

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Texas A & M University
College Station

June 9 - 10, 1988

88-239
RECEIVED JUL - 7 1988

EXECUTIVE SUMMARY

1. Panel recommended that early reciprocal liaison be established between DMP and proposed shipboard measurements panel.

[Rec: 88/9]

2. Concern was expressed that proposed LFASE experiments in Hole 418A would place the hole at risk: Panel consensus was that this was scientifically unacceptable.

3. Panel recommended that the diamond coring system should be designed so that the required suite of logs and other downhole tools can be run: the design currently being pursued does not make this provision.

[Rec: 88/10]

4. A proper analysis should be made of the cost of drilling deep log-compatible diamond-cored holes versus that of slimholing logging tools and instruments, and the necessary redesigning of physical properties equipment on board ship. Costing should make provision for compatibility tests of slimhole and regular tools.

[Rec: 88/11]

5. DMP should be represented during course of developments re broadband seismometers in the deep ocean.

6. Subcommittee appointed to redraft guidelines on monitoring of third party specialist tools.

7. DMP is establishing liaison with KTB of FRG. Panel recommended that KTB staff be invited to give a presentation on the KTB project to EXCOM and PCOM as soon as possible.

[Rec: 88/12]

8. DMP adopted as its thematic thrusts:

- lithospheric stress on a global scale
- sediment cyclicity
- composition and structure of the crust
- hydrogeological phenomena
- monitoring of modern geological processes.

These themes will guide the input of non-standard downhole measurements to future ODP programmes.

9. DMP re-affirms the importance of logging and downhole measurements at the old crustal reference site AAP1B and recommends that this site be drilled first during Leg 123.

[Rec: 88/13]

10. JOIDES office have indicated a shortness of time in relation to the planning of downhole measurements for Nankai (Leg 129). This panel meeting evaluated three related proposals. Panel considered that Nankai downhole measurements scenario was becoming very complex and, in view of communication from JOIDES office that there is "some pressure re time", adopted the following recommendation.

A working group be established to formulate the detailed programme of downhole measurements for the Nankai Leg. A two-day meeting to be held in College Station on 25/26 July 1988. Recommended members are: P F Worthington (Chairman), K Becker, B Carson, D Huey, R Jarrard, D Karig, M Kastner (or J Gieskes), H Kinoshita, G Moore (or T Shipley) and K Moran.

[Rec: 88/14]

11. Panel recommended that standard logging suite be run in SUL 4 (Leg 124) because of the importance of this site in sediment cyclicity studies.

[Rec: 88/15]

12. Panel encouraged the submission of a proposal to JOI-USSAC to hold a geochemical logging workshop around mid-June 1989 with a subsequent thematic volume.
13. DMP to meet next in October 1988.

Paul F Worthington

15 June 1988

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Texas A & M University
College Station

June 9 - 10, 1988

MINUTES

Present

Chairman: P F Worthington (UK)

Members: B Carson (USA)
E Howell (USA)
D Karig (USA)
R Porter (USA)
R Stephen (USA)
R Wilkens (USA)
H Kinoshita (Japan)
J Kopietz (FRG)
J Legrand (France)
K Moran (Canada)

Liaisons: R Anderson (LDGO)
R Jarrard (LDGO)
S O'Connell (ODP/TAMU)
M Langseth (PCOM)
K Becker (LITHP)

Guests: H Draxler (KTB/FRG)
R Hanel (KTB/FRG)
G Foss (ODP/TAMU) *
L Garrison (ODP/TAMU) *
B Harding (ODP/TAMU) *
W Meyer (ODP/TAMU) *
T Pettigrew (ODP/TAMU) *
D Ruddlehuber (ODP/TAMU) *
M Storms (ODP/TAMU) *

Apologies: G Olhoeft (USA)
C Sondergeld (USA)

Absent: A Kristensen (ESF)
R Traeger (USA)

* attendance for agenda items 10 - 12 only

1. Welcome and Introductory Remarks

The meeting was called to order at 8.04 am. The Chairman welcomed DMP Members, Liaisons and Guests, especially the representatives of the Continental Deep Drilling Programme of the Federal Republic of Germany (KTB of FRG).

2. Review of Agenda and Revisions

(i) An additional proposal (304F) was received by the Chairman on June 3, 1988. This proposal relates to an ODP Nankai downhole observatory. The accompanying telex from JOIDES made reference to the pressure of time since Nankai is scheduled as Leg 129. DMP was asked to discuss 304F as soon as possible. The proposal was distributed to the Panel and scheduled for discussion under Item 16.

(ii) Item 19 (vii)

Should read "Geological information from wireline logs".

(iii) JOI-USSAC workshop on "Broadband downhole seismometers in the deep ocean". Report by R. Stephen included as addendum to Item 6.

(iv) A report on the Navidrill be included as part of the TAMU briefing, Item 11.

(v) Staffing matters pertaining to the Western Pacific legs be discussed under Item 23.

Subject to these modifications, the pre-circulated agenda was adopted as a working document for the meeting.

2. Minutes of Previous DMP Meeting, University of Miami, January 19-20, 1988

These were adopted without modification.

The Chairman signed the master copy for ODP records.

Matters Arising

(i) Letters to Co-chiefs

These are intended to inform Co-chiefs of the scientific value of logging in order to improve the prospects of maximum scientific returns from each Leg. The Chairman will, with supporting input from LDGO, finalize appropriate drafts for signature by the PCOM Chairman.

[ACTION: JARRARD/WORTHINGTON]

(ii) Malfunctioning of Barnes/Uyeda tool

This turned out to be an intermittent electrical fault which caused erroneous recording of temperature. It was of limited occurrence, easy to recognize, and has now received attention.

(iii) Proposal 66F

Karig reported that his correspondence with the proposers had indicated that borehole televiewer (BHTV) core orientation would suffice. The proposers are aware of the limitations of this method of core orientation but wish to proceed. Their equipment will not subsequently be remaining on board ship.

3. PCOM Report

Langseth reported on the PCOM meeting held in College Station on April 20-22, 1988. Initially he reported on the PCOM response to DMP recommendations 88/1 - 88/8.

DMP Recommendation

PCOM Action/Response

88/1 Appoint TAMU staff scientist to evaluate performance and quality of those downhole measurements under TAMU control	PCOM endorses: passed to ODP/TAMU for action
88/2 ODP/TAMU and LDGO develop a display-capable core data base to automate the production of barrel sheets and to facilitate the integration of log and core data on board ship	PCOM endorses
88/3 Future vacancies on SOHP and TECP be filled with priority given to a least one member on each panel having downhole measurement expertise	PCOM consider recommendation within constraints of panel member selection
88/4 For Leg 121 holes NNER-9, NNER-10, 90ER-2, it is recommended that borehole televiewer be deployed in basement and over limited section of sediment for as long as data remain useful	PCOM endorses

- | | |
|---|---|
| 88/5 A packer/hydrofrac scientist should be included as a member of the shipboard party for Leg 123 | There will be two people with packer/hydrofrac experience on Leg 123 |
| 88/6 Subgroup meeting with WPAC | Already actioned |
| 88/7 Next DMP meeting on June 9-10, College Station | Accepted |
| 88/8 TAMU be asked to report to next DMP meeting on reasons for the processing bottlenecks on board ship together with their proposed solutions | PCOM asks DMP to be more specific. Will upgrades planned for FMS solve the problem? (TAMU report forms part of Item 11) |

PCOM was impressed by the thorough job done by DMP on third-party tool policy. Further action was requested. Deferred to Item 7.

A Shipboard Measurements Panel (SMP) will be created as part of a reorganisation of the JOIDES advisory structure.

DMP Recommendation 88/9

"Reciprocal liaison be established between DMP and SMP."

In future, long-range science will be thematically rather than regionally driven.

The Engineering Leg (124E) has been extended to 35 days, principally to accommodate the programme recommended by DMP.

Darrel Cowan (UW) has been appointed as an alternative PCOM liaison to DMP.

The Chairman thanked Langseth for his excellent report.

4. LITHP Report

Becker reported that two relevant meetings had been held since the last DMP meeting, the LITHP meeting itself at which CEPAC matters had been the focus, and a meeting of the EPR working group. LITHP had identified several thematic objectives. These can be addressed during CEPAC, requiring 6.5 legs. Minimum hole size stipulated for EPR drilling was 4 inches.

LITHP did not endorse Proposal 300B (ref. Item 20).

LITHP minutes contained reference to a Geochemical Logging Workshop being organised by Brass and Kastner of PCOM. DMP have no knowledge of such an initiative: the topic is scheduled for discussion later (Item 21).

DMP expressed concern over the low frequency acoustic seismic experiment (LFASE) planned for hole 418A south of Bermuda, because of the admitted risk to a hole of this scientific value. This experiment could damage the hole or equipment could be left therein. DMP supports the development of technology in wireline re-entry and borehole geophysics. However, 418A is important because it is the only hole which penetrates deeply 100 My old oceanic crust with a record of alteration. 418A is a natural candidate for wireline re-entry since it has not been logged with the high technology tools that have only recently become available, eg the geochemical logging tool. Only the choice of 504B would have been worse. The proposed experiment is not site-specific: 418A was chosen because of its proximity to another hole. 395A and 396 would meet the LFASE programme requirements without the risk to a hole of the highest scientific importance.

DMP Consensus

"Hole 418A should not be put at risk."

5. TEDCOM Report

The Chairman, as DMP Liaison to TEDCOM, reported on the TEDCOM meeting held in Houston, Texas, on February 4-5, 1988. The major thrust of this meeting was an evaluation of how mining technology might contribute to the drilling of deep penetration holes, especially in young oceanic crust. A full report is attached as Annexure I.

The Chairman emphasised that any new drilling technology should not be developed without taking account of the requirements of ODP scientists. For example, does the time and monetary dedication needed for deep drilling developments impact too heavily on other interests? What is the minimum size of core needed? What is the minimum hole size needed for an adequate logging suite? These questions are important especially with the emergence of a panel dedicated to shipboard measurements and the commitment of COSOD II to logging in young oceanic crust.

It was reported that the diamond coring system (DCS) is being developed for a 4-inch hole. DMP considered this inadequate for their logging purposes. Panel prepared a table indicating the wireline information lost for each of several hole diameters (Annexure II). The following tools could not be run in a four-inch hole:

- full waveform sonic (all tools)
- VSP
- wireline packer
- lithodensity tool
- geochemical logging tool

- borehole gravimeter
- magnetometer
- induction
- formation microscanner
- thermal/epithermal neutron porosity

Panel considered this to reflect a serious loss of information. KTB representatives stated that their preference for minimum hole size is 6.25 inches, the size of commercial fishing tools. Mining technology is currently being used to drill 6-inch holes. Panel expressed concern that no cost analysis had been undertaken of 6-inch diamond coring vs. 4-inch coring with 6-inch reaming vs. miniaturization of logging tools with redesign of physical properties equipment. Further, some logging tools cannot be miniaturized.

DMP Recommendation 88/10

"Diamond coring system should make provision for the required suite of logs and other downhole tools to be run."

[The required suite is that which would be run on scientific grounds without diametral restrictions (see Annexure II)]

DMP Recommendation 88/11

"A proper cost analysis be undertaken of drilling deep log-compatible DCS holes vs. the slimholing of tools and instruments, and the necessary redesigning of physical properties equipment on board ship. Costing to make provision for compatibility tests of slimhole and regular tools."

6. Vertical Seismic Profiling

(i) JOI-USSAC workshop on VSP

Stephen reported on the JOI-USSAC workshop on VSP held at CSM on August 27-29, 1987. The workshop report is not yet available. The workshop provided scientific support for VSP surveys in ODP and recommended that a U.S. national VSP laboratory be established to carry out VSP work as required by the U.S. science community, to coordinate development of VSP technology and analysis, and to assist in specialized borehole seismic experiments.

In essence, the workshop recommended that VSP surveys should become an integral part of ODP science, that zero-offset VSP should be performed at all structurally simple sites where sonic log(s) will also be run, and that offset VSP should be performed for specialized applications in structurally complex settings. Substantial improvements in tools and analysis capabilities must be accomplished to ensure a

viable programme, eg broad-band tuned source arrays, three-component tools, multi-element vertical arrays of geophones and hydrophones, and computer processing and modelling capability at sea and on shore.

The national laboratory would interface with other groups working on wireline re-entry and long-term earthquake monitoring, with JOIDES contractors, and with the JOIDES DMP. The laboratory would be funded through the USSAC programme and would report to the USSAC committee.

(ii) VSP strategy

Stephen conveyed a summary of the meeting of the USSAC committee in Corvallis, Oregon, on May 10-11, 1988 which reviewed the workshop recommendations. Although general support for VSP was re-affirmed, the long-term details of a national laboratory have not been worked out. Obvious difficulties are management structure, how to handle international cooperation, and the level of commitment and funding required. USSAC will review progress in addressing these difficulties at their September 1988 meeting.

DMP await developments with interest.

(iii) JOI-USSAC workshop on Broadband Seismometers in the Deep Ocean

Stephen also reported on this JOI-USSAC workshop held at Woods Hole on April 26-28, 1988 and which was a natural successor to the earlier JOI-USSAC workshop on wireline re-entry. The driving force behind the workshop was a desire to extend the worldwide seismic network into the oceans. This would require low frequency instrumentation. The workshop brought together whole-earth seismologists and marine geophysicists. The feeling was that seismometers would perform better in boreholes rather than on the sea floor, and therefore there was considerable interest in wireline re-entry. The workshop identified targets to be achieved within a ten-year period.

DMP Consensus

"DMP should be represented during the course of further developments in the deployment of broadband seismometers in the deep oceans."

7. Monitoring of Third Party Specialist Tools

DMP had produced a strategy for PCOM which had now been returned for modification.

PCOM Liaison reported that PCOM was impressed by the thorough job started by DMP on third party tool policy. Specific areas were identified for further attention.

After much discussion it was felt that the Panel were being drawn into legalistic details which are best resolved in subcommittee.

Chairman to redraft the guidelines in accordance with PCOM representations; draft to be reviewed by LDGO, LITHP and PCOM liaisons; revised draft to PCOM by end-July 1988.

[ACTION: WORTHINGTON/LANGSETH/BECKER/ANDERSON]

8. Report on Continental Deep Drilling Programme of FRG

Hanel reported on KTB activity (total budget: 450 million marks). The objectives set by the scientific community have led to the formulation of a key project which can be carried out only by means of a superdeep hole. The programme provides for a pilot hole of depth 3-5 km and a superdeep borehole down to 10-14 km. The pilot hole was spudded on September 22, 1987 and has now reached a depth of about 2.1 km.

A comprehensive logging and testing programme has been established: this includes research and development projects on fundamentals and interpretation techniques. The programme has undertaken a market survey of high temperature tools rated up to 300°C. The programme also includes:

- a set of new tools, eg four-pad formation microscanner, geochemical logging tool, reactivated spontaneous potential tool;
- hydraulic tests, 3-D seismics, multi-offset VSP;
- tool development, eg thermal conductivity, acoustic televiewer.

Collaboration with ODP would be mutually beneficial for it would allow:

- participation on panels;
- dovetailing of activity;
- cost saving;
- exchange of reports, DMP minutes, etc.
- mutual utilization of tools, eg magnetic susceptibility, acoustic BHTV, thermal conductivity tool;
- cooperation on research projects, eg facies log, geochemical logging tool, stress measurements, cooling for downhole measurements.

The deep hole is scheduled for spudding in late 1989/early 1990 and will be drilled over a period of about eight years.

There is also an excellent rock properties laboratory at the wellsite which contains comprehensive and contemporary petrophysical equipment.

The Chairman thanked Dr Hanel for his most interesting overview. The panel supported active collaboration with KTB. The obvious liaison is the FRG representative on DMP (H. Villinger). Representatives of KTB are, of course, welcome to attend DMP meetings themselves when it is considered especially desirable.

The following actions were proposed.

A KTB report be given at each DMP meeting and vice versa through the liaison.

[ACTION: VILLINGER]

A KTB/ODP joint workshop be held in FRG around September 1989 at which case histories from the KTB pilot hole and from ODP would be reviewed, common problems exposed, and joint solutions proposed.

[ACTION: WORTHINGTON/ANDERSON/HANEL/DRAXLER]

A DMP meeting be held in FRG at the time of the above workshop.

[ACTION: WORTHINGTON]

KTB representatives to seek direction on the desirable frequency of their attendance at DMP meetings.

[ACTION: HANEL]

To pave the way for these actions DMP considered that EXCOM/PCOM should be made aware of the scope of KTB activity.

DMP Recommendation 88/12

"KTB staff should be invited to give a presentation on the KTB project to EXCOM and PCOM as soon as possible."

Progress towards ODP/KTB collaboration will be reviewed at the next DMP meeting.

9. DMP Thematic Thrusts

Panel identified five areas where specialized downhole measurements would always be strongly supported.

- (i) Lithospheric stress on a global scale;
- (ii) Sediment cyclicity;
- (iii) Composition and structure of the crust;
- (iv) hydrogeological phenomena;
- (v) Monitoring of modern geological processes.

These themes will determine the input of non-standard downhole measurements to future ODP programmes. They are not exclusive: specialized downhole measurements in pursuit of other objectives will always be recommended where justified.

Strategic use of these themes in long range planning will allow some initial provision for non-standard logging to be made when the initial leg structure is being devised. Where one or more of these themes is pertinent to the scientific objectives of a proposed leg, provision should be made in the initial leg schedule for appropriate specialized tools to be run. It should be presumed that DMP will require the most comprehensive logging suite in support of each pertinent theme. LDGO liaison is asked to provide details of specialist tools and deployment times appropriate to themes (i) - (iv).

[ACTION: ANDERSON]

The mechanisms for incorporating the DMP thematic strategy into planning cycles will be developed further at the next panel meeting.

10. Logging Contractor's Report

Anderson reported events from recent and current legs.

Leg 118

Hole 735B was investigated with virtually every downhole measurement on board ship. Core recovery was 87%. This provides substantial scope for the calibration of tool response, eg the geochemical logging tool.

Leg 119

Four holes were all logged with standard technology.

Leg 120

The death of Lamar Hayes is deeply regretted by all.

Leg 121

The seismic stratigraphy tool was lost at Site 752B but was successfully fished. After fishing the Co-chiefs still made time available for the three standard logging runs. The Chairman complimented the Co-chiefs on their flexibility.

Jarrard reported on the LDGO performance evaluation.

There was a marked increase in the percentage hole logged around Leg 111 because of an improved mud programme through salting which resulted in much less bridging. However, there has been a big

increase in XCB sticking because this is being pushed beyond its limit in seeking the better core recovery it provides. It is for this reason that the 750m rule has been introduced: logging is carried out when hole depth reaches 750m, then drilling is continued with XCB, then lower hole is logged.

TAMU is more rigorously enforcing PCOM logging objectives.

LDGO is seeking to improve Schlumberger tool performance. For example, the sonic digital tool (SDT) is being removed from the ship: the tool is not sufficiently robust and reliable for shipboard use. The long spacing sonic (waveform) is being re-introduced.

In WPAC more holes have a TECP objective so there are fewer shallow holes and there will consequently be a large logging effort.

In CEPAC more holes have a LITHP priority, more time is assigned to drilling, with less time for logging. Consequently, the logging effort can be expected to be smaller.

Anderson reported on COSOD II implications for tool development.

(a) High resolution logs

The contract to miniaturize the formation microscanner (FMS) was let to Schlumberger on March 1, 1988 with delivery by year end. A test is scheduled for Leg 124E.

(b) Geochemistry

A prototype high spectral resolution, germanium crystal, cryogenic tool has been tested at 100m/hour. This is a very sharply resolved version of the geochemical logging tool. The Schlumberger cryogenic tool is to be run in the KTB hole.

(c) Stress

The need for stress measurements has been re-emphasized. The FMS caliper locks into the ovalized hole so the inferred stress direction may be incorrect. The FMS does not provide stress magnitudes. The BHTV can furnish stress directions and magnitudes. It is therefore important to maintain BHTV capability.

11. TAMU Briefing

Harding reported on the following topics.

(i) Side entry sub (SES)

The SES on board ship can be run up to the present drill string weight limit. LDGO are commissioning a finite

element stress analysis (with Stress Engineers of Houston) to investigate whether more pipe can be hung on to SES. TAMU prepared the specification for and will monitor the study.

(ii) Quantification of acceptable level of risk to drillstring

Can't quantify: too many factors, some of which can only be assessed on board ship. Defer to judgement of operations superintendent.

(iii) Mud programme

Contract at TAMU to improve hole cleaning capability through flow loop analysis of lifting capacities of different muds. It is hoped to use some recipes in deep penetration hole planned for Leg 122. Message is to use bentonite or gel rather than polymers. Key issue to be resolved is effectiveness of small volumes of very viscous muds vs. larger volumes of lighter muds. However, all options are salt muds.

LDGO request notification of the addition of barite because of the adverse effect on the geochemical logging tool.

More time has been spent conditioning holes and this has contributed to a reduced bridging problem. Also a better mineralogical capability on board ship allows mud composition to be tuned to formation type.

(iv) Lockable flapper

This is used with XCB: allows logging through the bit. Will allow 750m logging. No longer in development phase.

(v) XCB stuck core barrels

New XCB design on Leg 121. Overtorquing the lowermost connection has been the main problem. New design has more than doubled the strength of that connection. Recovery is higher than with rotary system. Design is continuously evolving.

(vi) Navidrill

Tested on Leg 121 at three sites to date. Ability to provide geoprops pilot hole proven. Core quality has been excellent in basalt and in limestone/chalk/chert sequence. Remaining problem areas include some core jamming, especially in interbedded formations. Projected use of the Navidrill is to drill 50m into basement (without reaming). This would remove the logging option.

Meyer reported on computer aspects.

(vii) Computer bottlenecks on board ship

ODP has grown beyond shipboard processing power. Excess capacity is needed because of work-load peaks, heavy use of graphics, and need for adequate idle time for system work. Upgrade of two VAX 3600 processors will add much CPU power to the system which will provide adequate capacity.

It is not TAMU's brief to process logging data. LDGO have committed funding for the purchase through TAMU of a VAX 3600 processor dedicated to the formation microscanner.

(viii) Disc storage of core barrel data

Many but not all of these data are available for shipboard display. Need to complete this and be able to compare with logs. A working group should assess the situation from a shipboard standpoint and report to TAMU within 3 months (ie by September 10, 1988) with TAMU response to proposal within 3 weeks (ie by October 1, 1988). Matter to be reviewed at next DMP.

[ACTION: JARRARD/WILKENS/CARSON]

12. Engineering Leg

Harding reported that, with one exception, the DMP recommendations have all been incorporated into the leg schedule which has been extended to 35 days to accommodate the programme of downhole-measurement tests. The exception is the test of the ODP rotatable packer which is top of the reserve list. The reserve list also includes the testing of a combined BHTV/susceptibility/three-component magnetometer tool.

The priority list of logging tests now reads:

- (i) drill dedicated hole for downhole measurements to approximately 200m into basement (1.5 days)
- (ii) wireline heave compensator (0.5 days)
- (iii) wireline packer (2 days)
- (iv) formation microscanner (0.5 days)
- (v) GST through-wiring (1 day)
- (vi) SES hot hole evaluation (1 day)

In addition the Geoprops Probe, or a dummy if the probe is not ready, will be subjected to a trial emplacement within a Navidrill test hole.

The primary aim of the leg is to test the high-speed diamond coring system. Target is 200m penetration into a fractured formation. Hole diameter is 4 inches: core diameter 2.5 inches.

Panel noted that:

(i) COSOD II emphasized the need for logs in young ocean crust;

(ii) high temperature SES is not compatible with DCS.

The engineering leg is fully staffed.

13. Budget FY 89 et seq.

Anderson reported on the BCOM-approved budget status up to FY 92. Items that have been cut are indicated in parentheses.

FY 89	FMS, gyro, packer parts (3rd packer, computer upgrades)
FY 90	Zero (IP tool, digital BHTV)
FY 91	Lease of high temperature logging tools
FY 92	Lease of high temperature logging tools, digital BHTV (computer upgrades)

A major item of concern is the deferral of the digital BHTV to FY 92. LDGO view was that the existing televiwers could not fully support the programme over the next four years. Significant periods of downtime could be expected during breakdowns and repairs without adequate back up. DMP were especially concerned in view of emphasis on stress measurement both by COSOD II and by DMP itself (see DMP thematic thrusts, item 9).

DMP Consensus

"In the light of its identified priorities, DMP notes that the LDGO budget status fails to make provision for adequate downhole-measurement support for the characterization of lithospheric stress on a global scale. The early acquisition of a digital televiwer would partly alleviate this shortfall."

14. Technical Review - in situ Probe Tools

(i) Geoprops Probe - status

Karig reported that the feasibility study for the Geoprops

Probe was completed in March 1988. This formed the basis for an NSF proposal (\$ 154 000) for the development of two probe tools, spare parts and a data stripping system. Development is scheduled in three phases.

- Phase I - testing of sensors in the packer (\$ 7 000, funded by residual money from feasibility study)
- Phase II - development of prototype electronics (\$ 10 000, funded by JOI-USSAC; work to commence week of June 13, 1988; estimated to take 1-2 months)
- Phase III - actual construction of the probe by TAM, Inc (\$ 154 000, needs NSF approval of proposal; decision estimated late July 1988)

Estimated completion date is early 1989. TAM cannot guarantee that the probe will be ready before the Engineering Leg. If not, it is hoped to deploy a mechanical dummy in one of the Navidrill holes to test latching and Navidrill hole conditions. Land testing of the complete probe is anticipated in early 1989 and shipboard testing as soon as possible thereafter.

Geoprops Probe measures permeability, pore pressure and temperature, and takes fluid samples.

(ii) Lateral stress tool (LAST)

Moran described the objectives of LAST which are to measure the lateral stress and deformation of soft sediments on the Canadian margins and in those areas of ODP where a knowledge of lateral stress is important.

A feasibility study carried out in 1986 proposed two phases of development.

- Phase I - tool to measure lateral stress (LAST)
- Phase II - tool to make deformation measurements, stress and strain, shear modulus, creep

Phase I tool is being developed now. It is due for offshore testing in July 1988 after some ground testing.

Phase I tool measures lateral stress in three locations around the tool, pore pressure and temperature, and retains a disturbed rock sample.

15. Legs 121 - 123 General Overview

O'Connell and Jarrard reviewed plans for imminent legs.

Leg 121 - under way

Scheduled logging is standard suite + BHTV

Leg 122 - tie-in with industry wells on NW Shelf

Standard logging suite

Leg 123 - French susceptibility tool to be run. Magnetometer from GPIT. Co-chiefs cut out VSP to allow increased basement penetration but PCOM extended Leg and VSP now reinstated.

VSP scientist needed for Leg 123

DMP Recommendation 88/13

"DMP re-affirms the importance of logging and downhole measurements at the old crustal reference site AAP1B and recommends that this site be drilled first during Leg 123."

16. Nankai Leg

Chairman reported that 20 days had been set aside for downhole measurements. Several priorities had been recommended by DMP (refer previous minutes). PCOM had subsequently asked DMP to comment on drilling strategy as it affects downhole measurements, and to develop logging scenarios for availability/non-availability of Geoprops Probe.

Panel considered two issues pertinent to Nankai logging programme.

(i) LAST

DMP considered that this tool should be incorporated within the high priority list for Nankai downhole measurements.

It was noted that LAST as a soft sediment tool is complementary to the Geoprops Probe which is designed for consolidated sediments. Furthermore the scope of LAST largely encompasses that of the new Barnes/Uyeda WSTP which WPAC have recommended for all their legs.

(ii) Proposal 304 F

As presented this would require an extra week for the proposed dedicated hole for long term temperature measurements. This, in turn, would displace some logging runs. A dedicated hole is not essential to the objectives but the condition of a non-dedicated hole might deteriorate before probe emplacement. Better hole conditioning seems the optimum solution.

DMP Response

"DMP strongly endorses the scientific objectives of Proposal 304 F but questions the need for a dedicated hole which would impact adversely on other downhole measurements because of time considerations. Panel view is that the experiment be carried out in a conditioned hole or perhaps be incorporated within a second engineering leg."

DMP considered that the programme of downhole measurements for Nankai was becoming very complex and was not well structured. Panel felt that a working group of interested parties should be convened to meet as soon as possible, in view of stated urgency (refer Item 1 (i)). This working group should draw upon engineering input and should produce a draft report before next PCOM.

DMP Recommendation 88/14

"A working group be established to formulate the detailed programme of downhole measurements for the Nankai Leg. A two-day meeting to be held at College Station on 25-26 July 1988. Recommended members are:

P F Worthington (Chairman), K Becker, B Carson, D Huey, R Jarrard, D Karig, M Kastner (or J Gieskes), H Kinoshita, G Moore (or T Shipley), K Moran."

Since this meeting is scheduled before next PCOM, Chairman should convey recommendation to JOIDES office directly for approval.

[ACTION: WORTHINGTON]

Chairman will telex identified members of working group to solicit agenda input.

[ACTION: WORTHINGTON]

17. Western Pacific

(1) Sub-meeting to revise WPAC logging

Chairman reported that DMP having noted discrepancies in WPAC data at last meeting, a subgroup was identified to finalize the WPAC logging programme. Subgroup to comprise DMP and WPAC chairmen and representative of LDGO. Meeting scheduled for April 8, 1988.

WPAC chairman declined to attend and so Worthington and Jarrard met in Europe on appointed date and fine-tuned the WPAC logging programme as far as Leg 130.

(ii) WPAC meeting on April 11-14, 1988

Villinger represented DMP. WPAC essentially accepted all the DMP recommendations for logging arising from the sub-meeting on April 8, 1988.

(iii) Programme for Legs 124-130

Leg 124 - Sulu/SCS

Standard suite at SUL 5 (now called SS1) and Celebes, and possibly at SUL 4 (350m site)

DMP Recommendation 88/15

"Standard logging suite to be run in SUL 4 because of the importance of this site in sediment cyclicity studies."

Leg 125 - Bonin/Mariana

DMP recommended FMS for all sites. FMS is unlikely to be ready so it is no longer scheduled. This raises the importance of the BHTV on this leg. Current plan allows for standard suite in all holes, BHTV in MAR 3A and BON 6, and wireline packer in MAR 3A, MAR 3B and BON 7. Also packer experiment and magnetometer/susceptibility in BON 6.

Leg 126 - Bonin

FMS now included in "standard suite". Standard suite in all holes. Wireline packer in BON 1 and BON 2, BON 5A and BON 5B. Induced polarization log in BON 1 and BON 2 (if mineralization encountered). BON 1 may be high temperature (up to 600°C).

Panel to report to LDGO individually with knowledge of IP tool availability.

[ACTION: PANEL]

Leg 127 - Japan Sea I

Standard suite in all holes.

BHTV and magnetometer/susceptibility in J1b and J1e (and J3a). Packer/hydrofrac at J3a. VSP and packer at J1b.

VSP and packer are sometimes incompatible in the same pipe

trip. It might save time if packer was moved to Leg 128. Until VSP tools are identified, DMP cannot take a position.

Leg 128 - Japan Sea II

Standard suite in JSa and JS-2. Return to J1b, deploying seismometer array, geoelectrical study, oblique seismic experiment. VSP at J2a. Induced polarization deleted at J2a. WPAC prefer packer to wireline packer for broadscale permeability at J2a.

Leg 129 - Nankai

see Item 16

Leg 130 - Geochemical Reference Leg

Old crustal site; logging programme similar to site AAP1B of Leg 123.

(iv) Programme for Legs 131 et seq.

The second year of WPAC will be tuned up at next DMP meeting. A potential problem concerns Vanuatu where the study of décollements and fluid flow requires time for the ODP rotatable packer as well as the wireline packer and possibly the Geoprops Probe.

18. Central and Eastern Pacific

There is no CEPAC leg structure as yet. In addition to DMP thematic thrusts (Item 9), downhole-measurements issues are high temperature logging and diamond coring systems. All EPR and other rise holes will be hydraulically active and will require sealing. Sealing mechanisms will need to be developed.

DMP input to CEPAC will be mapped out at the next panel meeting.

19. Scientific Value of Logging

Reports were received on actions intended to promote an increased awareness of the scientific benefits of downhole measurements.

(i) Post-cruise data access

Anderson reported that an ODP licence contract had been offered by Terrasciences. This was a \$ 30 000 institutional licence which made no provision for hardware but allowed an unlimited number of workstations for accessing Terralog. Initial panel response was that this offer is hardly preferential.

(ii) Keynote paper

Chairman reported that this paper, which was prepared for COSOD II but which did not appear in the COSOD II report, will be submitted for publication by 1 July 1988.

(iii) Logging schools

Anderson reported that two logging schools had been scheduled in the USA; 29 October 1988 in Denver, Colorado, immediately prior to the GSA meeting, and 4 December 1988 in San Francisco immediately prior to AGU.

Canada seemed committed to a logging school during 1989.

(iv) Keynote presentations

Chairman reported that Tom Pyle's efforts to secure a keynote slot on ODP downhole measurements at IGC had drawn a blank because the keynote aspect of the IGC programme was already fully developed. It is possible, if sufficient abstracts are submitted, to generate a logging session but this would be by circumstance rather than design. As such, it is not preferred. ODP will have a booth at IGC which will include a logging display.

(v) JGR thematic volume

Becker reported that an AGU special poster session on crustal logging would form the basis for a JGR thematic volume with manuscript deadline of 1 February 1989.

(vi) Shipboard presentations

Anderson reported that these are being given by LDGO scientists early in each leg.

(vii) Video

Chairman reported that the production of a video on "Geological information from wireline logs" for shipboard viewing was going ahead.

20. Proposals

(i) 76E - Hekinian & Francheteau

Superseded by EPR working group.

(ii) 298F - Moore

Provisionally endorsed: refer to Nankai working group.

[ACTION: WORTHINGTON]

(iii) 299F - Brandon & Moran

Panel encourage initiative and look forward to further developments. Panel emphasize need for reliable in situ calibration.

(iv) 300B - Dick et al

Not endorsed by LITHP

(v) 301D - Gieskes et al

Panel endorses concept of physical and chemical characterisation of accretionary prisms but awaits a decision from PCOM/TECP.

(vi) 302F - Hamano et al.

Strongly supported: noted that time requested is three days.

21. Geochemical Logging Workshop

No proposal has been submitted to USSAC. Brass and Kastner reported to be organising (ref. Item 4). Panel considered that DMP must be involved in organisation. To be successful, workshop needs a well-worked database, adequate case histories, and to be broader-based than ODP. To hold such a workshop now would be premature.

DMP Consensus

"Encourage the submission of a proposal to JOI-USSAC to hold a geochemical logging workshop around mid-June 1989 with a subsequent thematic volume."

DMP nominated Worthington and Howell to pursue this initiative. Chairman to contact Brass and Kastner in the first instance. DMP preference was for these four to organise workshop.

[ACTION: WORTHINGTON/HOWELL]

22. Date of Next Meeting

Chairman had difficulty identifying suitable dates due to conflicting activities. Venue chosen as LDGO. Provisional dates for next DMP meeting chosen as 21 and 22 October 1988: these are tentative.

23. Other Business

Staffing: ODP/TAMU are always pleased to receive nominations for JOIDES logging scientists.

[ACTION: PANEL]

There is an urgent need for a nomination for a JOIDES logging scientist for Leg 125 from the FRG. Representatives to investigate and submit names through appropriate contact to the ODP/TAMU Operations Manager.

[ACTION: KOPIETZ/HANEL/DRAXLER]

24. Close of Meeting

The Chairman thanked Members, Liaisons and Guests for their contribution to the meeting, ODP/TAMU for their kind hospitality and Dr S O'Connell for her gracious hosting. The meeting closed at 3.09 pm on 10 June 1988.

Paul F Worthington

15 June 1988

MEETING OF JOIDES TECHNOLOGY AND ENGINEERING DEVELOPMENT COMMITTEE (TEDCOM)

Airport Holiday Inn

Houston, Texas

4 - 5 February 1988

REPORTSummary

The major thrust of this meeting was an evaluation of how mining technology might contribute to the drilling of deep penetration (2 - 3km) holes. Important scientific issues should not be prejudiced by the choice of technology. Thus there is a need for the scientific community to make its views known on such matters as time dedication vis-a-vis shallow drilling, minimum core size that is necessary for study, minimum hole size needed for downhole experiments, etc. The Downhole Measurements Panel will be collating an advisory brief for TAMU during the next few months.

1. Function

The undersigned attended in his capacity as Liaison to TEDCOM from the JOIDES Downhole Measurements Panel. These notes relate specifically to those matters which impact on the activities of DMP.

2. Engineering Liaison

PCOM have approved liaison of TAMU engineers (in addition to TAMU staff scientists) to important meetings of JOIDES scientific panels in future. This decision is in accord with the philosophy that scientific achievement is not possible without engineering development.

3. Operations Highlights - Recent Legs

Leg 116: 9 " APC/XCB bit successful in achieving 2 - 3 times faster coring rates.

More frequent mud sweeps used for hole cleaning to aid logging attempts.

XCB hole cored to 935.0m, deepest XCB ever.

Leg 117: Lockable flapper successfully field tested to log through.

Leg 118: First positive offshore operation of the Navidrill. The Navidrill bit design would be greatly enhanced by real-time physical properties measurements, e.g. compressive strengths. It is ludicrous to design bits without this information. It is recognised that physical properties has been the poor relation of shipboard measurements.

In response, PCOM liaison stated that a major thrust to rectify the situation is now underway within ODP.

4. ODP Engineering R & D Projects

- (i) Drilling/coring fractured crustal rocks.
- (ii) Bare rock spudding.
- (iii) High temperature drilling/coring.
- (iv) High temperature logging
 - LDGO responsibility.
- (v) Recovery of alternating hard/soft sequences.
- (vi) Recovery of coarse-grained unconsolidated sediments.
- (vii) In-situ physical properties including pore pressure and permeability measurements
 - providing engineering liaison for third party tool development including pressure meter, TAM drilling/tubing packers, Geoprops probe and pore water sampler.
- (viii) Recovery of gassy sediments under in-situ pressure.
- (ix) Maintaining deep/stable holes (2 - 3km).

TAMU emphasised the need for advance planning (3 - 4 yrs) of potential technical problems that will need to be addressed in ODP.

5. TAMU Mud Programme

A flow loop has been constructed. This encompasses a scale model of the APC/XCB configuration together with drill pipe. The aim has been to introduce pill sized cuttings to simulate drill cuttings and to study slip velocities using a video system. This was unsuccessful and further experimentation is underway. Ultimate goal is improved hole stability and thence better logging prospects.

6. COSOD II Results and Goals

COSOD II exposed the realization that scientific goals will not be accomplished without engineering developments. There is almost a conflict of requirements within ODP, i.e. a few deep holes vs. lots of shallow holes. For this reason an alternative platform concept has been discussed as an addition to JOIDES Resolution.

7. Mining System Technology into ODP Drilling

Object: deep penetration drilling (hard rock). There are five concepts that have been studied by TAMU:

- (a) Navidrill Core Barrel (NCB)
 - high speed diamond coring
 - limited (<200m?) basement penetration through APC/XCB B.H.A.
 - currently under development
- (b) Mud motor with conventional core barrel
 - at design stage
- (c) As for (b) but compatible with wireline coring
 - contingent upon (b) being successful
 - if (b) unsuccessful, shift emphasis to (d) or (e)
 - feasibility study planned
- (d) Hollow rotor turbine with hydraulic thruster
 - system feasibility related to successful deployment/operation of the NCB
- (e) Drill rod inside drill pipe/mini-riser
 - limited testing already done
 - investigate possibility of rotating the core barrel downhole while drill string stays stationary in the guide horn.

8. Deep Penetration Holes - Development Strategy

The above concepts may provide the key to deep penetration holes. There are other alternatives as per COSOD II document, e.g. deep water riser drilling, but these may be prohibitively expensive. For example, the development of an oilfield riser system for ODP has been costed at \$20 000 000.

A recommendation was made to dedicate engineering time and budget to perform the testing of slim hole (mining) type coring operations. In so doing, engineering issues that need to be addressed are:

- (1) Drill-rod evaluation (compatibility with ODP pipe)
- (2) Measurements of mining system
- (3) Heave compensation
- (4) Surface equipment (rig & platform)
- (5) Mud (lubricants)/hole cleaning
- (6) Latch-in of pipe and seafloor
- (7) Seafloor structure - standard re-entry cone (?)
- (8) Core barrels and recovery technique
- (9) Bits/cutting shoes
- (10) Pumps and circulating equipment

These efforts will assume 1000m water and a good formation from a drilling standpoint.

There is a need to identify at the outset the requirements of ODP scientists. What is the minimum size of core needed? What is the minimum hole size needed for logging? What core size will permit extraction of horizontal core plugs of the minimum dimensions necessary for accurate physical properties measurement on board ship? If these questions are not taken into account there becomes a danger of drilling to greater depths at all cost, that cost including some of the scientific objectives of ODP.

9. Engineering Leg

It was reiterated that a shipboard physical properties measurement capability is essential for the Engineering Leg (125) to aid the drilling experiments in real time.

The current status of physical properties in ODP is that the recommendations of the Downhole Measurements Panel have been passed to TAMU for costing/feasibility.

**LOGGING CAPABILITY IN BOREHOLES
OF DIFFERENT DIAMETERS**

Tool	Tool Diameter (inches)	Slimhole Capability	Loggable Hole Diameter			
			6½"	5½"	4½"	4"
Phasor Induction	3 $\frac{5}{8}$	No	X	X		
Dual Induction	3 $\frac{5}{8}$	Yes	X	X	X	
Dual Laterolog	3 $\frac{5}{8}$	Yes	X	X		
HEL Dual Laterolog	2 $\frac{3}{4}$	Yes	X	X	X	X
Microlog	4 $\frac{1}{2}$	No	X	X		
Dipmeter	3 $\frac{5}{8}$	No	X	X		
FMS	3 $\frac{5}{8}$	No	X	X		
Induced Polarization	2 $\frac{3}{4}$?	X	X	X	X
Full Waveform Sonic	3 $\frac{5}{8}$	No	X	X		
HEL Velocity	2 $\frac{3}{4}$	Yes	X	X	X	
Slimhole Velocity	1 $\frac{11}{16}$	Yes	X	X	X	X
Thermal/Epithermal Neutron Porosity	3 $\frac{5}{8}$	No	X	X		
HEL Porosity	2 $\frac{3}{4}$	Yes	X	X	X	
Slimhole Porosity	1 $\frac{11}{16}$	Yes	X	X	X	X

Lithodensity	3 $\frac{5}{8}$	No	X	X		
HEL Lithodensity	2 $\frac{3}{4}$	Yes	X	X	X	
Slimhole Density	1 $\frac{11}{16}$	Yes	X	X	X	X
Induced Gamma Spectral (GST)	3 $\frac{5}{8}$	No	X	X		
Aluminium Activation	3 $\frac{5}{8}$	No	X	X		
Natural Gamma Spectral (NGT)	3 $\frac{5}{8}$	No	X	X		
Natural Gamma	3 $\frac{5}{8}$	Yes	X	X		
Borehole Televiewer	3 $\frac{5}{8}$	Yes	X	X		
Slimhole BHTV	1 $\frac{11}{16}$	Yes	X	X	X	X
Borehole Gravimeter	3 $\frac{5}{8}$	No	X	X		
Magnetometer	3 $\frac{5}{8}$?	X	X		
Drill-string Packer	3 $\frac{5}{8}$	Yes	X	X	X	X
Wireline Packer	3 $\frac{5}{8}$	No	X	X		
Borehole Fluid Sampler	1 $\frac{11}{16}$	Yes	X	X	X	X
Packed-off Fluid Sampler	3 $\frac{5}{8}$	No	X	X		
VSP Multi-shuttle 3-component	3 $\frac{5}{8}$	No	X	X		
VSP Single 3-component	3 $\frac{5}{8}$	No	X	X		
VSP Single vertical component	3 $\frac{5}{8}$	No	X	X		