valve operational _____ cylinder hydro _____ VIP _____

S/N: _____ Contents: gas type _____ % gas pressure _____ psi / bar

Bail-out: Valve operational _____ cylinder hydro _____ VIP _____

S/N: _____ Contents: gas type _____ % gas pressure _____ psi / bar

Bail-out: Valve operational _____ cylinder hydro _____ VIP _____

S/N: _____ Contents: gas type _____ % gas pressure _____ psi / bar

Water Containment

Check each part of the system for water volumes contained. Use a measuring device to determine volume. Note if units measured are ounces or milliliters.

Results:

- No significant water volume observed in breathing loop
- Water volume found in the following places and quantities:

Mouthpiece/DSV: _____ oz / ml Inhalation hose: _____ oz / ml

Canister: _____ oz / ml Exhalation hose: _____ oz / ml

Water trap: _____ oz / ml Inhalation C/L: _____ oz / ml

Computer/handset #1: _____ oz / ml Exhalation C/L: _____ oz / ml

Computer/handset #2: _____ oz / ml Other (list): _____ oz / ml

Sensors

Note sensor conditions both prior to and after cleaning and drying. Pay particular attention to wiring and sensor faces. Note corrosion, discoloration, moisture, debris on sensor faces, etc.

Sensor	Wire condition	Sensor face
1		
2		
3		
4		

Before cleaning:

Sensor	Manufacturer	S/N	Date Code	0.21 PO ₂ (Mv)	1.0 PO ₂ (Mv)	2.0 PO ₂ (Mv)	3.0 PO ₂ (Mv)
1							
2							
3							
4							

After cleaning and drying:

Sensor	Manufacturer	S/N	Date Code	0.21 PO ₂ (Mv)	1.0 PO ₂ (Mv)	2.0 PO ₂ (Mv)	3.0 PO ₂ (Mv)
1							
2							
3							
4							

CCR Displays

Primary: calibration: _____

Battery level: _____ Menu scrolls: _____

Secondary: calibration: _____

Battery level: _____ Menu scrolls: _____

HUD: Lights: _____ Vibrating? (Y/N) _____

Alarms: _____

CCR Batteries

Battery	Visual condition (discolor, corrosion, etc.)	Flooded (Y/N)	Manufacturer	Date code	Voltage (no load)	Voltage (under load)
1						
2						
3						

General Interior Inspection

Note any unusual conditions of the CCR interior. Pay particular attention to any residue, foreign materials or alterations made to the system.

Notes: _____

Dive Computer(s)

NOTE: Download data to PC as soon as possible!

Brand: _____ Model: _____

Configuration for: _____

Dives logged: _____ (see attached download)

Battery level: _____ Menu scrolls: _____

Brand: _____ Model: _____

Configuration for: _____

Dives logged: _____ (see attached download)

Battery level: _____ Menu scrolls: _____

Brand: _____ Model: _____

Configuration for: _____

Dives logged: _____ (see attached download)

Battery level: _____ Menu scrolls: _____

Valve Tests

ADV: Brand: _____ Model: _____

S/N: _____ Inflation test: _____

OPV: Brand: _____ Model: _____

S/N: _____ Inflation/deflation test: _____

Man O₂: Brand: _____ Model: _____

S/N: _____ Inflation test: _____

Man dil: Brand: _____ Model: _____

S/N: _____ Inflation test: _____

DSV: Brand: _____ Model: _____

S/N: _____ Mushroom test: _____

Dil Reg: Brand: _____ Model: _____

S/N: _____ IP pressure _____ Test: _____

O₂ Reg: Brand: _____ Model: _____

S/N: _____ IP pressure _____ Test: _____

Inline hose isolation valve: Brand: _____ Position: _____

S/N: _____ Location: _____ Test: _____

Inline hose isolation valve: Brand: _____ Position: _____

S/N: _____ Location: _____ Test: _____

Buoyancy Control Devices

Brand: _____ Model: _____

S/N: _____ Inflation test: _____

Harness Devices: Brand: _____ Model: _____

S/N: _____ Condition test: _____

Crotch strap? (Y/N): _____ Chest straps (Y/N): _____ Scooter ring (Y/N): _____

Note any straps, harness clips or counterlung clips not fastened correctly. Pay particular attention to lower clips on counterlungs that might not be fastened. Also look for any breathing hoses or IP hoses that are misrouted.

Notes: _____

Absorbent Condition

Retain absorbent, even if wet, for later analysis of carbonates vs. hydroxides content.

Manufacturer: _____ Grade: _____ Type: _____
When filled: _____ By whom: _____
How: _____ Flooded? (Y/N) _____
Channeling prevention O-rings or gaskets noted: _____

Regulator Testing

Alternate air source combined with BC:

Manufacturer: _____ Model: _____ S/N: _____
Function test: _____
Cracking pressure: _____ Free flow? (Y/N/Int): _____
Pre-dive/dive lever selection: _____ Adjustment knob status: _____
Notes: _____

Other alternate air source attached to onboard diluent cylinder:

Manufacturer: _____ Model: _____ S/N: _____
Function test: _____
Cracking pressure: _____ Free flow? (Y/N/Int): _____
Pre-dive/dive lever selection: _____ Adjustment knob status: _____
Notes: _____

Bailout regulator 1

Manufacturer: _____ Model: _____ S/N: _____

Function test: _____

Cracking pressure: _____ Free flow? (Y/N/Int): _____

Pre-dive/dive lever selection: _____ Adjustment knob status: _____

Notes: _____

Bailout regulator 2

Manufacturer: _____ Model: _____ S/N: _____

Function test: _____

Cracking pressure: _____ Free flow? (Y/N/Int): _____

Pre-dive/dive lever selection: _____ Adjustment knob status: _____

Notes: _____

Weighting System

Note amounts and locations of all weights carried by the diver. Note units used.

Weight belt: _____ lbs / Kg Quick release (Y / N)

Integrated, left pocket: _____ lbs / Kg Quick release (Y / N)

Integrated, right pocket: _____ lbs / Kg Quick release (Y / N)

Integrated, in CCR housing: _____ lbs / Kg Quick release (Y / N)

Integrated, top of CCR: _____ lbs / Kg Quick release (Y / N)

Integrated, on backplate: _____ lbs / Kg Quick release (Y / N)

Other: _____ lbs / Kg Quick release (Y / N) Location: _____

Other: _____ lbs / Kg Quick release (Y / N) Location: _____

Other: _____ lbs / Kg Quick release (Y / N) Location: _____

Weight estimate: Reasonable amount Obviously overweighted Obviously underweighted

Step 4: Post Disassembly Testing

After the complete disassembly and component testing is completed, then the following steps should be completed using appropriate manufacturer's pre-dive and post-dive checklists:

- Unit cleaned, disinfected and dried
- Unit reassembled using new sensors and batteries, charged gas cylinders, etc.
- Functional tests of calibration, handset/computer function, etc.
- Functional tests of other electronic components
- Functional tests of gas addition and controls
- Unit cleaned, disassembled and stored

Step 5: Unit-Specific Testing

Refer to unit-specific guidelines for other items to inspect or consider during testing.

Inspection Equipment Needs (Inventory)

Oxygen analyzer

Helium analyzer

Voltmeter

IP gauge

SPG

Rebreather manual

Oxygen cylinder

Diluent cylinder

Special tools for CCR

Set of replacement sensors for CCR

Replacement batteries for CCR

Bags for absorbent

Measuring cups

Pressure chamber to test sensors

Disinfectant and application device

Pre-dive and post-dive checklists for CCR

Regulator test bench

Calipers

Magnifying glass

Camera with macro lens

Media sticks for camera

Video camera with macro

Tapes for video camera

Standard tools (slotted and Phillips screwdrivers, hex wrenches, needlenose pliers, slip joint pliers, adjustable wrenches, box-end wrenches, nut drivers, knife, etc.)

Flashlight (for inspections)

Snoop (soapy water in spray bottle)

UV light

Scale

Preparation

Instrument Calibration

Oxygen gas analysis: model: _____ Calibration date: _____

Helium gas analysis: model: _____ Calibration date: _____

Sensor analysis: model: _____ Calibration date: _____

Voltmeter: model: _____ Calibration date: _____

Pressure analysis: model: _____ Calibration date: _____