"Cheat Sheet"
Chemical Water Quality Sampling Steps

Note: This "Cheat Sheet" is a shortened guide to be used once you are familiar with the procedures and steps more thoroughly explained in the RiverTrends Manual- Please read the manual first.

General Tips for Water Sampling

- **SAFETY FIRST – Do not jeopardize your safety to collect samples, especially in inclement weather.**
- See Section 2 of the Manual ("Before You Begin"), which explains safety and basic monitoring guidelines in more detail.
- If sampling from a dock or pier, go as far as possible to the end to collect your sample.
- If collecting without a dock or pier, throw a bucket out as far as possible into the main channel - try not to disturb stream bottom.
- In general, try to sample at the same time of day and same day of week.
- Wash hands thoroughly after sampling before eating and drinking.

Equipment Preparation (Can perform at home the evening before or morning of sampling. If using Hydrolab, please see XII for instructions):

I. Check Sodium Thiosulfate (if using LaMotte DO test kit)

1. Rinse the *titrating tube* (small glass vial with plastic lid with hole in it) with a small amount of **Iodate-Iodide Standard Solution** (in large amber bottle).
2. Pour into waste container.
3. Pour *20 ml* of the **Iodate-Iodide Standard Solution** into the rinsed *titrating tube.*
4. Add 8 drops of **Sulfuric Acid** (hold the bottle vertical to ensure equal drop size) to the 20 ml of solution and mix by swirling. Then place plastic cap (with hole in it) onto titrating tube.
5. Fill *titrating syringe* to the "0" mark with **Sodium Thiosulfate.**

Preparation cont'd

6. Titrate using the **Sodium Thiosulfate.**
7. When solution turns a pale yellow color, but not clear:
   - Remove cap, leaving syringe in cap.
   - Add **8 drops Starch Solution (white bottle).** Swirl titration sample gently to mix to a uniform blue color. Recap glass tube and continue titration process.
8. Continue adding **Sodium Thiosulfate** until solution turns from blue to clear.
9. Read results on syringe - Record your results under the Dissolved Oxygen (grayed) portion on your field datasheet.
10. If results are less than 9.4 mg/l or greater than 10.0 mg/L, perform a 2nd test and record in the space on datasheet marked "2nd check".
11. Dispose of solution in titrating tube and syringe by pouring down sink and flushing with additional tap water.
12. Keep the amber bottle solution at home- don't need to take into the field.

II. Bacteria Monitoring

1. Take bacteria media solution out of freezer and put in refrigerator to thaw.
2. Place ice packs in freezer so they will be cold for the next day.
3. On day of sampling, put ice packs in the cooler.

III. Nutrient Sampling

1. Prepare cooler with ice or ice packs (put ice packs in freezer the night before monitoring).
2. If using demineralized water bottle, make sure it is full of water (from your tap is fine.

IV. Using a Refractometer

1. Calibrate using distilled water if it does not read 0 o/oo.
2. DO NOT PREFORM CALIBRATION IN THE FIELD – must take place in a controlled environment at approximately 20°C (room temperature) using distilled water at the same temperature. (See manual for more instructions.)

V. Fixing Column Separation in your Thermometer

1. Heating method (Wear safety glasses and gloves before proceeding)
   a. Heat liquid to roughly the temperature for making tea.

Preparation cont'd

b. Place the thermometer in the liquid in an upright position away from your face.
c. Allow the liquid column to rise slowly until just after the separated column enters the expansion chamber at the top of the thermometer. (Overfilling the temperature chamber will break the thermometer.)
d. Tap the thermometer gently on a padded surface in an upright position allowing the gas separating in the column to rise above the column (i.e. a computer mouse pad or bubble wrap).
e. Allow the thermometer to cool slowly in an upright position.

Testing Procedure

Perform monitoring steps in the following order:

I. Air temperature

1. Hang thermometer out of direct sunlight.
2. Wait 3-5 minutes.
3. In the meantime, fill out page 1 of the data sheet.
4. Record to nearest 0.5 ° C. (Note: don't hold thermometer by the bulb!)

II. Water Clarity: Secchi Disk (if using the Turbity tube wait until step X to perform)

1. Perform slightly downstream of sample location.
2. Remove sunglasses.
3. Stand with sun to your back, and try to lower in a shaded area (to reduce glare.
4. Lower until disk barely disappears from sight – note the depth.
5. Slowly raise until disk reappears – note the depth and average 2 readings – record to nearest tenth of meter.

III. Water Depth

1. Lower Secchi disk into the water until it is resting on the bottom and line is slack.
2. Record depth reading, to the nearest tenth of a meter.

IV. Water Sample Collection in a Bucket

1. Rinse bucket twice downstream of actual sampling location.
2. Gently lower the bucket into the water to avoid splashing and fill 2/3 full.
3. Be careful not to aerate or jostle the sample.
4. This water will be used for the remainder of the tests. (Try to move quickly through the remaining measurements.)

V. Water Temperature

1. Hang thermometer along rim, inside bucket, so that majority of the thermometer is submersed.
2. Wait 3-5 minutes.
3. Record to the nearest 0.5 ° C.

VI. Dissolved Oxygen

1. Rinse water sampling bottles (including the caps) with the water collected in the bucket (Note: bottles should have already been cleaned once at the end of the last monitoring event using tap water.
2. DO NOT return the rinse water to the bucket; pour it into the waste container.
3. Submerge ½ bottle opening allowing water to flow into the bottle. Try to fill without causing bubbles.
4. Bottle should start at a 45 ° angle to the water and be rotated while filling to a vertical position under the water surface.
5. While bottle is submerged tap sides to dislodge any air bubbles and cap bottle.
6. Remove from water and invert bottle- tap to see if there are any air bubbles. (If large air bubbles are present - empty bottle into waste container and repeat bottle filling procedure.)
7. Once both bottles are filled, place on a flat surface and uncap.

"Fixing" Phase of D.O. Test:

***NOTE:** **For all DO chemicals** – hold chemical solution bottles vertical when adding solution to the samples to ensure consistent drop size. Also, avoid solution contamination by avoiding contact of the bottle tip to sample jar, table, etc. After use, replace caps to proper solution bottles.

8. Add **8 drops Manganese Sulfate** Solution **(pink - think ladies first)** to each sample bottle.
9. Add **8 drops of Alkaline Potassium Iodide** Solution **(blue- think boys next)** to each sample bottle.
10. Cap each sample bottle and mix by inverting several times (making rainbows with hands). Precipitate will form. Set bottle back on table.
11. Allow the precipitate to settle out below the shoulder of the bottle.
12. Mix both bottles again and allow the precipitate to settle to the shoulder again.
13. Add **8 drops of Sulfuric Acid** to each sample bottle.
14. Cap. Mix until reagent and precipitate have dissolved or until the precipitate will not dissolve any further. Clear yellow to orange brown color will develop.
15. **Samples are now "fixed" – can wait up to 8 hours before proceeding further.** Place out of direct sunlight and do not expose to extreme temperatures.

"Titration" Phase of D.O. Test:

16. Rinse glass titration tubes with a small amount of the fixed solution and discard in waste container.
17. Pour 20 ml of *fixed* solution into titrating tube. Fill to white line so bottom of meniscus rests on top of white line. Use **glass dropper** to add/remove as needed. Do not return any of fixed solution to sample bottle. (Avoid contact of dropper tip to titration or sample bottle, table, paper towel, etc.)
18. Place cap with hole on tube.
19. Prime the titration syringe. (Use sodium thiosulfate - this procedure ensures that no air bubbles are trapped in the syringe.)
    a. Insert the syringe into the bottle of sodium thiosulfate. (Keeps the syringe in the bottle during the whole priming procedure.)
    b. Draw some sodium thiosulfate into the syringe. (You will probably notice a large air bubble.)
    c. Dispense the solution back into the bottle.
    d. Repeat the procedure until the air bubble disappears and the syringe is filled with only sodium thiosulfate.
20. Fill titration syringe to "0" mark with **sodium thiosulfate**.
21. Use this syringe for titrating one bottle, and use 2nd syringe for titrating 2nd bottle.
22. Insert syringe in cap with hole in center.
23. Add 1 drop sodium thiosulfate to tube and swirl gently to mix. (Do not allow to wash up into syringe.)
24. Add another drop and swirl.
25. Continue adding sodium thiosulfate a drop at a time until yellow brown color changes to pale yellow, but not clear.
26. Gently remove cap, leaving syringe in cap.
27. Add **8 drops starch solution (white bottle – shake before using).** Swirl titration sample gently to mix to a uniform blue color. Solution turns from light yellow to dark blue.
28. Recap glass tube and continue titration process.
29. Continue adding sodium thiosulfate until solution turns from blue to clear. This is the endpoint. If solution turns blue again, ignore.
30. Using scale on the side of the syringe read the total number of units of sodium thiosulfate used.

Dissolved Oxygen Test (Cont'd)

31. Each line is 0.2. That number equals the number of parts per million (ppm) or milligrams per liter (mg/l) of dissolved oxygen in the water sample – can be read to the nearest 0.1.
32. Discard any unused sodium thiosulfate remaining in the titration syringe into waste container. (Do not return to original solution bottle!)
33. **Repeat with 2nd sample bottle using 2nd syringe.** Record results of both tests. If the difference between the two is greater than 0.6 ppm, you should perform 3rd test. Record the two test results that are closest to each other.

Important!! In instances where DO is greater than 10 mg/L:
Do not go beyond the 10 mg/l line on the syringe. Stop at the 10 mg/L line and refill your syringe a second time; refill to the 0 mg/l line with sodium thiosulfate and continue titrating until reaching the endpoint. This will most frequently occur in winter months, when water temperature is cold.

Dissolved Oxygen Tips:

- Titration syringe (if using old glass syringe) has a tendency to stick. Store with plunger outside of syringe and occasionally lubricate syringe with silicone grease.
- For instances where dissolved oxygen level is so low that the sample is already a light pale color once sample is "fixed" but before adding sodium thiosulfate, you may go ahead and add starch indicator prior to adding any sodium thiosulfate.
- If you are unable to determine if your sample has reached its endpoint (unable to distinguish between pale blue and clear), try holding up a sheet of white paper behind test tube, then proceed if necessary by continuing to adding sodium thiosulfate until solution turns clear.

VII. pH Test

1. Rinse the sample test tube and cap with water from bucket. (Note: should have already been cleaned once with tap water at the end of the last monitoring event.)
2. DO NOT return rinse water to bucket.
3. Fill sample test tube to black line with water from bucket. (To the bottom of meniscus even with line.) Use plastic dropper to add/remove as needed. (Avoid contact of dropper tip to sample bottle, table, paper towel, etc.)

pH Test (Cont'd)

4. Hold chemical solution bottles vertical when adding solution to the sample to ensure consistent drop size. (Avoid solution contamination by avoiding contact of the bottle tip to sample jar, table, etc.)
5. For **wide** range kit:
   a. Add **10 drops** of indicator solution, holding the reagent bottle completely upside down.
6. For **narrow** range kit:
   a. Add **8 drops** of indicator solution, holding the reagent bottle completely upside down.
7. Cap test tube and mix by inverting several times.
8. Slide tube into comparator slot and record pH value to nearest 0.5 unit (wide range) or nearest 0.1 unit (narrow range). Best to use natural sunlight as your light source.

VIII. Salinity

Using a hydrometer:

1. Fill hydrometer jar about ¾ full with water to be tested.
2. Hang thermometer in jar.
3. Lower hydrometer into jar, allowing it to float.
4. Read and record temperature in jar.
5. Read and record specific gravity to the fourth decimal place. (Look at from below and above.)

Using a Refractometer:

1. Refractometer should have been calibrated. (See page 2.)
2. Rinse refractometer with water sample.
3. Apply drops from water sample on refractometer and hold up to light to read salinity. (Right side of circle.)
4. Record as parts per thousand (0/00), the scale located on the right hand side of refractometer view scope.

IX. Turbidity Tube

1. Close the drain tube by squeezing the crimp.
2. Fill the transparency tube with your sample water, either directly from stream or from bucket.

3. To collect from stream: point the top of the tube in the upstream direction and collect surface water, being careful not to disturb the streambed.

Turbidity (Cont'd)

4. To collect from bucket: pour sample water from the bucket water directly into the transparency tube, making sure to stir water in bucket before pouring into tube.
5. Looking down through tube opening, partially open drain crimp and slowly draw off sample; control flow by squeezing the crimp.
6. When the black and white pattern faintly begins to appear- immediately tighten the crimp and record the level of water remaining via centimeter rule on tube exterior. (Note: this is in cm, not mm.)

X. Nutrient Procedures

Equipment Preparation

Can be performed at home the evening before or morning of sampling.

1. If using a demineralized water bottle, make sure it is full of water, from your tap is fine.
2. Do not forget the filtering equipment.

Nitrate-Nitrogen Test

1. Grab a fresh bucket of sample water. (Remember to rinse bucket several times and pour rinse water downstream or on the stream bank.)
2. Rinse nitrogen test tube and cap (inside and out) one time using water from the bucket. Discard rinse water on ground or downstream.
3. Fill test tube to the 5-mL line with sample water. Use plastic dropper to add or subtract water from the test tube – discard additional sample water from the dropper, DO NOT return it to the bucket.
4. Add one nitrate tablet #1.
5. Cap the test tube and mix until the tablet dissolves.
6. When the tablet has dissolved, add one Nitrate tablet # 2 to the test tube.
7. Cap and mix until the tablet dissolves.
8. Once dissolved, wait 5 minutes for the reaction to occur.
9. In the meantime, insert the nitrate-nitrogen octa-slide into the viewer.

Nitrate-Nitrogen Test (Cont'd)

10. After 5 minutes insert the test tube into the octa-slide viewer and match it to a color sample.
11. Record the value on your datasheet in ppm (parts per million).

Phosphate Test

Setting up the Axial Reader

1. Find a flat surface to set up the Comparator and Axial Reader.
2. Position the comparator so that the side with the numbers is towards you.

(The axial reader should be on the back of the comparator and should slide freely up and down.)

3. Place the ampoule of distilled water in the square hole on the left side of the comparator.

Filtering your Sample

1. If turbidity is low (approximately >60 cm on turbidity tube), filtering is not required: Proceed to step 3.
2. If turbidity is high (approximately <60cm on turbidity tube), filtering is recommended: Proceed with steps A through H.
    A. Fill syringe with sample water.
    B. Place filter apparatus on the bottom of the syringe.
    C. Eject syringe water, discarding it on the ground to rinse the syringe and filter apparatus.
    D. Remove filter apparatus from the syringe then unscrew the top portion of the apparatus.
    E. Using forceps, place 1 filter pad on screen inside filter apparatus and screw apparatus back together.
    F. Fill the syringe with sample water.
    G. Place filter apparatus onto the bottom of the syringe.
    H. The sample is now ready to be filtered, proceed to step 3.

Phosphate Test (Cont'd)

Preparing the Blanks

3. Rinse two tests tubes once with filtered water or sample water and dispose of rinse water.
4. Fill the two test tubes with filtered water or sample water to the white line using the extra pipette. These test tubes are blanks. NO REAGENTS ARE ADDED TO THEM.
5. Place the two test tubes into the axial reader behind the colored slots on either side of the ampoule.

Preparing the Sample

6. Rinse a third test tube with sample water or filtered water.
7. Fill the remaining test tube with water from the filtering syringe or bucket to the white line using the extra pipette to add or remove sample.
8. Using the 1-mL plastic pipette add 2-mL of the VM phosphate (translucent bottle).
9. Cap the test tube and invert several times to mix.
10. Wait three minutes.
11. Use the plain pipette and add 4 drops of reducing reagent (white bottle) to the test tube.
12. Cap and mix.
13. Remove cap and place in the middle slot on the axial reader, behind the ampoule.

Using the Axial Reader

1. Slide Octet Comparator up until top is even with the top of the Axial Reader.
2. Hold comparator so that natural light shines down through the test tubes.
3. Compare the colors – compare color in center test tube to colors in top left corner of octet comparator.
    A. If the color of the test sample is less than the color of the lowest value, the result is recorded as "less than" the lowest value.

Phosphate Test (Cont'd)

B. If the color of the test sample matches one of the color standards in the upper left-hand quadrant, the result is taken as the value of that color standard (in parts per million).
C. If the color of the test sample falls between these two values, the result is the average of the two values.
D. If the color of the test sample is darker than the color of the second color standard, move the comparator to a position where the bottom of the Axial Reader and the bottom of the Comparators are even. This movement aligns the mirror with the bottom row of windows in the comparator. The comparator unit should be moved carefully within the reading device to avoid spilling the contents of the tubes. The comparison of the unknown sample is then made with the standard in the lower left-hand quadrant of the Octet comparator.
E. If a color match is not reached with the standards on the left-hand side of the comparator, the test sample and blank tubes are transferred to the right-hand side of the Axial Reading device. The ampoule of distilled water is transferred to the hole on the right-hand side of the comparator. Be certain that the test sample is positioned directly behind the ampoule of distilled water with untreated sample (blanks) on either side of the treated sample. The comparison technique is continued as described above.

Nutrient Sampling Cleanup

Field Rinsing

Rinse the syringe and filtering apparatus, extra pipette, reagent pipettes and test tubes in the field with DEMINERALIZED water.

Cleaning Nutrient Sampling Supplies at home

1. Rinse all N and P supplies thoroughly with tap water then rinse thoroughly with DEMINERALIZED water and allow to dry.
2. **NEVER** use detergent to clean any of the monitoring supplies.
3. Fill DEIONIZED water bottle with tap water. If crystals become amber-colored, inform your monitoring coordinator that you need a replacement bottle.

Store equipment in a cool, dry place, out of the reach of children and pets.

XI. Bacteria Monitoring

6. Note the amount of rainfall within 48 hours prior to sampling and record in the bacteria section of the datasheet
7. Wade into the main flow of the stream; take a few steps upstream with minimal disturbance; then reach upstream away from your body to collect the sample. (If wading is not possible, follow step V [Water Sample Collection in a Bucket] and proceed with the following directions, making sure not to touch inside of bucket with hands) – if using a bucket collect a fresh water sample in the bucket after you finish the bacteria monitoring
8. Using good sterile technique (open bulb-side first as not to contaminate the tip) pipette desired volume (1.0 – 5.0 milliliters) of sample water directly into Coliscan media bottle.
9. Immediately place bottle on ice in cooler (probably (2) 2-ml allotments is best using 3 ml disposable pipette.)
10. Repeat for replicate #2
11. Record the expiration date of the media bottle
12. **If collecting samples from more than one site, label each bottle with the site name and # with a permanent waterproof marker.**

Bacteria monitoring - sample plating

1. Fill out the label on the Petri dish with required information.
2. Gently mix (do not shake) bottle of Coliscan media containing the sample water, then pour the entire contents into a Petri dish. Be careful not to let the bottle lid touch anything as not to contaminate the sample. Also, only open the Petri dish long enough to pour in the sample.
3. Gently swirl Petri dish so the Coliscan media covers the entire bottom.
4. Allow the media to solidify for approximately 60 minutes prior to incubation. For safety purposes, it is a good idea to tape each Petri dish shut at this point.
5. Repeat for replicate #2
6. Put plates in incubator and try to maintain at 37 ° C (= 98.6 ° F) temp for 24 hours. Record the average incubator temperature on the datasheet as well as the # of hours that the plates were in the incubator
7. **As soon as plates are removed from incubator, they must be scored**

Bacteria monitoring - scoring plates

13. Place the plates on a white background or score in natural sunlight. Count the number of dark blue (NOT TEAL) to purple (NOT PINK) colored colonies larger than pinprick size on each plate. Do not pay attention to halos around the dots, but only the center color. Record this number in the column labeled **"Total # of purple or dark blue colonies on plate"** on the data form. Repeat for replicate #2.
14. Calculate the number of *E. coli* per 100 milliliters of water by following the instructions on the datasheet and record on the data form.
15. Calculate the **average number** of *E. coli* per plate and record on the data form- **report this value on the online database.**

Cleaning Bacteria Supplies

1. Throw used pipettes in the trash
2. Rinse media bottles 2-3 times and then throw in trash
3. Add enough bleach or rubbing alcohol in Petri dishes to cover plates, let stand 10 minutes. Place the plates in a zip-lock bag and dispose in your household trash
4. Store equipment in a cool, dry place, out of the reach of children and pets.

XII. Hydrolab

Equipment Preparation

Pre Calibration – Specific Conductance

1. Install the calibration cup on the sensor pack and rinse three times with room temperature deionized water.
2. To create your standard, begin with a stock solution of 1.0M KCL and use deionized water to make either a 1:1000 (SpC = 0.147mS) dilution for fresh water sampling or a 1:10 (SpC = 12.89) dilution for brackish water sampling.
3. Rinse sensors once with the standard solution and place waste in waste container.

4. Mount sensor pack in a calibration platform or ring stand and clamp with sensors pointing towards ceiling. Turn on Hydrolab.

5. Fill calibration cup with standard solution, making sure there are no bubbles in the cell. Record the real-time SpC reading in the "Pre-Cal" row on datasheet.
6. Navigate to the *Calib* icon and select it by pressing enter. Navigate down to *SpC* and select it by pressing enter. The most recent reading appears.

7. Use the right/down and left/up keys to adjust the reading up or down until it matches the SpC of the standard solution (either 0.147 or 12.89mS) then press *enter* to accept.

Hydrolab Equipment Preparation (Cont'd)

8. Press *Esc.* Confirm that the real-time SpC is consistent with the standard. If it is not, repeat the calibration and if it is the same, record on the datasheet in the "Cal" row.
9. Discard the standard in waste container.

Pre Calibration – pH

1. Rinse three times with deionized water.
2. Rinse once with 7.0 standard, discarding the rinse in waste container.
3. Fill Calibration Cup with 7.0 standard. Record the "Pre-Cal" reading on datasheet.
4. Move to *Calib* mode and select *ph.* Adjust the reading to 7.0 and press *Enter*. Escape out to *Screen* mode and confirm that the real-time reading is close to 7. Record this as the "Cal" reading on the datasheet. Discard standard in waste container.
5. Rinse once with either 4.0 or 10.0 standard slope solution, discard waste in waste container. Fill Calibration Cup with standard and record the "Pre-Cal" reading. Proceed to the *Calib* mode and adjust the reading to 4.0 or 10.0. Escape out to real-time, check the reading and record it in the "Cal" row. Discard the standard in waste container.

Pre Calibration – Dissolved Oxygen

1. You will calibrate the sensor in air of 100% humidity, and double check it against a theoretically predicted DO of 100% saturation. You will also need to calibrate to the current day's barometric pressure (BP) in mm Hg. You can obtain the barometric pressure off of a barometer or a local real-time weather report on the internet. To convert BP from inches or millibars to millimeters of mercury:

   BP in mm Hg = 25.4 X BP in inches

   BP in mmHg = 0.75 X BP in millibars
2. Rinse three times with deionized water.
3. Mount sensor pack in a calibration platform or ring stand and clamp with sensors pointing towards ceiling and pour an inch of water into cup.
4. Remove any drops of water from DO sensor by blotting with tissue paper.

Hydrolab Equipment Preparation (Cont'd)

5. Place black cap upside down atop the storage cup and wait 2 minutes to allow the humidity in the cup to reach 100%.
6. Record the reading on screen as "Pre-Cal" DO on datasheet.
7. Move to *Calib* mode and select *DO%.* It will already read 100%, but you may need to adjust the BP reading to today's value, as determined in #1.
8. Press *Enter*, then escape out to *Screen* mode.
9. Record the theoretical prediction by consulting a separate table of 100% saturation values, and record it as "Theor Sat DO" in the datasheet. Confirm that the real-time DO reading agrees with the prediction. If they agree, within 0.005ppm, record real-time reading as "Cal" DO. If they do not agree, repeat the calibration.

Pre Calibration – Depth

1. Go to *Calib* mode, select *Depth*, and adjust to zero. Press *Enter*.

Pre Calibration – Turbidity

1. Refer to user's manual for periodic calibration of turbidity sensor.

Hydrolab Field Procedures

Avoid jarring the sensor pack and/or the display. Do not twist or turn the cable especially near the connectors at either end. Whenever traveling, replace the storage cup, filling it first with an inch of tap water.

1. Remove the storage cup and place the guard cap on the sensor pack.
2. Hook the cable into the top of the handheld display.
3. Lower the Hydrolab into the water staying within the first meter of surface water and press the ESC button to activate the circulator.
4. Press On/Off button (at bottom) to turn on. After a few seconds, the display will show real-time data containing temperature, specific conductance, DO, pH, and depth. Record these values on datasheet for the appropriate parameter after numbers stabilize.

Hydrolab Field Procedures (Cont'd)

6. Press the Enter (top button) to switch to the real-time display of battery voltage, salinity, %DO, ORP, and turbidity. Record salinity and turbidity measurements on datasheet.
7. Press the On/Off button to turn off. Remove the Hydrolab from the water then remove the guard cup and place the storage cup on the sensor pack.

Hydrolab Post Calibration Procedures

1. After sampling, you must go through the same procedures described previously in the "Hydrolab Equipment Preparation" section for calibrating the Hydrolab for SpC, pH, and DO. (i.e. rinsing with deionized water, applying standard solutions etc.) Record the readings in the "Post Cal" column on the datasheet.

You will record these values in real-time readings, not in calibration mode.

Hydrolab Maintenance Procedures

The Hydrolab must be rinsed after each usage with tap water. Use tap water and/or soapy water to clean the sensors and their hosing, the storage cup, and the handheld display unit. Always store the Hydrolab sensor pack in an inch of water in the storage cup.

If the Hydrolab is reading accurately in the post calibration procedures, the sensors are performing optimally. If the post calibration procedures are off, you will need to maintain the Hydrolab.

PH Sensor

1. Changing the Electrolyte inside the blue reference sleeve should be done every month.
2. Move the turbidity sensor out of the way. Gently remove the blue pH sleeve.
3. Rinse the sleeve two times with tap water, them once with Saturated KCL & AgCl electrolyte.

Hydrolab Maintenance Procedures (Cont'd)

4. Drop in two KCl salt pellets, and then refill the sleeve with fresh electrolyte.
5. Hold sensor pack aimed downward and slide the sleeve up until it is just past the first "o" ring. Then, aim sensor pack up towards ceiling and seal the sleeve the rest of the way past the second "o" ring.
6. There must be no air bubbles inside the tube!
7. Rinse sensor pack with tap water to rinse off any spilled electrolyte.
8. The Teflon Junction at the end of the blue sleeve must be replaced twice a year, look for it to lose its white color, as this is the signal to replace it.
9. To replace the Teflon Junction, screw out the old junction and replace with a new Teflon Junction.

DO Membrane

1. Mount the sensor pack towards the ceiling; move the turbidity sensor. Remove the "o" ring and membrane, discard.
2. Rinse DO chamber twice with DO electrolyte (2.0 M KCl), then refill the chamber until there is a positive meniscus above the rim. There must be no air bubbles!
3. Secure a new membrane (holing only the edges). Turn the circulator blade out of the way. Hold the membrane between both hands and bow it into the small valley. Hold it over the DO sensor and drop it onto the meniscus of the electrolyte.
4. Drop the "o" ring flat onto the membrane so it is centers over the rim of the DO sensor. Brace fingers against the sensor pack and with both thumbs, move the "o" ring down around the rim. Make sure the membrane is free of any wrinkles or bubbles. Repeat if necessary.
5. Rinse sensor pack with tap water to rinse off any spilled electrolyte.
6. The circulator blade should be removed with a small screwdriver and cleaned with soapy water or rubbing alcohol and replaced.

Hydrolab Maintenance Procedures (Cont'd)

Other Sensors

The temperature probe, conductivity window, and turbidity probe can all be cleaned with soapy water or rubbing alcohol to remove grease, oil, or debris using a soft, non-abrasive cloth. After cleaning, rinse several times with tap water to remove any residue.

XII. Clean Equipment/Freezing Samples

1. **Once home, place samples immediately in the freezer (for nutrient sampling)**
2. Rinse all glass and plastic ware including caps, thermometer and titrator syringe using tap water
3. Allow bottles to air dry before recapping
4. With tap water running in the sink, pour the waste bottle contents down the drain; rinse bottle and allow drying before capping.
5. Store thermometer in an upright position.