MINUTES OF THE 16th MEETING OF THE SHIPBOARD MEASUREMENTS PANEL

OCEAN RESEARCH INSTITUTE, TOKYO OCTOBER 29-NOVEMBER 1, 1996

Members present:

Robin Brereton (UK)
Ronald Chaney (US)
Lucy Edwards (US)
Franz Heider (Germany)
Siegfried Lallement (F)
Robert Musgrave (CANAUS)
Satoru Nakashima (Japan)
Massimo Sarti (ESF)
Joris Gieskes (US), Chairman

Members Absent:

James Hawkins (US)
Janet Pariso (US/F)

Liaisons Present:

Roger Larson (PCOM)
Jay Miller (ODP/TAMU)

Liaisons Absent:

Paul Dauphin (NSF)
Kevin Brown (TECP)

ODP/TAMU:

Bill Mills (ODP/TAMU)

1. Opening of the Meeting

Joris Gieskes opened the meeting at 9:30 am on Wednesday October 29, 1996. Satoru Nakashima informed the panel on the schedule of the meeting and on the planned visits to the laboratory of the Ocean Research Institute of the University of Tokyo. The panel is grateful to Professor Taira for the invitation to hold the meeting at ORI.

2. Panel Liaison Reports

There is no report from the NSF liaison.

The PCOM Liaison report was delivered on the second day of the meeting by Roger Larson. This report will be mentioned in a later section (7. Future Aspects of Shipboard Measurements Advice).

3. Points arising from the Minutes of the previous meeting of SMP (March 1996, College Station, Texas).

3.1. Future of Shipboard Measurements

During the 15th Meeting of SMP in March 1996 Jeff Fox, director of ODP/TAMU, indicated that JOI, in consultation with PCOM and BCOM, has been asked to examine the important new innovations in the program (Borehole Utilization, Legacy Holes, etc.) and to detail their costs. In this framework the question was raised as to "what existing components might be

dropped or reduced to accommodate the new initiatives...". In view of the future inception of the new Scientific Measurements Panel (SciMP) it will become important to act on an issue regularly brought up during the last few SMP meetings:

"Future of Shipboard Measurements.

SMP is well aware of the budgetary constraints put on ODP as a result of (potential) funding reductions. In order to study the future of Shipboard Measurements in greater detail under these constraints, SMP deems it appropriate to request ODP/TAMU to provide information to be discussed in detail during the next meeting of SMP:

1. It is requested that a list be made of all major equipment, emphasizing the following:

   a. Life expectancy;
   b. Changes required for future use;
   c. Availability of spares;
   d. Software requirements;
   e. Maintenance requirements;
   f. Time available to perform the measurements.

   The basic efficiency of obtaining information using a particular apparatus should be a guide.

2. SMP also would like more information in the form of flow-charts of the various laboratories, indicating contributions to the final product of a cruise, as well as the necessity of performing the measurements on the ship.

SMP wishes to stress that hitherto the Panel, justifiably, has advocated the full scale of measurements on board ship, thus providing an opportunity to a large number of scientists from different disciplines to produce a product of first class scientific value in an unique environment that stimulates collaboration. This has served very well also in the training of young scientists and graduate students. Thus, though economic necessities may force some reductions in these efforts, SMP wishes to use the above requested information in a very carefully considered manner. The philosophy should remain that the shipboard party should produce a first rate scientific result through collaborative science on board the JOIDES Resolution. This information constitutes an important legacy of the Ocean Drilling Program."

Jay Miller indicated that under the new circumstances of re-organization and the work associated with the writing of a new 5 year budget, little time has been available to pay attention to this issue. However, in the near future attention will be paid to this problem.

Bill Mills noted that for the most part, since technicians are multi-tasking, technical costs are not reduced even if equipment is removed. A major point for consideration, however, will be the question of efficient use of time. In addition there will be a need to investigate aging equipment and its potential replacement. Jay Miller indicated that ODP/TAMU has learned that the level of effort required to do the above job well will be much greater than originally anticipated.

SMP is still of the opinion that this will be a useful exercise, at least as far as reporting age, maintenance requirements, and level of utilization. Hence SMP (or the future SciMP - Scientific Measurements Panel) looks forward to obtaining the requested information so that SMP (SciMP)

and ODP/TAMU can jointly investigate in detail what impact potential replacements and/or reductions in shipboard measurements will have on shipboard science or on budgetary savings.

Bob Musgrave noted that for many scientists, their level of contribution and interest in sailing is dependent on how much science they can accomplish. If the level of support for any facilities is reduced, the interest level of potential science participants can be impacted.

3.2.Status of Cookbooks

The chairman asked about the status of the development of Cookbooks for the various laboratories, with special reference Recommendation 95-7: Quality Assurance for Cookbooks.

Jay Miller indicated that "Generic Explanatory Notes" do now exist or are in production for future review by appropriate panel members. This will then allow the production of the Explanatory Notes for each Initial Reports Volume.

Jay Miller indicated that ODP/TAMU would eventually like to see continually updated WEB pages that outline detailed information on the laboratories for interested scientists. He suggested that working groups (consisting of ODP/TAMU personnel and interested scientists) should be charged with helping to produce and review these documents. These working groups can be charged with helping to produce and review these documents. ODP/TAMU would get the basics down and scientists could sail (for instance, on an engineering leg) to edit these documents. Jay Miller noted that one way of disseminating this information would be via a WEB-page, but that the creation and support of Web pages needs to be augmented if we are going to invest so much critical effort and dependence on this.

One SMP member suggested the potential use of undergraduate/graduate support to Texas A&M departments (e.g., computer science and geology). Student support for cookbook development, however, has costs that need to be put into the budget. A suggestion was made to restrict the updating and improvement of each document to one or two a year once a year. There should be a rotating update schedule. First attention must be given to the Physical Properties Laboratory.

Ron Chaney suggested that there exist national and international standards for tests, interferences, etc. These should be used a priori in the development of manuals. They are presently included as appendices to current cookbooks. Further questions to be addressed include sampling strategy, which tend to be leg specific, the standards are well defined but, for example, what is the utility of making all MST measurements on gassy cores ?

Recommendation 96-12

SMP recommends strongly the establishment working groups that will pay attention to the development of cookbooks for the various laboratories on board JOIDES Resolution. Experts with sea-going experience on JOIDES Resolution and personnel from ODP/TAMU should constitute these working groups. Resulting cookbooks should be published on the WEB and undergo periodic review by SMP (SciMP) members for their contents and usefulness.

3.3. Resistivity Measurements

During the last meeting of the SMP discussed the problems encountered by ODP/TAMU with the Spiess-Resistivity Apparatus. At that time it was decided that this apparatus not be

deployed until proven to work satisfactorily:

"Recommendation 96-9

SMP agrees that the ODP/TAMU purchased electrical resistivity apparatus should not be deployed on board ship at this time.

Further discussion suggested that continued investigation of this apparatus on a time available basis would be advantageous. At the same time ways should be found to have an outside interested party carry out further checking of this apparatus. At the same time SMP suggests that the possibility to obtain a whole core inductive coil measuring apparatus be explored."

Jay Miller indicated that the Spiess-Core Resistivity equipment still does not get reproducible results even after repairs. It will take someone full time work for a few weeks to evaluate specifically what are the problems, standards, and to write a cookbook. Since SMP recommended against sailing this instrument, ODP has dedicated minimal effort to development. Joris Gieskes has offered to undertake this task in his laboratory.

At the same time during ODP Leg 169 Joris Gieskes has investigated the use of the esistivity probes available on the drill ship for discrete measurements of the formation factor. A report will be made available to ODP/TAMU so that future shipboard Geochemists/Physical Property experts have access to resistivity apparatus until new equipment has been installed.

At the March Meeting of SMP in College Station Peter Jackson presented his version of electrical resistivity apparatus (see Minutes of 15th Meeting of SMP) and also indicated that his laboratory has worked on non-contacting resistivity measurements, which again could provide useful information and could, in principle, be incorporated in an MST device. He indicated that Geotek is interested in such a system. With the participation of Peter Schultheiss of Geotek in Leg 169 an opportunity may arise to test these new methodologies. Further use of this equipment, especially now that the Schultheiss half core track has been purchased, should be considered in the future. SMP suggests that such will remain in the category of "third party" tools, though on certain drilling legs, especially those concerned with sediment structures, the use of this equipment will be extremely useful.

3.4. Thermal Conductivity Apparatus

During the March Meeting (1996) SMP discussed the availability of thermal conductivity apparatus and suggested the following:

"One of the main drawbacks of the Teka system, when compared with the old WHOI system, is the fact that only one probe is used at any time. This will cause, especially on high recovery legs, a low depth resolution (1 to 2 measurements per core). It is, therefore, recommended that further development is necessary towards a multiprobe system. Such a development may require a Request for Proposals (RFP).

Recommendation 96-2

SMP agrees with the deployment of the Teka TK04 Thermal Conductivity Apparatus as from Leg 167. This deployment will (for the time being) be in addition to the existing WHOI equipment. SMP also recommends that thought be given towards development of an RFP for the expansion of the TK04 apparatus to a multiprobe system. Finally SMP endorses the proposal to integrate the Teka program in the Physical Properties Laboratory and also in the JANUS Data Base."

The following information was received from Peter Blum of ODP/TAMU:

"THERMAL CONDUCTIVITY SYSTEM STATUS AND RECOMMENDATION

PRESENT STATUS

The new TK04 system was installed and tested on Leg 168. Dan Pribnow, physical properties specialist on Leg 168, has paid special attention to the instrument and been in contact with the manufacturer and myself. Overall, the TK04 system has performed well. It is superior in many ways to the ailing Thermcon85 system.

Pribnow and manufacturer are still evaluating comparative data from both the TK04 and Thermcon85 system to further improve the system if necessary. However,the TK04 also had the following, expected weaknesses in regard to routine ODP use, as described in March 1996:

1) It is a single-channel system
2) The front-end of the controlling software is not designed for ODP "production use"
3) The data output is not in a form yet to be easily made compatible with Janus.

When the TK04 system was purchased, there was no multi-channel system of matching sophistication available, and ODP decided to buy the best single- channel system available to have at least a backup to the ailing Thermcon85 system. The TK04 manufacturer is in the process of building a multi-channel system and modifying the software to be more useful for ODP. The rate of progress is slow and there is no formal ODP input, however, because there is no contract between ODP and Teka for further development. We have also received word that a group at WHOI has developed, or is developing an upgraded system based on the Thermcon85. At the same time I was made aware that ODP electronics technicians are building a thermal conductivity prototype device (electronics part).

I am concerned that there are several unrelated efforts going on and that none of them will fully meet the requirements for the system the ODP needs because of the lack of coordination. There is often a perception by technicians and scientists alike that a thermcon system could be developed easily, quickly, and with little money. Indeed, it is not that complicated to build a basic thermal conductivity system, but in order to satisfy all requirements from different groups and parties, a coordinated effort and resource allocation is needed if a useful system is to be put in place in the near future.

REQUIREMENTS FOR AN ODP THERMCON SYSTEM

I can identify the following basic requirements, although I do not claim that they are complete:

A) Hardware:
- .half-space and full-space needle probes
- .multi-channel system
- .automated probe recognition

B) System control:
.variable heat supply for different materials
.automated temperature drift control
.cyclic control of multiple channels

C) Program interface
.fool-proof front-end with on-line tutorial for novice user
.parameter options for expert user
.professional, standard GUI user interface throughout
.graphical presentation of processed data for quality control (see TK04 system)

D) Raw data processing:
.routine processing for novice user
.special processing using different parameters for expert user

E) Data output
.write prime data file with time-temperature series
.header includes probe id, system status, heat supplied, etc.
.calculated thermal conductivity based on routine processing
.optional calculated thermal conductivity based on special processing

F) Data model
.raw data (time-temp series)
.calibration data (secondary calibration with standards)
.control data (standard measurements)
.probe data

J) Data report
.define standard data report to be provided by Janus

RECOMMENDATION

Considering the different parties involved in efforts to develop a thermal conductivity system for the ODP and/or the wider earth science community, I propose that ODP initiate phase I of a development project with a modest budget (mainly travel) and the following objective:

.refine the system specifications with input from expert users
.review upgraded Teka, WHOI, and any other existing system
.specify requirements for these systems to meet specifications
.design one or more plan(s) for a high-quality thermal conductivity
.system for ODP calculate costs

ODP, in conjunction with the new "Measurements Panel", to review and approve the plan, if possible as early as spring 1997. As soon as resources are allocated (very roughly estimated $100 K or less, including spares, training, and all), phase II of the project could be initiated which would include:

.initiation of contracts and/or assignments within ODP
.oversee progress
.testing
.installation on ship and integration into database".

Jay Miller pointed out that during Leg 169 both the Woods Hole and the Teka thermal conductivity apparatus were used. The ODP/TAMU Laboratory Working Group (LWG) prefers the Teka equipment if money is available. The major problem is that development and testing manpower is not available at ODP. Yet thermal conductivity measurements are a necessity for a proper heat flow measurements program. The latter is again of importance from the safety point of view.

Peter Blum reports that existing equipment has been evaluated pretty well, and the Teka manual is quite specific. What is needed next are more detailed/technical specifications for the new system, and some time later an evaluation of proposals for a new system (from Teka, WHOI, or home-grown) in regard to ODP use. SMP cautions with regards the use of home-grown equipment, particularly because pressures on manpower resources may tend to lead to a long gestation period or to slow progress at best. Any decision to go for home-grown equipment should be contingent on an evaluation of what WHOI has available or is planning, as well as gaining information from Teka with regards time scales on when something might be available and it's acceptability to ODP/TAMU. Consultation with heat-flow experts would be beneficial for this purpose. There is a need for a more precise evaluation of what Teka and WHOI can offer towards this as well as towards ODP needs in terms of data integrity and user friendliness for common novice users. This subject should become a prime topic for further discussion by the new SciMP panel.

During the SMP discussions the suggestion was made for a poll of recent users. In addition the possibility should be explored to seek graduate student support to test, calibrate, develop a manual, and write a decision and bias statement as part of an engineering student project. Several universities (Humboldt State and Texas A&M University (George Mason) were given as examples by SMP members) have graduate students looking for projects; many have financial support, but need a project to complete degrees. Peter Blum (from the ship) commented that " the graduate student could assist in the preparation of an RFP and in the evaluation of the proposals, where the review of the existing systems (on board!) would be the individual's warm-up. (Testing of the new system would follow significantly later, once the system is completed and delivered, which could easily be a year or two after initiation of the RFP. Required support will have to be part of the project proposal for an RFP and, and later for development. The main challenge will be to get the funds allocated sometime before the "Jahrhundertwende" and a development schedule that fits everyone, particularly the developer. It would be great to have an electrical/software engineering student involved in this and I think we should give this consideration highest priority. However, contractual and developmental realities may be in conflict with the timing of a student project."

Recommendation 96-13

SMP endorses the proposal presented by Peter Blum with regards an evaluation of the thermal conductivity apparatus available on JOIDES Resolution: specifically that ODP initiate phase I of a development project with a modest budget (mainly travel) and the following objectives:

- *** refine the system specifications with input from expert users**
- *** review upgraded Teka, WHOI, and any other existing system**
- *** specify requirements for these systems to meet specifications**
- *** design one or more plan(s) for a high-quality thermal conductivity system for ODP**
- *** to calculate costs**

In view of the importance of these measurements this project should be of high priority

3.5. Natural Gamma Ray Spectral Data

During the March Meeting of SMP Peter Blum presented results of an investigation of the use of natural gamma-ray spectra obtained with the shipboard scintillation detector. These tests were carried out during Leg 156 of ODP. The more complete documentation will be published in the Leg 156 Scientific Results Volume.

The results of this exercise indicated that, in principle, useful information on the concentrations of K (± 14%), U (± 24%), and Th (± 16%) can be obtained. It was also shown that acquiring 2048 channel data had no real advantage over the use of only 256 or less channels.

This led to the following SMP recommendation

"Recommendation 96-3

SMP recommends that the natural gamma-ray system be configured for 256 channel data acquisition for routine spectral data collection and archiving.

SMP also concurs with the suggestion that the JANUS Data Base provide three report options: total counts only (for most short-count data sets); 5-window spectra compatible with Schlumberger Downhole Logging; and 256-channel spectra (for rare long count data sets).

In addition SMP supports the suggestion that ODP/TAMU shall purchase standards in 50 cm coreliner segments, having known amounts of K, U, and Th."

Peter Blum of ODP/TAMU provided the SMP chairman with the following additional in formation on the justification for the purchase of standards.

"RATIONALE FOR ACQUISITION OF NATURAL GAMMA RAY STANDARDS

BACKGROUND

In early summer 1993, ODP installed a natural gamma ray (NGR) device on the JOIDES Resolution. The system includes a multi-channel analyzer (MCA) for
pectral data acquisition. On the subsequent Leg 150, the instrument was
ested, calibration procedures defined, and optional corrections to the data applied (Hoppie, Blum, et al., 1994). Up to the present day, calibration procedures involved tuning of two amplifiers serving four sensors, and a two-point, linear energy calibration of 2048 acquisition channels, using materials of choice such as KCl from the chemistry lab and Schlumberger's Th blanket. This allowed acquisition of energy-calibrated NGR spectra. However, the spectra could not be used to estimate abundance of K, U and Th on a routine basis, which is the main purpose of NGR spectral acquisition, because of the lack of quantitative standards. I propose here to acquire such standards to complete the introduction of NGR measurements on the JOIDES Resolution.

REQUIREMENTS AND PROCEDURE

Accurate and rapid calibration of NGR emission from ODP cores for estimation of K, U, and Th elemental abundance is best achieved by measuring a set of
standard cores that

.contain known concentrations of these elements
.have a matrix density similar to the material to be measured
.have the same cylindrical geometry and size as the cores to be measured
.are long enough to fill the entire measurement area of the sensors
.have a homogeneous concentration of the target elements throughout

One standard core containing the three elements at known concentrations, placed in a 40 cm long ODP core liner, could provide a basic, one-point calibration. However, there are at least three effects that need to be taken into consideration, the matrix effect, interference, and background contribution.

The matrix effect is caused by Compton scattering and other interactions of the emitted gamma rays in the core before they reach the sensors, and is a function of the matrix density, the sample geometry and size, geometry of the measurement chamber and sensors, and the activity and concentration of the emitter. It is not immediately clear how emissions from varying concentrations of the three elements, each with a different activity, are affected by the matrix. The relationship is not trivial to derive theoretically. I therefore propose acquisition of standards with varying concentrations of the three target elements to determine the effect directly. The range of concentrations spans the range of natural occurrence in common sediments (Table 1). An additional control would be through the measurement of standards with equal target element concentration, but different matrix density. However, this experiment is not part of this proposal in order to limit the total number of standards to be purchased.

Interference occurs when two different elements have daughter isotopes emitting at energies so close that they cannot be differentiated in the spectra obtained with scintillation detectors. This occurs several times for U and Th series isotopes. Detector efficiency limitations may also affect interference. This effect needs to be taken into account when estimating elemental abundance from natural mixtures. The most practical way to determine this effect quantitatively is to measure it directly with standards that contain only single elements and, standards that contain mixtures at known concentrations.

Background constitutes the bulk of an NGR spectrum. It is composed of zero-background (cosmic radiation, impurities), for which we can correct easily, and background resulting from Compton scattering, contribution of low-intensity emitters which disappear in the Compton background, and other effects (Blum et al. 1997, in press). It is possible to eliminate the background from the spectra and only use peak areas of one single element source through spectral analysis (Blum et al, in press). However, when count rates are low, which is usually the case for routine core logging, it is advantageous to use the background as well for elemental estimates to reduce the Poisson counting error significantly. It is not trivial, or impossible, to quantify background contribution theoretically, and the best way is again to determine it directly from measurements of mixtures and single element standards at various concentrations.

A proper calibration of the ODP NGR device therefore requires at least a set of 12 standards: 9 single element standards for three elements at three concentrations, and 3 mixture standards (Table 1). These standards should all
have the same matrix density of 2 g/cm^3.

Table 1. Proposed NGR standards.

Standard	K (%)	U (ppm)	Th (ppm)	Cost ($)
NGR1	1	-	-	1,650
NGR2	3	-	-	1,650
NGR3	5	-	-	1,650

NGR4	-	1	-	1,550
NGR5	-	4	-	1,550
NGR6	-	7	-	1,550
NGR7	-	-	1	1,550
NGR8	-	-	13	1,550
NGR9	-	-	25	1,550
NGR10	1	1	1	2,150
NGR11	3	4	13	2,150
NGR12	5	7	25	2,150

Homogeneity of the standards is guaranteed at 210 % on 1 cm^3 samples based on 10 samples. I therefore suggest to have 50 cm long standards manufactured, which is about twice as long as the measurement area of the device and allows measurement of an accurate, average calibration spectrum with a total error of significantly less than 1%.

COST

A quote has been received from Isotope Products Laboratories in Burbank, California. No other potential manufacturer is known to us. The itemized costs per standard are listed in Table 1. The total amounts to $20,700. The price includes natural K, U, and Th, a synthetic matrix (Al + epoxy), and mixing and filling into core liners supplied by ODP. Scrap material from each standard for independent lab analyses will be provided at no additional cost."

Jay Miller pointed out that at present 256 channels can be recorded. He pointed out that this will cause an overwhelming data base if it happens. The projected costs of the purchase of standards is part of the list of items for future purchase as itemized in section MMM of these minutes.

SMP concurs that the expense for this project is well justified, particularly because the information to be gained can be utilized to advantage in future core-log integration programs.

3.6. Gamma-Ray Attenuation Calibration

During the March 1996 SMP Meeting Peter Blum suggested better methodology for the calibration of the grape density system. This led to the following recommendation:

Recommendation 96-4

SMP recommends that the present gamma-ray attenuation density calibration using two aluminum rods of different diameters be replaced by a method that uses a water core and an aluminum rod. This new calibration procedure should first undergo comparative testing. SMP also recommends that ODP/TAMU obtain funds for the purchase of an appropriate balance to determine the mass of whole cores, thus providing an overall check on "whole core density" evaluations.

A new standard, consisting of different sizes of aluminum rods contained in water, based on the standard provided by Dr. Peter Schultheiss during Leg 169, is now regularly used for calibration of the GRAPE. The more frequent use of this standard leads to much improved reproducibility of the data and the "Boyce Correction Factor" has now become obsolete.

3.7. Moisture and Density Methods

At present there are still three methodologies available for discrete density measurements:

A. Bulk volume sampled with a fixed (known) volume ring or syringe type of device;
B. Bulk volume measured in a gas pycnometer;
C. Dry volume measured in a gas pycnometer.

During the Spring 1996 meeting SMP expressed its preference for methods B and C as the ship standard methods. Method A will not necessarily be a ship standard method but should still be available for scientists if they desire to use it in addition to methods B and C. The latter method (A) is often used during high recovery paleo-legs, where sediments are soft enough to obtain reliably reproducible volumes. A typical example for such usage is ODP Leg 154 (Kate Moran, personal communication). SMP supports this type of measurement in principle, but its use is let to the Shipboard Scientist. It should be noted that historic records indicate that Method A should only be employed as necessary. The measurement is accommodated in database, though there is a need for a review whether its use is required as often as was done in the past. There is still the need for the measurement of density through discrete index-property determinations, but the frequency of these measurements can be relaxed, especially if regular comparison with the MST data is made. Standardize on GRAPE system-use it as a complementary method as scientist requires. Do discrete sampling as required. Allow for it, but don't require it.

SMP encourages the investigation by the ODP/TAMU Physical Properties Laboratory Working Group of a potential measurement of the whole core density through volume and weight determination of an entire core section by means of a swing balance or suspension balance.

3.8. Thin Section Preparation

SMP is pleased that recommendation:

"Recommendation 96-6

As a minimum, the thin-section slide should be polished on the side mounted, so that it will be suitable for repolishing of the top surface to meet requirements for probework and reflected light studies. If the top surface is not polished, then the cover slip should be attached with binder that will allow easy removal. All thin sections of hard rock material (or other appropriate material, e.g., massive sulfides) shall be polished, unless there are friability constraints to prevent this."

has been acted upon and is now operational.

3.9. Chemistry Laboratory

Discussions during the SMP March 1996 meeting centered on the use of the shipboard methodologies for C/N analyses of sediments.

If the apparatus is set up for the generation of c & N data only, omitting the sulfur component, the following will result:

The benefits of this set-up are:

1. Increased column life: C/N only columns may last 700-1000 samples, whereas CHNS columns only allow the processing of 100-120 samples.

2. With C/N-only plumbing analyses will be four times faster. For those legs in which only C/N is of interest, this would greatly facilitate data collection.

One of the drawbacks is:

Because the runs are quicker, more of the chemistry laboratory's technicians' time will go to weighing the samples as a result of increased demands. Shipboard parties are urged to make no unreasonable demands on the chemistry laboratory for the sake of collecting more data. The Laboratory Officer should have the ultimate authority on this matter.

SMP considered this item and submits that C and N data are primary data, whereas S data are considered as optional data. The following recommendation was formulated:

"Recommendation 96-7

SMP considers the collection of C/N data of primary importance and C & N data are to be considered as prime data. The CHNS Apparatus should be plumbed for C/N only, unless an Organic Geochemist(s) indicates well in advance of the Leg that the S data are requested. In that case the apparatus will be plumbed for that purpose."

Unfortunately, partly as a result of this well-intended recommendation, there has been an increasing demand for this type of sulfur measurements.

Because of the problems associated with the C/N/S mode of the Available equipment and associated problems with reproducibility of the S-data SMP prefers the use of a separate apparatus for sulfur measurements, this apparatus being dedicated to S-measurements only. The use of a Leco-sulfur analyzer or equivalent is advocated for this purpose.

The question arose as to where to install this equipment in an already quite full laboratory. If the GEOFINA apparatus were to be removed into storage on ship, room would become available. The chair of SMP will enquire with the Organic Geochemistry re the desirability of such an action.

Recommendation 96-14

SMP urges consideration of the purchase of apparatus dedicated to the measurement of sulfur compositions of sediments or hard rocks (e.g., sulfides). Such apparatus will help prevent problems with the routine measurement of C/N ratios with the C/H/N/S Hewlett Packard equipment. In addition a more reliable determination of sulfur contents of sediments and rocks will become feasible.

4. Other items regarding Shipboard Laboratories

4.1. Paleomagnetic Laboratory

Jay Miller and Bill Mills reported the following:

Space Usage

Although sometimes cramped due to its narrowness, the lab functions well and has sufficient space

at this time. When necessary, the positions of the computers and smaller instruments are rearranged to accommodate "guest" equipment. Shelf space is adequate, but unfortunately can only be reached by climbing on the counters or using a ladder. Thus, the shelves function mainly as long-term storage for little-used items.

Scientific Equipment
The lab is very well equipped for paleomagnetic and rock magnetic studies. The spinner and cryogenic magnetometer have been replaced recently and a new, and more efficient alternating field demagnetizer will be installed during Leg 171. Continuing problems are overall electronic (radio frequency interference) and motion-related noise as well as spurious magnetic fields from the rig floor which act to decrease the sensitivity of the equipment, particularly the cryogenic magnetometer. Second-order nuisances are vibration and heading changes, which mainly impact the Kappabridge.

Computer Hardware/Software
The lab contains two Macintosh and three PC computers, which handle the needs of shipboard paleomagnetists well. One of the PC's is dedicated to running the cryogenic magnetometer, and two 486 PCs are used to control the spinner magnetometer and the Kappabridge. Any computer may be used for other purposes when not actively collecting data.

Data Curation
Currently preliminary solution is using spreadsheets.

Manuals, Explanatory Notes
Manuals are available for all equipment in the lab, and old obsolete copies are kept for the wealth of useful tidbits people have added in the margins over the years. Technician reports are useful sources of information for troubleshooting problems. Copies of all manuals have been given to Science Operations. A draft of standardized Explanatory Notes for "Paleomagnetism" has been submitted.

Technical Support
One technician per leg is assigned to the paleomagnetics lab (and the core lab). The technician provides support for the lab and familiarizes the shipboard scientists with lab equipment and software. The beginning of a leg is quite hectic for the technician as a result, but the lab generally requires much less attention after this (except during high-recovery legs).

Scientific Usage
Lab usage with respect to the other shipboard labs is moderate overall, if one averages both hard and soft-rock legs together. In order to keep core flowing through the lab during high recovery periods, both the scientist on duty and the paleomagnetics technician must keep an eye on the cryogenic magnetometer and reload it without delay. The cryogenic magnetometer is the most-used apparatus in the lab by far. The other equipment is used on a time-available basis.

The new cryogenic magnetometer has been installed during Leg 168 and much work has been carried out to make the apparatus functional, including the software writing. Much credit for making the system operational goes to Bill Mills (ODP LO), Margaret Hastedt, Edwin Garrett (ODP PMAG lab specialists), Roisin Lawrence (Leg 168, PMAG scientist), and Michael Urbat (Leg 169, PMAG scientist) The much higher sensitivity of the apparatus will allow much more significant measurements in carbonate sediments.

SMP considered the pass-through cryogenic alternating field demagnetization policy in the light of the higher field capability of the new cryogenic magnetometer. Some confusion among the

paleomagnetic community was noted about current IHP demagnetization policy and SMP suggests that this policy be made clear to shipboard paleomagnetists.

The following information was received from the ODP/TAMU Staff Scientists Carl Richter and Gary Acton:

"Shipboard AF demagnetization of archive halves

Neither IHP or SMP has ever set a limit of 20 mT in the recommendations that we have seen. The IHP recommendation (dated Sept 1992) is extremely concise and reasonable. It is also what is given in the Handbook for Shipboard Paleomagnetists (Tech Note 18, 1993). The handbook states:

"In September 1992 the Information Handling Panel (IHP) recommended that shipboard paleomagnetists be allowed to partially demagnetize the archive half- section of any core to as high a level as is necessary to isolate the characteristic remanence. The maximum demagnetization step size is limited to 15 mT to prevent the destruction of core magnetization without a record of intermediate data. Shipboard paleomagnetists are requested to demagnetize the cores at fields no higher than the minimum demagnetization field required to isolate the characteristic remanence. Shipboard paleomagnetists are encouraged to take discrete shipboard samples that can then be demagnetized either thermally or at alternating fields up to 100 mT. These results can then be compared to the results of demagnetization of archive halves to determine whether or not secondary magnetizations were adequately removed."

At the time of this recommendation, the magnetometer could not exceed fields of 30 mT (though rarely did anyone go above 25 mT because the coils supposedly got warm and there was a concern that an anhysteretic magnetization might occur at the high end of the limits of the AF unit). In any case, the above recommendation makes a lot of sense even for the new magnetometer. Shipboard paleomagnetists have been limited in resolving the characteristic direction in the past because 25 mT was often insufficient to remove the drill string overprint. That was one of the prime reasons for getting the new magnetometer with higher AF capabilities.

The maximum 15 mT demagnetization step size suggested in the IHP recommendation should prevent single step demagnetizations at excessive levels. Yet the wording "paleomagnetists be allowed to partially demagnetize the archive half section of any core to as high a level as is necessary to isolate the characteristic remanence" leaves room for shipboard paleomagnetist and co-chiefs to design a program that will achieve the goals of the leg. For example, if the shipboard paleomagnetists make a compelling case that 30 mT demagnetization is required and that time won't permit both a 15 and 30 mT step, then the shipboard paleomagnetists and co-chiefs should be able to opt for a single 30 mT step if they so choose. We believe that the shipboard scientists are in the best position to judge what needs to be done and that they will continue to make reasonable decisions as has been the case in the past.

Thus, we ask that SMP support the current statement in the handbook rather than attempt to enforce a set of new guidelines that are difficult to enforce."

SMP concurs with the above expressed sentiments and wishes to support the 1992 IHP recommendation.

4.2. Split Core Multi Sensor Track (SC-MST)

Bill Mills stated that ODP has purchased a GEOTEK (Schulheiss) Split Core Multi Sensor

Track (SC-MST) as part of a feasibility test. Originally $54 K was budgeted for the feasibility study and $150 K for purchase. By sailing P. Schultheiss on Leg 169 ODP acquired the entire apparatus for less than $90 K.

Benefits over the existing system are:
Over whole core:the core is visible
Spatial control.
Point susceptibility meter.

The instrument will serve as a test bed for development. It will be shipped back to ODP/TAMU for development but no funds are as yet allocated for this purpose. allocates for this. Development funds are in project requests.

The Whole Core MST device is now in very good shape and reliable data are obtained in non-gassy Advanced Piston Cores (APC). The addition of the split core device will extend the usefulness of the Whole Core MST (WC-MST) towards several main goals:

1. The SC-MST will in the future combine all of the major functions of the current WC-MST (P-wave velocity, magnetic susceptibility, GRAPE, and natural gamma-measurements) with a color scanning system. SC-MST measurements will be able to be correlated directly with other measurements made on the split sample surface or from direct samples of the core. These include paleontological dates, color spectral data, resistivity (when available in the future), shear strength measurements, index properties, discrete velocity measurements, paleomagnetic measurements, and, of course, visual core descriptions.

2. Speeding up of core MST data collection. The SC-MST would allow the functions of two MST systems to be split up, with the WC-MST used to ensure complete stratigraphic coverage by core-core correlation and the SC-MST used for detailed core measurements.

3. Most SC-MST designs are semi-portable, allowing the system to be moved from ship to shore, when the cruise schedule allows. This will allow detailed studies of already existing materials in the ODP core lockers.

4. When WC-MST measurements become less useful, as, for instance, in gassy cores or cores obtained with rotary drilling,often showing large core disturbances, but also showing biscuits of less disturbed material, the use of the SC-WSTP can serve as the device that will extend the usefulness of the WC-MST, particularly for discrete measurements and for measurements useful towards the goal of core-log integration.

Bill Mills explained the plan for the use of <u>two</u> half-core MST devices, of which one is already routinely used for Physical Property Measurements, but which can be extended to yield more measurements (e.g., grape, vertical p-wave, vane shear, discrete resistivity measurements, etc.). The second 1/2 core track would be used for Archive Half measurements, e.g., digital imaging, color measurements, point-susceptibility measurements.

Bill Mills pointed out that at a minimum 20 K$-US would be necessary to accomplish these goals. In addition he pointed out that there will be a need for "creative design" in the Core Laboratory so that continued infringement into working areas of other laboratory users (petrologists, sedimentologists) can be reversed.

SMP is most supportive of the further development of the use of the SC-MST in the core laboratory. With the introduction of digital imaging on board the need for the photographic laboratory will be less and less important, and thus space will become available for MST

deployments.

During the SMP meeting a demonstration was given by Dr. Masayoshi Ohnuma, Director of CORE-CORPORATION of Kanagawa, Japan. His color digital recording showed the high quality of digital imaging possible with this technology. This or similar technology, at first perhaps in terms of black and white imaging should lead to the future Core Description program (see section 4.3 of these minutes). SMP suggests to ODP/TAMU to find ways to invite Dr. Ohnuma to participate in a future engineering leg to test his equipment on board ship.

Recommendation 96-15

Digital core imaging will become increasingly important in the ODP and with high quality imaging of split cores it will soon replace core photography. In addition records of this type can be used in the Visual Core Descriptions Program. SMP, therefore, urges special attention to this subject in the near future and recommends a detailed evaluation of the various techniques available, with the specific aim of merging various interests in imaging, e.g., digital "photography; color scanning; core descriptions.

4.3. Visual Core Descriptions

During the Spring Meeting of SMP Kevin Brown reported on the discussions of the TECP of the report of the August 1995 Working Group ("Brown Report") and indicated the enthusiastic support for this project by TECP.

The merit of this project was supported by SMP through the following recommendation:

"Recommendation 96-11

SMP expresses its strong interest in a continued effort to improve the methodology of Core and Structure Descriptions as outlined in the Core Descriptions Workshop Report of August 1995. SMP recommends to PCOM that it also endorses the quick development of this important effort towards modernization of the core description process."

Kevin Brown (through electronic communication) indicated that progress on this issue has been retarded by the fact that the TAMU person responsible for this task is recovering from a bad accident. He indicated that funds are available to put a digital camera on the split core track and to get the digital images into the computer system. This project should go forward in the near future when he returns to work. In terms of the software development, matters are less certain and Kevin was not aware of the latest details. There appears to be some money available for this but not a great deal.

Jay Miller did report on the progress made on the use of "Apple-Core" developed by Mike Ranger of Canada. He arranged for a demonstration of the capabilities of this software and indicated that this program should be adaptable for a replacement of the present VCD/Structure program. During Leg 169, through the constant attention of Jay Miller, scientist have made good use of this capability. Though this program is presently available in Mac-form, changes towards PC-compatibility are being made in collaboration with Mike Ranger.

It should be understood that the use of Apple-Core is not intended as a replacement of the software/hardware proposed by the Core Descriptions Workshop, but that it will serve as a temporal replacement.

With the acquisition of the Schultheiss Split-Core Track it appears to be imperative to stress the urgency of further development and the study of the potential use of digital imaging of the split cores should be pursued with vigor.

Recommendation 96-16

SMP appreciates the development of the Apple-Core program for sediment and structure descriptions in the JOIDES Resolution's Laboratory, but urges the release of sufficient funds towards the development of a digital imaging system that will allow the development of a modern manner of Core and Structure Descriptions (as also urged in Recommendation 96-11).

With respoect to the use of as a temporary solution for Visual Core Descriptions it is of importance to quote from a message sent by Kate Moran, Chairperson of the JANUS Committee:

"We have decided to use the software Apple-core as our primary data capture tool for visual core description. Sedimentologists and petrologists used it on your leg (ODP 169) with good results. The version they used was without the modifications for Janus and the problems they found will be corrected with the new modifications. It is a simple, but elegant software package with data output that can be uploaded, in a structured format, to Janus. One of the changes to Apple-core will include ternary input of sediment composition, which is normally defined using smear slides. These compositional data will then be uploaded to Janus and will be accessible. The SC agreed that this type of input from smear slides to Janus using ternary composition fully meets the user requirements for sedimentologists and, thus, renders the SLIDES program obsolete. As you recall, SMP has always been very nervous about directly storing the numbers associated with smear slides because of their descriptive nature. It seems as though the use of the SLIDES program became the standard by default, rather than by thinking about the need for the data. With more use of MST, color reflectance, and selected XRD data (as is now happening onboard), the composition of sediment can be better assessed. We envision that this change will allow the sedimentologists to use smear slides as an aid to core description at a frequency that they deem necessary, rather than as a "test" that must be performed to generate data.

Given our decision, you may wish to discuss at SMP the need to continue to require sedimentologists to collect and keep smear slides. TAMU stores and catalogues all smear slides collected from the ship. Russ Merrill informed us that these materials are rarely accessed, probably because a sedimentologist who visits the repositories would rather quickly make their own smear slide from the core than to look at someone else's old smear slide. Since we are proposing that sedimentologists use smear slides as an aid to their core description, there is no need for them to take the time to prepare the slide for storage (particularly since no one wants to look at them later, anyway). This change would reduce the labour for the sedimentologists and would eliminate the need to catalogue and store the slides. We also think this change will improve the integrity of the data in the database. Hopefully, your panel will agree."

Unfortunately this message was received too late for discussion by the Panel, but the determination that Apple-Core be the temporary replacement for a future more elaborate core description program is consonant with the Moran letter. The details on the problem of storage of smear slides should be discussed during the next SciMP Meeting.

4.4. X-Ray Laboratory

Jay Miller indicated that the X-Ray laboratory is still in reasonably good shape. Demands on both the XRF equipment and on the X-Ray Diffraction equipment have been high and steady. This

indicates a continued need for upkeep of this facility. For these reasons SMP wishes to restate it's opinion on the need for thought on the replacement of the X-Ray diffraction apparatus in the near future. Though the equipment is functional, spare parts are not anymore available as this equipment line has been discontinued some time ago. The equipment lives on borrowed time.

Below the relevant section of the SMP Minutes of the Spring 1996 meeting are reproduced:

" Jay Miller reported on the response of the community with regards the present and future status of the X-Ray Diffraction apparatus. The following items are of importance:

Costs:

Scintag, Siemens, Philips virtually the same, Rigaku significantly less expensive.
Base cost USD $150K, with spares about USD $200 K.

Hardware:

Philips is the most robust; Scintag units more than 3 years old had significantly more hardware failures than similar age Siemens equipment. No data on Rigaku except that good data in the low angle range was a problem unless there were two diffractometers.

Software:

Older Scintag users were not impressed, 5 out of 6 new purchasers, however, much prefer Scintag software to Philips. Most Siemens users are happy with software.

Ease of Use:

Scintag rated high, particularly with recent purchasers. Only one comment on new Philips software suggests it is a significant improvement over the old version.

On-line technical support:

Siemens, Philips, Scintag all rated acceptable.

Documentation:

There is none for Scintag, Philips and Siemens rated acceptable.

Telephone technical support:

All rated high, but Scintag has only one technical expert.

Trade in allowance:

Only from Philips.

The general feeling of the ODP/TAMU X-ray Laboratory Working Group (LWG) is that we know Philips is robust and will operate in the shipboard environment. ODP/TAMU are also familiar with Philips service personnel and they know our specific environment. Before purchase, however, the LWG suggests that x-ray marine laboratory specialists see the new Philips system in operation to assess how well it will meet the demands of our shipboard operations."

SMP reiterates the observation that new XRD equipment will be necessary in the near future, as the present equipment is rapidly aging and spare parts haver become rare or not anymore obtainable.

The XRF equipment is still in reasonable shape and notwithstanding its heavy use can wait still some time for renewal, especially compared to the XRD equipment.

XRF Core Scanner

Satoru Nakashima arranged a visit to Seki Tecnoton Corporation on the day before t Meeting to investigate the use of an XRF Core Scanner (TN Spectrace, Sunnyvale California). Several SMP members were in attendance. Results on samples from a banded iron formation indicated promising results. In principle an XRF Scanner would allow a rapid semi-quantitative measure of the major or minor element composition of a core, thus allowing a more intelligent sampling for XRF sample analysis. With an increased use of XRF analysis of sediments in ODP, such apparatus would provide an improved sampling methodology. Joris Gieskes will attempt to visit Spectrace in December 1996 for further discussions of this technique.

4.5. Chemistry Laboratory

Jay Miller presented a report on the chemistry laboratory on JOIDES Resolution:

Coulometer

Labview software to operate the coulometer and associated microbalance have been completed by IS (Information Services) and tested by Chemistry MLSs on shore. The software was installed during 169S and was used during Leg 169. According to the MLSs on Leg 169, the program ran well and promises to streamline the measurement process significantly. They have made several suggested minor modifications to further improve the program. IS has already completed these modifications and an upgraded version of the software was sent to the ship for Leg 170.

CHNS Analyzer

As requested by SMP, all materials and hardware to operate the CHNS in CN-only mode have been acquired. During a service call for the instrument during the Leg 168 port call, all Chemistry MLSs became familiar with switching plumbing between CN-only and CNS modes. To date, however, shipboard preferences have kept the apparatus in CNS mode.

Nota Bene: See remarks in section 3.9 above.

Rock-Eval/GHM Evaluation

Although one of the organic geochemists on Leg 167, R. Stax, was interested in conducting the SMP requested comparison between the two instruments, because of the tremendous amount of core recovered and technical difficulties with the GHM, the comparison could not be conducted. Does SMP wish for us to continue to pursue the Rock-Eval/GHM comparison with appropriate future legs?

Nota Bene: SMP has suggested that the possibility be explored to purchase a separate sulfur analyzer (see section 3.9 above). This apparatus could occupy the space taken by the GHM. However, before that is accomplished, it would be useful to carry out such a comparison. Prior to any removal of the GHM it deserves a comparison with the Rock-Eval and SMP urges that time be made available for this. The requirement for a meaningful study is that organic carbon contents are $\geq$ 1 % TOC. Leg 170 would be ideal for such comparative work as organic carbon contents are high enough to make this possible.

Headspace Sampler Status

Per SMP request, the chemistry lab working group has been evaluating possible solutions for a uniform HS sampler. To obtain constant volume samples in both soft and indurated lithologies, the LWG believes we will need two different samplers: one for soft sediments and another similar to the SMP-proposed battery operated hand drill with serrated steel tube (borers) for indurated samples. No matter what design we have considered thus far, however, the ultimate

problem to overcome to obtain uniform, constant volume samples is the ability to cut the sample nce the device has been pushed/drilled into the core. For soft sediments without a core cutter, we will encounter the same problem that occurs with the present cork-borer sampler when sediment is sucked out while retrieving the minicore. For indurated samples, cutting the minicore off and keeping it in the sampler will be difficult. ODP engineers are being consulted for possible solutions for a core cutting mechanism.

SMP congratulates the Chemistry LWG on these efforts. Though these efforts for more uniform sampling are of great importance, future users should remain aware that the methodology can not per se obtain accurate information as long as samples are obtained from cores that actively de-gas during core retrieval.

4.6. Paleontology Laboratory

Two topics were discussed during the discussions concerning the Paleontogy Laboratory

4.6.1. Automatic acid digestion equipment for paleontological sample preparation

Jay Miller reported that he had received a request for equipment for automatic acid digestion in the paleontological lab. Cost estimate is $30,000.

SMP noted that the idea of automated digestion equipment is good, both for the safety concerns of handling acids on the ship and for the time that could be saved. There are several such devices on the market, and these need to be examined for shipboard use. SMP supports the idea in principle and awaits a more detailed analysis and proposal.

4.6.2. Proposed Dedicated Paleontology/Thin Section/Microscope Lab Tech

Jay Miller presented the following proposal:

A paleontology laboratory technician has been asked for by paleontologists for a number of years. Someone who provides sample preparations is equivalent to the thin section technician, who provides prepared samples for petrologists. The same person could possibly do both duties, with more thin section work on hard rock legs, and more paleo prep on soft rock legs. Furthermore, this person could oversee supplies and equipment in the paleo prep lab and microscopes, and help scientists in the use of digital imaging systems and image analysis. If a microbiology laboratory is added to the ship in the future, this technician may provide partial support for that as well.

Duties: to prepare thin sections, to macerate paleontology samples, to maintain microscopes and paleo prep and thin section equipment and support digital imaging photomicrography. Would help with catwalk core handling and paleo WR sampling.

SMP concurs strongly with this proposal. On many legs the paleontologists need relief from sample preparation and concentrate on their own work. The assistance of a Paleo-Tech (like in the early days of DSDP) is a necessity and not a luxury.

4.6.3 Microscopes

The Axioscope microscope that was installed in the last couple of years has been very well received by the paleontologists. The older microscope(s) in the laboratory should now be considered for replacement. The lenses from the older microscopes are incompatible with the new 'scope, necessitating shipboard stocking of two sets of lenses.

4.7. Microbiology Laboratory

SMP has noted the increased interest in the "Deep Biosphere", particularly the study of the microbial biology and its role in sedimentary and hard rock alteration processes. Clearly more attention will be necessary with regards appropriate Laboratory Space and Equipment on the JOIDES Resolution. At present facitlities in the Paleontological Laboratory are being used, but this space is not adequate with respect to the needs of a microbiological program..

Jay Miller reported on the potential future costs of setting up such a special designated Microbiology Laboratory, probably in the form of a van to be put on top of the core-tech van. In order to obtain a properly outfitted van a sum of $ 350,000 may be needed.

SMP considered this proposal in some more detail. However, there is clearly a need for input from the Microbiological community with regards needs, as well as with a proposal what needs to be provided by ODP and/or the individual participating Shipboard Microbiologists.

During the SMP meeting at JAMSTEC a visit to the microbiological facility at JAMSTEC was arranged. In this facility samples from hydrothermal vent areas are maintained under pressure, diluted with sterile growth media, and returned to high temperature at constant pressure. The engineering aspects of this system are indeed impressive and any future working group on microbiological work in ODP drill holes should include a representative of JAMSTEC in their discussions. Common interests could be explored (e.g., use of pressure core barrel and maintenance of pressurized conditions for culturing purposes).

Recommendation 96-17

SMP recommends that a workshop (sponsored by JOI) be held to plan for a Shipboard Microbiology Program and an appropriate Microbiology Laboratory. This topic is of great interest to the scientific community, but guidance is necessary with regards the most appropriate use of samples obtained by the drilling vessel.

4.8. Shipboard Computers

With the yearly renewal of 1/3 of the computers on board JOIDES Resolution it is time to give thought to the availability of computers on the market.

A letter from the Chief of Information Services (IS) (Russell Merrill) was received in which the potential demise of Apple as a competitive entity within the next five years is discussed. This may cause the inability of ODP to support Macs if this happens.

IS reported that it will support Macs on ship and shore indefinitely, because the scientific community is in favor of their use and thus IS has to be able to work with them. IS, however, wants to reduce the Program's exposure in making future purchases as a hedge against Apple's potential failure. IS has not recommended any specific replacement machines. It should be realized that the new Windows packages (e.g., Windows 95) for PCs are Apple or Mack like. What machinery will replace certain shipboard computers shall become an item for joint discussion with the new SciMP frame-work.

SMP urges attention to this item, especially because of the divergent likes of the user community on JOIDES Resolution.

1.9. Janus Data Base

SMP is aware of the efforts of the JANUS Steering Committee and the Minutes of the JANUS Steering Committee of 18-20 October have been received.

A large number of applications are scheduled for deployment during ODP Leg 171B.

4.10. Downhole Tools Laboratory

Until now SMP has acted as the "watch-dog" for the downhole sampling equipment pertaining to the in situ measurements of temperature or the in situ sampling of pore fluids. This task, of course, will come under the mandates of the new SciMP.

ADARA Temperature Loggers

This equipment has undergone heavy usage during its many deployments associated with the Advanced Piston Corer equipment. For these reasons there has been a slow, but steady attrition in this equipment. For these reasons the purchase of new ADARA temperature loggers at a rate of two per year should be strongly advocated. The measurement of heat flow remains an important part of the drilling program.

Davis-Villinger Temperature Tool

This equipment was tested for the first time during Leg 164 and was subsequently used during Leg 168. Though still officially a third party tool, certification by the DMP equivalent in SciMP should be considered a priority.

WSTP

The ADARA temperature loggers have been ordered and will be installed in the near future as soon as this equipment has been delivered. The WSTP and the Davis-Villinger tool are of primary importance in the measurement of temperature at depth horizons below the coring depth of the APC, with the WSTP having the additional capability to obtain in situ pore fluid samples.

Fisseler Water Sampler

This third party tool (built in-house by ODP) has undergone preliminary tests during Leg 164, but in a situation inimical to optimal performance. Thus a proper test has as yet not been achieved. Even though the funding of the ODP/TAMU Engineering Department does not allow further development of this promising tool, SMP suggests that the existing tool be tested at least once more in an environment more appropriate for this testing. Of importance to any future move to officially accept this tool, field tests are necessary and only in the open sea drilling environment such tests are feasible. An environment of relatively high porosity/permeability should be appropriate for such testing. The equipment is of particular importance in gassy environments, where more accurate estimates of true in situ dissolved gas concentrations are of importance (see also minutes of the Spring Meeting of SMP, 1996).

4.11 Underway Geophysics Laboratory

Jay Miller informed the SMP on the status of the Underway Gepophysics Laboratory.

Six-channel seismic streamers:

Two successful tests have been conducted during Leg 169. A streamer previously tested during Leg 168 is back at manufacturer for repair of manufacturer defect. ODP/TAMU expects to redeploy this streamer as a backup for Leg 171.

Real-time navigation system:

The vendor (Pelagos, Co.) visited ship during San Diego port call to install and upgrade the equipment and to meet with U/W laboratory technicians.

Chart recorders:

4 EPC chart recorders and complete set of spares have arrived at ODP. Presently ODP/TAMU is testing and developing a project plan for implementation. This will require slight modifications of the Winfrog (Pelagos Co.) navigation software for automatic annotations. The exact deployment date dependent upon these modifications.

Solaris 2.x upgrade for seismic acquisition, processing, and display:

This project is underway. ODP/TAMU anticipates deployment on Leg 171 as planned.

5. Potential future purchases of equipment

Jay Miller suggested to SMP that in the near future there may be a need to identify equipment purchases that may be possible through the achievement of year-end savings. Although there will be no requested funding for new equipment in the foreseeable future, equipment replacement, renewal, or updating will be necessary in order to make shipboard measurements to continue at there present excellent level.

SMP agrees with this assesment and it was decided to prioritize equipment replacement identifications using an arbitrary limit of below 50 K $ and higher than 50 K $.

Prioritization	**More than $50 K**
High priority	X-Ray Diffractometer - see section 4.4 Costs: ~ 200K $ Split core track development (digital image capture) - see section 4.2 Costs: ~ 50K $
Moderate priority	APC temp tools - see section SMP suggests scheduling 2 or so per year for delivery rather than all at once. Total Costs: 100K $
Lower priority	XRF Costs: 250K $ Axioscope Costs: 70K $ - see section 4.6.3
Other	Microbiology Laboratory - see section 4.7 This item needs input from the science community as discussed in section mmm. Identification of needs is of high priority.

$50 K or less items

High priority	Natural gamma standard	$21 K - see section 3.5
	Leco S analyzer	~ $10 K (?) - see section 4.5
	Digital cameras	5K $ each
	Shipboard color laser printer	6K $
Lower priority	GC replacement2 (2) - for Chemistry Laboratory; equipment still functional but aging. Costs: 50K $	
	Dionex - for Chemistry Laboratory; more precise equipment now available. Cost: 25K $	
	Binocular scopes (2): Costs: 30K $	
	dGPS antenna Cost: 30K $	
Needs development or unavailable	Cryomag cold head (~15K $)	
	Paleontology processing - see section 4.6 (~ 30K $)	

6. Visit to Jamstec

On Friday November 1, 1996 SMP visited the facilities of JAMSTEC in Yokohama.

An introduction to the scientific activities of JAMSTEC was presented by Dr. Kantaro Fujioka. In addition to a description of the JAMSTEC Research Fleet, Dr. Fujioka indicated JAMSTEC's commitment to the study of the Microbial Biosphere in the Deep Sea Hydrothermal Vent areas. A visit to the recently built Bacteriological Facility indicated that state of the Art equipment for this purpose is now available at Jamstec. The bacteriological community involved with the Deep Biosphere Program that is developing within ODP should draw the JAMSTEC component into their discussions (see Section 4.7 of these minutes).

After a visit to the various facilities at JAMSTEC the SMP met with JAMSTEC Scientists on the planning of laboratories on board of the planned Riser Vessel. A frank discussion was held with regards space requirements as well as the desirability of an extensive shipboard laboratory. If riser drilling is one of the main objectives of the new drill ship, it might be considered to operate a well stacked shore laboratory, with the ship board work concentrating on work that must be done on the ship to ensure proper identification of sampling intervals and to carry out those investigations that can not be carried out at a later stage.

The laboratory design is presently modelled on that on the JOIDES Resolution, but questions were raised on the desirability of certain equipment (e.g., ICP-MS) as well as space allocations.

The principal reason for this meeting was to establish common grounds and to establish means for consultation on laboratory design. Much expertise and experience is located at ODP/TAMU and mutual exchange of ideas on laboratory design will be beneficial to the overall drilling program.

SMP suggests that these contacts shall be fostered further when the Japanese Project for the "Godzilla Maru" becomes more evolved.

7. Future Aspects Of Shipboard Measurements Advice

SMP held a discussion about the reorganization of the Advisory Panel Structure of JOIDES/ODP. The panel was aware of efforts of both IHP and DMP, but the document below was considered to be an alternative that would help best the continuance of all the good aspects of the present SMP:

On the Structure of the Scientific Measurements Panel: a discussion held at the Shipboard Measurements Panel Meeting, Tokyo October 30, 1996

The Shipboard Measurements Panel of JOIDES met in Tokyo November 30-31, 1996 and held a discussion on the future Scientific Measurements Panel (SciMP).

Under this newly proposed panel structure DMP, SMP, and IHP will be replaced by this new Scientific Measurements Panel. In this new framework, in addition to a ~ 15 member SciMP, three kinds of groups could be formed occasionally to fulfill temporary needs:

(1) Detailed Planning Groups will continue to be used to blend multiple drilling proposals for an area into a prioritized drilling plan;
(2) Program Planning Groups will generate proposals for portions of the Long Range Plan not addressed by unsolicited proposals
(3) Working Groups can be formed to investigate individual scientific or technical topics in depth and produce white papers.

The Chairs of DMP, SMP, and IHP, however, have expressed concerns about combining these three panels, which would inevitably lead to a decreased attention to subjects formerly covered by their mandates, and they have expressed these reservations in a joint letter to PCOM. The most recent PCOM meeting, held when the chair of SMP was at sea, committed to this change and asked the three panels to provide recommendations concerning the SciMP mandate, and called for a November meeting of panel chairs and PCOM liaisons to merge and reconcile these recommendations.

Among the major concerns of the panel membership of SMP was the maintenance of the broad-based interaction presently existing between the various Science Operators of the Drilling Program: ODP/TAMU - Science Operations, ODP/TAMU - Information Handling (publications and curation), and the Logging contractor(s) BRG /WLS (Wire Line Services Contractor). The following remarks are principally meant to cover the needs of the advisory structure on Shipboard Measurements, but similar models (consistent with this one) could also be appropriate for the other two main branches of the advisory structure.

It is appropriate to summarize the principal components of the present advisory structure:

<u>Shipboard Measurements</u>

*Prioritization of shipboard measurement programs
*Operational aspects - operations, cookbooks, renewal
*Consideration of new potential measurement programs
*Calibration/Standards

<u>Information Handling</u>

*Databases and data handling
*Publications - including issues such as Scientific Integrity (nonperformance, prepublication, etc.)
*Curation of data and core materials, including repositories
*Maintenance of a Micropaleontology Reference Collection
*Computers and related issues

Downhole Measurements

*Prioritization of shipboard logging programs
*New tool development
*Third party tool oversight

Many of the mandates of these panels have been described in the JOIDES Journal, but by no means completely. Normally much more areas of interest are covered, to the good of the drilling program.

Of particular importance, especially to the Shipboard Measurements aspects, are the direct interactions between the members of the Panel and ODP, whether during the meetings or during the periods between the meetings. Hitherto this interaction has worked extremely well and as a result the ship has been outfitted with a well working extensive array of equipment unequalled by any laboratory at sea. Whenever appropriate SMP has gained from the inputs and advice from smaller specialist working groups and helped translate the results of these working groups into the shipboard measurements program.

Under the auspices of the new measurement panel (SciMP) it will be important to maintain many, if not all of the above functions. The problem that has arisen concerns itself mostly with the *modus operandi* of this new structure. The membership of the panel expressed several concerns with regards the breadth of advice necessary to cover the wide range of shipboard measurements. Under a new panel with potentially 1/3 of the present membership, the expertise would be too thin and, in addition, international partnership participation would be restricted to a large extent. The suggestion of replacement of the larger part of the panel by working groups would have the strong disadvantage of a loss of oversight on the overall prioritization of shipboard measurement programs. At the same time, however, an advantage of a combined panel (experts on IHP, DMP, SMP related matters) would be increased interaction between these interests. Below we present a potential structure of the SCIMP that will serve to preserve both of breadth of coverage and a larger integration. This will require two important aspects in terms of meetings and meeting philosophies:

1. Each component (i.e., shipboard measurements, information aspects, downhole measurements) would hold one meeting a year at the part of the ODP operations closest to the interests of the group: TAMU - information and shipboard measurements); Lamont-Doherty or other affiliates of BRG/WLS). These groups will constitute of 10-12 members covering both expertise and giving an international balance. This would provide an opportunity to cover all aspects in close consultation with the "executive branch" of the ODP. In essence, SMP has met in College Station every spring meeting, yielding maximum interaction with a wide variety of TAMU personnel.

2. A second yearly meeting of 5-6 member subgroups of the various panel components (total membership about 15) should be held preferably at a port of call of the Drilling Vessel. Membership could easily be balanced internationally. This meeting would serve as a venue for information exchange and meshing of interests. This would constitute a large improvement over the present situation.

In summary:

The above solution will lead to:

1. Fewer meetings per year leading to cost savings;

2. More effective exchange of ideas and areas of common interest;

3. A much improved and interactive measurement program.

The above will not remove the periodic need for additional working groups. For instance, during the existence several working groups, instigated by SMP, PCOM, JOI, have proven to be successful through interaction with the SMP. Examples are, for instance:

1. JANUS Advisory Committee (chaired by two ex-members of SMP);

2. Core-Log -Integration Committee (CLICOM);

3. Paleomagnetics Workshop;

4. Core Descriptions Workshop.

SMP recommends to PCOM (SCICOM) that the above would constitute an improved advisory structure and yet preserve the breadth of advice that hitherto was yielded by the three separate panels. Advice could flow to OPCOM AND SCICOM as well as to the Executive Branch of the Ocean Drilling Program. The latter must be considered as vitally important. Bureaucracy will be reduced.

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