Particle Size Analysis Protocol
Revised 4/16/12 by Nannette Huber

*Before you begin, be sure to sign the PSA log sheet.

*If at any time the PSA starts to over fill, first use the Control menu to open the drain and turn off the pump, then get help!

Supplies needed:

Sediment sample	Stir bar
Gloves	100 mL beaker filled ¾ full with tap water
Scoopula	Printer paper
Transfer pipette	Thumb Drive
Stir plate	

Particle Size Analyzer (PSA) Set-up:

1. Turn on computer, printer, and PSA.
   a. On/off switch for PSA on lower left
   b. Green light turns one when machine is ON
   c. Note, for best results, allow PSA is warm-up for 2 hours
2. Open PSA program
   a. *LS32* icon located on desktop
   b. A dialog box will appear, press *OK*
3. From the *Control* menu, turn on pump
   a. Whirling noise indicated pump is on
   b. Remove yellow cover and verify clean water is flowing through PSA
4. Create a folder to save your files
   a. Open the *File* menu
   b. Select *Create Directory*
   c. Create a new folder under the 2012_TESC_445 folder and select OK. Give this folder a name that reflects the samples.
   d. Go to *File* menu
   e. Select *Change Directory*
   f. Select *C:\LS32*
   g. Go to *File* menu
   h. Select *Change Directory*
   i. Select your new folder directory (this will remain the default till changed)
   j. At the end of the day, move results to your X-drive folder

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Prepare Sediment Sample:

1. Fill a 100 mL beaker ¾ full with water. Tap water is okay.
2. Mix your sediment sample thoroughly while it is still in the sample bag.
3. Add approximately ¼ teaspoon of sediment into beaker. <u>Be sure you do not add rocks, shell fragments, or Asarco slag</u>. The PSA can only analyze particles up to course sand size.
4. Add magnetic stir bar. You may need to periodically clean iron fragments off the stir bar.
5. Place beaker on stir plate
6. Select stir setting that fully agitates sample. Slower works better than faster for some samples. You want the sample fully suspended in the beaker.

Particle Size Analysis:

1. Click on *Cycle* icon (green arrow) on the menu bar
   a. Click on *New Sample*(this will set the defaults on this menu)
   b. Click on *Sample Info*
      i. Fill in *Field ID* with station number and date (YYYYMMDD)
      ii. Fill in *Operator* with your last name
      iii. Fill in *Sample ID* with sample location, if known
      iv. Click *OK*
   c. Click on *Start*
   d. PSA will run standardization test. This test takes a while. The PSA will beep when it is ready.
   e. The standardization test will run automatically every 2 hours machine is in use
2. Use a clean transfer pipette and squeeze air out of the bulb.
   a. Place the pipette tip at the bottom of the well-mixed solution in your beaker
   b. Open the bulb while dragging the tip through to solution from bottom to top. This gives you the best unbiased sample possible.
3. When screen prompt indicates *Obstruction Level 0% Add Sample* carefully add sample until obscuration is between 8-12%.
   a. Be sure to add the sample down the center of the analyzer well.
   b. There is a lag time between adding the sample and obscuration level changing, so do not add sediment too quickly or you will over-obscure.
   c. When appropriate obscuration level is reached, *Add Sample* becomes I
   d. Select *Done / OK*
   e. Place yellow lid over vessel till sample is analyzed.

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4. Sample will be analyzed for 60 seconds and histogram of grain-size distribution will automatically appear. The PSA will not beep this time, you will know it is done when the histogram is no longer moving.
    a. Save the histogram to the folder you created, you may need to update document name (use Save As).
    b. Print hard-copy.
5. Repeat to run additional samples. Each sediment sample should be run three times.

To save the file for Excel:

1. Click the *Open* icon.
2. Navigate to the directory where the desired file is stored.
3. Open the file. The histogram created earlier will appear.
4. In the histogram window, click:
    a. *RunFile*
    b. *Export*
        i. Check the data you want to export (if unsure, check all the data boxes)
        ii. Click the Settings button.
            1. Select comma deliminated (the export extension should automatically change to CVS).
            2. Click OK/Done to return to the export dialog.
        iii. Make sure you are exporting to your desired location
        iv. Put your desired file name (if it's not there already) in the Export As box.
        v. Click *Export* when ready.

Particle Size Analyzer End of Day:

1. Select rinse from control menu to clean PSA. When the well is clear, end the rinse cycle manually.
2. Using the *Control menu*, turn off pump
3. Log off the computer
4. If using PSA for the next week or so, leave PSA on
5. If finished with PSA, turn PSA off.

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Φ	µm	Φ	µm
8	4	3	125
7.5	5.5	2.5	180
7	7.8	2	250
6.5	10	1.5	360
6	15.6	1	500
5.5	22.4	0.5	710
5	31	0	1000
4.5	45	-0.5	1440
4	63	-1	2000
3.5	85		