

## Standard Operating Procedure - Core Lab

Dec 2003

### I. PORT CALL—ON COMING

- Go to your lab and begin cross over with the off going technicians. Read the lab report from the previous leg and discuss any changes in equipment status or procedures.
- Attend introductory meeting or any other safety or training meeting.
- Assist with loading/unloading freight and other tasks as directed by the Lab Officer or Assistant Lab Officer.

### II. SITE PREPARATION

The following is a list of actions that should be accomplished prior to arriving at the first site. On cruises with short transit times before reaching the first site it is advisable to perform as many of the preparations in port as possible.

#### A. PREPARE THE LAB FOR CORING ACTIVITIES

All the technicians assigned to the Core Lab are responsible for maintaining the stock of supplies on the Catwalk and in the Core Lab. Supplies can be obtained from Lower Tween and Hold stores, Hold reefer, and Casing Hold. Bring supplies as follows:

- Supply the catwalk with: clear, blue, and yellow endcaps; acetone in squirt bottles; clean, absorbent rags; meter sticks (~149cm); permanent red and black markers; 4" stainless steel spatulas; chisel and mallet for harder sediment and hard rock; liner puncture tool for gassy sediments; hammer, hacksaw, plunger; china markers for hard rock and marking liners on wet days; and cutters (for core liners) with good blades.
- Supply the description table with: glass slides; toothpicks; mounting media (Norland Optical Adhesive (for ultraviolet curing); coverslips; smear slide cases and labels; Wheaton sample vials; miscellaneous glassware; desk supplies, including pens, pencils, liquid paper, rulers, etc. various sizes; and Saran Wrap.
- Supply the sample table with: 5 and 10 cc sample tubes/scoops, 5-10cc sample plugs, sample bags, foam plugs (5, 10cc), split foam rods and pop top vials stored in the bins under the table. Close to the core rack area and in the Stanley Vidmar cabinet, store: core boxes, bucket holding foam sponges, polyethylene and filament tapes, utility knives, black felt tipped markers, black D-tube endcaps, "K-Pak" bags etc.
- Supply the photo area with: red endcaps; sponges; red permanent markers; core boxes; polyethylene and fiber tapes; staples and red pens.
- At the JANUS core entry and sampling stations insure that the Laser and bar code printers are loaded with sufficient labels and paper.

## **B. GENERAL ACTIVITIES**

- Stand Underway watches in the Underway Geophysical Lab as assigned by the Lab Officer.
- Go over the various instruments and software with the scientists assigned to the Core Lab.
- Train the scientists and temporary technicians in the operation of the instruments they will be required to use and/or in procedures they will have to perform during the Leg.

## **III. ON SITE ACTIVITIES**

The following is a list of actions that are shared among the technicians assigned to the Core Lab regardless of whether they are also assigned another Lab.

### **A. CATWALK CORE HANDLING AND SAMPLING**

When a sediment core comes on deck, proceed as follows:

- Cap the liner at either end to keep sediment from falling out during the initial handling stages.
- Measure 1.5 m sections (1 through 7), mark the ends of each section, label each section with leg, site, hole, core, core type and section number and an arrow pointing 'up'.
- If voids are forming due to gas expansion, puncture the liner as quickly as possible with multiple drill holes to vent the gas (use non-magnetic drill bits if requested). However, make sure the geochemists have taken a free gas sample (syringe or glass vacutainer depending on request of scientists) before puncturing the core. Also, let the core degas for a while before proceeding.
- Cut the liner with a circular cutting tool at the section break and part the contained sediment with a spatula. If the material is well lithified a hacksaw or hammer and chisel is used to section the core.
- Give the paleontologists 3 to 5 cm whole round (100-176 cc) of material from the core catcher for biostratigraphic dating, place the core catcher in plastic liner, cap and glue with acetone, and label it with marker.
- Cut the geochemists/chemistry technicians a whole round sample from the bottom of a section for Interstitial Pore Water analysis (the number and amount will vary upon request of the scientists) and let them take a 5ml headspace sample from every core at the top of one section. The Curator will write the catwalk sampling plan on the catwalk whiteboard.
- Keep the catwalk area acetone-free until the shipboard scientists and geochemists or chemistry technicians have finished taking their samples.
- After the whole round samples are removed from the catwalk, cap and glue with acetone the remainder of the core. Blue endcaps are placed at the top of each section, clear endcaps at the bottom, and yellow endcaps at the end of any section from which a whole round sample was taken.
- Bring the core in the Core Lab once it is labeled, sectioned and capped.
- If the recovery is less than three sections, ask the curator whether to suspend whole round sampling.

When a hard rock core comes on deck, handling of the core somewhat differs. Proceed as follows:

- Section cores at fractures or other natural breaks as close to 1.5 m intervals as possible.
- Break the core at some appropriate point with a hammer and chisel if pieces longer than 1.5 meters are recovered.
- Measure the core starting at the bottom of the recovered material and working backwards. When you get to the first section, it should be less than 150cm. Measure the recovered rock inside the liner to get your total recovery but measure the liner to be cut at 150cm. This will allow you some extra space to curate the individual pieces.
- Since hard rock cores are curated without a core catcher section, place the piece(s) from the core catcher in the bottom end of the core liner in correct stratigraphic order and orientation.
- Sometimes the hard rock cores do not come up with a liner. In this case, pick up the pieces of rock as they come out of the barrel, mark the orientation, and fill split liners to 1.5 m. Curation will be done later inside the Lab.

## **B. PROCESSING OF CORES THROUGH THE CORE LAB**

The following list highlights the core flow through the Core Lab. Technicians assigned to the Core Lab routinely perform these tasks:

- Place the sections on the core rack and engrave the working and archive side of the liners with the standard ODP identifier, "Leg-Site-Hole-Core-Coretype-Section-A or W" along with an 'up' arrow.
- Enter the following information in the Janus database (CoreLog): number and length of each section, location of catwalk samples, and any other comments.
- Generate, using CoreLog, six bar core labels for each section and four hardcopy printouts of the core data. Bring a copy of the tracking sheet to the sampling and description tables, and a copy to the photo table along with two sets of labels.
- Leave the section in the core rack to equilibrate to room temperature.
- Run the sections through the MST. This can be done by any of the Core Lab technicians or shipboard scientists.
- Measure the sections for thermal conductivity. The Physical Properties technician or scientists usually do this.
- At this point, take the whole round samples for Physical Properties if needed. Cut the whole rounds on the catwalk, seal the samples and store them upright in saltwater in the reefer. Enter the samples in CoreLog.
- After whole round measurements have been made, transfer the sections to the splitting room.
- Split the sections longitudinally from the bottom of the section to the top on the core splitter with either the wire (for soft sediments) or the supersaw (for lithified material) along an axis halfway between the double line and the opposing single line scribed on the liner.
- Gently rinse the lithified cores before leaving the splitting room.
- Place the archive halves of the core on the description table in the Core Lab and the working halves on the sampling/Physical Properties table.

- The archive halves will be described by the sedimentologists, scanned on the DIS and AMST by one of the shipboard scientists or the Paleomagnetism technician, and then run through the Cryogenic Magnetometer by the Paleomagnetists.
- After the descriptions have been completed, place the archive half on the photo table and shoot the entire core with color and black and white film. Remember to place the whole round spacers of the proper length in all of the core photos.
- After photography, place the archive halves in D-tubes (red endcaps and red labeling).
- The working halves are taken one by one by the Physical Properties scientists for P-wave velocity and vane shear strength measurements.
- After the physical properties measurements are done, help the scientists, when time permits, in taking shipboard and personal samples.
- After sampling, place the working halves in D-tubes (black endcaps and black labeling). Put yellow caution stickers on the D-tube of any section that has had something unusual happen to it.
- When putting either working or archive halves into the D-tubes, make sure that you slide each section bottom first and follow with a wet sponge before sealing the D-tubes with polyethylene tape.
- When there is no more space for temporary core storage in the lab, box the sections (10 per box) and move the boxes to the core reefer. Make sure that the photographer has taken all close-up photos before taking the archive halves to the reefer (8 boxes maximum moved at one time).
- Keep track of the boxed sections using the Core Box Inventory forms.
- Segregate cores in the core reefer so that working halves are on the port side and archive halves are on the starboard side of the reefer. On a high recovery leg core stack the boxes ten across on the floor in the center of the reefer.

Handling of hard rock cores somewhat differs from soft sediment. Hard rock curation needs to be done by the Curator or a senior technician and petrologists. Proceed as follows:

- Carry the hard rock section into the core entry area and record the liner length of each in the JANUS CORE application. Curated lengths are not entered until the core is fully spaced out and curated.
- Label and engrave empty liners into which you will transfer the core.
- Carry the core to the splitting room and split the first uncurated section of core on the core splitter.
- Mark with a red wax china marker, starting from the top of the section, the bottom of each piece long enough not to have rolled in the liner.
- Space the pieces, i.e. with the help of the a petrologist, broken or beveled rock pieces which still have features are aligned from piece to piece and are fitted together. Hard rock pieces that do not fit together are separated from each other in the core liner by dividers.
- Acetone spacers in the split liner.
- Once the core is fully spaced out (curated), measure the curated length of the section and enter it in JANUS. (Remember that Depths will have to be re-generated for the site after each annotation of the core application.) Only once the depths have been re-run, can the sections be run on the MST.

- Split the core pieces on the Felker saw in the splitting room along the splitting line marked on each piece. Long pieces can be split without a liner on the supersaw, and smaller, more delicate pieces should be split on the Tile Saw in the sampling area.
- Once split, return the hard rock core pieces to their respective liners, lay them flat side down and dry the pieces.
- Make labels using the BRADY hand-held label printer with the standard identifier Leg, Site, Hole, Core, Coretype, Section, Piece (and Sub-piece number), an “Up” arrow if the piece is oriented, and a "W" or an "A", indicating whether the piece is from the working or archive half.
- Affix labels parallel to the cut face with epoxy resin so that they read parallel to the lines of writing and with the orientation arrow pointing towards the top of the core. Make sure that all oriented pieces have arrows pointing “UP” core. When it is not possible or desirable to affix labels to the actual pieces, affix the labels to the core liner.
- Once the core are curated and properly labeled, follow the core flow described above.
- After sampling of the had rock cores, shrink wrap both working and archive sections prior to their final trip down to the reefer. Place a blue dot on the endcap to denote no sponge.

For details on proper handling and curation of special cores including soupy cores, expanding cores, cores with split liners, H<sub>2</sub>S cores, and cores with critical intervals (e.g K/T boundary, volcanic glass, sulfides, sapropel, etc..), see the curatorial cookbook section on “Special Core Handling Problem”.

### **C. GENERAL ACTIVITIES**

- Re-supply Lab when needed. Check on levels of supplies DAILY.
- Check and maintain SIMAN inventory on a regular basis and submit orders to the Assistant Lab Officer.
- Update shipboard manuals and cookbooks on a regular basis.

### **IV. LAB MAINTENANCE**

In the Core Lab, the following maintenance takes place during and at the end of the Leg:

- For the Super Saw: WD-40 the bearings and track of both the saw and the wire splitter as needed. At the end of the Leg, service the bearings and clean the saw very well. Make a new rope. Note that if the track is still difficult after cleaning the bearings, it may be time to replace the bearings. See the Assistant Lab Officer or a senior technician for how-to. Changing the bearings is a major operation requiring at least two people.
- For the Drill presses: At the beginning of the Leg, check the spindle for proper rotation and spindle alignment. After each use, rinse thoroughly and spray the drill bit/ collar with WD-40. At the end of the Leg, clean the presses thoroughly and grease with WD-40 as appropriate.
- For all the other saws (Felker and Tile): At the beginning of the Leg, check the blades for proper rotation and alignment. After each use, rinse thoroughly and spray the blade with

WD-40. At the end of the Leg, clean the saws thoroughly and grease with WD-40 as appropriate. When needed, change the blades.

- Empty and clean the sediment traps.

## **V. END OF LEG ACTIVITIES**

- Write the end-of-leg lab report, give a copy to the Lab Officer and Yeo-person.
- Make sure all data are sent to Janus before the MCSs cut off database access. All non essential data should be erased from the hard disk of all the Lab MACs and PCs.
- Pack up equipment being returned for repair and give the Assistant Lab Officer the following information: ODP inventory number, value, weight, serial number, model number, vendor's name and country of manufacture.
- Give the Lab Officer a list for port purchases if any.
- Perform the end of leg maintenance as listed above.
- Clean the lab as listed below and other area as assigned. Bring all the trash including the glass container to burn basket or incinerator.

At the end of the Leg, it is the responsibility of the Core Lab technicians to clean the Lab as follows:

- Remove unnecessary paperwork and tape from walls, bulletin boards, shelves and drawers.
- Clean the splitting room thoroughly; wash the mats on the catwalk with the pressure washer.
- Clean the freezer.
- Clean all equipment & tools, including microscopes.
- Clean description and sample table racks.
- Vacuum all the shelves and drawers.
- Wash countertops and cabinets thoroughly.
- Clean the stereo system.
- Clean all monitors, keyboards AND mouse pads.
- Clean the lights and vents.
- Vacuum the chair seats and wash their feet.
- Wash walls, doors, portholes, and baseboards.
- Clean deck drains, sediment traps, and sinks
- Vacuum and scrub the floor.

## **VI. PORT CALL—OFF GOING**

- Find the oncoming Marine Lab Specialist(s) for your lab and cross over. Make sure the technicians that are replacing you are aware of any changes made to the lab, procedures, current equipment status, and port purchases if necessary.
- Attend the port call meeting.
- Unload off going airfreight and frozen shipment, or any freight as required. Load on coming freight if time permits.

