

**EN416****Pre & Post Cruise:**

Calibrate &/or check fluor & xmiss, PAR & SPAR dry, in air  
complete syscon.doc with current info  
enter Seacon parameters

**Before first cast & with each new winch operator and assisting scientists/crew:**

Review deployment, lowering, raising/bottle trips and recovery  
As needed: Setup cleats, taglines, hooks, recovery poles, etc. for recovery & deployments  
Have 2-3 people available to assist on deck plus one winch operator for each cast.

**Review safety issues, signals, taglines, cleats, knots, etc.:****Communicate with winch operator:**

Lower package slowly, going into water and down to 5. The surface is a critical point where numerous wire partings and CTD losses have occurred due to high dynamic tension. The package gets lifted by crests and let down by troughs. If the wire is going out fast during a crest, the package can gain more downward momentum with that greater amount of wire out during the trough, and in the worst case snap & part the wire.

To prevent confusion and accidents: CTD operator communicates a depth to the winch operator by saying it twice, each time a different way e.g. "one fifteen, one one five". Otherwise it may sound like 150 instead of 115. Winch operator will repeat the understood depth back to the CTD operator. Winch op will call CTD op when depth is achieved, CTD op will acknowledge.

**Safety issues:**

Stay clear of wires overhead. Keep body parts and other objects away from rests of hydraulic equipment. Keep feet out from under objects being lifted. Stay clear of taglines and wire with high tensions.

**Signals:**

Make signals deliberate so they can be seen from a distance and in the line of sight of the equipment operator.

Stop is a strong raised fist. Wave arm a bit to get attention.

Up = up index finger & arm

Up slow = up index finger & thumb pinching together, up arm

Up fast = up index finger rotating in a circular motion, up arm

Down = down index finger

Down slow = down index finger & thumb pinching together

Down = down index finger rotating in a circular motion

In sight = point at own eyes

Zero = one or both hands form a circle pointed at the operator

**Taglines:**

Tie a bowline with one end of the line to fixed object such as a deck eye. Lead it up through mid-lower part of frame to fixed cleat. Figure 8 on cleat in best direction for the current configuration. Take into account where the package will be going and coming during deployment & recovery. Go under the cleat at the point farthest away from the package. Lead the line up, over and across the cleat to form a figure 8. Use shortest distance from the fixed objects to package. Rig so most control is at points package is most likely to swing and cause damage to personnel or equipment. Take into account that package will move in horizontal and vertical axes.

Keep hands on line at least 2' from cleat during deployments and recoveries.

Object should be vertical under gear that is lifting it. Slack smoothly with control if it is at an angle, being held too tightly by the tagline. Letting go of the tagline rapidly causes the package to swing = BAD.

Request instruction on knots if unsure of how to tie properly.

**Ask someone if unsure, especially regarding deck safety issues****SAFETY FIRST!**

**Keep in mind also that you are in charge of a package that costs \$70,000 at the minimum.**

## CTD Procedures, R/V Endeavor

07-03-07, 07:51

**Create the following directories & files for the corresponding purpose &/or clear directories from past cruise:**

Windows: c:\sswin = Seasave Win v5.37d program files      DOS: c:\seasoft = Seasoft 4.249 program files  
c:\sspro = SBE Processing Win v5.37 program files      c:\sswin\data = raw data  
c:\sswin\data\list = processed data

**\*\*\*See also EN416\documents\HowToAccess416Data.doc and EN416CTD\CTDReadMe416.txt & CTDprocessing416.doc & CTDSysCon416\_0444.doc\*\***

c:\sspro\arc416.bat = archives CTD files  
c:\sspro\pro416\*.bat = processes CTD raw data & inserts bottle SN (from 4160x.csv) into ctd\*.btl file  
copy pro416.bat to pro416\*.bat and edit files to process groups that use the same \*.con files as below:  
(pro416a.bat = CTD0xx-0xx, pro416b.bat = CTD0xx-xxx)  
CTD0xx-0xx one fluorometer, one transmissometer, etc  
c:\seasoft\end416\*.bat = combines arc416\*.bat & pro416\*.bat (not necessary for use off the ship)

**Before the first cast, do a test cast**, even if on deck. Do not cock bottles, but check carousel function with a person pulling up on each lever as it fires. For processing, run each module of the Pro416 batch file one at a time. For each .psa file, Save As a new name for the current cruise so the originals are not overwritten. Rename the c:\sswin\data\list\ctd.\* processed data files that were just created so they are not lost if the upcoming batch file doesn't work. Then run the batch file to be sure the modules run without errors. If all is fine (check and compare processed data with Seaplot) delete the old renamed processed files.

mwo = meters wire out

### Each cast:

Notify bridge of intent to do a CTD cast

Request 10 minute advance notification from bridge. Let them know the cast # so it can be recorded accurately in the ship's log

Log bottom depth from Knudsen, PTR, Chirp or other reliable source. Do this well before station as well as during cast to be sure of accuracy.

### On computer:

Open **Seasave for Windows** There is an icon on desktop or find it at c:\sswin\seasave.exe

**File, Open Configuration EN416.cfg** (for casts w/out HP system) to set up for correct paths, con file, display files and parameters

**Realtime Data, Start Acquisition**, choose **file name** and change cast # to next

Choose correct con file and parameters, **Start Acquisition** green button

Enter relevant data into header. Do not press OK yet.

If using DOS: CTD\c:\seasoft\seasave

**Enter** at Acquire Real Time Data

**change cast ###**

**F10** to acquire data

enter **relevant information** into header

### Ready the CTD package:

Wear your work vest & boots! This is a wet job.

Secure all levers down on carousel pylon

24 pl frame Cock Niskins: top cap then bottom. Check that the lanyard has a free path and will not be hung up when bottle trips. **Be careful not to snap the bottom & top cap against bottle rim. This will prevent chips and fractures of the bottle PVC. Each bottle costs ~\$1000.**

Tighten all air valves, pull out all petcocks, and turn the petcock disk so hole is not lined up with pin.

Remove fresh water tubing or syringes from TC ducts

**Remove PAR cap! Also remove auxiliary sensors not rated to max depth of cast.**

Winch operator will contact bridge for permission to deploy, however it is scientists' responsibility to check this.

unfasten J-frame

setup taglines

remove securing plates/bolts &/or other securing gear

**Deploy** using taglines, hooks & cleats depending on package and weather.

**!!!Keep tension on the wire while winch is in operation!!!** This prevents snaps and loose wraps on the winch drum. **Be sure the wire does not catch on anything and that the lifting shackle is straight and not side loaded!!!**

If using taglines, slip tagline free from package once package is overboard & stable. Do this quickly and controlled to prevent a knot forming in end of line or whipping someone. A tie wrap or few stuffed into the center or taped to the line at the working end will prevent knots.

### **Deployment continued**

Zero (reset) the winch readout when the CTD is just below the surface (entire package covered with water). The package does not have to stop at the surface each deployment as long as the winch operator checks the Zero as the package is at the surface, going down. It should be reset on the first cast and any time the wire may have become slack with either the counter or wire moving. Slack causes an offset of the counter.

Signal winch operator to put CTD package down to 5m. This forces bubbles out of the flow paths, etc.

### **Back in the lab:**

Turn the television channel to the camera that monitors the winch drum. *Watch the winch drum carefully*, especially on the upcast when the wire can wrap improperly. *Alert the winch operator and technician if & as soon as a miswrap is detected*. The winch should be stopped, then enough wire let out to eliminate of the bad wrap. If bad wraps are not eliminated they can compound with each layer, putting personnel and equipment at risk.

### **Power ON** to SBE 11+ deck unit

log GMT date, lat & lon, TSal temp & salinity, bottom depth, etc.

**!!!Check that profile plan & bottom depth do not conflict!!!**

CTD to just below surface, w/someone on deck signaling winch operator to assure correct depth below surface.

**“Doghouse, Lab. Come up to just below the surface.”**

begin Seasave logging by entering **OK** in header

**in TSal, Ctrl-F5** to mark TSal file

Log **Start Time**

**Check & Log Pressure, Temp, Sal, PAR, Sound Vel,** and/or any other relative parameters from the fixed display window.

### **CTD down to max planned depth at 30m/min for first 100+m then increase speed to 60m/min**

**“Doghouse, Lab. Go down to x meters wire out and stop there if you don’t hear from me”**

Make this 5+ meters above the bottom (v shallow casts). For deep casts: Make this 10-20 meters above the bottom. The CTD can go deeper once the requested mwo is reached. The package can hit the bottom if the ship drifts to a shallower area, the estimate is too close, or distractions occur. The package hitting the bottom can damage sensors, foul or kink the wire, and even cause loss of the package.

As package nears bottom: watch its trace on echosounder (if package is going deeper than 25meters) & be ready to communicate with winch operator. Package will not be visible on echosounder above ~25m or if it is not directly under the ship.

Winch operator will stop & indicate when requested mwo is reached.

**“Thank you, hold it there please.”**

**Log max mwo, Pressure, Temp, Salinity, &/or other pertinent information &/or row of data for Bottom on logsheet**

### **Within 10-30 seconds CTD computer operator should communicate**

**“Doghouse, Lab. Come up to xx meters”** Trip bottles. Sensor pressure reading will be ~1m more than requested bottle depth. Take into account the distance difference of bottles (at the top of the package) and sensors (at the bottom of the package) during processing. During EN416 bottom, surface and sometimes mid depth samples were taken.

**For each bottle trip:** log mwo, time, temp, salinity, PAR, sound velocity, etc. as applicable. Fire the bottle (**Ctrl F3**) then log pressure.

**“Doghouse, Lab. Bring it to the surface”**

The winch operator should stop the package before it comes out of the water during a trough of the swell. **If rough weather: bring it no higher than 2-5 mwo.** In calm weather it can be just below the surface.

Winch operator may contact bridge for permission to recover. Double check that permission is granted from Bridge.

**!!!One scientist is responsible for communicating with the winch operator as the package gets close to the surface and must stand out on deck to give signals. The deck person goes outside when the package is coming up or at the bottle stop that is before a surface stop.**

**When everyone is ready the CTD computer operator can communicate “Doghouse, Lab. Bring it to the surface”**

**Deck person signals:** in sight, point at eyes; then up index finger & thumb to continue up slow. Stop is a strong raised fist. Make signals deliberate and in the line of sight of the winch operator. Stop the package before it comes out of the water during a trough of the swell. **In rough weather bring it no higher than 2-5 mwo.** In calm weather it can be just below the surface.

**Before recovery:****Win: Realtime Data, Stop Acquisition****DOS: Ctrl F1** to exit acquisition of SeasaveBe sure overlay plot window is active. File, Print to HP1120c for color plot **Ctrl F9, Escape** 3x out of Seasave**Turn power off to SBE 11+ deck unit**

Winch operator may contact bridge for permission to recover. Double check that permission is granted from Bridge.

**On Deck:**Recover package using recovery poles, taglines, hooks & cleats as necessary. **!!!Keep tension on the wire!!! Leave enough slack for J-frame to go all the way out without adjusting CTD cable length.****Secure package to deck****Secure J-frame**Put fresh **DI water in conductivity cells**, only if temperatures are above freezing. Rinse cells periodically with a dilute solution of Triton X-100 to prevent growth & fouling.**PAR sensor cap on** if PAR sensor on packageKeep area clear of sampling people until the above is completed**Contact bridge** to let them know the CTD is secure, if ready to get underway to next station, and estimated time of sampling, if any.

Contact the bridge when sampling and work on the CTD (adjusting lanyards, etc.) is complete.

**On Computer, run the following batch files in DOS:**

c:\sspro\PRO416 ctd### to process data and c:\sspro\ARC416 ctd### to archive and, or c:\sspro\END416 ctd### to archive and process data, where ### = cast #

\*\*\*For EN416, All DOS Seasoft modules were not used\*\*\*

**Short version for posting:**

**Get bottom depth from Knudsen, PTR, Chirp or other reliable source.****On CTD computer:**

**WINDOWS:** Open Seasave for Windows there is an icon on desktop or find it at c:\sswin\seasave.exe

**File, Open Configuration EN416.cfg** to set up for correct file paths, con file, display file and parameters

**Realtime Data, Start Acquisition**, choose **file name CTD###.dat** and change cast # to next

Choose correct con file and parameters, **Start Acquisition** green button

Enter relevant data into header such as Station number. Do not press OK yet.

**Ready the CTD package:**

Winch operator may contact bridge for permission to recover. Double check that permission is granted from Bridge.

**unfasten J-frame**

**setup taglines if rough weather**

**remove securing plates/bolts**

**!!!Keep tension on the wire while winch is in operation!!!**

Up signal to winch operator.

**!!!Be sure the wire does not catch on anything and that the lifting shackle is straight and not side-loaded!!!**

Deploy CTD to 5 meters

Have the winch operator **Zero (reset) the winch readout** when the CTD is just below the surface

**Back in the lab:**

**Power ON** to SBE 11+ deck unit

**Log GMT date, lat & lon, TSal temp & salinity, bottom depth, etc.**

**Pump ON 0111**

CTD to **surface (1-5m): "Doghouse, Lab. Come up to just below the surface."**

Begin Seasave logging by entering **OK** in header

**in TSal, Ctrl-F5** to mark TSal file

Log **Start Time**

**Check & Log Pressure, Temp, Sal, PAR, Sound Vel**, and/or any other relative parameters on the fixed display window.

**"Doghouse, Lab. Go down to x meters" Target CTD pressure=Actual bottom-5 or more meters**

Winch operator indicates when requested mwo is reached. **Acknowledge winch max wire out.**

**Log max mwo, Pressure, Temp, Salinity, &/or other pertinent information**

**"Doghouse, Lab. Come up to xx meters"** Trip bottles. Sensor pressure reading will be ~1m more than requested bottle depth. Take the distance difference of bottles (at the top of the package) and sensors (at the bottom of the package) into account during processing. During EN416 bottom, surface and sometimes mid depth samples were taken.

**For each bottle trip:** log mwo, time, temp, salinity, PAR, etc. as applicable. Fire the bottle (**Ctrl F3**) then log pressure.

**!!!One scientist is responsible for communicating with the winch operator as the package gets close to the surface and must stand out on deck to give signals. The deck person goes outside when the package is at 50m coming up or at the bottle stop that is before a surface stop.**

When everyone is ready the CTD computer operator can communicate **"Doghouse, Lab. Up to the surface (1-5m)"**

**Deck person signals:** in sight, point at eyes; then up index finger & thumb to continue up slow. Stop is a strong raised fist.

Make signals deliberate and in the line of sight of the winch operator. Stop the package before it comes out of the water during a trough of the swell. **In rough weather: bring it no higher than 2-5 mwo.** In calm weather it can be just below the surface.

**Before recovery: Realtime Data, Stop Acquisition, Power OFF** to SBE 11+ deck unit

To print: Be sure overlay plot window is active. **File, Print or Ctrl-P** to HP1120c for color plot

**On Deck:**

Winch operator contacts bridge for permission to recover.

**Recover package** using recovery poles, taglines, hooks & cleats as necessary **!!!Keep tension on the wire!!! Leave enough slack for J-frame to go all the way out without adjusting CTD cable length.**

**Secure package to deck, Secure J-frame**

Put fresh DI **water in conductivity cells, only if temperatures are above freezing.** Rinse cells periodically with a dilute solution of Triton X-100 to prevent growth & fouling.

**PAR sensor cap returned to sensor** if PAR on package

**Notify bridge CTD is secure & ready to get underway to next station**

**On Computer, run the following batch files:**

c:\sspro\PRO416 ### to process data and c:\sspro\ARC416 ### to archive and, or c:\sspro\END416 ### to archive and process data, where ### = cast #

Color printouts of archived data from Windows version of Seasave: Archived data: Start, Select data file, Yes to use same cast \*.con file. Wait until #s stop changing. **File, Print to HP1120C, Ok**

Shortest version for posting in the lab:

**Basic CTD INSTRUCTIONS****bottom depth from Knudsen HF**

On CTD computer:

**Seasave for Windows**If needed: **File, Open Configuration, EN416.cfg****Realtime Data, Start Acquisition****Enter Output Data File Name** change cast # to nextbe sure **Save Data to File** is checked or data will not get saved**Start Acquisition**Enter relevant data into **header****Do not press OK** yet.**Deploy CTD to 5 meters****Power ON****Log GMT date, lat & lon, TSal temp & salinity, bottom depth, etc.****Pump ON** 0111 for 3 minutes**“Doghouse, Lab, Bring CTD to surface (1-5mwo)”****OK** in header at 3mwo, coming up**Log Start Time****Check & Log Pressure, Temps, Sals, etc**Begin cast **“Doghouse, Lab. Go down to x meters”** where x=requested depth**\*\*\*!!!DO NOT TOUCH BOTTOM WITH THE PACKAGE!!!\*\*\*****Log max mwo, Pressure, Temp, Salinity, etc****Upcast, trip bottles**For each bottle trip: Fire the bottle (**Ctrl F3**)**log pressure, time, temp, salinity, etc.****“Doghouse, Lab. Up to the surface (1-5mwo)”****Realtime Data, Stop Acquisition****Power OFF****Recover CTD****Print**      **activate desired overlay plot**    **Ctrl-P, Enter, Enter**At DOS prompt    C:\sspro\**pro416 CTD0##**      C:\sspro\**arc416 CTD0##**

Copies processed data from CTD to Shipback

tech\e:\endata\en416\CTD\CTDprocedures416.doc

By Lynne Butler, Marine Technician, 30 October 2000

**On Deck:**

Winch operator contacts bridge for permission to recover.

Recover package using recovery poles, taglines, hooks & cleats as necessary **!!!Keep tension on the wire!!! Leave enough slack for J-frame to go all the way out without adjusting CTD cable length.**

Secure package to deck, Secure J-frame

Put fresh water in conductivity cells, only if temperatures are above freezing. Rinse cells periodically with a dilute solution of Triton X-100 to prevent growth & fouling.

PAR sensor cap returned to sensor if PAR on package

Notify bridge CTD is secure & ready to get underway to next station

**Ready the CTD package:**

Winch operator may contact bridge for permission to recover. Double check that permission is granted from Bridge.

unfasten J-frame

setup taglines if rough weather

remove securing plates/bolts

**!!!Keep tension on the wire while winch is in operation!!!**

Up signal to winch operator.

**!!!Be sure the wire does not catch on anything and that the lifting shackle is straight and not side-loaded!!!**

Deploy CTD to 5 or 50 meters depending on instrument requirements

Have the winch operator **Zero (reset) the winch readout** when the CTD is just below the surface

**!!!One scientist is responsible for communicating with the winch operator as the package gets close to the surface and must stand out on deck to give signals. The deck person goes outside when the package is at 50m coming up or at the bottle stop that is before a surface stop.**

**When everyone is ready the CTD computer operator can communicate “Doghouse, Lab. Up to the surface (2-5m)”**

**Deck person signals:** in sight, point at eyes; then up index finger & thumb to continue up slow. Stop is a strong raised fist.

Make signals deliberate and in the line of sight of the winch operator. Stop the package before it comes out of the water during a trough of the swell. **In rough weather: bring it no higher than 2-5 mwo.** In calm weather it can be just below the surface.