

**USCGC Healy WAGB-20**  
**CTD Equipment Inspection Trip**  
**27 Feb. – 02 Mar. 2006**

## **SUMMARY**

Scripps Institution of Oceanography (SIO) has been tasked with preparing the Healy's CTD systems for the 2006 science season. An initial survey and inspection trip to the Healy was made over February 3, to March 2, 2006 while the ship was pier-side in Seattle. All work and tests were performed by SIO Shipboard Technical Support in conjunction with the shipboard MST group.

The primary winch and cable were inspected. The primary CTD cable was tested. Both carousels were tested and both rosette frames inspected. The CTD acquisition computer and both deck units were tested and confirmed operational. All available sampler bottles were visually inspected. Shipyard maintenance work still in progress presented many challenges in the form of restricted compartment access and unavailability of basic services such as potable water supply or drains in the lab spaces. Much credit is due the MST group for their creative work-around solutions.

### **1. Sampler Bottles**

All 12L Ocean test (OTE) sampler bottles had been removed from the 24 place rosette and spares storage and placed on the storage hangers in the STBD staging bay. Additionally there were 2, 30L and 3, 5L sampler bottles in the STBD staging bay. Refurbishment of the adjacent lab space decks resulted in much fine powder debris consisting of metal dust and grinding wheel particles settling on all exterior surfaces of the sampler bottles. On some surfaces the debris was as much as 1/16" thick.

#### **1.1 5L Sampler Bottle Results**

A total of four, 5L sampler bottles were located. Two are setup with extra long release lanyards for use on the multi-core. One is configured for wire use and the last did not have end caps attached. All bottles are configured for internal springs and use the OTE supplied surgical rubber tubing. All 5L sampler bottles are setup with Buna-N O-rings through out. All had heavy dust and debris coating as described above. The bottles were vacuumed and brushed to remove the debris.

All O-rings were inspected and damaged ones replaced. The interior of the bottles were visually inspected for damage or debris build-up. All bottles were found to have good internal conditions with light to moderate salt build-up around the O-rings. Handles and spine were securely fastened in place and release rods operate smoothly.

A new surgical tubing band was cut and end caps reattached to the 4<sup>th</sup> bottle.

**Recommend washing all bottles before sea trials to remove remaining traces of dirt and salt from seal surfaces.**

#### **1.2 12L Sampler Bottle Results**

A total of 32, 12L sampler bottles were located. Six bottles are configured for internal springs and use OTE supplied surgical rubber tubing. These bottles cannot accept external springs as they do not have the spring guide bosses on the bottle body nor are the caps drilled to allow lanyard passage. The remaining 26 bottles are setup with external springs and use OTE supplied stainless steel coil springs. All bottles were found with heavy dust and debris coating as

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described above. The bottles were vacuumed and brushed to remove the debris. One bottle was found with a broken spigot. The spigot guide boss was inspected and the spigot internals replaced from spares. The 6 internal sprung bottles are setup with all Buna-N O-rings. The 26 external sprung bottles are setup with all silicone O-rings.

All O-rings were inspected and damaged ones replaced. The interior of the bottles were visually inspected for damage or debris build-up. All but one bottle were found to have good internal conditions with light to moderate salt build-up around the O-rings. Handles and spine were securely fastened in place and release rods operate smoothly. One sampler bottle has a chip missing from the upper end cap surface of the bottle end. This resembles classic damage from tripping the bottle shut while in the air. The damage does not affect bottle performance. The seal surface is intact and there is no visible crack leading away from the bottom of the chip valley. This bottle has been identified with red tape indicating the location of the damage.

**Recommend washing all bottles before sea trials to remove remaining traces of dirt and salt from seal surfaces.**

### **1.3 30L Sampler Bottle Results**

A total of 14, 30L sampler bottles were located. Two bottles were in the STBD staging bay with only top end caps set in place. One bottle was in the Aft computer lab (bottle was removed from the 12 place rosette in cargo hold 3) and the remaining 11 bottles are mounted on the 12 place rosette in cargo hold 3. Twelve sampler bottles are setup with external springs and use OTE supplied dual stainless steel coil springs. Only the two bottles from the staging bay were found with heavy dust and debris coating as described above. The bottles were vacuumed and brushed to remove the debris. One bottle was found with a missing small spigot. The spigot guide boss was inspected and the spigot internals replaced from spares. All 30L sampler bottles are setup with silicone O-rings.

All O-rings were inspected and damaged ones replaced. The interior of the bottles were visually inspected for damage or debris build-up. All bottles were found to have good internal conditions with only light salt build-up around the O-rings. Handles and spine were securely fastened in place and release rods operate smoothly.

**Recommend washing all bottles before sea trials to remove remaining traces of dirt and salt from seal surfaces.**

## **2. CTD EM cable and Slip Rings**

### **2.1 Primary CTD Cable**

Inspected CTD winch#1, slip rings and cable. Visual inspection of the conductors on the termination end showed no signs of oxidation since last use. The cable had been pulled back, wound on, and secured to the winch drum prior to the last yard period. Wire handling portions of the winch looked in good condition with rollers operating smoothly. Performed conductivity check on all three conductors. End to end resistance of each conductor was measured at the J-Box down stream from the slip ring end of the drum to the termination end. Insulation breakdown tests were also performed on each conductor to the armor and on each conductor to the other conductors.

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| HI POT Readings (MEG Ohms @ 500VDC) |      |                        |      | Continuity Readings (Ohms) |     |  |
|-------------------------------------|------|------------------------|------|----------------------------|-----|--|
| Armor to:                           |      | Conductor to Conductor |      | Red                        | 254 |  |
| Red                                 | >999 | White                  | >999 | White                      | 260 |  |
| White                               | >999 | Black                  | >999 | Black                      | 256 |  |
| Black                               | >999 | Black-White            | >999 | All parallel               | 84  |  |

## 2.2 Backup CTD Cable

The backup CTD cable appears to have not been used.  
Testing of cable not performed.

## 3. CTD Systems

All sensors are currently at their respective manufacturer for calibration and inspection.

### 3.1 Rosettes

Two rosettes are present aboard Healy. A 12 place, 30L rosette and a 24 place, 10/12L rosette. The 12 place rosette is in good condition. The epoxy coating is intact on all frame surfaces with only superficial scratches. All zinc anodes are in good condition with only minor corrosion build-up around the anode base.

The 24 place rosette is in fair condition. The epoxy coating is mostly intact with aluminum showing through in places on the outer horizontal rings from rubbing or tag line abrasion. The zinc anodes show some degradation from doing their sacrificial protection job.

**Recommend removing and cleaning all anodes from both rosettes at the end of the 2006 season before putting the rosettes in storage.**

### 3.2 SBE CTD Deck Units

The deck units are in the same condition as reported last year.

CTD deck units checked for proper operation. Each deck unit interfaced with acquisition computer for function checks. Deck unit #0416 has a NMEA card installed and Surface PAR sensor connection. Deck unit #0417 lacks both of these interfaces. Both deck units are Version 1 SBE11Plus.

**Recommend upgrading both deck units to full Version 2 with remote output and adding Surface PAR to deck unit 0417.**

### 3.3 CTD Acquisition Computer

The single acquisition computer is in approximately the same condition as reported last year. Windows XP has been updated and networking has been kept up to date.

The acquisition computer does not have a GPIB board for acquiring data from the deck unit. It uses the built-in COMM 1 port for CTD data acquisition at 19200. The modem channel for bottle tripping commands is connected to a serial to USB converter (COMM 3). This configuration is not particularly fault tolerant as the USB to serial converter hangs the port

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periodically requiring system reboot. The latest versions of Sea Bird software were downloaded for installation on the computer prior to sea trials.

**Recommend acquiring a GPIB card and a two-port RS232 serial card for the computer to facilitate a more fault tolerant communications installation. The computer is a 2U rack mount unit which will support insertion of 2 interface cards.**

### **3.4 SBE 32 Carousels**

Two carousels are present for the rosettes: a 12 place SBE 32 Carousel, S/N: 3224152-0347, and a 24 place SBE 32 Carousel, S/N: 3224152-0348

The 24 place carousel was found to have much debris lodged between the trigger assemblies. The 12 place carousel was bound up with frozen latches in 10 of the 12 positions. Since this system was not used during the 2005 seasons this appears to be the result of high salt humidity in the cargo hold.

Each carousel was cleaned, inspected and tested. All solenoid positions were cleaned of built-up salt and debris with a soft brush and soapy water. All solenoid faces are in good condition free of rust with good epoxy seals on the face. Each carousel latch assembly top was soaked in soapy water, rinsed, and checked for freedom of movement of each trigger release arm. All functioned satisfactory after cleaning.

Both carousels were tested electrically for communication and proper firing operation. Both performed satisfactorily in all positions.

**Recommend keeping the carousel tops covered when not being deployed to minimize dirt and salt ingress.**

### **3.5 Spare Parts Inventory**

A spot check was made of the two Vidmar cabinets used for SBE spares and compared with the inventory list created at the end of the 2004 season. This check and discussions with the MSTs concerning spare parts consumption during the 2005 season indicates adequate SBE spare parts and consumable items are on board for the 2006 season.

The only possible exception to this would involve a request by an on-coming science party for sampler bottles with all Buna-N O-rings or O-rings of a non-standard type.