

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Laurel Point Hotel
Victoria, B.C.
Canada

23-25 September 1992

EXECUTIVE SUMMARY

1. This was the last DMP meeting under the present Chair. The Chairman would be stepping down at the end of 1992 although he would remain on the Panel for a further year in the interests of continuity and corporate memory. PCOM had appointed Peter Lysne to be his successor with effect from 1 January 1993. It was especially important that Panel members took careful note of action items arising from this meeting so that the changeover might be as smooth as possible.
2. Key thrusts of the meeting were the evaluation of the recently printed booklet on ODP downhole measurements, third-party tool guidelines, technology reviews of topical subjects, a joint session with the JOIDES SMP continuing the dialogue on the shipboard integration of core and log data, and a tour of the JOIDES Resolution.
3. The educational and promotional booklet "Downhole Measurements in the Ocean Drilling Program - A Scientific Legacy" has been printed and is ready for distribution. Authors are Worthington (DMP Chair), Fisher (ODP-TAMU) and Golovchenko (ODP-LDGO). Panel view was that the booklet would achieve the stated goal of educating the scientific community. Panel acknowledged the contribution of the Editor, Karen Riedel (ODP-TAMU), to the production of the booklet. This contribution has resulted in a product that has far surpassed Panel's reasonable expectations. The extremely high quality of the booklet will significantly increase its impact on the scientific community. Panel wishes to convey its appreciation to Karen for her dedicated efforts in achieving this goal.
4. Panel expanded its earlier Recommendation 92/7 to state that the Principal Investigators associated with the instrumented borehole seal (CORK) programme should investigate oil-industry thermistor/pressure observatories in order to establish what is available as off-the-shelf technology.

[DMP Recommendation 92/9: to ODP-LDGO, Tool P.I.s]
5. The present guidelines for third-party tools will be promulgated through a public information brochure as soon as possible. These will be seen as completing the first stage of the communication process. Technical specifications will be developed as the second stage. There will be a need for close monitoring of tool developments.
6. Panel concurred that the monitoring of third-party tool developments is a fundamental and central part of the ODP contractual function: it is not optional.
7. Panel recommended that within the staff complement of the ODP logging operator there should be a person designated as the permanent point of contact for the development of third-party wireline logging tools.

[DMP Recommendation 92/10: to PCOM, ODP-LDGO]

8. During their joint meeting DMP and SMP re-emphasized the scientific requirements of core-log data integration during the upgrading of the shipboard computer system. In order to incorporate a new core-log data integration shipboard facility, a scientific staff member at ODP-TAMU should be identified to lead and coordinate this development. The core-log integration software development should draw upon existing capabilities within the JOIDES community where appropriate. The job description for the shipboard core-log data correlation specialist needs to be identified at an early stage. To facilitate this definition, DMP and SMP will identify the key tasks that will have to be undertaken in order to achieve the data integration objectives. The job description should be completed prior to the staffing of Leg 150.

[DMP Recommendation 92/11: to PCOM, ODP-TAMU]

9. In connection with Leg 148, Panel considered that the procedures for and protocol of drilling, coring and logging at Hole 504B should conform to the earlier DMP Recommendation 92/6, which Panel wishes to re-affirm. The deployment of other (third-party) tools must be in accordance with the ODP guidelines. Each Principal Investigator associated with a proposal for additional (third-party) tool deployment during Leg 148 should present a case for acceptance as an ODP Development Tool to Panel at their meeting in January 1993. Approval there should be deemed ODP approval of the suitability of the tool for test deployment. To secure that approval the Principal Investigator should carry out beforehand a land test that simulates as closely as possible the expected subsea conditions at 504B. For this purpose, a satisfactory temperature and pressure autoclave test to expected in situ conditions, in conjunction with a (lower temperature and pressure) borehole test of field deployment, would be acceptable.

[DMP Recommendation 92/12: to PCOM, ODP-LDGO, ODP-TAMU]

10. Panel further recommended that prior to standard logging at Hole 504B during Leg 148, fluid circulation should be undertaken with the specific objective of cooling the hole. This would improve the prospects of running the Schlumberger standard tools without exceeding their temperature limit of 175 °C. The cost of deploying the Schlumberger hostile environment logging (HEL) tools as a contingency should continue to be investigated.

[DMP Recommendation 92/13: to ODP-LDGO, ODP-TAMU]

11. In connection with the long-term monitoring of hydrothermal systems at mid-ocean ridges, and possible collaboration with the RIDGE programme, Panel identified three key issues: interprogramme agreement on sites of common interest; dovetailing of science; and the development of complementary technology. DMP could make a contribution to the last of these. Panel felt that they could not progress the discussion without the benefit of a first-hand exposition of RIDGE practices and aspirations. A RIDGE representative should be invited to address the next DMP meeting.
12. The next meeting of the JOIDES Downhole Measurements Panel is scheduled for 19-21 January 1993 at ODP-TAMU, College Station, Texas.

PAUL F WORTHINGTON

19 October 1992

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Laurel Point Hotel
Victoria, B.C.
Canada

23-25 September 1992

MINUTES

Present

Chairman:	P F Worthington	(UK)
Members:	R Desbrandes	(USA)
	G Fryer	(USA)
	J Gieskes	(USA)
	S Hickman	(USA)
	M Hutchinson	(USA)
	P Lysne	(USA)
	R Morin	(USA)
	C Sondergeld	(USA)
	M Williams	(USA)
	H Draxler	(FRG)
	J-P Foucher	(France)
	T Kanazawa	(Japan)
	L Pedersen	(ESF)
	H Salisch	(Canada/Australia)
Liaisons:	K Becker	(PCOM)
	A Fisher	(ODP-TAMU)
	D Goldberg	(ODP-LDGO)
	B Malfait	(NSF)
	J McClain	(LITHP)
	T Pyle	(JOI)
Guests:	R Boggess	(Fugro-McClelland)
	P DeMenocal	(ODP-LDGO)
	J Edmond	(MIT)
	T Francis	(ODP-TAMU)
	** K Moran	(SMP)
	K Rodway	(ODP-LDGO)
Apologies:	J Bahr	(SGPP)
	O Kuznetzov	(Russia)
	C Moore	(TECP)
	G Olhoeft	(USGS)

** Items 9 and 10 were conducted in joint session with the JOIDES Shipboard Measurements Panel

1. Welcome and Introductions

The meeting was called to order at 0845 hours on Wednesday 23 September 1992. This was the third and final DMP meeting of 1992. A special welcome was extended to those members attending for the first time and to guests. New Panel members were: Gerard Fryer (replacing Roy Wilkens for the USA), Henry Salisch (new Canada/Australia representative), and Toshi Kanazawa (new Japan representative).

Review of Agenda

Eleven modifications were proposed.

- (i) Item 11, concerning a technology review of downhole monitoring of temperature and pressure, is deleted: Crocker's sudden rotation off the Panel had precluded his following up an action to secure a speaker.
- (ii) Item 11 is replaced by a new topic - Long-term development plan for downhole tools. [WORTHINGTON]
- (iii) Item 18, concerning a technology review of cross-hole electrical measurements, is deleted due to the invited speaker being unable to attend.
- (iv) Item 18 is replaced by a new topic - Long-term monitoring of hydrothermal systems at mid-ocean ridges. [BECKER]
- (v) Additional item 5(v) - NSF Report [MALFAIT]
- (vi) Additional item 5(vi) - JOI Report [PYLE]
- (vii) Additional item 8(ii) - RFT sampling of pore fluids [DESBANDES]
- (viii) Additional item 20 - Technology review: downhole radar [PEDERSEN]
- (ix) Additional item 21 - ONDO experiment update [KANAZAWA]
- (x) Additional item 22 - Use of borehole TV camera [DESBANDES]
- (xi) Additional item 23 - Panel membership [WORTHINGTON]

With these modifications the precirculated agenda was adopted as a working document for the meeting.

2. Minutes of Previous DMP Meeting, Windischeschenbach, FRG, 2-4 June 1992

The following modifications were proposed:

- (i) Page 1: list of attending members to include Carl Sondergeld (USA); for "Petersen" read "Pedersen".
- (ii) Page 12, Item 18, Paragraph 1, Line 5: for "Leg 138" read "Leg 145".

With these modifications the minutes were adopted as a true record.

Matter Arising

Becker noted that DMP Recommendation 92/7, which relates to long-term monitoring at Hole 504B, should be more generally directed at the instrumented borehole seal (CORK) programme, especially as deployment at 504B was now no longer feasible in the short term. Panel expanded the scope of this recommendation as follows.

DMP Recommendation 92/9

"The Principal Investigators associated with the instrumented borehole seal (CORK) programme should investigate oil-industry thermistor/pressure observatories in order to establish what is available as off-the-shelf technology."

3. Downhole Measurements in the Ocean Drilling Program - A Scientific Legacy

The Chairman introduced the newly printed booklet of the above title, which had been prepared with the object of educating the scientific community. The subcommittee that had progressed the initiative comprised Fisher (ODP-TAMU), Golovchenko (ODP-LDGO), Riedel (ODP-TAMU) and Worthington (DMP). Riedel had acted as Editor. Gieskes, Hickman, Lysne and Pyle had acted as reviewers.

Suggestions for distributing the booklets were: a mail-out to the JOIDES community; copies supplied to international partners; as a supplement to logging schools; make them available to future shipboard scientific parties; a mail-out to previous shipboard scientists; and availability at the ODP booth at AGU.

The Chairman observed that with this envisaged scope of distribution, a reprinting might be needed in nine months' time. He commented on the cost of the booklets and emphasized that they be distributed wisely. Pyle agreed that duplication in mail-outs should be avoided on grounds of efficiency and cost. However, Pyle noted that booklets kept in an ODP storeroom do not work for the Program: we have to get them out into the community and, if a reprinting is required, this should be seen as a success. Sondergeld pointed out that ODP has to spend money on this type of technical promotional material if the Program is to be widely recognized: it is an integral part of the Program's function because the booklets represent an investment in the future.

McClain noted that the modular format of the booklet might allow certain pages to be updated from time to time, in order to keep the subject matter current. In accepting McClain's point, the Chairman proposed that even without updates, which would cost money, the booklet has a contemporary shelf-life of at least five years. The Chairman asked Panel to review the booklet carefully and to provide him with "Messages for Next Time" at the next DMP meeting: it would be the intention to incorporate these messages into a reprinted version where possible.

[ACTION: PANEL]

Panel view was that the booklet would achieve the stated goal of educating the scientific community. Fisher emphasized the Editor's contribution, pointing out that this role had involved much concentrated effort during the latter stages of production: it was only through this effort that such a high quality product had been created. Panel concurred that the production quality of the booklet was excellent and acknowledged the role of the Editor in achieving these standards.

DMP Consensus

The contribution of the Editor, Karen Riedel (ODP-TAMU), to the production of the educational and promotional booklet "Downhole Measurements in the Ocean Drilling Program - A Scientific Legacy", has resulted in a product that has far surpassed Panel's reasonable expectations. The extremely high quality of the booklet will significantly increase its impact on the scientific community. Panel wishes to convey its appreciation to Karen for her dedicated efforts in achieving this goal.

4. PCOM Report

Becker reported on the JOIDES PCOM meeting held in Corner Brook, Newfoundland, during the period 11-13 August 1992. The PCOM responses to DMP Recommendations 92/5 and 92/6 were:

Rec. No.	Description	PCOM Response
92/5	In situ sampling of pore fluids	PCOM intends to issue the necessary RFP in spring of 1993 for funding with effect from October 1993
92/6	Downhole measurements at Hole 504B	DMP are asked to advise on peripheral downhole measurements during Leg 148

Highlights of the PCOM meeting were the liaison reports from other global programmes, i.e. InterRIDGE and Nansen Arctic Drilling, the FY94 prospectus comprising Atlantic drilling programmes, and discussions of the current major initiatives (and their budget constraints), i.e. DCS, shipboard computer upgrades, pore fluid sampling RFP, and deep drilling RFP.

5. Liaison Reports

(i) LITHP

McClain reported that several members of LITHP remained supportive of the Lithosphere Characterization initiative, which DMP had aired some time ago. The key question is "Can a point measurement be related to seismic scales?" There is a new role for thematic panels to become advocates of drilling programmes. Lithosphere Characterization could be a candidate.

Several points emerged during discussion. At least two holes would be needed in an area that is well characterized seismically. The holes would need to be closely spaced because of limitations of source strength in cross-hole work and in order to improve the prospects for interwell correlation. The lithosphere in that locality would need to be laterally heterogeneous, but only to a moderate degree. A judgement would have to be made on the feasibility of the exercise of relating logs to cross-well surveys and surface geophysical data in a sub-ocean environment. Facilities for a land test exist in Iceland, where closely spaced boreholes penetrate oceanic crust.

The Lithosphere Characterization initiative is relevant not only to the goals of LITHP but also of SGPP, e.g. the generic gas hydrates leg. The following strategy was agreed. Liaisons from these panels were asked to research their panels' needs and aspirations in this subject area and to report at the next DMP meeting. Panel will evaluate the technical feasibility of achieving these goals after hearing presentations on key aspects of the technology, i.e. cross-hole electrical and acoustic measurements. A position will then be taken.

Several actions were identified:

- (a) Contact Gary Olhoeft and transfer his invitation as a guest speaker to the next Panel meeting. Morin will contact Olhoeft; Chairman will notify the JOIDES office.
[ACTION: MORIN, WORTHINGTON]
- (b) Chairman will identify a speaker on cross-hole seismics.
[ACTION: WORTHINGTON]
- (c) Speakers should be identified on interwell tracer studies and a land-based case history of multiscale geophysical characterization for the DMP meeting of May 1993.
[ACTION: PANEL]
- (d) LITHP and SGPP Liaisons to prepare a report for the next DMP meeting on the needs of their respective panels in relation to cross-hole measurements.
[ACTION: BAHR, McCLAIN]

McClain was asked to acquaint the new LITHP Liaison to DMP with the requirements of Action (d).

(ii) SGPP

No report: Liaison unable to attend.

(iii) TECP

No report: Liaison unable to attend.

(iv) KTB

Draxler reported that the KTB main hole had reached a depth of 6760.5 m by 30 July 1992. Seven cores had been cut using the Large Diameter Coring System (LDCS), which had improved core recovery. The drillstring had stuck at 6754 m and fishing had been unsuccessful. The hole was cemented back to 6619.5 m and a sidetrack was attempted, during which the cover plate from the cutting sampler was lost. This had to be milled and, while milling, the system stuck again. Further back-cementing was undertaken and another sidetrack is currently being attempted. These setbacks have delayed operations by two months. It is noteworthy that during recovery efforts, an overpull of 100 tons stretched the drillstring by 7.5 m. BHT is currently 180°C: during drilling, with a circulation of 2400 litres/minute, this temperature was reduced to 115°C.

The fifth national KTB conference took place on 25-27 June 1992. An international conference on continental drilling is scheduled for Potsdam during the period 30 August - 2 September 1993.

(v) NSF

Malfait reported that five of the seven international partners have confirmed their intentions to continue as members of ODP under a new MOU with guaranteed funding to 1998 and provision for extending to 2003. Russia is to be inactive. The US National Science Board have approved a ten-year extension for the USA with funding approved up to 1998.

(vi) JOI

Pyle reported that a four-year programme plan had recently been developed. The new financial year, beginning 1 October 1992, has a lower budget because of the inactive Russian membership. Strong demands are being made on this budget by the need to refurbish existing facilities, e.g. shipboard computers. It will be difficult to maintain the momentum for new starts.

There are strong moves to internationalize ODP. An RFP has been issued for the international location of the JOIDES office from October 1994. A review committee will evaluate responses and the final decision will be taken by EXCOM at their meeting of January 1993. An RFP for the logging contract is also being developed. This will be issued shortly with a decision expected in January 1993. JOI is also working with TAMU to prepare an RFP for data management.

A committee is actively reviewing the JOIDES advisory structure: chair is H. Durbaum. There are one or two possibilities for new international ODP members but there are, as yet, no grounds for optimism.

6. Tool Monitor Reports

(i) Geoprops Probe

Fisher reported on the current status of Geoprops, which is designed to measure (ahead of the bit) temperature, pressure and permeability, and to collect water samples. Bench testing has been carried out at ODP-TAMU and in Salt Lake City by Aumann Engineering. An electrical problem was discovered in August; the power supply has been replaced and electrical drawings produced. A shock sub has also been developed; this reduces landing forces from 40 g to 4 g and is available for a variety of tools. Two Geoprops tools are ready for shipboard tests during Leg 146.

(ii) LAST

Moran reported that the lateral stress tools (LAST I & II) are on board ship for Leg 146, with Last I, which was deployed at Nankai, being seen as a back-up for LAST II, which had its final land test in June 1992. Leg 146 will therefore provide an opportunity for a shipboard test of LAST II. The LAST tool is designed for measurements ahead of the bit in sediments. A bladder is expanded and a stress/strain curve is measured using a pressure meter. The electronics are rated to 50°C. The aim is to determine shear modulus and strength, in situ horizontal stresses, and pore pressure.

(iii) BGR Borehole Magnetometer

Draxler reported that BGR are working on an orientation system. The tool needs to be dewared. If a dewar is available, the tool could be ready by the end of the year. The tool has been tested to 162°C in the KTB hole. The tool would be discussed further under Item 7(ii).

(iv) French Sediment Magnetometer

Foucher reported that the magnetometer and susceptibility tools were used very successfully on Leg 145. The primary objective is to detect magnetic reversals. Schlumberger have signed an agreement with the tool developers to market the tools commercially. They will appear in the Schlumberger catalogue as two separate tools. They will therefore continue to be available to ODP through the Schlumberger logging contract.

(v) Japanese Borehole Magnetometer

The Japanese three-component borehole magnetometer was deployed on Leg 143. The data indicated sharp, high-amplitude variations in the horizontal magnetic field. These variations are incompatible with the weak magnetization of these limestones and they are believed to be artifacts caused by abrupt changes in tool orientation. The relationship between the tool rotation period and the measured variations is currently being studied. The tool was also deployed on Leg 144 when it flooded, presumably because of O-ring failure. The tool could not be repaired on board ship. Attempts are being made to redesign the instrument to decrease rotation and improve the reliability of the O-rings.

It was noted that before an upgraded tool is proposed for running as a development tool on board ship, it must satisfy all the requirements for third-party-tool deployment (see Item 7). Extensive land tests should be carried out before any further shipboard deployment is requested.

7. Third-Party Tools

(i) Promulgation of Guidelines

The Chairman reminded Panel of the current status. Both PCOM and DMP have adopted the reinforced guidelines for the development and deployment of third-party tools in ODP. At the last DMP meeting Panel recommended that these be promulgated. Although PCOM had directed that the new guidelines should be published in the JOIDES Journal, Panel had favoured an additional medium, namely a brochure that could be given to prospective proponents so that they might be made fully aware of what would be required of them. The preparation of the brochure had been deferred pending completion of work on the downhole measurements booklet (Item 3). However, that initiative has come to fruition and it is now appropriate to focus attention on publicizing the protocol for third-party tools.

Draxler drew attention to two shortcomings in the present strategy. First, there is no definitive list of tool specifications that a third-party tool must meet, e.g. diameter, temperature and pressure ratings, electronic specifications. Second, there is a need for a designated interface between ODP and third-party tool proponents: there should be a post within the permanent ODP structure whose portfolio encompasses technical liaison with proponents. The postholder should be the point of contact with all the Principal Investigators and should also be a liaison to DMP. There are also legal aspects. For example, who is responsible if a third-party tool is lost? The guidelines should recommend that proponents insure their tools. Again, data obtained through shipboard deployment of third-party tools have not been reported in a regulated manner. For example, how are the log data to be archived? The proponents should be made aware of ODP data requirements and of reporting deadlines. The present guidelines do not address these issues. It is important to consider these questions because more third-party tools will emerge over the next few years.

The Chairman pointed out that the PCOM-approved guidelines are precisely that: they are broad instructions that are intended to inform prospective proponents of the nature and scope of the

requirements they will have to satisfy. The discussion had moved beyond the guidelines to technical and organisational details. Perhaps it was now appropriate to consider these matters as Level 2 and Level 3 of the overall issue.

After much discussion, the following plan of action was agreed.

- (a) The present guidelines will be promulgated through a public information brochure as soon as possible. These will be seen as Level 1 of the communication process.
[ACTION: WORTHINGTON]
- (b) Work will begin on Level 2 - detailed tool specifications. Draxler has prepared a draft itemisation. Panel members are asked to review and add to this list and to return their amendments to Lysne no later than 30 November 1992. The amended list will be distributed for discussion at the next DMP meeting.
[ACTION: PANEL]

In order to encourage the implementation of Level 3, Panel adopted the following consensus and recommendation.

DMP Consensus

The monitoring of third-party tool developments is a fundamental and central part of the ODP contractual function: it is not optional.

DMP Recommendation 92/10

"Within the staff complement of the ODP logging operator there should be a person designated as the permanent point of contact for the development of third-party wireline logging tools."

Goldberg projected that this role would be assumed by the Manager of Technical Operations at ODP-LDGO. This function would be part of the Level 3 effort.

(ii) Application to Existing Tools

The Chairman reminded panel members that it was proposed to use the BGR magnetometer and the CSM high-temperature resistivity tool to evaluate the third-party tool guidelines. The plan was for the Principal Investigators to report back to Panel through Draxler and LDGO Liaison, respectively, with messages for improving the guidelines based on their experience of attempting to comply with them.

Draxler reported that the Principal Investigator for the BGR magnetometer, Dr Bosum of BGR, Hannover, had approached ODP-LDGO with a request that his tool be accepted as an ODP Certified Tool so that it might be deployed on future legs as an integral part of the science rather than in development mode. Draxler proposed that this be seen as a test case for evolving the Level 2 guidelines. The Chairman agreed and noted that feedback reports concerning both the BGR and the CSM tools should be an integral part of the next meeting.

[ACTION: DRAXLER, LDGO LIAISON]

8. In Situ Pore Fluid Sampling

(i) JOIDES Steering Group

Gieskes reminded Panel that DMP had, at the last meeting, endorsed the Steering Group's RFP for a feasibility study of in situ pore fluid sampling. PCOM had deferred discussion of the initiative to their August meeting, at which they had decided to delay issuing the RFP until the spring of 1993, with a view to the feasibility study starting in October 1993. Unfortunately the notification of this delay was given after Panel had relocated their September meeting to Victoria primarily to facilitate a meeting of the Steering Group around the autumn DMP meeting. There had been little point in the Steering Group holding that meeting once the new timetable had become apparent.

The RFP is concerned with in situ pore fluid sampling, not borehole fluid sampling, and therefore there is no conflict with other ongoing initiatives (Items 16 and 17(iii)), as perceived in some quarters. However, some fine-tuning of the technical details might be desirable, e.g. information on the type of formations that might be drilled. The Steering Group will meet around the next Panel meeting in College Station in January 1993.

A key question concerns who is responsible for issuing the RFP. Pyle stated that JOI may not issue the RFP at the appointed date of 1 May 1993 because the funds will not have been committed to the project. It was noted that the whole question of in situ pore fluid sampling remains a high priority of at least two thematic panels who are anxious to see the technology developed.

(ii) RFT Sampling of Pore Fluids

Desbrandes showed results from a research investigation into the effectiveness of commercial pore fluid samplers where there is no mud cake. Commercial tools such as the Schlumberger RFT are too large for deployment through the ODP drillpipe; however, the "top-hat" solution to this problem has been proposed and no doubt this will be one of the options considered during the feasibility study. The key question concerns whether these tools would perform satisfactorily as pore fluid samplers in holes drilled with sea water as the circulating fluid. In the ODP situation there is no mud cake to allow an effective seal of the doughnut against the borehole wall. Finite difference model studies have indicated that the RFT tool would not provide a realistic measurement of formation pressure in the absence of a mud cake. Therefore its pore-fluid sampling capability is seriously open to question. It is unlikely that a pristine sample of pore fluid can be obtained using this off-the-shelf-technology in ODP holes.

9. Shipboard Integration of Core and Log Data

Fisher reviewed recent developments. ODP-TAMU have purchased four Sun SPARC-10 workstations, one of which will be installed on the ship during the transit prior to Leg 149: it will be an "empty" platform for use by shipboard scientists. Several copies of PV-Wave software have been acquired for development of custom data-merging tools. The data manipulation package CORPAC will be evaluated over the coming year. The natural gamma sensor system will be installed during Leg 147 but will not be fully merged with the multisensor track until Leg 149. The joint ODP-DHWG computer development plan has been rejected by PCOM who have requested an RFP from ODP-TAMU. This is not specific to core-log integration but will underpin it.

DMP and SMP expressed concern that core-log integration has not been included as an integral part of the new computing system upgrade. There is a need to identify scientific requirements and turn them into specified tasks within a core-log integration portfolio. To this end, it is important to identify a core-log integration coordinator and dedicated resources within ODP. DMP and SMP jointly formulated the following recommendation.

DMP Recommendation 92/11

"DMP and SMP re-emphasize the scientific requirements of core-log data integration during the upgrading of the shipboard computer system. In order to incorporate a new core-log data integration shipboard facility, a scientific staff member at ODP-TAMU should be identified to lead and coordinate this development. The core-log integration software development should draw upon existing capabilities within the JOIDES community where appropriate. The job description for the shipboard core-log data correlation specialist needs to be identified at an early stage. To facilitate this definition, DMP and SMP will identify the key tasks that will have to be undertaken in order to achieve the data integration objectives. The job description should be completed prior to the staffing of Leg 150."

Panel members are asked to consider the nature of these key tasks for the core-log data correlation specialist and to forward their input to the Chairman before the end of November.

[ACTION: PANEL]

The Chairman will converge these messages with those of SMP at the annual meeting of PCOM and panel chairs.

[ACTION: WORTHINGTON]

There followed discussion of shipboard physical properties measurements with five topics highlighted, all of which have corresponding measurements downhole.

(i) Discrete measurement of index properties

This includes measurement of grain density, bulk density and water content. Procedures are working satisfactorily. A comparison should be made with the freeze drying technique. Data accuracy needs to be checked and uncertainty quantified. Ideally a portable X-ray CT scanner should be used to investigate rock homogeneity. It was believed that such a facility had already been developed by an oil service company.

(ii) Resistivity

This equipment was removed from the ship because the data were inconsistent. A new device is being tested on Leg 146. Other possibilities include an induction resistivity cell. The Chairman mentioned that such a cell had been developed by the Norwegian oil company, Statoil.

(iii) GRAPE

There had been questions raised about the reliability of earlier readings. At low densities GRAPE data were at variance with discrete measurements. At high densities the data sets converged. An error of 0.1 g/cc had been found in the water calibration. A full check of both systems was needed incorporating carbon standards.

(iv) Velocity

Up to now velocity measurements have been confined to the Hamilton Frame. ODP needs a facility for measuring the acoustic velocity of hard rocks under stress (see Item 10). For soft rocks the MST in conjunction with the APC is satisfactory.

(v) Multi-Sensor Track (MST)

Quality assurance procedures are needed. An MST workshop is planned for 1993. The natural gamma will be introduced during Leg 147 but will not be fully integrated with the MST in the first instance.

10. Technology Review - Laboratory Measurement of Geophysical Rock Properties

Sondergeld described state-of-the-art well site measurements of physical properties achievable using Amoco's heli-portable Geophysical Evaluation Module (GEM). Measurements that can be made in real time include: density (dry, saturated and grain); porosity (Boyle's law and effective); P-wave and S-wave velocities at elevated pressures; shear-wave velocity anisotropy; magnetic susceptibility; qualitative and quantitative mineralogy; total organic carbon, hydrogen and nitrogen; compressive strength and elastic moduli; air permeability; quantitative image analysis (grain size, pore size distribution and pore throat size). Data were available in hard copy as well as in the form of a rock properties database. Sondergeld presented examples of some results.

ODP were free to approach Amoco to enquire about the possibility of licensing some of the technology, which would satisfy some of the needs identified in 9(i)-(v) above.

11. Long-term Development Plan for Downhole Tools

The Chairman introduced this item by explaining that EXCOM had reportedly commented on the absence of a long-range development plan for downhole tools, analogous to that which exists for engineering technology. In fact, DMP had developed precisely such a long-term plan three years

ago but this had lacked the visibility of the engineering development plan because of a much smaller budget allocation. It was a plain fact of ODP life that the development of the DCS had curtailed many other potential activities. Another key point was that ODP technology has been science driven: technology has not led. ODP has relied heavily on oil-industry logging technology but the ambitions of the ODP Long-Range Plan will not be attained through this policy alone. That is why high-temperature tools are being developed now. The EXCOM message suggested that logging tool development deserved a higher profile than accorded hitherto. It would be imprudent of Panel not to respond positively.

Draxler imparted some perspective to the technology development issue. First, there is the pending prospect of diametral limitations on logging tools if and when the DCS becomes operational. This, in itself, would wipe out much of the available logging technology within ODP. Then there is the question of temperature. KTB had recently tendered oil service companies for logging a 10000 m well. Western Atlas had no tools rated beyond 235°C. Halliburton's new list of services includes a fluid sampler rated to 260°C. Schlumberger offer the HEL tools: they now have an AMS, inclination system, four-arm caliper (FMS sonde) and FMS pads, all rated to 260°C. It is important to maintain a watching brief on developments in the oil service sector even though these will not satisfy ODP's projected needs.

Several other points were raised. A tool development vision should be married to the needs of the ODP Long Range Plan, just as DMP had related their earlier strategy to thematic requirements. We can expect deep hot holes. There would need to be a redefinition of routine and non-standard logging in these hostile environments, for it is unlikely that ODP will be able to extrapolate its current classification beyond present tool limits. The brief of the logging contractor should be re-examined. All of these deliberations should be structured in terms of three distinct tool types: third-party tools, logging-contractor tools and Schlumberger tools.

The following actions were agreed. The Chairman will extract from previous DMP minutes a summary of earlier Panel discussions and recommendations in the tool development area, in order to avoid re-inventing the wheel. These will be reviewed at the next DMP meeting.

[ACTION: WORTHINGTON]

Panel are asked to give this matter their consideration and to come with prepared input to the next DMP meeting.

[ACTION: PANEL]

A presentation on the ODP Long Range Plan will be sought for the next DMP meeting in order to help Panel in developing their strategy.

[ACTION: LYSNE]

12. Operations Report

DeMenocal and Fisher reported highlights from Legs 144 and 145. Leg 144 had very poor core recovery: some sites produced less than 2% recovery, usually the harder sediment. Logs therefore provided the basis for stratigraphy. Unfortunately the very low core recovery meant that there was insufficient core to calibrate the logs. Carbonate velocities were generally higher than expected, typically 3-4 km/s.

Hole 801C (left unlogged during Leg 129) had been logged and packer tested. A hydrothermal zone had been identified from the log data. This zone was tested using the drillstring packer: permeability was approximately $5 \times 10^{-14} \text{ m}^2$. The underlying zone was impermeable.

Leg 145 involved drilling at seven sites. The high sedimentation rates of about 140 m/Ma gave rise to an expanded scale that allowed logs to be used as paleoclimate indicators. Ash layers in sediments younger than 2.6 Ma and in the Eocene have provided new evidence for a period of Eocene volcanism. The French magnetometer and susceptibility tools were able to resolve discrete ash layers: vertical resolutions for these two sister tools are 0.5 m and 1.0 m, respectively.

13. Logging Contractor's Report

Goldberg reported that two subcontracts were being established between ODP-LDGO and the University of Leicester, United Kingdom, and IMT, Marseilles, France. It was proposed that these organisations would become processing centres within an enlarged ODP network. Initially Leicester would focus on geochemical logs and IMT on the FMS. However, it was the eventual plan to render the processing capability uniform through all three centres. This strategy would lead to a loss of efficiency in the short term but would increase the available manpower in the long term.

The Schlumberger operating division that discharges the ODP wireline logging subcontract is to change from North America (Houston) to Africa (Algiers). As a consequence of this move ODP will receive better value for money in terms of a new digital telemetry system, new downhole imaging tools, and the MAXIS system (at an earlier date than would otherwise have been possible). The last item is on the future ODP wish list: it will now not be necessary to dedicate additional funds to its acquisition. The MAXIS will be available in Africa by January 1993. It is proposed to introduce it on the ship immediately before Leg 148. The MAXIS is part of Schlumberger's Offshore Service Unit Version F (OSUF), which also comprises the winch and drum. The existing winch contains a control panel for the Wireline Heave Compensator (WHC). It will therefore be necessary to redesign the WHC control box during the first part of Leg 148. This means that there will be no wireline heave compensation facility during the initial temperature logging at Hole 504B.

The Chairman raised the question of communication with Schlumberger and asked Goldberg to assure the Panel that ODP-LDGO would remain the primary point of contact between ODP and the logging subcontractor for as long as LDGO remained the logging operator. Goldberg replied that he could not give that assurance. In fact, the opposite was happening. It was planned that the primary point of contact between ODP and Schlumberger would be IMT, specifically Pezzard who is an LDGO employee.

Several other points were reported. The first half of 1992 was characterized by a record number of data requests, many of which encompassed a preference for diskettes or electronic transfer. LDGO are examining the possibility of including processed geochemical log data in the ODP Preliminary Results volume rather than in the later Scientific Results volume. It is proposed to issue processed log data as a CD-ROM to be distributed with the Preliminary Results volume. A survey of former shipboard scientists has revealed a strong preference for an on-line database for ODP wireline logging data.

On the tool front, both digital BHTVs are off the ship now but will be back for Leg 147 (Hess Deep).

14. Science Operator's Report

Fisher reported initially on downhole tool developments. ODP has taken delivery of the final four ADARA heat-flow APC tools, making a total of ten, together with related hardware, software and manual: technical staff were trained before Leg 146. Components have been acquired for a third WSTP, which will be assembled around Leg 146: new processing software was installed, the manual updated and technical staff trained. A dedicated 486 computer has been installed in the downhole tools laboratory on board ship: it is connected to the shipboard network via ethernet.

As regards hard-rock orientation tools, the Sonic Core Monitor has not been run since Leg 143: XCB recovery was too good during Leg 145. Similarly, the Core Scribing System has not been changed but a new core-barrel latch, which is to prevent rotation when used with the RCB, is due to go out on Leg 147. The Tensor Tool was run about 12 times during Leg 145 with a 75% success rate, failures being attributed to battery problems: a new battery supplier has been identified and ODP has purchased a second tool, which is going out on Leg 147. The Bit-depth Indicator, for which data are collected manually using an "electronic clipboard", will not see evolution to true digital drilling parameters for about a year.

15. Future Logging Programme

(i) Legs 146 - 148

Leg 146 - Cascadia Accretionary Margin

This leg involves transects off Vancouver and Oregon to assess fluid and chemical budgets, to install long-term observatories (CORK), to determine the roles of fractures and layers in directing fluid flow, to test a model for the formation of gas hydrates, and to evaluate tectonic histories and influences. Downhole tools include standard logs (including FMS), WSTP/ADARA tools, Geoprops Probe, LAST I and II, Pressure Core Sampler, and packer experiments in perforated casing. In addition, two CORKS are to be emplaced and the thermistor string in corked Hole 857D (Leg 139) is to be replaced.

Leg 147 - Hess Deep

This leg aims to obtain the first continuous core of gabbroic crustal Layer 3 formed at a fast spreading ridge in the eastern Pacific, to test the feasibility of drilling tectonic blocks, and to drill through the Layer 3/Mantle boundary, all by means of one deep hole. If drilling is successful, 3.5 days will be dedicated to logging at the end of the leg. The logs to be run are, in order of decreasing priority, standard tools (including FMS), digital BHTV, VSP, magnetic susceptibility, and (provisionally) packer.

Leg 148 - Return to Hole 504B

The plan is to run temperature logs and borehole fluid sampling tool(s) before drilling deeper with the object of penetrating seismic crustal Layer 3, if the hole has not reached it already, and recovering gabbro. The plans are then to log with standard tools (including FMS), BHTV and (German) magnetometer. In addition a VSP is scheduled, packer-flowmeter deployment is programmed, and the bromide experiment will take place. All logs are over previously unlogged sections.

The Chairman reported that following the previous DMP meeting, which was not long ago, he had been inundated with "urgent" requests to consider new proposals pertaining to tool deployment at Hole 504B during Leg 148. None of these new proposals had DMP support because Panel had not had the opportunity to discuss them. These new proposals were: emplacement of thermistor string (now withdrawn); LDGO shear-wave tool; VSP; High-temperature Borehole Instrumentation (temperature, pressure, axial fluid velocity, fluid conductivity and hole caliper); CSM high-temperature resistivity tool. Panel had been asked by PCOM to evaluate the VSP and HTBI proposals in particular. Panel were informed that the pre-cruise meeting for Leg 148 had already included the VSP in the scientific prospectus: PCOM had reportedly delegated the VSP issue to the Leg 148 Co-chiefs. Panel elected not to discuss this issue.

The PCOM view was that Hole 504B should not be used as a test site. On the other hand there was much potential information to be gained by running the tools if available, tested, and the subject of sufficient interest on board ship. Another relevant point was that the limit of drilling might be reached prematurely, allowing time for additional downhole experiments. Some relevant special tools should therefore be on standby.

Panel saw two central issues. First, Panel's earlier Recommendation 92/6, to the effect that all additional downhole experiments should be deferred until the hole has reached its target depth, still stands. Second, all new tools proposed for testing must satisfy all the requirements of ODP Development Tools as per the ODP guidelines for third-party tools. In the past, too many tools had slipped through the third-party net, which should now be tightened. The Chairman noted that there was not time for the new tools to satisfy the third-party tool guidelines before Leg 148 because DMP could only recommend acceptance of a tool; it was PCOM who approved its status.

In the light of these points, the following recommendation was formulated.

DMP Recommendation 92/12

"The procedures for and protocol of drilling, coring and logging at Hole 504B during Leg 148 should conform to the earlier DMP Recommendation 92/6, which Panel wishes to re-affirm. The deployment of other (third-party) tools must be in accordance with the ODP guidelines. Each Principal Investigator associated with a proposal for additional (third-party) tool deployment during Leg 148 should present a case for acceptance as an ODP Development Tool to Panel at their meeting in January 1993. Approval there should be deemed ODP approval of the suitability of the tool for test deployment. To secure that approval the Principal Investigator should carry out beforehand a land test that simulates as closely as possible the expected subsea conditions at 504B. For this purpose, a satisfactory temperature and pressure autoclave test to expected in situ conditions, in conjunction with a (lower temperature and pressure) borehole test of field deployment, would be acceptable."

The Chairman was charged with asking PCOM to delegate approval of tool status for Leg 148 to DMP at their January meeting.

[ACTION: WORTHINGTON]

Draxler provided Panel with some information about the new Schlumberger autoclave facility at Clamart, France. The facility is 9.9 m long and of diameter 200 mm. Sample test conditions are 335°C @ 24000 psi, 310°C @ 29000 psi, and 280°C @ 34000 psi. The cost is 1450 francs per hour of occupation. An autoclave test could not therefore be discounted on grounds of availability and cost.

The discussion moved away from third-party tools to ODP tools. The German BGR borehole magnetometer is programmed for Leg 148. However, the Germans had requested that two persons accompany the tool, a scientist and a technician, on operational and safety grounds. Since the tool was being run in support of ODP operations, it was felt that the technician should not be considered part of the German scientific quota. Draxler enquired as to the present situation. This issue was apparently due to be resolved about the time of this DMP meeting.

Williams asked about the scientific merit of running a shear-wave tool in 504B, which does not offer a good opportunity for such a test because of risk and time constraints. It was noted that the presence of the MAXIS (alongside the CSU) would allow the Schlumberger Digital Sonic Imager to be run. However, this tool was only rated to 175 °C. If a shear-wave tool is run, it would be as part of the engineering tests. It was considered that the decision to run extra logs should be based on scientific rather than engineering merits.

The high-temperature cable will be replaced prior to Leg 148. This cable had been downrated to 165 °C following the FMS experience on Leg 140. Some tools failed on Leg 140 after a cooling run which had lowered the temperature from 170 °C to about 115 °C. This was primarily a telemetry failure. It would be prudent to heat-test all Schlumberger tools prior to Leg 148. This could be done during Leg 147 if a field heat-test oven could be obtained. Panel's concerns about the high-temperature environment at 504B were embodied in the following recommendation.

DMP Recommendation 92/13

"Prior to standard logging at Hole 504B during Leg 148, fluid circulation should be undertaken with the specific objective of cooling the hole. This would improve the prospects of running the Schlumberger standard tools without exceeding their temperature limit of 175 °C. The cost of deploying the Schlumberger hostile environment logging (HEL) tools as a contingency should continue to be investigated."

(ii) North Atlantic

Leg 149 - Iberian Abyssal Plain

The drilling programme now comprises three sites with basement penetration of 200-300 m targeted at each. In addition to the standard suite, magnetic susceptibility logging has been identified as enhancing core-log integration and interhole correlation. The BHTV should be run at each site with these data being used to decide whether or not a packer test should be carried out.

Otherwise there have been no developments since the last DMP meeting.

16. Technology Review - Fluid Sampling

John Edmond (MIT) reported on the background to a scientific support committee, convened at the request of JOI and which he had chaired, with the brief to report on the scientific rationale of high-temperature borehole fluid sampling. The experience of the Salton Sea had demonstrated that there is no off-the-shelf high-temperature borehole fluid sampler that actually works. Peter Lysne was working on the development of a new tool, with DoE support. This would be a community tool. The committee is acting in support of Lysne. The aim is to build a tool rated to 400°C and 700 atmospheres to measure temperature and pressure, and to contain other sensors that could control the opening and closing of the sampling valve. Lysne has secured funding for the physical part of the development. Edmond's committee has developed a scientific plan and is now submitting a proposal for a water sampler that is compatible with the tool that Lysne is building. Thus, Edmond's group of proponents are collaborating on the design of an in situ borehole fluid sampler that would be controlled by Lysne's tool.

The tool will not require special cables, connectors, etc., so it is hoped to be able to run a very efficient operation which would become fairly routine at an early date. The intention is to test the tool in hot holes on land before asking for ship time. The temperature and pressure tool is scheduled for land testing within 12 months. The design protocol of the fluid sampler is very complicated. The aim is to recover a sample without loss or gain of fluid. Yet, the sampling process itself changes the chemical regime. For example, the temperature drop on recovery leads to precipitation and to a separation of liquids and gases. A key question is whether we try to re-homogenize the sample after recovery. One option is to design the tool as a laboratory test vessel so that handling problems are minimized. The sampling tool is not expensive and therefore disposable.

Another question is how to sample target zones. This would require skills in packer technology. If this can be achieved in hot holes on land, the tool could go to sea. If wireline re-entry is feasible, the tool could be used in existing holes. It is therefore not a one-off technology.

The Chairman noted that the move to share expertise and costs in this way was a blueprint for the future: we can expect that attempts to overcome the technological challenges and fiscal hurdles will benefit enormously from interprogramme collaboration. Fisher stated that much expertise had been brought to bear on this problem, which could not have been tackled by an ODP group alone.

17. Progress on High-Temperature Logging Technology

(i) Temperature Tool and Cable

The first shipboard deployment of the Gable tool, cable and cablehead is scheduled for Leg 148. Panel view was that the Gable tool and cablehead should be tested in a high-temperature autoclave and in a land well (to test pull) before shipboard deployment. In these respects DMP Recommendation 92/12 also applies to this tool.

(ii) **Resistivity Tool**

This digital tool is being built by CSM who are an ODP-LDGO subcontractor. The tool comprises focussed and short-normal sensors: the former can provide a measurement that is virtually independent of the borehole fluid and diameter. In addition to measuring formation resistivity, the tool also measures borehole fluid resistivity and temperature. Data are transmitted uphole in real time. The tool has been land-tested at CSM. Autoclave tests are planned for the end of November 1992. The tool is currently two months behind schedule.

Although not strictly a third-party tool, this tool should be tested as fully as possible in order to comply with the guidelines. The feedback in seeking this compliance will be an important component of the future evolution of third-party-tool protocol.

(iii) **Borehole Fluid Sampling**

The current status of Lysne's tool has been covered under Item 16.

(iv) **Logging Through Coiled Tubing**

Desbrandes described this oil-industry technology, which might be of relevance to logging in hot ODP holes. Essentially the tubing is 1.25 or 1.5 inches O.D. with a maximum length of 4500 m. The wireline passes through the tubing, which is within the drillpipe. Thus it is possible to circulate above the tool continuously while logging so that the entire cable is cooled. This technology might be especially effective in offshore wells where the circulating water would be cooled to the sea floor. Dowell Schlumberger and Otis (Halliburton) offer a commercial service. A major difficulty for ODP would be the shipboard storage of the coiled tubing: space is at a premium.

18. Long-Term Monitoring of Hydrothermal Systems at Mid-Ocean Ridges

The Chairman explained that this agenda item has its roots in the development of interprogramme collaboration and a desire to share resources. Panel had been asked to debate the issue. Becker led the discussion.

The InterRIDGE programme is working towards establishing natural laboratories on the seafloor. These would comprise flowmeters, seismometers, etc., and they would provide base-line data for hydrothermal drilling and data interpretation. Key questions are: how should natural laboratories be designed, how would such experiments be carried out, and what role could ODP play?

Panel noted that since the drilling process would disturb hydrothermal sites, there is a need to monitor a proposed drilling site for about one year beforehand. In this way drilling-induced changes could be monitored, too. Further, where there is a sea-bottom observatory, a fine-scale siting of boreholes can be usefully proposed (as per Leg 139 where considerable changes were seen over short lateral distances). Thus, Panel supported the concept of natural laboratories. However, the sites chosen by RIDGE do not correspond to proposed ODP drilling sites.

Panel identified three key issues: interprogramme agreement on sites of common interest; dovetailing of science; and the development of complementary technology. DMP could make a contribution to the last of these. Panel felt that they could not progress the discussion without the benefit of a first-hand exposition of RIDGE practices and aspirations. A RIDGE representative should be invited to address the next DMP meeting.

[ACTION: LYSNE]

19. ODP Downhole Measurements - Publicity Opportunities

Item deferred to next DMP meeting when hopefully the ODP Public Information Coordinator would be able to attend. In the meantime Panel are asked to continue to give thought to this very important issue.

20. Technology Review - Downhole Radar

Item deferred to next DMP meeting.

21. ONDO Experiment

Kanazawa reported that a visit to Site 808 in July 1992 had been unsuccessful from the standpoint of data recovery from the ONDO installation. It is proposed to try again next year using a submersible.

22. Downhole Camera

Desbrandes drew Panel's attention to black-and-white/colour downhole cameras manufactured by the Hittwell Corporation. These require a co-axial cable for real-time operation. They have potential value in fishing operations.

23. Panel Membership

Two Panel members are rotating off DMP during the next few months. They are Carl Sondergeld, who is due to retire after this meeting, and Joris Gieskes, who will retire after the May 1993 DMP meeting. In order to maintain the current science/technology balance, Sondergeld should be replaced by an industrial geoscientist and Gieskes by a geochemist. Panel considered it imperative to have continuity of geochemical presence on DMP in view of the currently strong interest in the pore fluid sampling initiative. Because of this concern, it was agreed to switch the replacements, i.e. to replace Sondergeld by a geochemist and Gieskes by someone from industry. A strong nomination was made for a new geochemist to join DMP. The Chairman and Gieskes will progress the matter.

[ACTION: WORTHINGTON, GIESKES]

24. Next DMP Meetings

The next meeting of the JOIDES Downhole Measurements Panel is scheduled for 19-21 January 1993, one day earlier than previously notified, at ODP-TAMU, College Station, Texas. Andy Fisher will host. The subsequent Panel meeting is tentatively scheduled for 25-27 May 1993 at Scripps Institution of Oceanography, La Jolla, California. Joris Gieskes will host. The fall meeting of DMP will take place in Sante Fe, New Mexico, in September/October 1993. Peter Lysne will host.

25. Close of Meeting

The Chairman thanked Panel members, liaisons and guests for their contribution to the meeting, and acknowledged Kate Moran for her gracious hosting. It was noted that Sondergeld and McClain were attending their last DMP meeting and they were thanked for their input.

This was the last Panel meeting under the present Chair. The Chairman would be stepping down at the end of 1992 although he would remain on the Panel for a further year in the interests of continuity and corporate memory. PCOM had appointed Peter Lysne to be his successor with effect from 1 January 1993. It was especially important that Panel members took careful note of action items arising from this meeting so that the changeover might be as smooth as possible.

The meeting closed at 1515 hours on Friday 25 September 1992.

PAUL F WORTHINGTON

19 October 1992