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Shipboard Measurements Panel

20-22 March 1992

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EXECUTIVE SUMMARY

SMP visited the ship at the port call in Honolulu and thus, focused the discussions on individual laboratories. The panel was impressed with the new core laboratory layout. The panel congratulates the technical and science staff for a job very well done. The new configuration provides much better core flow and space for future acquisition of systems, such as the split core MST. In addition to its review of individual laboratories, SMP discussed the implementation plan for core-log data integration, the ODP DataNet proposal, new technologies (CATSCAN and Infrared spectroscopy), methods for sediment analyses using the XRF, and the recommendations of the Data Handling Working Group. The panel also reviewed the equipment priority list, making some changes.

The panel again found the ship visit to be very productive. There is no substitute for 'hands-on' and much information was exchanged between the technical staff and SMP members. SMP recommendations are listed below grouped in categories of: laboratory specific recommendations, recommendations related to safety; recommendations on core-log data integration; the recommendation on ODP DataNet Services; and recommendations specific to upcoming legs. Finally, this summary list includes the revised SMP equipment priority list.

Laboratory Recommendations

The panel recommends that the cryogenic software be completed for use on Leg 145 (92-1 to ODP/TAMU).

SMP restates the need that technical staff must have shorebased training prior to sailing and should remain in a specific laboratory for at least 8 legs (92-3 to ODP/TAMU).

SMP recommends that sailing petrologists should be told that only Tungsten-Carbide grinding vessels are available on the ship, but that they are welcome to bring other types of vessels for use during their leg. (92-4 to ODP/TAMU)

SMP recommends that programming software (preferably C) be added to the list of supported software for the Macintosh computers (95-6 to ODP/TAMU).

SMP recommends the acquisition of the Minolta colour measurement instrument for quantitative measure of L*a*b and Munsell colour on core samples (92-7 to BCOM - see priority list).

SMP recommends that a few samples are sent to Corelabs for infrared mineral analyses (92-8 to ODP/TAMU) to evaluate the IR method.

SMP recommends the acquisition of a workstation for digital seismic data acquisition and processing (92-9 to BCOM - see priority list).

Safety Recommendation

SMP recommends that assessment of AC fields as a potential human health hazard take place as soon as possible or at the latest, during the next port call for Leg 144 (92-2 to ODP/TAMU).

Upcoming Legs

SMP recommends adoption of the procedures for XRD sediment analyses for Legs 143 and 144 as proposed by M. Rhodes which include using standard procedures for trace elements and using fused samples for major element analyses with matrix corrections. The use of pressed powders should not be used until the methods have been investigated and appropriate software developed. (92-5 to ODP/TAMU)

The panel was dismayed to learn the pore pressure component of the WSTP had been removed for reasons that are not acceptable (calibration problems). This is the only standard tool which measures pore pressure and all components of the tool are essential to the success of Leg 146. SMP recommends immediate action to re-install the pore pressure transducer into the WSTP, calibrate the tool so that it is reliable and ready for Leg 146 (92-10 to ODP/TAMU and PCOM)

Core-Log Data Integration

The TOTCO system was reviewed. This system is supposed to provide real-time drilling parameters. However, none of these parameters are available in real-time. The panel agrees that these data are important for core-log data integration because some of these data are required for use with the SCM which is a key component for data integration. SMP recommends that development of the real-time drilling parameters data acquisition system should be put back on the list of engineering developments (92-11 to ODP/TAMU; PCOM).

The panel recommends the acquisition of the Corpac software as the shipboard core-log data correlation tool. Current available versions of Corpac require the provision of a manual and some modifications to meet the specific requirements of shipboard data correlation. The panel agrees that these modifications should be performed by the author of the software with support from the ODP. Once this software is acquired, a minimum of one technical staff member must have formal training using this software tool for each leg. Training at an appropriate level must also be provided for the sailing core-log data correlation specialist (92-12 to ODP/TAMU; PCOM).

Data Handling Working Group

SMP endorses the recommendations of the DHWG report. The panel wishes to emphasize to the Planning Committee that this initiative represents a significant, additional level of effort and cannot be completed by the operator under the current budget level. The panel is concerned that this

activity will be looked upon as something that can be completely contracted out. Although the panel agrees that significant parts of this activity can be performed outside of the existing contractor(s) through subcontracts, the computing system is a central activity of the ODP and therefore must remain the responsibility of the lead contractor. **SMP recommends the following:**

The area of shipboard computing as a facility for data handling is a central activity of the ODP. As such, the recommendations of the JOIDES Data Handling Working Group should be implemented under the direction of the Science Operator, advised by a specialist JOIDES steering group for development of the new computing system. The JOIDES Computing Steering Group, in conjunction with the Science Operator, will serve as a technical forum for monitoring and reviewing software developments, especially those arising through external sub-contract and other third-party inputs from the ODP community (92-13 to PCOM).

ODP DataNet Services

SMP supports the overall direction of the proposal for DataNet Services. Specifically, SMP agrees that real-time shipboard data processing capacity has in some labs reached its limit (e.g. downhole measurements), thus requiring some level of shore-based support. The panel envisions that there will be an increasing need for shore-based data processing support, particularly for cases where operational decisions are required, and to handle large shipboard-measured datasets (e.g. images or VSP). Although these needs can conceptually be met with a system such as DataNet, the panel emphasizes the requirement that any and all shore-based processing 'nodes' must be set up as a service to the shipboard science operations. The concept of an on-line database for readily accessing ODP and other related data is excellent. The database specifically proposed (GeoBase) is not truly a database, but a database browser specific for geographic information. The 'proposal' does not address the real requirement of a functional relational database which is an essential requirement for both shipboard and shore-based science. The panel encourages submission of a more detailed proposal for review (92-14 to PCOM).

SMP Equipment Priority List

- **Core-log data integration needs:**
 - a) **natural gamma and MST upgrade**
 - b) **computer workstation**
 - c) **resistivity equipment for discrete core measurement**
- **Colour measurement instrument**
- **Bar code system**
- **Carbonate autosampler**
- **Seismic workstation**
- **Auto titration**
- **Seismic towing system**

DRAFT MINUTES

I Introduction

Members, liaison, and guests were introduced. Meeting participants are as follows:

J. Baldauf (ODP liaison)	M. Mottl (member)
R. Chaney (member)	M. Rhodes (member)
R. Current (ODP liaison)	A. Richards (member and liaison to IHP)
P. Dawson (guest)	E. Thomas (member)
J. Fox (PCOM liaison)	H. Tokuyama (member)
D. Goldberg (guest)	J.P. Valet (member)
J. King (member)	R. Whitmarsh (member)
K. Moran (member, chair)	P. Worthington (DMP liaison)

II Minutes from the sixth meeting were approved with one clarification

R. Whitmarsh and A. Richards will rotate off the SMP after the March '92 meeting.

III Business Arising

Paleomagnetics

J-P Valet and J. King reported that the move of the paleomagnetics laboratory was excellent. The ODP personnel should be commended for their efforts. There are still some needs in this laboratory which can be grouped into two categories (very short fuse requirements and long fuse items). Very short fuse items include (1) completion of the cryogenic magnetometer software; (2) re-configuration of the alternating field demagnetization coils; (3) shielding of the Walker Scientific magnetometer; (4) determination of the source and hazard level of the AC magnetic fields on the ship; and (5) completion of a core barrel magnetization study using the Walker Scientific magnetometer. One long fuse item is needed, a new more sensitive spinner magnetometer.

Very Short Fuse Items

It is critical that the key software developer (D. Bontempo) is allowed the time to finish the paleomagnetics software upgrade as soon as possible. This development has gone on for much too long. **The panel recommends that the cryogenic software be completed for use on Leg 145 (92-1 to ODP/TAMU).** The alternating-field demagnetization coils need to be reconfigured. The largest of the nested coils needs to be replaced by a smaller coil. This change should be made at the port call before Leg 145 by B. Gorree. The cost will be small because ODP already owns the necessary coils and installation can probably be accomplished in one day. The Walker Scientific magnetometer and probe must be shielded to be useful on the ship. AC magnetic fields interfere with the measurement of DC magnetic fields on the drill floor. Encasing the magnetometer in copper-bronze screening will provide the necessary shielding. The magnitude, location and sources of the AC magnetic fields (which were identified during the SMP ship visit)

must be determined immediately. These fields have been suspected to be human health hazards. Equipment for detection of these fields cost a few hundred dollars. **SMP recommends that assessment of these AC fields as potential health hazards take place at the next port call for Leg 144 (92-2 to ODP/TAMU).** A study of core barrel magnetization should be done with the shielded Walker Scientific magnetometer. Values should be determined for a used APC barrel, for a new APC barrel, for the drill pipe, and for the drill floor. If these studies indicate that it will reduce magnetic overprint, then core barrel demagnetizer must be constructed as previously recommended (SMP recommendation 91-7).

Long Fuse Item

A new, more sensitive spinner magnetometer should be purchased for the ship to replace the Minispin. A Czechoslovakian-made spinner is available for ~ \$25k that will provide sensitivity comparable to the cryogenic magnetometer for weakly magnetized samples.

Physical Properties

A. Richards reported that the possibility of a physical property workshop to be held through ESF in cooperation with GEOMAR is not logistically feasible. The panel agreed that the workshop issues are still important and that they could be addressed during a special meeting of physical property specialists associated with an SMP meeting. **(ACTION: K. Moran to request a one day special meeting associated with the next SMP meeting)**

R. Chaney and A. Richards reported on the physical property laboratory. There are several concerns about the current condition of the laboratory. They reported that the physical property technician who is to sail on Leg 143 had no training and was out on the ship for the first time. Although the technician was enthusiastic and capable, her knowledge about the laboratory, due to lack of training, was poor. This laboratory is not a simple one and an untrained technician is unacceptable. **SMP restates the need that technical staff must have shorebased training prior to sailing and should remain in a specific laboratory for at least 8 legs (92-3 to ODP/TAMU).**

The laboratory is missing equipment which should be part of standard measurements. This equipment includes a miniature vane shear device and discrete electrical resistivity. The miniature vane shear equipment includes two apparatus: a Wykeham-Farrance motorized vane shear and a custom built torque transducer vane shear. The Wykeham-Farrance device is very simple and **should never be removed from the ship.** This instrument can be repaired by the ET onboard, it is comprised of a simple electric motor connected by a belt to a spring which drives the vane. Any repairs to the instrument should be done onboard. The other shear vane should be repaired, modified so that the output goes directly to a PC, and should be out on the ship for Leg 144. Two additions should be made to the testing procedure: (1) mark each vane shaft for insertion depth, so that measurement depths are consistent; and (2) include a procedure for determination of residual strength in the vane shear manual. In addition, the Torvane had only one head in the drawer, the remaining two heads with the instruction manual must be located and returned the laboratory. **(ACTION: Report from B. Mills at next SMP on the status of the shear vane and Torvane).** In order to avoid losing track of equipment,

a checklist of physical property equipment, standards and manuals should be available and reviewed at the beginning and end of each leg.

The discrete electrical resistivity equipment was taken off the ship for repair or replacement after Leg 133 and there has been no action since then. This situation must be rectified immediately. SMP members can assist in selecting new equipment, if necessary. As reported at the last SMP meeting, an instrument built by the Universität Bremen would be an appropriate instrument for shipboard use (**ACTION: K. Moran to request information from Bremen and forward to TAMU**).

The laboratory draft manuals are good, but there is some clarification needed. For instance, example calculations with expected ranges of values for all measurements would be useful additions. There are a large number of very old manuals and old versions of the cookbooks which should be removed from the lab to avoid confusion. It may be best to keep these old versions in the lab officer's area. The Seitec scale manual requires the addition of a manual for the Fluke multimeter. (**B. Mills to present status of physical properties manuals, copies should be forwarded to R. Chaney for review prior to the next meeting**)

The spreadsheets on the micro-computers are excellent and the panel encourages further development of this software. Some suggested changes are to provide consistent significant figures throughout the spreadsheet, change the names of variables so that they are easily deciphered, and provide a definition sheet for all of the variables and terms in the spreadsheet.

R. Whitmarsh reported on the MST/GRAPE. The Co-Chiefs of Leg 138 reported discrepancies between GRAPE density and other density measurements. They blamed the GRAPE. Although no documentation of this problem was available, or could be found onboard, the GRAPE system was checked as thoroughly as time allowed. It appears that the current Cs 137, 5 millicurie source has been on board since at least June 1989. It was discovered, by chance, that the source may have been badly aligned (this could have an effect on measurements by effectively reducing the density of electrons passing through the cores). The retaining bolts appeared to have little thread left and both retaining nuts were quite loose (presumably due to vibration). A more positive alignment and retaining system (probably with locking nuts) should be used. One of the closure clips on the source container was rather corroded and should be replaced. Parts of the lead shielding around the Cs 137 source has a makeshift appearance and the main shield appears to rest directly on top of the source container. It is so heavy that it is difficult not to knock the container when removing/replacing the shield.

The GRAPE equipment was checked by running the regular 3-in-1 air-66mm/Al-25.5mm standard through the machine. In addition a distilled water "standard" was also run in place of a core. At first nonsensical (systematically wrong) readings were obtained; a marked improvement was noted after the source retaining bolts had been tightened. Eventually the equipment appeared to function correctly. However, on consulting the output files it was found that densities of -0.119, 2.519 and 0.869 g/cc had been computed for the three standards. The GRAPE software was then inspected. The software clearly lists values of 0.000, 2.600, 1.000 (see files GRSTART.DAT and GRAPE.DOC) for the standards (and

these appear to be correct for the old Ba 133 source). If they are also correct for the Cs 137 source (this requires further investigation) then the software is obviously in error in computing values of -0.119, 2.519 and 0.869 g/cc.

An attempt was made to trace the computation path in the software, but it is written in such a way that it is not easy to relate the C coding to the physical equations of Compton scattering. The problem is likely software related.

Documentation for GRAPE was either meagre (no reprints other than Boyce). There is useful literature on the fundamentals of the equipment which should be on board. There was also a lot of old, and possibly out of date, information scattered among different ring files. Some tidying up is required.

The screen display of computed density is in F3.1 format (i.e. to one decimal place). This is useless and the software should be altered as soon as possible to produce an output to two decimal places.

(Action: R. Whitmarsh to follow up with assessment of the GRAPE software and make recommendations to SMP Chair for immediate action; ODP/TAMU to determine if constants in the software are appropriate for Cs 137 source, and, if so, determine why there is a discrepancy between what should be measured by the standard and what actually is measured. Also, the mounting of the source should be modified to secure it.)

Micropalaeontology

E. Thomas reported on the status of the micropalaeontology laboratory. There has been no specific technician in charge of the maintaining the lab microscopes which require special attention. This situation has recently been partially remedied by including this task as part of the responsibilities of the photographic technician. Generally, the photography technician does not have the expertise in this area. Consequently, training should be provided to the shipboard photographers. In addition, at the end of each leg, an inventory of all microscopes should be made, and all accessories and parts placed in appropriate, marked bins in a storage cabinet. the petrologic microscopes should be provided with objectives so that they can be used for nannofossil work. At the last SMP meeting, a recommendation was made on the training of technicians for sample preparation in this laboratory. The duties of this technician should include the maintenance of the sample preparation area, operation and maintenance of the centrifuges, ovens, fume hoods, dishwasher, slides dryer, and supplies. This technician should also prepare an end of leg technical report, just as in other labs.

The new software which is currently under development is excellent. A prototype version was demonstrated to SMP and the Leg 143 palaeontologists. The panel encourages further development as soon as possible. Suggested additions to the software are as follows:

- must be able to sort species list by alphabet, abundance, FA, LA, manual
- desirable if whole chart could be viewed before printing (similar to page preview)

- desirable if heading (species names) bar could be kept in place while sample list is scrolled (similar feature in VCD)
- must be checked if size of data files permit backup on floppy discs, or whether extra storage is needed (possibly one extra storage device for the whole lab), to prevent total data loss during hard drive crash

(Action: ODP/TAMU presentation of paleo software at the next SMP meeting)

Improvements have been made in the library arrangements for this laboratory. However, the ODP Part 2 volumes should be placed in the lab, along with the DSDP volumes. Determination literature should be kept in the lab and the remaining reference literature retained in the ship's library.

(Action: J. Baldauf to report on the status of technician training and changes to the micro-paleo laboratory)

Petrology

M. Rhodes and P. Dawson reported on this laboratory. Good stuff was reported: the lab has been producing good data of an accuracy and precision equivalent to some of the best shorebased research laboratories. The ODP/TAMU technicians have received training on the repair of the XRF from the manufacturer (ARL). The only problem area was concerning the shatterboxes, once again. On the last leg, two new ceramic shatterboxes were cracked. The sailing scientists attributed the cracking to ship's motion and not sample size as we previously had thought the problem to be. SMP briefly discussed the problem and because of lengthy discussions on this topic at previous meetings, the panel quickly agreed on the following recommendation: **Because of the excellent results of the shipboard XRF, increasingly more sailing scientists wish to take powdered samples home with them for additional analyses. However, agate grinding vessels have not proved to be reliable in the shipboard environment. SMP recommends that sailing scientists should be told that only Tungsten-Carbide grinding vessels are available on the ship, but that they are welcome to bring other types of vessels for use during their leg. (92-4 to ODP/TAMU)**

P. Dawson 'dove' into the XRF onboard the ship without harm (to himself, the machine, or the ODP technician) and gained valuable information about the shipboard instrument which will significantly enhance future training of ODP technicians. Thanks were relayed to Pete for his efforts.

The PDP11 is still the data acquisition computer for the XRF. The manufacturer now has a PC upgrade and the panel encourages the program to make this change so that data can be directly dumped to the file server and the database. Currently, all data are re-entered onto a spreadsheet by hand.

M. Rhodes presented the results of his study on sediment analysis using the XRF (Attachment A). The current methods are perfectly satisfactory for trace element analyses.

Major element analyses should be performed using fused glass discs. For sediments with extreme compositions, matrix corrections are advised. If the PDP11 is upgraded as planned to a PC, then matrix corrections can be applied. For large numbers of analyses which require less accuracy, then the pressed powder method as described by Gardner (Chem. Geol, 1990) may be the solution. This method would require a significant level of effort in software development.

The chair thanked Mike for providing an excellent report to the panel.

It was noted by P. Worthington that the ability to analyze sediments for elemental analyses will provide a major step forward in the calibration and interpretation of the Geochemical Logging Tool.

SMP recommends adoption of the procedures for XRD sediment analyses as proposed by M. Rhodes which include using standard procedures for trace elements and using fused samples for major element analyses with matrix corrections. The use of pressed powders should not be used until the methods have been investigated and appropriate software developed. (92-5 to ODP/TAMU)

Computers

K. Moran presented the status of shipboard computing. A discussion of the results of the Data Handling Working Group (DHWG) were not presented here. This status did not include an evaluation of the overall computing environment (i.e., VAX/VMS/1032) because it was discussed in detail by DHWG. In general, the micro-computer environment on the ship is very good. Software is available for scientific use on both MAC's and PC's with the exception that there is no programming software supported for the MAC. Network upgrades have been implemented so that most of the micro-computers are now connected on the Ethernet trunk which has significantly improved file transfer speeds. In addition, a scratch file server has been added which now provides an interim solution for data access for the scientific party. All of the changes are very positive and, in no way, restrict or vary from the recommendations of the DHWG. **SMP recommends that programming software (preferably C) be added to the list of supported software for the Macintosh computers (95-6 to ODP/TAMU).**

Leg 143 system managers will be testing new procedures for regular email and, if successful, they will become standard for all subsequent legs. SMP was very pleased to hear this good news.

There was some concern from recently sailing scientists that the restrictions on report format were too severe. Although SMP sympathizes with these concerns, the panel does not agree that requiring the final versions of reports to be submitted in one standard format (in this case Wordperfect) is too onerous. The computing environment on the ship is very flexible and, with two systems managers, help is just a few decks away.

Sedimentology/Visual Core Description/Sampling

E. Thomas and K. Moran tested the latest (beta) version of the computerized barrel sheets and found it to be excellent. This version is much improved over the previous one and the panel looks forward to hearing the response from science parties. Two comments on the existing beta version: (1) it would be useful if in the structure column draw one long arrow, instead of a group of small arrows; and (2) it is difficult to make age-lithostrat-colour fields exactly adjacent (the program refuses to draw because of overlap, or generates a double boundary line). It would save time in manipulating if the program automatically assumed continuity of fields, while allowing overrides.

The software for core recovery data entry (CORELOG) and sample information entry (SAM) is still running on old DEC PRO350. These software utilities are in the process of being changed to IBM-PC versions. Data from CORELOG will be used at many sites onboard and the structure of this program is of prime importance. Based on discussions with the curation staff, E. Thomas reported that SAM will be updated, but the new version may not be addressing the old software problems. The program should be discarded and replaced by a spreadsheet type program (preferably on a MAC since the VCD and paleo programs run on Macs). This is of prime importance since SAM is used in a labour intensive lab area and it is cumbersome, out of date, and user unfriendly (for example, corrections are difficult to make). It would be worthwhile for SMP to evaluate the performance of the new versions as soon as they are available. **(Action: J. Baldauf forward beta versions to Thomas and Moran for evaluation)**

The curation rules which define "critical areas" in cores should be better defined. **(Action: E. Thomas to review and make recommendations for the next SMP meeting)** .

A. Mix was not able to attend the meeting to describe the digital colour scanner he used very successfully on Leg 138. It was reported that he has been supported by NSF for further upgrades to this system. After upgrades, the system could be incorporated as a routine instrument located in the new space which was made available with the restructuring of the core lab. The panel will monitor this device as a third party development. **(Action: K. Moran to again request to invite Mix to the next SMP for a report on the colour scanner)**

H. Tokuyama brought the new Minolta colour measurement instrument to the ship visit. The device is an excellent solution for quantitative colour measurement which can be used now. The device was tested by SMP by using it to measure a core and to measure the colour of Munsell colour chips. In both tests, the instrument performed very well. This device will eliminate the subjective nature of colour estimates made on cores, it is quick and easy to use and it is relatively inexpensive. This instrument in no way competes with the Mix development which is a much more sophisticated device (measures colour spectra over visible and infrared ranges). However, we do not now make consistent, repeatable measurements of colour and the Minolta could provide this now to the program. **SMP recommends the acquisition of the Minolta colour measurement instrument for quantitative measure of L*a*b and Munsell colour on core samples (92-7 to BCOM - see priority list).**

M. Rhodes presented the results of his investigation (Attachment B) into infrared spectroscopy for quantitative mineral evaluation as a possible replacement for smear slide analyses. This method is used by Corelabs (Houston and elsewhere) which utilizes a Fourier transform technique to resolve individual spectra from the simultaneous measurement of absorbance over the full range of infrared wavelengths. At first glance the method looks simple and elegant. However, there is very little experience in the geological community using this method. The most severe problem may be sample preparation. Corelabs grinds their samples to about 2 microns. We can currently grind to approx. 20 microns. This method does need some further investigation and Mike suggested the following:

1. Send a few well-known samples to Corelabs for analysis; and
2. If these results are promising, either lease equipment from Corelabs or develop the technique within the program (perhaps using data from Mix instrument).

M. Rhodes, in the mean time, will be gaining experience with this technique at the Bruker application laboratory. **SMP recommends that a few samples are sent to Corelabs for infrared mineral analysis (92-8) for evaluation of the IR method. Action: J. Baldauf to report on Corelab results and M. Rhodes to report on Bruker experience at the next SMP meeting)**

R. Current reported that a mistake was made in modifying the X-ray system and it is not yet on the ship. The panel emphasizes the need to get the system back onboard for Leg 144. **(ACTION: B. Mills to report on X-Ray status.)**

Geochemistry

As reported at the last meeting, M. Mottl reported that the Geochemistry lab is bursting its bulkheads. Although the lab still functions, planned improvements should proceed in order to reduce the labour intensive aspects of the analyses (thus freeing up technician time for more types of analyses) and to rid the lab of equipment which is so outdated that spares are difficult to supply. The technical staff provided M. Mottl and the panel with well thought out list of possible changes and improvements. The panel reviewed and discussed this list and prepared an action plan for lab improvement. New pieces of equipment in this action plan have been incorporated into the current SMP equipment priority list. The suggested Chem lab action plan in priority order is as follows:

- Coulometer: test autosampler and software and purchase, if satisfactory
- Rock Eval: (a) cross correlate with the Geofina HM on Leg 143; (b) because this instrument is increasingly burdensome to maintain, present the results of (a) to the OG community and evaluate the impact of the loss of § data (which is presently used by the Safety Panel) and TOC data; (c) investigate alternative methods of measuring TOC; (d) if acceptable base on these steps, remove Rock Eval.
- Automatic Titration System: replace present system for measuring pH/alkalinity with commercial system with (a) ± 0.1 mV readout; (b) capability of calculating endpts. via GRAN plots; (c) capability of measuring chlorinity and calcium with ≥ precision than via present colorimetric titration.
- Upgrade GC#2 to Series II for easier training and easier maintenance
- Replace LAS computer system (HP1000) with PC-based system which will free

- up a significant amount of space and will be much easier to use
- Replace Dionex with either a single or dual-channel instrument which will free up bench space plus improve the efficiency of analyses
- Upgrade computers (HP 150's) to PC's so that the lab has a common platform for easier use
- Automate balances to improve efficiency of this time consuming task

With all of these improvements, the lab will provide a more efficient and easier work environment. Although the panel would like to see all of these changes, they must be incorporated over time. This action plan will be reviewed and priorities placed on each item relative to the needs of other labs during subsequent meetings. **(Action: M. Mottl to review status of the chemistry lab upgrade plan at the next SMP)**

Action: M. Mottl review appropriate system for Dionex replacement.

Underway Geophysics

J. Baldauf reported again that the navigation equipment had not yet been purchased. However, a letter of interest which had been reviewed was sent out and some responses had been received. **Panel members again expressed their concern over the delay and suggested prompt action on the acquisition of this much needed equipment.**

A high speed streamer was tested at the end of Leg 142. H. Tokuyama reported on the results of the test. Mechanical problems occurred in the cable after the ship increased speed greater than 8 knots. After some of these problems were solved, the data were still very noisy and Tokuyama once again suggested major changes to the towing system (extended lateral boom) as presented at SMP meeting 3. These changes include a modified towing position, incorporation of at least three stretch sections, and a weighted section with a depth transducer output.

The panel discussed the need for this equipment again and are still convinced that it is somewhat negligent of us to proceed through remote locations of the world oceans without attempting to collect data underway. Although the panel realized primary program objectives are more important, improvements to this system have not occurred at all. The panel will attempt to break down the tasks required for improvement at the next meeting, then include these tasks in the overall ranking of new equipment for the program **(Action: H. Tokuyama review and itemize tasks required for seismic data acquisition while underway including estimated costs for the next SMP meeting)**

H. Tokuyama also reported on the SparcII workstation which was temporarily installed on the Resolution by G. Moore (SOEST) during the port call. In the configuration installed by Moore, the system worked well. This station could replace the existing system (which the panel has previously flagged for replacement) and could be acquired (including software) for the cost of the equipment which includes the workstation, an A/D card, and a tape storage device because the software is under development by SOEST/WHOI for some of the US scientific ships. In addition, this software would incorporate real-time navigation.

SMP recommends the acquisition of a Sparc workstation for digital seismic data acquisition and processing (92-9 to BCOM-see priority list).

ODP Sampling and Downhole Tools

R. Whitmarsh reported on the status of downhole tools laboratory. Very little change had occurred since our last visit to the ship. The Adara temperature shoe has now been used for 3 legs with good success. A new digital core orientation tool (TENSOR) has been added and appears to be very functional. This includes two horizontal fluxgate magnetometers, two micrometers and it has a solid-state memory. Data is easily dumped from the tool to a micro-computer, freeing up some technician time. The WSTP has undergone some re-design with Titanium incorporated into the pore water container and an improved tip. **However, the panel was dismayed to learn the pore pressure component of the WSTP had been removed for reasons that are not acceptable (calibration problems). This is the only standard tool which measures pore pressure and all components of the tool are essential to the success of Leg 146. SMP recommends immediate action to re-install the pore pressure transducer into the WSTP, calibrate the tool so that it is reliable and ready for Leg 146 (92-10 to ODP/TAMU and PCOM).** The panel noted that for the most critical accretionary prism Legs (110 and 131), the WSTP did not have one successful run.

P. Worthington reviewed the TOTCO system. This system is supposed to provide real-time drilling parameters which include the following: Depth and Rate of Penetration (ROP); Torque; RPM; Hook Load; Weight on Bit (WOB); Pump pressure; Sandline weight; Calculated pump flow; and Pump strokes. However, none of these parameters are available in real-time. The panel agrees that these data are important for core-log data integration because some of these data are required for use with the SCM which is a key component for data integration. **SMP recommends that development of the real-time drilling parameters data acquisition system should be put back on the list of engineering developments (92-11 to ODP/TAMU; PCOM).**

IV PCOM Report

Our new PCOM liaison (J. Fox) did not attend the last PCOM meeting. He assured the panel that he would relay our concerns and recommendations at the PCOM meetings. The panel members welcomed the new liaison. K. Moran summarized the previous PCOM meeting and reported that SMP recommendations had been considered and the most critical were fairly addressed and acted upon by PCOM (specifically with respect to Core-Log Data Integration and Technical Staffing).

V DMP Report

P. Worthington reported on several issues of interest/concern to SMP. DMP are preparing a 20

page glossy booklet on downhole measurements which will include a general overview of downhole measurements, illustrations of applications, and links to core and geophysics. This booklet is partially supported by the science operator and partially by JOI. It is scheduled to be out by the end of May. P. Worthington suggested that, if this is a successful endeavour, SMP may also wish to prepare a similar style of booklet. **(Action: Moran to monitor the booklet development and report to the panel at the next meeting).**

The DMP liaison also reported on the status of the French high resolution magnetic susceptibility tool. Software is under development now to improve the vertical resolution from 0.5m to <5cm. The tool will be tested on Legs 144 and 145. In addition, the French are also developing a pad-type magnetic susceptibility tool which will have a vertical resolution of the same order as core measurements. The software developments are expected to be complete within 12 months which may provide data for direct core-log data correlation using susceptibility.

The Pore Fluid Sampling Steering Group was formed to develop a plan for developing pore fluid sampling capabilities because the wireline packer was not a successful development. They suggested that a feasibility study should be contracted out and also recommended 5 different options for proceeding with tool development.

Paul will be stepping down as chair of DMP after the annual PCOM meeting. As a suggestion for industry membership on SMP, Paul suggested that we invite a scientist from Corelabs in Houston. The panel agreed that this member would be a good addition to the panel.

VI Upcoming Legs

J. Baldauf reviewed the current ship schedule and the new schedule for 1993 in the Atlantic. The chair asked all panel members to review the objectives of these legs so that shipboard measurement concerns can be flagged early. **(Action: all panel members review 1993 scheduled leg objectives for next panel meeting)** The panel previously identified the Atolls and Guyots legs as requiring special consideration. Procedures for elemental analyses using the XRF were prepared by M. Rhodes for this purpose. The Mix colour scanner will not be available for Leg 145. The panel emphasizes the need to acquire, as a minimum, a device for quantitative colour measurement prior to Leg 145. If this is not possible, the colour measurement instrument used by K. Moran may be able to loaned to the program for this Leg. The panel is still concerned that limited log data will be acquired on Leg 146 to Cascadia. **SMP emphasizes that physical property (including pore pressure), structural geological and pore water geochemical core data have previously provided results which have been the backbone of major advancements in the study of active margins. The collection of these data coupled with downhole discrete measurements should be given highest priority.** Highest priority means very high resolution sample intervals for these three data sets, of the same order as Leg 131 with appropriate time allocated to downhole tools.

Again SMP discussed the need to communicate directly with the co-chiefs on legs where special procedures or laboratory needs are required. A pre-cruise planning meeting for each leg is attended by our ODP/TAMU liaison, the liaison should communicate specific SMP concerns/recommendations to the co-chief scientists. **Action: J. Baldauf to discuss Leg 145 and 146 SMP recommendations and suggestions at the pre-cruise planning**

meetings. An assessment of the availability of a colour measurement instrument for Leg 145 should be done at the time of the Leg 145 meeting. An assessment of the status of the WSTP should be done at the time of the 146 meeting.

VII Discrete Measurements of Index Properties

K. Moran reported that she had modified the discrete measurement of index property manual and at the time of the meeting had received comments for changes to that document from all appropriate members and liaison. These changes have been incorporated into the document (Attachment C) and provided to ODP/TAMU for immediate use. R. Chaney reported that ASTM is currently developing standard methods for the use of the gas-comparator pycnometer for index property determination. **(Action: Chaney to report on the status of ASTM standard for the pycnometer at future meetings)**

At the last meeting, the panel agreed that new methods should be investigated to replace the labour-intensive method of discrete index property determination. R. Chaney reported on the most promising of the potential replacement methods, the CATSCAN (Attachment D). There are two types of CATSCANS currently available: medical units and industrial units. Ron ran tests on sediment samples and presented the results in image form. The results are very promising and given that the data can be stored and manipulated digitally, the technology can be used to determine bulk density at a very high vertical resolution. It is possible with this technology to essentially 'zoom' in on an operator-selected 'biscuit' and determine density for small pixels. Although this technology could meet our requirements for discrete density determination, there are two major problems. The medical units, which are available as used equipment, are much too large for the ship. They require up to 20" of concrete or the equivalent in lead (which the panel speculated could flip the ship over). While the industrial units are designed for specific applications and not just for human body sizes, the size and shielding is smaller, but the cost would make BCOM flip over and could not even be considered in the a budget exercise. After considerable discussion, other alternatives were suggested by A. Richards, specifically, X-Ray fluoroscopy. Although this technique is used successfully for full whole round core samples, it has not been developed for the wide range of sediment and rock recovered on the Resolution. Consequently, further development of the method is required, including a significant level of effort in software design. Based on these considerations, the panel agreed that additional research was required. **(Action: R. Chaney to investigate two possible methods for improved discrete measurement of index properties: (1) possible downsizing of a medical unit for shipboard use including software modifications; and (2) possible use of X-Ray fluoroscopy with the modifications for detection of good biscuit material)**

VIII Integration of Core and Log Data

At the last SMP meeting, a joint session was held with DMP to prepare an implementation plan for Core-Log Data Integration. K. Moran reported that this implementation plan was presented to PCOM at the annual meeting in Dec '91 and received endorsement. The critical list of requirements was prepared as follows:

1. quantify methods of depth measurement for drillpipe and wireline
2. refer all depths to the gamma log

- 3 develop software and graphics for depth matching
- 4 establish a relational database with an adequate structure for shipboard and shorebased access of core and log data
- 5 create the position of *Data Correlation Specialist* as a member of the shipboard scientific party
- 6 disseminate data to the scientific party in a readily transportable format
- 7 support related development work currently taking place at ODP/TAMU

SMP identified item 3 as still requiring discussion so that specific software could be developed or purchased. At previous meetings, SMP had identified Corpac as a tool which could potentially meet requirement #3. D. Goldberg presented the capabilities of Corpac to the panel (Attachment E). Corpac can handle any digital data series, data can be inverted, normalized, and the data series can be mapped as function of a second data series. This means the software is capable of relating one depth (or time) data series to another depth (or time) data series with no additional information required. However, if a user, for example, knows of a data point or a series of data points in each depth record that are definitely correlated, the user can identify this by graphically picking peaks on each data series. The panel agreed that this software tool is an ideal tool for use by the data correlation specialist. This software can be used by this specialist to match MST data with the gamma log, for example, and the correlation 'mapping' function which is generated from this match can then be applied to all of the core data sets to get reference depth. However, the panel is concerned that the software may not be available quickly enough, the existing software is a beta version. **(Action: J. King will assess the status of the Corpac software and manual and assist ODP/TAMU in the preparation of specific ODP requirements which must be met before acquisition).** The panel recommends the acquisition of the Corpac software as the shipboard core-log data correlation software tool. Current available versions of Corpac require the provision of a manual and some modifications to meet the specific requirements of shipboard data correlation. The panel agrees that these modifications should be performed by the author of the software with support from the ODP. Once this software is acquired, a minimum of one technical staff member must have formal training using this software tool for each leg. Training at an appropriate level must also be provided for the sailing core-log data correlation specialist (92-12 to ODP/TAMU).

IX Data Handling Working Group Report

K. Moran reported to the panel on the results of this working group. The working group was successful in identifying the basic requirements for a new ODP computing system which include: a new on-line relational data base that has client/server capabilities; a UNIX based system; and the requirement for user-friendly data acquisition modules and data retrieval modules. The working group agreed that the need for this new system is now urgent and that development cannot take more than 2 years. With this constraint, it is clear that this development is a major new initiative in the program.

SMP endorses the recommendations of the DHWG report. The panel wishes to emphasize to the Planning Committee that this initiative represents a significant, additional level of effort and cannot be completed by the operator under the current budget level. The panel is concerned that this activity will be looked upon as something that can be completely contracted out. Although the

panel agrees that significant parts of this activity can be performed outside of the existing contractor(s) through subcontracts, the computing system is a central activity of the ODP and therefore must remain the responsibility of the lead contractor. **SMP, therefore, recommends the following:**

The area of shipboard computing as a facility for data handling is a central activity of the ODP. As such, the recommendations of the JOIDES Data Handling Working Group should be implemented under the direction of the Science Operator, advised by a specialist JOIDES steering group for development of the new computing system. The JOIDES Computing Steering Group, in conjunction with the Science Operator, will serve as a technical forum for monitoring and reviewing software developments, especially those arising through external sub-contract and other third-party inputs from the ODP community (92-13 to PCOM).

SMP members reviewed prime datasets, processed datasets and datasets which are generated semi-routinely from shorebased studies. The intent of this review was to provide a basis for definition of the database structure. The lists of datasets are compiled in Attachment F. **(Action: Moran to forward dataset list to IHP for review).**

X ODP Datanet Services

The PCOM chairman requested that the panels review the proposal for Datanet Services and provide recommendations. Prior to the meeting, panel members had reviewed the documentation and D. Goldberg presented the proposal at the meeting. He presented an overview of the proposal which includes two primary aspects: (1) real-time link to shore-based data processing support and (2) a user-friendly, accessible database. The panel was very positive about the direction of the proposal and could immediately see the benefits of shore-based processing support for downhole measurements. However, the panel did not see the current requirement for a real-time link for other shipboard data. Core-log data integration could potentially be met by utilizing shore-based processing, but the need to access (and discuss with colleagues) all shipboard information for this task (including looking at the core) suggests that a better solution would be to install a workstation on the ship for this task, as has previously been recommended. There were other aspects of data processing that most panel members agreed could potentially benefit from a real- or near real-time link to specialized shore-based laboratories, such as, access to a signal processing (time series analysis) laboratory or access to facilities for VSP processing and, in future, access to facilities for processing large image datasets when additional equipment is added to the split core MST. The proposal for use of GeoBase is a good idea; however, this is not actually a database, it is a database access utility or 'browser'. ODP is currently in need of a relational database for storing and accessing all shipboard and shore-base collected data which cannot really be met with GeoBase. GeoBase is a good tool for geographically accessing information, but it cannot really be used to search on any ODP-type data field.

Following fruitful discussions of the Datanet Services proposal, the panel agreed to the following recommendation: **SMP supports the overall direction of the proposal for DataNet Services. Specifically, SMP agrees that real-time shipboard data processing capacity has in some labs reached its limit (e.g. downhole measurements), thus**

requiring some level of shore-based support. The panel envisions that there will be an increasing need for shore-based data processing support, particularly for cases where operational decisions are required, and to handle large shipboard-measured datasets (e.g. images or VSP). Although these needs can conceptually be met with a system such as DataNet, the panel emphasizes the requirement that any and all shore-based processing 'nodes' must be set up as a service to the shipboard science operations. The concept of an on-line database for readily accessing ODP and other related data is excellent. The database specifically proposed (GeoBase) is not truly a database, but a database browser specific for geographic information. The 'proposal' does not address the real requirement of a functional relational database which is an essential requirement for both shipboard and shore-based science. The panel encourages submission of a more detailed proposal for review (92-14 to PCOM).

XI Lab Equipment Priorities

Shipboard equipment needs were again reviewed. All equipment which was identified from the lab visits and from previous SMP recommendations were included in the ranking. One addition was included in the ranking which spanned all of the laboratories and is an ideal addition if the DHWG recommendations are adopted, that is a bar code system. The panel also identified equipment which are third-party developments and require monitoring by the panel, but are not yet ready for shipboard use. Finally, the panel prepared a list of equipment which will soon require replacement. If the science operator does not have a capital replacement plan, then the panel would encourage the development of such a plan and the items listed on the third list should then be included in this plan.

Current equipment requirements, in priority order, are as follows:

- 1 Core-log data integration needs:
 - a) natural gamma and MST upgrade
 - b) computer workstation
 - c) resistivity equipment for discrete core measurement (low cost)
- 2 Colour measurement instrument (low cost)
- 3 Bar code system
- 4 Carbonate autosampler
- 5 Seismic workstation
- 6 Auto titration
- 7 Seismic towing system

Note: The reference slide collection which had previously been approved for acquisition, has not yet been completed, but is still a high priority.

Third-party equipment under development which SMP is monitoring for future use on the ship:

- 1 Colour reflectance scanner (Mix)
- 2 Electrical resistivity core imaging system (Jackson)
- 3 Split core MST track (?)
- 4 DISC (ODP/TAMU)

Equipment which will soon require replacement (note that this list does not include the computing and software replacements identified by DHWG):

- 1 LAS computer replacement (should be included in DHWG plan, if approved)
- 2 Magnetometer
- 3 IC

XII IHP Report

A. Richards reported that the IHP meeting is scheduled after SMP so that he had little to report. He noted that the IHP chair had forwarded information items to him since the last meeting and one of these items of specific interest to SMP are the CD-ROM development of a paleo-reference collection which will include images. He also reminded the chair that a new SMP liaison to IHP would have to be selected since he was rotating off of the panel.

XIII Do we need an entire half of the core for archive?

J. Baldauf briefly reported on the history of this standard procedure. The panel agreed to table this item until the next meeting due to time constraints.

XIV Revisions to Core Disturbance Meeting Report

All comments were received from panel members and meeting participants and the final report is included as Attachment G. SMP agreed that this and other reports should be submitted to the JOIDES journal for publication. (**Action: Moran to submit this report to the JOIDES office for possible publication**)

XV Panel Membership

R. Whitmarsh and A. Richards are rotating off of SMP and this was their last meeting. The panel chair thanked both members for their diligence and efforts in improving shipboard procedures. R. Whitmarsh reported that his replacement has been named, Dr. N.R. Brereton of BGS, a physical property specialist. The ESF replacement has not yet been named and the panel would encourage this organization to nominate a sedimentologist to SMP, if possible. **SMP recommends that R. Chaney take over from A. Richards as liaison to IHP (92-15 to PCOM).**

XVI Next Meetings

After much discussion about panel member participation in cruises, SMP agreed that the next meeting should be requested to be held at Pat Bay, B.C., Canada for the dates of 12-13 September (Saturday and Sunday). K. Moran will host the meeting. The spring meeting should be held in

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College Station, jointly with IHP. The SMP proposed dates are 23-27 March. IHP requested (after the close of the SMP meeting) that they would prefer to hold the meeting in February. **(Action: all panel members contact the chair if they have any conflicts during the month of February '93).**

The SMP chair thanked all members, liaison and guests and closed the meeting with thanks to our meeting host, Mike Mottl.