SMP
27-28 February 1989
Executive Summary

At the first meeting of the Shipboard Measurements Panel, the agenda was focused in two main areas. First, the panel members needed information about the current status of the JOIDES Resolution shipboard facilities and methods. Some members have not yet sailed on the Resolution and also required information about changes since the Challenger. This first area was addressed by direct discussion and presentations from ODP/TAMU staff members. Secondly, the panel reviewed all shipboard measurements under the panel's mandate. By going through this exercise, problem areas were identified and some recommendations for improvement were made. However, no major equipment purchase recommendations were made given our need to first assess the overall status of the shipboard procedures and equipment.

The panel discussed shipboard measurements by reviewing disciplines/topics as listed in the meeting agenda (Attachment #1). In general, the labs and disciplines/topics which are in 'good' shape and only require monitoring and minor modifications to procedures are: (1) geochemistry; (2) paleomagnetics; (3) paleontology; (4) petrology; and (5) biology. The disciplines/topics which require moderate change (e.g. documentation of procedures, minor equipment improvements) are: (1) computers; (2) core handling; and (3) physical properties. The three topics which require major improvement are (1) underway geophysics; (2) sedimentology; and (3) visual core description. We have made specific recommendations for improvements to underway geophysics which are outlined in the minutes (pages 7 -12). These recommendations include the purchase of equipment and software. The panel discussed the possibility of incorporating underway geophysics with a future 'routine' VSP program. Because the two experiments share very similar equipment requirements, it would be most efficient to combine the responsibility of these activities. The panel, however, realizes that the routine use of VSPs on the ship has not yet been decided.

The panel will discuss sedimentology and methods of visual core description at the next meeting. It was felt that major improvements can be made in this area to improve the quality and efficiency of the data collected. These improvements would have the greatest impact on the timing of Vol. A.

The panel requires some clarification from PCOM on downhole tools. At present, ODP/TAMU staff are responsible for the operation, maintenance and (in some cases) development of downhole tools. At sea, this operation is integral with shipboard measurements. Should SMP include some aspect of downhole tools in the mandate?

SMP
Second Meeting
2-3 October, 1989
Lamont-Doherty Geological Observatory

Proposed Agenda

I Introduction and welcome
II Minutes of the last meeting
III Additions to agenda
IV. Sedimentology and visual core description
  a. Definition of measurement/observation requirements
  b. Possible means of meeting each requirement
  c. Impacts on core flow/shipboard computers
  d. Recommendations
V Requirements of downhole logging and shipboard measurements data integration/analyses
VI Paleomagnetics
  a. pulse magnetizer
  b. core orientation device/non-magnetic barrels
  c. problems with contamination
VII Physical properties
  a. review of required standard
  b. review MST
  c. geotechnical measurements
VIII Computers
  a. define standard plots
IX Micropaleontology
  a. Hydrofluoric acid
  b. How is new lab setup going?
X Petrology
  a. Status of shatter box
XI Technical staff
  a. training
  b. dedicated work stations
XII Space - review current needs/problems
XIV Other disciplines/topics - review
  a. APC and bit movement
XV ODP shipboard measurements list of benefits and accomplishments
XVI Next meeting

Members

I. Gibson
J. King
K. Moran
M. Mottl
A. Richards
M. Rhodes
E. Thomas
H. Tokuyama

Liaison

A. Taira, PCOM
M. Leinen, PCOM
J. Gieskes, DMP (or alternate)

Guests

J. Baldauf, ODP/TAMU
D. Huey, ODP/TAMU
J. Mutter
representative from Borehole Logging Group
representatives from OHP and SGPP

Shipboard Measurements Panel
27-28 February 1989
Minutes

I Introduction of members, liaison, and guests.
The following attended the first meeting of SMP:

Jack Baldauf (ODP/TAMU)
Ian Gibson (member)
Joris Gieskes (liaison from DMP)
John King (member)
Margaret Leinen (PCOM)
Kate Moran (chair)
John Mutter (guest)
Adrian Richards (member)
Mike Rhodes (member)
Ellen Thomas (member)
Hidekazu Tokuyama (member)

In addition, members of the ODP staff attended the meeting for specific discussion and are listed in the minutes.

II The chair called for any additions to the agenda which resulted in the modified agenda (Attachment #1).

III Current membership was accepted as appropriate for the near future with the addition of J. Mutter in attendance until problems associated with Underway Geophysics have been addressed completely.

IV J. Baldauf presented an overview of scientific operations onboard the Resolution with particular emphasis on comparison of DSDP and ODP. The presentation included statistics on the increases of data and staff between DSDP and ODP (Attachment #2). It was noted that even though the overall staffing has increased since DSDP due to the broader and more complex ODP program, the ratio of technical to scientific staff has slightly decreased. The presentation also included the status of the current changes to the paleontology and physical properties labs which were initiated from comments made by the user community.

V R. Olivas (ODP/TAMU) presented the status of the technical support staff. The current structure of the technical staff was presented with noted changes of all seagoing personnel under the management of the shipboard laboratory officer including curatorial and computer services (refer to

Attachment #2). At present there are eight marine technical staff per leg responsible for the supporting the following:

Core laboratory
Core orientation/downhole tools
Paleomagnetics
Physical properties
Paleontology
Thin Sections
XRF/XRD
Inventory control
Underway Geophysics
Safety
Maintenance
Special studies

In addition to marine technicians, the other technical support includes two electronic technicians, 1 photographer, two dedicated geochemistry technicians, 1 yeoperson, and 1 curator. The eight marine technician positions per leg are filled with 6 full time personnel, 1 student, and 1 rotating person from ODP staff. The group totals 32 and 15-16 are required each leg which limits the amount of time onshore for any technical training.

VI Following presentations by ODP staff, the panel discussed shipboard measurements. A summary of the discussions and recommendations by discipline/topic follows. All panel recommendations and action items are printed in bold type.

GEOCHEMISTRY

This discussion was led by Martha vonBreymann, ODP staff scientist. Attachment #3 includes a summary of the current lab status. The panel generally agreed that the geochemistry lab had very few major problems. The following discussion items were considered by the panel:

1. Sampling program

The routine sampling program as prescribed in Attach. #4 is agreeable for normal applications, but on legs with increased geochemical emphasis, it will be important to increase the sample density. For this reason, **the panel urges a greater flexibility of subsampling rules**, so that geochemical objectives can be met. This increased sampling program could either use samples from split cores or from 5 cm whole-rounds where the potential for lithological or paleontological boundaries is very low. In certain cases, it may be desirable to obtain samples under oxygen-free conditions, e.g. under a nitrogen atmosphere. **The panel recommends that glove bags be made available for such purposes.** In addition, one of the squeezing chambers could be sealed in such a manner that pore fluid extraction can be performed under a nitrogen environment. Similarly, especially when studies of rapidly oxidizable trace metals are envisaged, **it will be advantageous to have available a few non-plastic or teflon coated squeezers to minimize contamination.** Finally, the availability of a high speed centrifuge (especially suitable for the more porous upper sediments) should be encouraged; this can provide excellent samples and centrifuge tubes can be easily handled in a nitrogen atmosphere.

The panel recognizes that artifacts can be introduced by extracting at temperatures different from in situ conditions. However, it should be realised that squee at in situ temperatures should be performed with knowledge of the existence of a geothermal gradient. Any special attention to this should be restricted to special geochemical efforts.

2. Laboratory Equipment

The panel recognizes the availability of a large array of analytical equipment both for organic geochemistry and inorganic geochemistry (Table 1). Continuous attention to updating procedures should be encouraged through interaction with appropriate panel members as well as shipboard Scientists with geochemical backgrounds.

3. Technical Support

The panel recommends that chemistry laboratory technicians receive appropriate training not only in chemistry procedures, but also in the significance of the work of the chemistry laboratory. Due to a recent turn-over in technical staff, training is presently the most important issue to address in this laboratory. This can be accomplished either onboard ship, at ODP, or at an appropriate laboratory. It is the panel's considered opinion that this will lead to a continued improvement of the technical operations of the shipboard operations of the chemistry laboratory.

Table 1.
Chemical Equipment Onboard JOIDES Resolution

ORGANIC GEOCHEMISTRY

Hydrocarbon Monitoring
- 2 Hewlett Packard 5890 gas chromatograph, TCD and FID
  - NGA: hydrocarbons through C_{14}
  - Liquid extraction analysis, fused quartz small bore column
- 1 Carle 101 GC, FID
  - methane and ethane (C1/C2)
- Ultraviolet ray box (Halliburton)
  - qualitative analysis of hydrocarbon shows

Sediment analysis
- Rock-Eval II plus TOC nodule (Delsi Nermag)
  - type and maturity of organic carbon and hydrocarbon potential
- Carlo Erba NA 1500 elemental analyzer
  - analysis of carbon, nitrogen and sulphur

INORGANIC CHEMISTRY

Sediment and rock analysis
- Coulometric analyzer
  - carbonate determination
- XRF (Applied Research Lab 8400 hybrid spectrophotometer)
  - calibrated for both major and trace element analysis of sediments and rocks
- XRD (Phillips ADP 3520)
  - identify mineral composition

Pore water analysis
- Dionax ion analyzer (SO^{2-}_4)
- Automatic titrator (Alkalinity; chloride)
- Spectrophotometer (Bausch and Lomb)
- Semi-automatic titrators for Ca, Mg, Cl.

PALEOMAGNETICS

This discussion was led by J. King. In general, the panel felt that this lab is working well and had no major problems. The following issues were raised, discussed and some recommendations were made.

1. Paleomagnetics

a) **The panel recommends that the curatorial policy should be modified to allow peak alternating field demagnetization of archive halves to 15mT.**

b) In order to improve data analysis, **it is recommended that ODP obtain deconvolution software for high-density sampling of low sedimentation rate sites.**

c) Due to the complexity of the cryomagnetometer, a trained paleomagnetics technician is required on each leg in order to train the paleomagnetics scientist(s). The panel discussed the requirement for a dedicated technician to this discipline, similar to the geochemistry set-up. However, a detailed discussion of technician assignments could not be completed at this initial meeting due to time contraints.

d) A pulse magnetizer capable of peak field of 2T to determine mineralogy and generate data to identify diagenetic and paleoceanographic cycles was discussed. **ACTION: J. King estimate cost and evaluate the priority.**

2. Rock-Magnetics

a) DMP should consider the requirement for a magnetic susceptibility logging tool (may be available from Bartington).

b) A requirement for integration of multi-sensor data with down-hole logs exists. The major integration tasks are data handling problems. The panel will discuss and make recommendations at a future meeting regarding logging and sample-measured data integration.

3. Coring-Related

Three issues were discussed which directly impact the quality of paleomagnetic data. The first two topics resulted in questions which should be answered by ODP engineers and DMP and then re-addressed at a subsequent SMP meeting.

a) Is there a faster core orientation device that provides digital data which would be an improvement over the multi-shot tool? **ACTION: ODP and DMP**

b) Can non-magnetic core barrels and drill string to reduce remanences which overprint paleomag record be implemented into the program? **ACTION: ODP and DMP**

c) Contamination of core samples has occurred which influences the quality of paleomagnetics data collected. Further discussion and documentation is required in order to make recommendations for improvements. **ACTION: J. King; documentation of contamination.**

PHYSICAL PROPERTIES

This discussion was led by K. Moran. W. Autio (ODP/TAMU technical staff) also participated in the discussion. The physical properties laboratory has seen some significant improvements over the DSDP lab facilities. One of the most common comments from users of the lab is that the data acquisition and analysis is accomplished utilizing a wide variety of computers and programs. This variety tends to limit the efficiency of the lab and, for some measurements, may compromise data quality.

The most important requirement for the physical property laboratory is to standardize and document methods. **The panel recommends that standard methods for the determination of water content, bulk density, and porosity be established.** These methods should rely on use of the penta-pycnometer for sediments and use of gravimetric methods for lithified materials. The documentation of the software which is used in the calculations is also required as part of the standardizing procedures. The measurement of grain density should be carefully considered for sediment. In high water content materials, the error in grain density increases. The direct measurement of specific gravity should be considered as a replacement for the 'routine' calculation of grain density. These measurements are the most basic of all physical property measurements and are used extensively in other disciplines. Consequently, the highest priority should be placed on this standardization exercise. Standardizing these measurements can best be implemented in conjunction with appropriate panel members and by utilizing the appropriate ASTM committee for review.

The P-wave logger, which has been incorporated into the multi-sensor track, has not been calibrated since it was placed on the vessel. **The panel recommends that P. Schulteiss be contracted to calibrate, upgrade and document the software for the logger.**

A constant volume subsampler (very low cost) should be made for the lab so that, in coarse sediment, samples can be collected at a

constant volume for density and porosity determinations. A. Silva (URI) has built some of these for use in soft sediment.

The panel briefly discussed the following items which require further discussion before recommendations can be made:

a) an improved V_p system to replace Hamilton frame for collection of digital data and determination of attenuation;

b) improvements in the flexibility of whole-round sampling;

c) replacement of the gamma sensor with X-ray backscatter on the multi-sensor track;

d) purchase of a strain-relaxation device;

e) technical staff and training;

f) purchase of a natural gamma sensor for the multi-sensor track; and

g) integration of down-hole logging and shipboard measurements is required; this integration may require additional lab equipment and requires further discussion with DMP and LDGO.

UNDERWAY GEOPHYSICS

This discussion was led by J. Mütter. A. Meyer and B. Hamlin and ODP technical staff participated in the discussion. The panel agreed that this component of the program needed significant improvement.

1. Seismic System

There are three principal objectives of the seismic profiling system as follows:

(a) To ensure that the drill ship reaches the intended site;
(b) To tie the actual drill site into an existing grid of regional seismic data; and
(c) To provide seismic profiling between sites.

Of the three requirements, the first two have considerably higher priority than the latter. Furthermore, the system which satisfies the first two may not be suitable for the latter. It is, however, desirable that all three be achieved as the vessel frequently transits sparsely surveyed regions between sites and obtaining good quality seismic profiling data in transit is invaluable. Surveys in the region of the drill site can also provide valuable augmentation to the existing grid of site survey data, although this should not be regarded as a primary function.

Site-specific surveys

Numerous complaints have been received about the quality of reflection profiling and the case with which the present system can be used. ODP has taken steps toward solving this problem by investigating SIOSEIS or a replacement for the present system, HIGHRES. While SIO systems is certainly superior to HIGHRES, and has been installed at several locations in the U.S., its principal draw-back is that, not being a commercial system, no after sales service is provided. It is also somewhat limited and not straight forward to operate. Thus SIOSEIS is an improvement over HIGHRES, but not as good a system as is available commercially and may prove difficult to maintain and upgrade.

At present, the seismic processing cannot be achieved in anything like real time or near real time, apparently due to hardware limitations: disk space and CPU, possibly tape drives also. Because the realization of ODP's scientific objectives depends critically on locating sites correctly and correctly tying the site into existing reflection profiling, **it is absolutely essential that an adequate, near real time record can be made from the drill ship.** First priority must be given to obtaining a software package and associated hardware to achieve this. Specifically:

1. The Sierraseis commercial package should be assessed as an alternate to SIOSEIS. It is far more powerful, flexible and user-friendly. Being commercially available, the package is routinely updated and the documentation is extremely good. Furthermore, all its advertised functions actually work! It is available to UNIX-based small computers and is highly portable to other machines. Its off-the shelf price is $12,000; but since TAMU is an IRIS institution and IRIS has adopted this package as a standard, it is available to TAMU at a lower cost. The IRIS link has ensured that Sierraseis has been placed in many US institutions; many more than SIOSEIS.

2. Whichever onboard processing system is chosen, it must be available in near real-time mode. The acquisition systems must be modified, together with the appropriate hardware upgrades implemented to achieve this. One mode is to write a disk file in parallel with the tape record so that data can be accessed after every shot, processed and plotted. A delay of no more that five or six shots (a couple of minutes) would occur.

3. On-line display of DR navigation, updated with transit and/or GPS fixes is essential for site-specific surveys. A plotted display of the track must be made in the underway lab. This system should also allow for existing track, intended site location, core positions, etc. to be plotted also so that the survey can be most effectively carried out (see specific notes in navigation).

Profiling between sites

This function is apparently so poorly achieved at present that it is seldom even attempted. The ship transits at 10-12 knots and recordings are typically swamped with noise. However, the fact that a good record can be made at 5 knots and that PDR records can be made if the transducer is set out from the hull suggests that a good 10 knot record should be achievable.

ODP technicians have tried several methods of improving the records, including lowering the tow point and setting the active section as far astern as possible, but no improvement has been achieved. Apparently, however, in calm seas, acceptable records have occasionally been obtained. This suggests that although ship-generated noise is undoubtedly very important, towing noise is also a major factor.

Lamont and a few other institutions are presently obtaining high quality seismic profiling at around 10 knots using an internally ballasted streamer produced by the French manufacturer AMG. The vessels used to tow the hydrophone arrays are much quieter that the Resolution. Nevertheless, it seems that ODP should test the AMG streamer system for suitability. The Lamont system could be borrowed after April 1989 and before January, 1990. A low tow point and long lead section will still be required. The same system might be used at 5 knots by hauling in most of the lead before beginning the site specific work.

H. Tokuyama suggested other towing arrangements which could be tried to improve towing at higher ship speeds. This requires an additional boom located to move the streamer outboard of the vessel (see attachment #4). This configuration may also be required, even if the current Teledyne streamer is replaced with the AMG (Table 2).

Table 2
Comparison of Streamers

Streamer Section	Teledyne	AMG
active	yes (single)	yes (4 channel)
weighted	no	yes
stretch	no	yes

2. Navigation and non-seismic geophysics

The ship is equipped with Transit and GPS satellite systems, will soon have Loran C, and for DR user an E-M log and gyro compass. The latter is fairly crude by current standards. Navigation is achieved by hand plotting positions. While this may be suitable for transiting between sites, it is insufficient for site location. The present practice is to wait for a GPS window before conducting site location surveys. Improvements need to be made in two areas as follows:

a) Navigation equipment
The speed log should be augmented by a doppler speed log that measures ship speed relative to the deep water mass. The present E-M log is unlikely to be giving good speed estimates and hence the quality of DR navigation will be low. In addition, since Transit satellite input (the fix calculation is basically based on doppler shift information) these fixes will also be poor. The speed information is in error.

b) Navigation calculation
Real-time DR navigation can be fairly simply obtained and should be displayed on a map chart that is computer-generated on board the vessel. Many institutions do this. The reconciliation of DR with "absolute" systems is more complicated but could also be done at sea if suitable staff were available. A simple chart could be plotted by sampling the Magnavox position computed using speed and heading, updated with fix positions. Navigation information should be logged on the same system that is recording seismic data, sampled once per

shot. Seismic recording alone ought not completely occupy the Masscomp. Lamont and other institutions have achieved this and could provide software and expertise.

3. Integration with VSPs

Underway geophysical operations represent a distinct and separate function of the JOIDES Resolution, more nearly allied to downhole logging and VSP operations than it is to drilling and work on the recovered materials. ODP has not been able to satisfactorily provide this essential service for reasons related to the facility itself, rather than in the manner in which it has been operated. The initial system, as previously described, was not a complete, working, seismic processing system that could easily be operated by technicians who are non-specialists in seismics. The basic set-up ensured that real-time processing of seismic data was not possible. ODP staff have put in quite a bit of effort into trying to work with the system with some success. However, with technicians stretched thin in the other labs, the underway geophysics has become a burden.

JOI/USSAC together with DMP has been advocating a larger and more routine role for VSPs in the Ocean Drilling Program and USSAC has recently agreed to commit funds to support US VSP activity on the Resolution. Given that the existing Technical Support Staff are presently fully involved in the present laboratory activities and because VSPs are a specialized experiment, this new task should not be taken on by ODP staff.

In future, if VSPs are designated and become a routine part of ODP, SMP recommends that underway geophysical operations are integrated with the VSP program. The tasks of this combined program would be:

1. digital acquisition of all underway geophysical data;
2. digital acquisition of VSP data;
3. digital acquisition of all navigation data;
4. provision of on-line DR navigation in the form of continuous plots;
5. processing of underway geophysical data, VSPs and navigation information following acquisition, but prior to the completion of the leg[1];
6. provision of on-line, near real-time seismic reflection profile for use in site-specific surveys[1];
7. archive and provide upon request copies of the navigation, underway geophysics and VSP data to ODP operations.

SMP sees the following advantages to this integration:

1. improved effectiveness of the TAMU staff in performing the primary drilling-related functions of ODP; and

2. coupling of underway seismic profiling with VSP acquisition at the operational level to properly support the scientific objective of VSP work which is to tie the drilling information to existing seismic data.

COMPUTERS

ODP staff members Larry Bernstein and Patsy Brown presented the status of shipboard computers and the 1032 data base systems. The direction taken of networking the PC's, MAC's, VAX, and micro-VAX is a good one. The response of ODP in purchasing MAC's was also a good move. This type of configuration allows for greater user flexibility, but still leaves ODP with 'standard' VAX-based systems. The graphics package, currently used by ODP is not as user-friendly as most PC and MAC-based graphics packages. The shipboard scientist should be allowed to plot and analyze the data using 'easy' packages. At present, the ship has MAC software for this purpose; however, PC graphics packages are not onboard. This should be remedied. At present, the database group has input data up to Leg 119. The effort is commendable. The group has also developed computer forms for data entry; this should be extended to include other data sets. A list of specific discussion topics and recommendations follow:

1. The current database has access limitations which may hinder science performed while onboard. The panel needs to specify its concerns for IHP **Action: further discussion and definition required at next panel meeting.**

2. **IBM-PC software should be acquired for graphics.**

3. **Improvements to the software (and documentation) for data acquisition and calculations in the physical properties lab are required.** The most urgent requirement is upgrading the thermal conductivity routines so that first, temperature can be monitored until an equilibrium is reached for testing to commence, and then data is collected without such intense user-input.

4. **Micropaleo data for Part A in addition to Part B data should be entered into the database.**

5. **Software for range charts (Checklist) should be routinely available.**

6. **Software for micropaleontological data input should replace the carbon-copy forms which would also make it easier for data base work.**

7. **Graphics: there should be templates available for making biostratigraphy - compilation figures and the sedimentation**

rate curves.

8. Standard sotware templates for each lab need to be developed to improve the efficiency of routine plots generated for Vol A. **ACTION: All panel members review respective disciplines and define routine plots.**

MICROPALEONTOLOGY

There were several problems in the past, mainly because of insufficient space in the preparation lab and the workspace. There were also major problems in the water supply lab. These problems were recently addressed by TAMU/ODP, and we must wait to see how the new lab configuration works out. In addition, the panel makes the following recommendations:

1. **On heavy micropaleo legs (e.g. 6 to 7 paleontologists), there should be a designated technician for the paleo lab to help sample processing.**

2. **There have been problems with maintenance of the microscopes, these should be checked at the end of each trip.**

3. **The 'foram scopes' - Zeiss stereo microscopes should be equipped with different sets of ocular objectives (possibly a zoom objective) if feasible for these models. Otherwise they should be replaced.**

4. **Sample splitter (vibrating) should be made available.**

5. **Literature: bound volumes of reprints (from the Challenger) should be placed in the micropaleo lab.**

Another problem area under this discipline is the safe use of hydrofluoric acid for palynological preparation. The panel needs to discuss this further. **ACTION: Moran get input from Leg 104/105 palynologists.**

SEDIMENTOLOGY AND VISUAL CORE DESCRIPTION

Suzanne O'Connell presented the current status of this lab (Attach 5). Since this lab has one of the most time-consuming processing tasks, the discussion focused on changes which will speed up the process as well as provide consistent results. It was noted that variations in results from this lab occur on a shift cycle as well as on different legs. The panel believes that major improvements can be made in this lab, but this topic requires investigation and further discussion at the next meeting. Some of the suggestions made were as follows:

digital colour scanner **ACTION: Moran**
XRD for routine composition analysis **ACTION: Leinen/Rhodes**

video scanner **ACTION: Thomas**
image analysis for smear slides **ACTION: Richards**
computer form for core description data entry **ACTION: Gibson**

These suggestions will be discussed with regard to improving the consistency of the visual core description and the quality of the data collected as the highest priorities. In addition, all suggestions will be evaluated on how they would impact the speed of data collection/output. When discussing this topic at the next panel meeting, we will require representation from OHP and SGPP.

At this time, only one recommendation concerning this 'lab' could be made. **The panel recommends that the evaluation of the smear slides should not be broken down into absolute percentages; rather the percent composition should be represented by descriptive terms which represent ranges of percent compositions.** The designation of numbers implies a certain accuracy and because this data is being entered in the database, there is a danger of misuse of this inherently inaccurate dataset.

CORE HANDLING

A general discussion of core handling included TAMU/ODP staff members and the panel. Technical staff members also participated in this discussion. Four general topics were discussed: core barrel handling; core liner handling; core splitting procedures; and core storage. It was noted that when the core barrel is retrieved to deck level, little effort is made to minimize shock loading. **The panel recommends that shipboard ODP operations staff make every effort to inform the drilling personnel of the requirement to reduce disturbance to the sample as much as possible.** After the core liner is removed from the core barrel, this now very flexible sample is moved to the catwalk for cutting and initial sampling. This additional extreme flexing of the samples causes disturbance which can and should be eliminated. The argument that all samples are disturbed due to pressure change anyway is not an acceptable one. When collecting samples, every effort should be made to eliminate sample disturbance where feasible. In this case, **the panel recommends that a rack be built which can be used to transport the sample from the core barrel to the catwalk rack.** This should be done by considering current operations and by designing the rack for ease of use by the technicians (i.e. light weight; comfortable handles; accessible) It may be possible to re-design the catwalk rack so that it could serve both purposes. At present, the water used in the core splitting room is 'drill' water, the composition of which varies from port to port. This water contaminates the core sample with essentially unknown substances. **SMP recommends that filtered surface seawater be used in the core splitting room.** Presently, cores are put directly into 'D' tubes for permanent storage. Some cores which degrade rapidly when exposed to oxygen or when dried out may require additional protection. The panel realizes that due to time considerations, additional wrapping of all core samples would be prohibitive. However, for special circumstances, **SMP recommends that facilities be provided and made readily available on the ship to wrap sections of core in polyethylene film.** The chief scientists/staff should arrange for "at risk" sections, and "priority" sections to be wrapped in polyethylene before they are placed in the D-tubes. The wrapping should be evacuated plus sealed. It is envisaged that only a small proportion of reference/sampling sections would be wrapped, based on the decision of the curator and shipboard party.

PETROLOGY

ODP staff scientist, Andrew Adams presented the status of this discipline onboard. B. Domeyer (ODP/TAMU technical staff) also participated in the discussion. No pressing problems were identified. Discussions included the thin-section lab, XRF, XRD, and the computer forms for visual description. The success of the evolution of the computerized visual description was noted and this success will help in improving the sediment visual core description task. There may be a requirement to replace the existing shatter box; further review is required (**ACTION: Rhodes**). **SMP recommends that the clean hood be replaced with a portable clean hood.**

BIOLOGY

Jack Baldauf informed the panel of successful biological 'add-on' programs which have occurred. One example was phytoplankton subsampling on Leg 119. The panel agrees that this type of cooperation is good and should not be discouraged.

SPACE

Deferred discussion until next meeting.

GEOTECHNICAL MEASUREMENTS

Deferred discussion until next meeting.

VII Shipboard procedures related to faster publication. During discussion of each discipline/topic, the panel considered this question. In general, the panel agreed that Volume A results are essentially complete when the ship arrives in port, inclusive of biostratigraphy. The preparation of Volume A, however, still includes some time-consuming aspects most of which are related to visual core description, the preparation of barrel sheets, and data analysis from the physical properties laboratory. These time-consuming tasks take away time available to shipboard scientists for the preparation and review of Vol. A text and data. We plan to discuss and provide recommendations on visual core description (and barrel sheets) at our next panel meeting as our highest priority.

VIII Next Meeting: Lamont-Doherty Geological Observatory, October 2-3. John Mutter has agreed to host the meeting.

Attachment 1

Shipboard Measurements Panel
Agenda - First Meeting
27 - 28 February 1989
ODP, College Station, Texas

Start at 08:30

1. Introduction of members, liaison, and guests

2. Additions to agenda

3. Membership/Terms of reference

4. Presentation by scientific staff representative on status of shipboard laboratories

5. Presentation by technical staff representative on status of technical staff/expertise

6. Discussion of shipboard measurements under the following topics and disciplines in order of number in brackets:

   (a) Biology (10)
   (b) Computers for data collection, data analysis, and data presentation (shipboard and Vol. A) (5)
   (c) Core handling (8)
   (d) Geochemistry: organic and inorganic (1)
   (e) Geotechnical measurements (11)
   (f) Micropaleontology (6)
   (g) Paleomagnetics (2)
   (h) Petrology (9)
   (i) Physical properties (3)
   (j) Sedimentology and core description (7)
   (k) Space (12)
   (l) Underway geophysics (4)

7. Discussion of shipboard procedures related to faster publications

8. Next meeting: when and where?

9. Adjourn

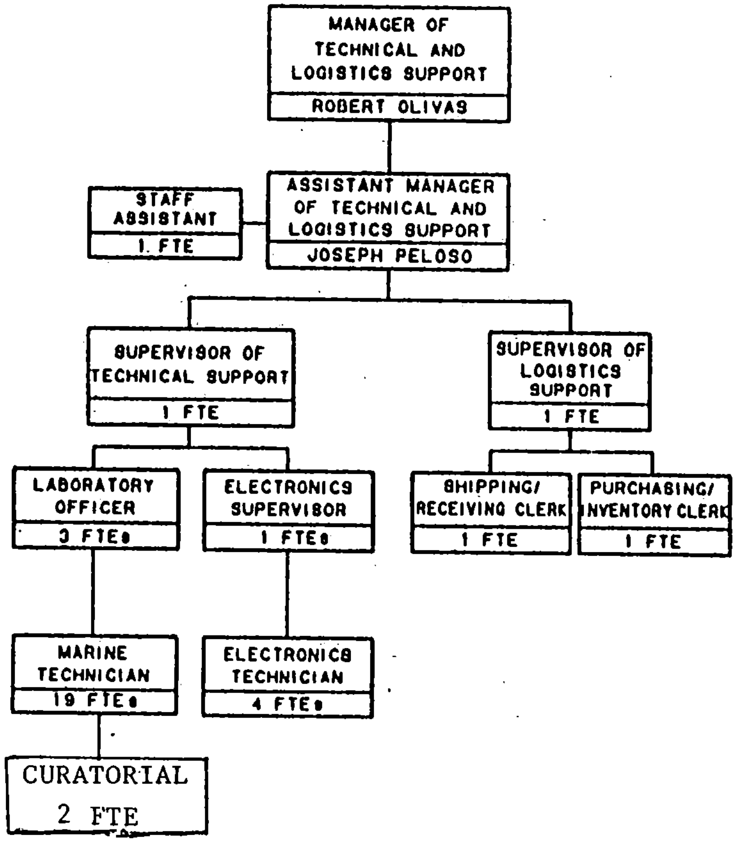
	DSDP		ODP
Scientific Party			
Scientists	15		~25/28 (+66/86%)
Logistics	11		18 (+63%)
Laboratories			
sq. ft.	4,500		12,000 (+166%)
Volumes			
Paleoceaongraphic	**Leg 85**		**Leg 108**
# of cores	297(90%)		461(90%)
# of pages	1022		1090 (Init. Rept.)
# of illustrations	340		372 (Init. Rept.)
Paleo./Tectonic	**Leg 62**	**Leg 103**	**Leg 115**
# of cores	218(36%)	156(73%)	424(78%)
# of pages	1120	1558	1102 (Init. Rept.)
# of illustrations	514	677	358 (Init. Rept.)
Lithosphere	**Leg 70**		**Leg 111**
# of cores	148(89%)		77(80%)
# of pages	481		639 (Init. Rept.)
# of illustrations	230		387 (Init. Rept.)

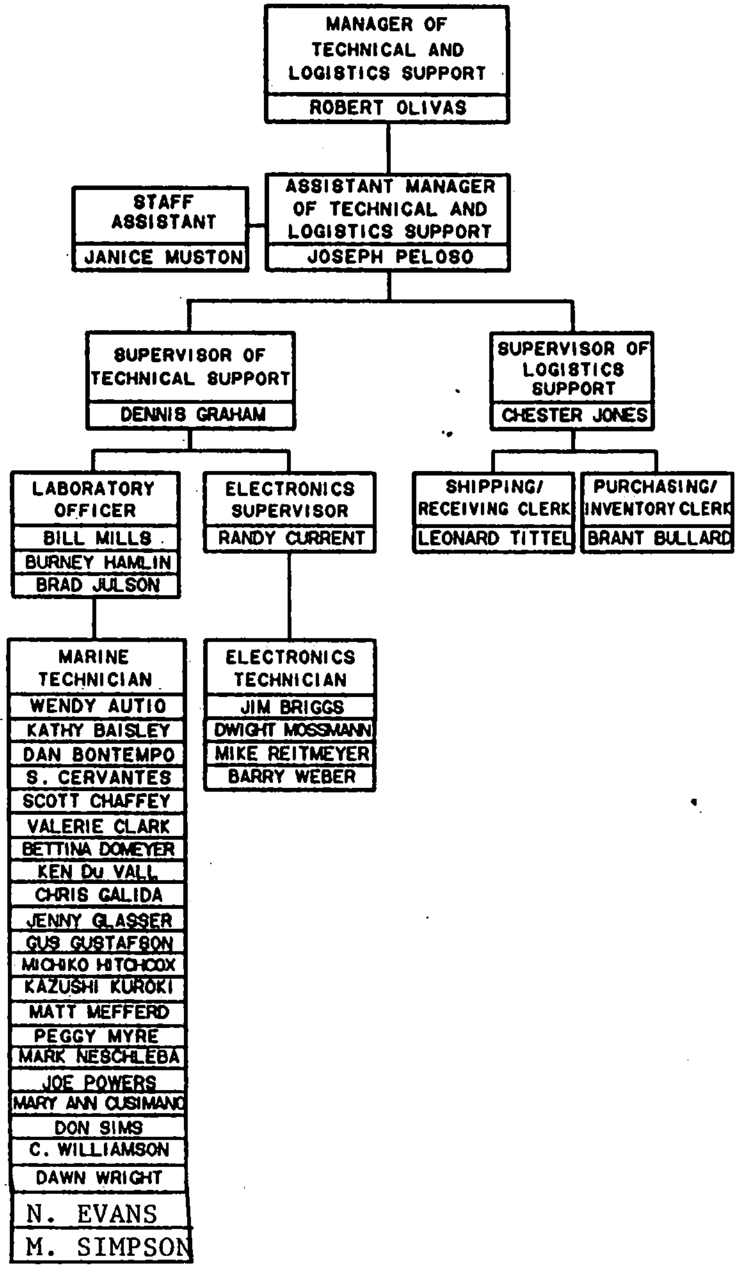
Data base		
Total	212 MB	~160 MB (to date)
Avg. per Leg	2.2 MB	~15 MB (+600%)

Tasks: TECHNICAL SUPPORT, LOGISTICS SUPPORT

Cost Center: 1804 - TECHNICAL AND LOGISTICS SUPPORT

Functions: Support services to shipboard and shore-based facilities, inventory, maintenance and records; oversees subcontractors' logistics activities; coordinates shipboard technicians.





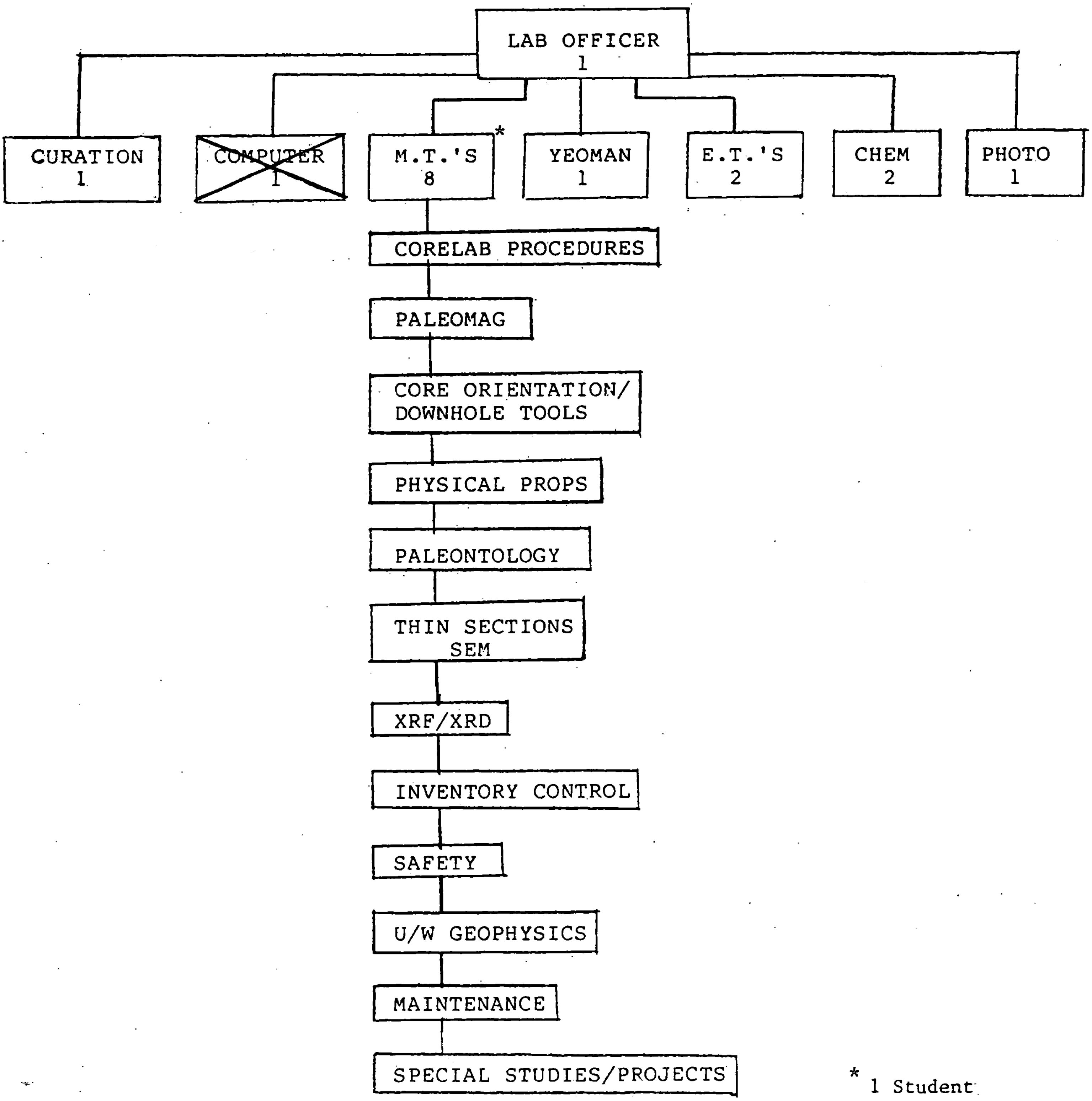
3 Administration Support
3 Logistics Support

Administration
October, 1988

TOTAL: 32 TECH SUPPORT

ODP TECHNICAL SUPPORT

SHIPBOARD ORGANIZATION



* 1 Student

CHEMICAL ANALYSIS OF SEDIMENTS AND INTERSTITIAL WATER

ORGANIC GEOCHEMISTRY

Hydrocarbon monitoring

* 2 Hewlett Packard 5890 gas chromatograph, TCD and FID
  NGA: hydrocarbons through C_{14}
  Liquid extraction analysis, fused quartz small bore column
* 1 Carle 101 GC, FID
  methane and ethane (C1/C2)
* ultraviolet ray box (Halliburton)
  qualitative analysis of hydrocarbon shows

Sediment analysis

*Rock-Eval II plus TOC nodule (Delsi Nermag)
  type and maturity of organic carbon and hydrocarbon potential
*Carlo Erba NA 1500 elemental analyzer
  analysis of carbon, nitrogen and sulfur

INORGANIC CHEMISTRY

Sediment and rock analysis

*Coulometric analyzer
  carbonate determination
*XRF (Applied Research Lab 8400 hybrid spectrophotometer)
  calibrated for both major and trace element analysis of sediments and rocks
*XRD (Phillips ADP 3520)
  identify mineral composition

Interstitial water program

	Sample size (ml)	estimated accuracy	analytical technique	
Alkalinity	10-3	3%	G.T	#
Cl	0.1	0.4%	T	#
Ca, Mg	0.5	1%	T	#
Ca, Mg, Na, K	0.1	2%	AA	
Fe, Sr, Mn, Li			AA	
NO_2	2	3%	Sp	
NO_3	4-6	5%	Sp	
SiO_2	0.2	2-3%	Sp	
NH_4	0.1	2-3%	Sp	
PO_4	1.5	2-3%	Sp	
Br(?)	0.5		Sp	
SO_4	0.2	1%	IC	#

# = analysis done routinely
T = titration (Metrohm 655 Dosimat)
G.T = Gran titration (Metrohm 655 Dosimat, Metrohm 605 pH meter)
AA = atomic absorption (Varian Spectra A 10/20)
Sp = spectrophotometry (Baush & Lomb Model 1001)
IC = ion chromatography (Dionex)

Other equipment

* Labconco 39 port freeze dryer
* Balances (differentiated counter-balance with computer averaging)
  - Cahn 29 on gimbaled table (spare on storage) : from micrograms to 1250 mg
  - Scientech balance: 1 mg to 40 g
* Barnstead ultra-pure water purifier (Osmotic pressure and filtration systems)

DISCUSSION ITEMS

*Dionex sulfate analyzer

Curve from Gieskes and Peretsman, 1986

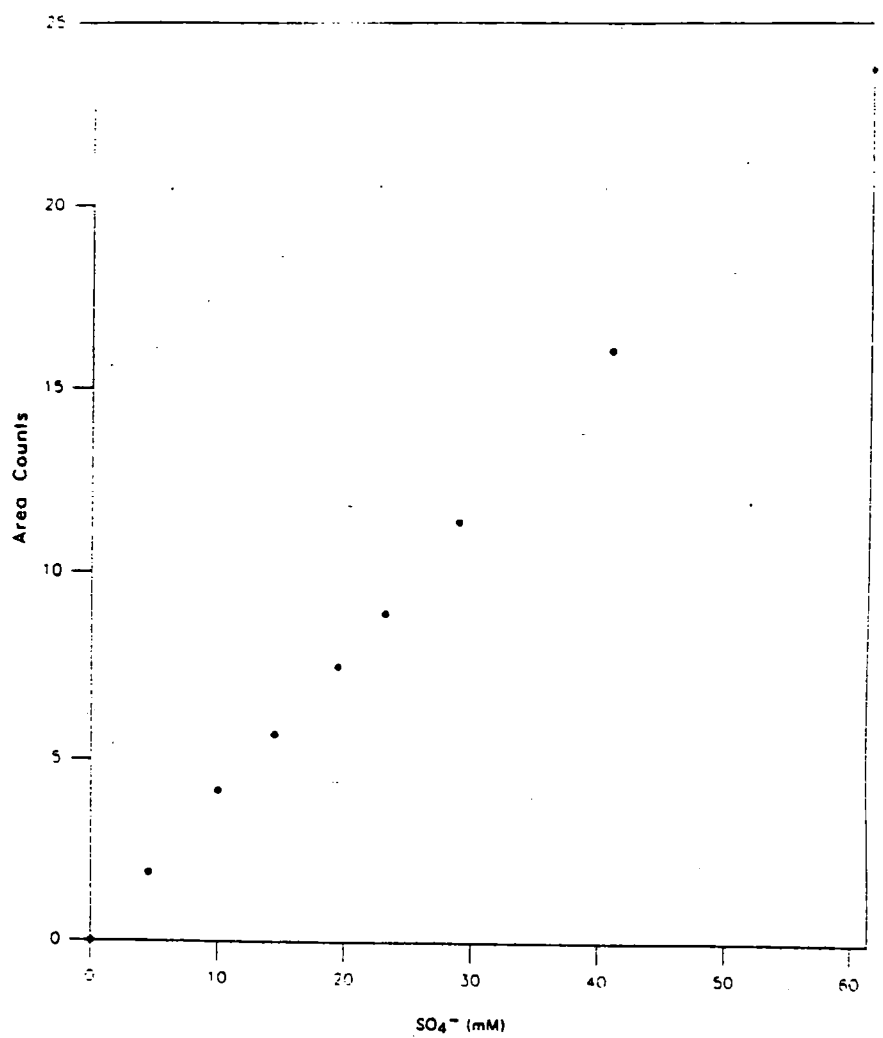


Figure 7. Sulfate standard curve, from Dionex Ion Chromatograph analysis of Joris standards and IAPSO standard seawater.

Leg 119 had problems: noisy baseline and bad reproducibility. During Leg 120 it was determined that the fiber suppressor had a leak. The Anion Micro Membrane Suppressor system was installed in place of the fiber suppressor which improved the baseline considerably. The conductivity detector was cleaned using a 3N HNO_3 solution and the detector calibrated. This procedure was established as routine to be done once a leg. Currently the instrument works well as long as the eluent path flow is regularly washed with DDW before and after the SO_4 runs

Retention time: 8 minutes
Flow rate: 2 ml/min.

Nitrogen/temperature controlled environment:

Currently only atmosphere controlled availability is through nitrogen glove/bag.

Personally, I think sampling artifacts due to changes in temp, pressure and atmosphere contamination (oxidation?) during core cutting, retrieval and sampling must be addresed before before the need for temp/pressure environment in the lab is critical.

Fine scale whole round subsampler

Enough water?

Provision of an autoanalyzer

Flow through cell for the spectrophotometer as well as automated sampling is being considered. Don't think a full scale auto-analyzer is practical for nutrient analysis in pore fluids.

Atomic absorption spectrophotometer

Was installed onboard on Leg 124E

Acetylene gas distribution panel (AGDP) was installed with a hydraulic flash arrestor and a solenoid valve for emergency shut-offs

Standards were run for Mg, Ca, Na, Sr, and K. Reproducibility is good when using N_2O flame but not satisfactory with air-acetylene. Still working on improving the analysis.

Microbalance

There is a back-up on storage

Routine pore water analysis

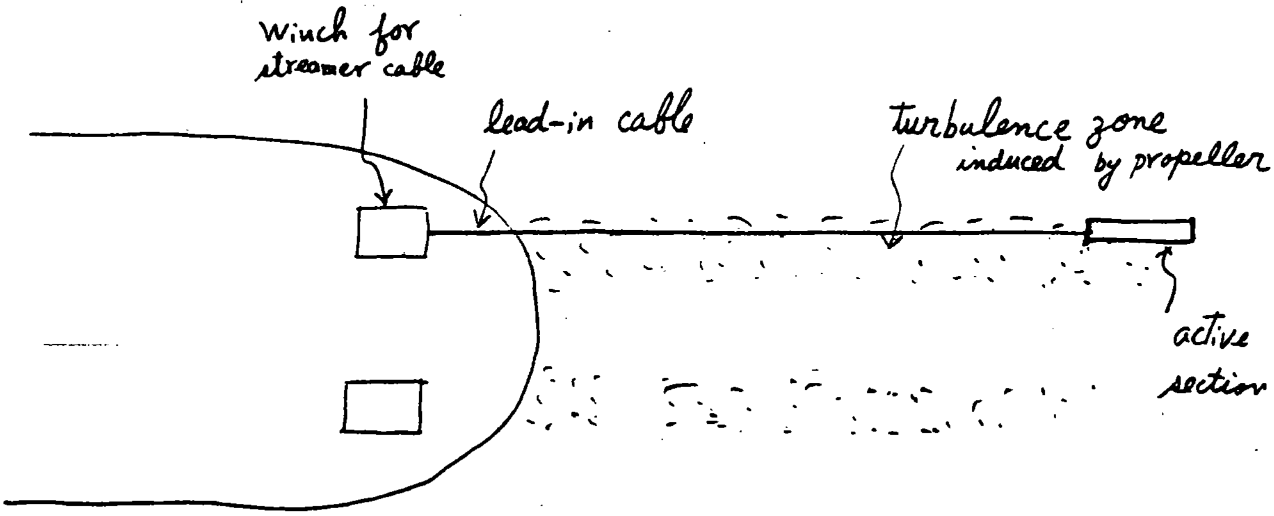
See above

CNS

Installed during Leg 124E
Standards were run, with satisfactory results

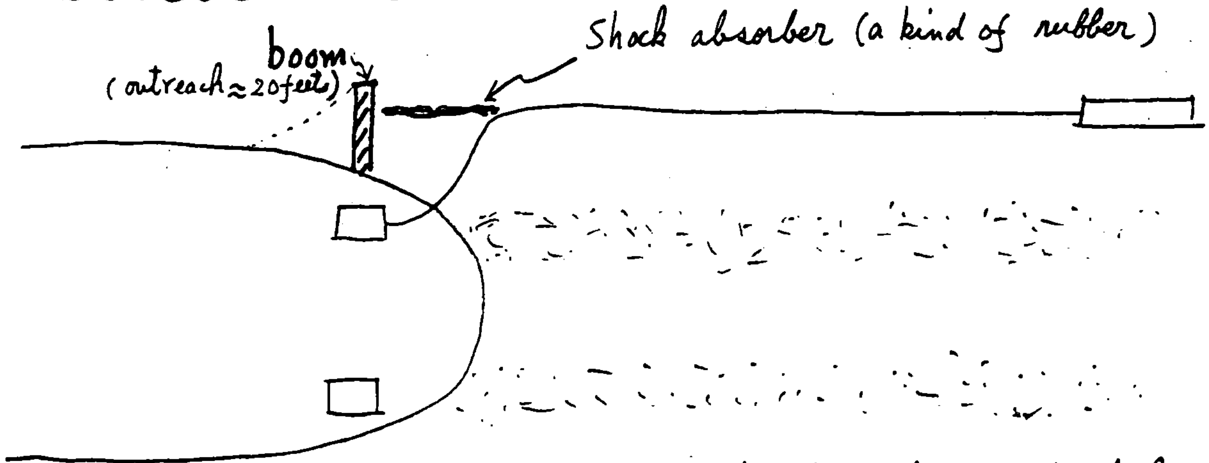
Case 1; present version

Attach #4
H. Tokuyama



An active section is presumably in a turbulence zone at a speed of more than ten knots.

Case 2; new version



An active section is free from a turbulence zone.

Attach 5/page 1

JOIDES Resolution, Sedimentology Lab

prepared for ODP Shipboard Measurements Panel, February 27-28, 1989

I. Shipboard Sedimentologists Handbook (ODP Technical Note #8)

All you could ever want to know (and more) about the shipboard sedimentology lab and procedures for describing sediments.

II. Sedimentology Lab Equipment

Hand lenses
Munsell Color Charts (laminated)
Smear slide facilities (using Norland optical cement)
Smear silde library
Microscopes (1 binocular and 2 microscopes)
Video camera and printer for one of the microscopes
Microvax 3500 terminal
Lasentec particle size analyzer — silt/clay ratios w/ magnetic stirrer
Photographic facilities

III. Core Description and Data Storage

Visual Core Description

See page 12 for a blank form, p. 20-21 for examples of completed forms.

Smear Slide Summary

Smear slides are prepared by shipboard sedimentologists to give a relatively quick analysis of sediment size and composition, which are used to classify the sediment.

See p. 22 for blank form. The smear slide summary is now only used as a back-up. Smear slide data is entered directly into the vax by the sedimentologists using the program SLIDES. This produces a table for each core which is pasted onto the barrel sheet. In addition, the data is stored and can directly be input into the ODP data base.

Barrel Sheets

See p. 24 for blank form, p. 27 for example of completed form.

All of the information, except the Lithologic Description (text) and the Smear Slide Summary (table) are filled in by hand, by scientists from the appropriate discipline. The lithologic description text, is typed onto a disc by ? (preferably one the sedimentologists), and pasted onto the barrel sheet. After the cruise this text goes directly to the typesetter.

Although there has been discussion about "computerizing" the barrel sheet graphic display, no decision has been reached about this. Such a program should allow data to be entered directly into the data base, as well as provide a high resolution graphic display. Several programs are currently under investigation.

IV. New Equipment

Digital Color Scanner

Two systems are in the early stages of consideration (1) a colortype densitometer and (2) a video digital imaging system. Colortype densitometers were designed by the printing industry for color inks. They measure the density of the 3 primary colors. One of these was tested in the repository this fall and distinguished about 100 parts between Munsell color chips, so it's higher resolution and more precise than the human eye. For ODP use, minor modifications will have to be made such as changing the nosepiece, and software would have to be written to convert the densitometer numbers into some type of scheme that would be useful to sedimentologists. We are exploring this device actively. Final cost would be around $3500 a piece.

Video imaging systems vary widely in price and capability, but are more expensive than densitometers. Cores might be scanned with a video camera during each cruise. These images could be digitized post-cruise and undergo image analysis, from which color and texture could be determined. At present no such system exists. Robert Holman (OSU) has developed a black and white imaging system which he uses for varved sediments. He twice submitted a proposal to NSF (with Mitch Lyle, OSU->LDGO) to develop a color imaging system that would measure intensity vs. wavelength, but it wasn't funded. They planned to develop software which would give color, reflectance, texture, and image enhancement.

Digital Texture Scanner

Software could be developed so that digitized video images could give texture information.