

DRAFT MINUTES

MEETING OF THE JOIDES DOWNHOLE MEASUREMENTS PANEL

SANTA FE, NEW MEXICO
OCTOBER 12-14, 1993

EXECUTIVE SUMMARY

The DMP has instituted a policy of focusing attention on legs that present difficult downhole measurement scenarios; the previous DMP meeting featured the Barbados Program, and the present meeting featured TAG. In view of the importance of TAG to the Lithosphere Panel, a joint session was held on October 12 to discuss the status of special, high-temperature instrumentation required for downhole measurements. These discussions carried over into DMP sessions occurring on the last two days of the proceedings.

The DMP recognizes that downhole measurements at Barbados can provide a significant definition of an accretionary prism beyond that which is currently available, and that measurements in a producing hole at TAG would be truly a unique scientific experience. However, Barbados and TAG require instrumentation that is costly. Thus, the DMP would be remiss if it did not provide PCOM a prioritization of downhole measurement thrusts, however painful this prioritization may be. After considerable discussion (Minutes, Items 3, 5-7), the DMP makes the following recommendations involving measurements at Barbados and TAG:

RECOMMENDATION 93-4

The DMP recommends that the Logging Contractor inform Schlumberger that the standard suite of tools will be deployed at TAG to the limit of their temperature specifications, and that the tools should be capable of such operation. The BRG and Schlumberger should work together to insure that these conditions are met. (Minutes, Item 6 (Continued))

RECOMMENDATION 93-5

The DMP recommends plans for Logging While Drilling (LWD) for Barbados be progressed subject to the availability of funds. The cost of the necessary services is estimated to be \$195K. (Minutes, Item 14.d)

RECOMMENDATION 93-6

The DMP recommends that, should there be financial conflict, the use of LWD technology at Barbados be accorded priority over the use high-temperature instrumentation at TAG. The rationale is based on probabilities. It is judged more probable that LWD instruments will be necessary to achieve downhole measurement objectives in the unstable environment at Barbados than high-temperature instruments will be necessary to attain similar objectives at TAG where downflow is expected. (Minutes, Item 14.d)

RECOMMENDATION 93-7

The DMP recommends that, subject to the availability of funds, the ODP rent or purchase a memory-temperature tool for use at TAG. The purchase cost of the tool is estimated to be \$50K. (Minutes, Item 17)

The DMP notes that other tools are applicable and desirable for use at TAG. These tools include: the Camborne School of Mines Associates resistivity tool, the German magnetometer tool, the French temperature tool, and the high-temperature borehole televiewer. The use of these tools requires the availability of a high-temperature logging cable, and some are third-party tools that must be proven in land-tests. Memory tools do not suffer from a cable restriction, and they are under development at Sandia and other institutions. The use of the Sandia tools will require an agreement between the ODP and the US Department of Energy. All tools will be reviewed by the DMP at its spring meeting, and recommendations for deployment may be made. (Minutes, Items 6, 8, 15, and 17)

The DMP reviewed technical and scientific issues of pertinence to the ODP.

The DMP recognizes the work that Graham Westbrook has put into the development of a proposed VSP experiment at Barbados. While many panel members felt that the proposed experiment would be scientifically beneficial if it were carried out successfully, the Panel did not feel that it could support the proposal due to unresolved technical issues. (Minutes, Item 14.e)

The DMP reviewed a prospective logging plan presented by the Logging Contractor and concluded that downhole measurements at Sedimented Ridges II would be similar to TAG, and operations at Mediterranean Ridges would be similar to Barbados. In both cases, necessary technologies new to the ODP may be attempted in 1994. While the DMP is confident that these technologies will be successful, it is too early to say that they will be practical in an era of declining budgets. Thus, PCOM should proceed with caution in regard to Sedimented Ridges II and Mediterranean Ridges. (Minutes, Item 14.f)

The Panel recognizes the considerable effort the Bobb Carson and Dan Karig have placed into the GEOPROPS program over the past several years, and the Panel further recognizes the work that they have done regarding the thrust to reinstitute development of the tool. However, the DMP cannot recommend further development of GEOPROPS in view of a lack of support from the Thematic Panels. (Minutes, Items 2.d and 16.c)

Information Dissemination.

The DMP recognizes that the success of the Downhole Measurements Program is contingent upon the use of generated data to advance scientific efforts, and the DMP always invites comments on how to advance this thrust. Furthermore, the DMP recognizes that some measurement issues are technically complex, yet the basic principles of the measurements and what they mean needs to be disseminated throughout the ODP. Thus, the DMP has instituted the development of brochures describing the measurements currently used within the ODP. The first two brochures will be on the geochemical logging tool, and the neutron porosity tool. Finally, to further the dissemination process, a representative of the BRG will be available to the thematic panels for consultation on a one-meeting-per-year basis. The DMP recognizes and commends the BRG for its efforts to promulgate the Downhole Measurements Program. (Minutes, Items 1, 2.c, 2.d, 13, 20)

Contractual Issues.

The DMP is concerned that contracts with small business too often fall into difficulty. Thus, the DMP will review future development efforts according to the following criteria: (1) system specifications must be detailed and carefully explained to the vendor, (2) difficult issues must be identified early on, (3) the ODP institution in charge must maintain a detailed monitoring of system advancement, (4) open and frank discussions must be initiated if developmental difficulties arise, (5) continuity of ODP and vendor personnel must be maintained, and (6) an honest recognition of system costs must be made at the onset of a program. (Minutes, Item 14.b)

Next Meeting.

Subject to PCOM approval, the next meeting of the DMP will be in Uppsala, Sweden, May 17-19, 1994. The fall meeting of the DMP will be at the headquarters of the Logging Contractor in Palisades, NY.

MEETING OF THE JOIDES DOWNHOLE MEASUREMENTS PANEL

**SANTA FE, NEW MEXICO
OCTOBER 12-14, 1993**

Chairman:	Peter Lysne	US
Panel Members:	Robert Desbrandes	US
	Johann K. Draxler	Germany
	Gilles Dubuisson	France
	Gerard J. Fryer	US
	Steven H. Hickman	US
	Mark W. Hutchinson	US
	Richard D. Jarrard	US
	Laust B. Pedersen	ESF
	Henry A. Salisch	Australia-Canada
	Karen L. Von Damm	US
	Michael D. Williams	US
	Paul F. Worthington	UK
Liaisons:	Susan M. Agar	TECP
	Jean M. Bahr	SGPP
	Frank Filice	BRG-LDEO
	Adam Klaus	ODP-TAMU
	Brian Lewis	JOIDES OFFICE
	Thomas Pyle	JOI
	Kiyoshi Suyehiro	PCOM
Guests:	LITHP (entire)	JOIDES
	David Goldberg	BRG-LDEO
	Andrew Green	CSMA
	Susan E. Humphris	Leg 158
	Gene Pollard	ODP-TAMU
Friend:	Keir Becker	US
Apologies:	Bruce Malfait	NSF
	Roger H. Morin	US
	Makoto Yamano	Japan

1. WELCOME AND INTRODUCTIONS

The third meeting of the JOIDES Downhole Measurements Panel for 1993 was called to order at 0835 hours, Tuesday, October 12 in the Abraham room of the La Posada Hotel, Santa Fe, New Mexico. The first day's proceedings were a joint session with the JOIDES Lithosphere Panel. This session featured a review of high-temperature logging systems, and how they could be used during operations at the TAG Hydrothermal System (Leg 158).

Introductions were made around the room. A special welcome was extended to Richard Jarrard, a new DMP member; to Adam Klaus, a new liaison to the DMP from the ODP Science Operator; to Andrew Green, a representative of Camborne School of Mines Associates; to David Goldberg, the Director of the Borehole Research Group; to Susan Humphris, a Co-Chief of TAG; to Brian Lewis, the Director of the JOIDES Office and Chairman of the Planning Committee; and to Tom Pyle, the Vice-President of the Joint Oceanographic Institutions. Kiyoshi Suyehiro, an alternate PCOM liaison to the DMP, was introduced when he arrived later in the day. Keir Becker appeared as a friend of the DMP, and an advocate of the CORK program; he was introduced during the second day's proceedings. Bruce Malfait, Makoto Yamano, and Roger Morin were unable to attend the meeting.

Peter Lysne noted that liaisons were especially important to the operation of the DMP, and he extended a welcome to the LITHP as it acted in this capacity. It was agreed that technical terms and jargon would be explained as required.

Lysne introduced his wife, Jeanette, who was a Co-Host of the meeting. Extracurricular activities were discussed.

The following modifications were made to the Draft Agenda for joint the meeting of October 12, 1993:

1. The report from the National Science Foundation would be omitted due to the inability of Bruce Malfait to attend the meeting.
2. Brian Lewis would give a combined JOIDES Office/PCOM report due to the temporary absence of PCOM representatives to either the LITHP and the DMP.
3. Lysne would present a discussion on the need for third-party tool requirements, and on the status of fluid-sampling tools due to the temporary absence of Paul Worthington and Karen Von Damm.

With the above modifications, the Draft Agenda was adopted as the working document for the joint LITHP/DMP meeting.

2. LIAISON REPORTS

a. Joint Oceanographic Institutions, Inc.

Tom Pyle reported that new contracts had been signed between the National Science Foundation (NSF) and the Joint Oceanographic Institutions, Inc. (JOI). Furthermore, subcontracts have been signed between JOI and the Texas A&M Research Foundation for science services, and between JOI and the Lamont-Doherty Earth Observatory (LDEO) for wireline logging services. Finally, all partners have renewed with the Canadian-Australian consortium being at a 7/12 status.

The FY94 budget is \$44.3M with an additional \$0.6M for the computer/database upgrade to be transmitted upon the acceptance of a development plan. Special Operating Expenses (SEO) include: \$560K for CORKs, Hard Rock Guide Bases, and supplies for Leg 153; \$690K for the Diamond Coring System (DCS); \$100K for DCS shipping; and \$70K for a navigation system. No SEOs were allocated for tool development. The present budget is \$4M below the Long Range Plan.

Pyle noted that a move of the East Coast Core Repository to the University of Bremen is undergoing considerable discussion. JOI proposed a compromise that core taken through Leg 150 stay at LDEO, and core taken after Leg 150 be stored at Bremen. This proposal was rejected by the Executive Committee (EXCOM); JOI is trying to obtain a reconsideration of the compromise.

b. JOIDES Office and the Planning Committee (PCOM)

Brian Lewis gave the JOIDES Office/PCOM report. Short term planning for PCOM is focused on a review of the science and logging prospectus. Long range planning includes science goals for 1995-1998, post 1998 drilling, and the influence of an alternate Japanese platform that will allow deeper drilling with a riser-pipe capability. A proposed February workshop in Japan would involve the panel chairs, and would discuss science goals for the current proposal cycle and beyond. Lewis noted that future drilling needed noteworthy results in order to insure the health of the program. He further commented that the land tests of the DCS had not progressed, and a reshuffling of Engineering Leg 157 would occur. Furthermore, engineering considerations may require that the DCS test be conducted in deeper water than that available at the VEMA Fracture Zone, which is the present location for the test.

Lewis commented that the budget is unlikely to undergo a significant change, and shortfalls for new initiatives will continue. Nevertheless, downhole measurements are doing well and are running 14.4% ahead of the Long Range Plan. Lewis noted that the Borehole Research Group (BRG) did not get everything asked for in the proposed FY 94 budget; an On-Line Data Base (\$177K) and an Engineering Development Center (\$355K) were stricken. The BRG budget stands at \$4.8M. Details may be found in the Budget Committee (BCOM) Minutes dated March 8-10, 1993.

Due to the budgetary shortfalls, tool development will have to rely on outside funds. PCOM has asked for a list of routinely used tools, an engineering and cost evaluation of tools currently under development, and a prioritization of developmental tools. Lewis noted that there is a clear need to find the means to sustain developmental efforts. Lysne noted that industry and other scientific programs might be supportive on a partnership basis, but he was unsure of the ODP enthusiasm for such action.

Lewis expressed the need for prioritization of development efforts. Specifically, PCOM asked for a review of pressure coring systems and GEOPROPS.

Lewis noted that Core-Log Integration (CLI) is in a developmental stage, and he suggested that a small group be formed to provide advice on this issue. This group would include members from the DMP, the Shipboard Measurements Panel (SMP), TAMU, the BRG, and other knowledgeable individuals.

c. Tectonics Panel (TECP)

Susan Agar and Jeffrey Karson reported that East Equatorial Atlantic Transform, Mediterranean Ridges, and Alboran Sea were top choices of TECP for 1995 drilling activities. TECP also noted a need within the ODP for a broader outreach to the earth-science community.

In regard to new downhole technology, TECP's primary interest is the development of a fluid-sampling capability. In the longer term, TECP would like to see the development of tools and procedures for defining three-dimensional structure, such as crosshole techniques.

TECP felt it would be useful for a logging representative to be present at selected meetings, and brochures describing logging systems would be very beneficial. Notes on the costs of development and deployment of new tools are essential for prioritization.

Dave Goldberg commented that Peter Harvey is in the process of developing the first two logging brochures on the geochemical tool and on the neutron "porosity" tool.

d. Sedimentary and Geochemical Processes Panel (SGPP)

Jean Bahr reported the following SGPP rankings for 1995 drilling: (1) Gas Hydrate Sampling, (2) Bahamas Transect, (3) Mediterranean Sapropels, (4) Sedimented Ridges II, and (5) VICAP/MAP. There was a SGPP consensus that Gas Hydrate Sampling could yield useful data even without a fluid sampler or significantly improved Pressure Coring System (PCS).

SGPP reviewed the proposal for a Push-In Pressure Core Sampler (PPCS), and passed a strong recommendation for its development, along with further development and testing of the PCS. The SGPP recognized a need for a sample-analysis manifold to accompany these

tools, and noted that development of the manifold should proceed simultaneously with tool development. The SGPP has appointed watchdogs for the PPCS, the PCS, and the Vibro-Perussive Coring System (VPS). The SGPP has no interest in the development of GEOPROPS.

SGPP feels that it is essential that technicians who are familiar with third-party tools be available on legs utilizing such equipment. SGPP would appreciate having a BRG presence at one of its semi-annual meetings, and noted that a BRG representative at joint meetings would be an economical way in which to disseminate information.

e. Technology and Engineering Development Committee (TEDCOM)

Yngve Kristoffersen reported that the secondary heave-compensation test of the DCS had slipped from August until the latter part of October, and results are four to six weeks away. TEDCOM has instituted a sub-committee to monitor the land test. For the present, TEDCOM advises against the deployment of the DCS on Leg 157. Further developments will be presented at the PCOM meeting in December. A weight-on-bit tool is under development to help refine the secondary heave compensation system.

TEDCOM reviewed the status of several diamond-retractable bits for the DCS. However, TEDCOM advises that this system be put on hold until after the DCS is proven. A Russian Tri-Cone bit is under development for drilling on bare rock, and a prototype is expected in February, 1994. The cost of this bit is \$57K.

Kristoffersen noted that the Vibro-Perussive-Corer (VPC), a hard-rock core-orientation system, and PPCS are under investigation at TAMU. PCOM has not approved the TEDCOM request for proposals to investigate a deep drilling capability; TEDCOM will continue internal discussions on the subject.

TEDCOM wants to be more active in providing advice and guidance to TAMU, and helping PCOM set priorities. In general, TEDCOM is responsible for recommending to PCOM drilling tools and techniques to meet scientific objectives, and to monitor the development of new systems. TEDCOM has asked TAMU to provide cost estimates and manpower requirements for all planned projects as background for prioritization. There is some frustration within TEDCOM due to recent events involving the DCS.

f. Ocean History Panel (OHP)

John Tarduno reported the OHP ranking for 1995 drilling is: (1) NAAG II, (2) Combination of Bahamas Drift and Sapropels, (3) California Margin, (4) East Equatorial Atlantic Transform, and (5) Alboran Sea. California Margin would have been second but for a perceived lack of site survey data.

3. TAG DRILLING PROSPECTUS

The TAG drilling prospectus was presented by Peter Herzig and Susan Humphris, the Co-Chiefs for the TAG program (Leg 158). TAG is located on the Mid-Atlantic Ridge at about 26° North. In contrast to Middle Valley (Leg 139), the TAG system is volcanic hosted, rather than sediment hosted. The following three holes are planned:

- (1) A 200m deep hole near a set of black smokers (output temperature, ~360°C) to penetrate the entire sulfide mound, and the uppermost portion of the highly altered crust.
- (2) A 500m deep hole near white smokers at the "Kremlin" site (output temperature, ~250°C) to penetrate the area of conductive cooling and the upper part of the inner stockwork.
- (3) A 200m deep hole just off the TAG mound to penetrate the area of fluid mixing, the oxidation zone, and the upper part of the outer stockwork.

Humphris requested that downhole measurements be deployed to provide information on temperature, porosity, permeability, resistivity, stress, formation and fluid chemistry, and borehole details (through imaging). In addition, CORKs are planned to provide a long-term view of the TAG system. She stated that non-CORKed holes must be plugged to ensure that fluids did not enter the TAG Mound, communicate hole-to-hole, and contaminate CORK data. The panels noted that downflow of cold sea water into initially hot holes was likely due to density perturbations caused by cool drilling fluids. This downflow may allow use of standard-temperature logging tools, but it was detrimental to fluid-sampling experiments. Furthermore, fracturing of rocks could be caused by thermal contraction effects; in this event, holes could become unstable.

4. NEED FOR THIRD-PARTY TOOL REQUIREMENTS

Chairman's note: The issue of third-party tools was introduced during the joint LITHP/DMP; it was revisited in detail during the third day of the DMP meeting, cf., Section 15. a.

Lysne noted that the history of third-party tool development within the ODP has not been good. Approximately four years ago the DMP recognized the need for an advisory system to help principal investigators with the development of tools, and to ensure that immature tools were not used in measurements upon which the success of a leg depended. These guidelines have evolved, and were recently published in the brochure Guide to Third-Party Tools, available from the operators at LDEO and TAMU. The progress of a tool through the system follows the sequence: (1) Developmental tool, (2) Certified Tool, and (3) Mature Tool. The success of a leg cannot depend upon a Developmental Tool; it may depend upon a Certified or Mature Tool. The DMP will review tools at each stage of the development process, and make recommendations of tool status to PCOM.

Bruce Malfait had expressed a concern to Lysne that the third-party certification process discouraged principal investigators from submitting tool-development proposals to the NSF. Lysne recognized this possibility, but noted that the use of immature tools jeopardized good science by wasting resources. He further noted that principal investigators would need strong support if the certification process was not to become a stifling influence. The issue of support must be resolved by the JOIDES Panel Structure, and it will be difficult in the absence of funds set aside for tool development. Lysne had prepared a discussion on the evolution of logging tools, including a section on third-party issues, for publication in the JOIDES Journal.

5. STATUS OF HIGH-TEMPERATURE TOOLS

Chairman's note: The issue of high-temperature tools was introduced during the joint LITHP/DMP; it was revisited in detail during the second and third days of the DMP meeting.

a. French High-Temperature Cable and Temperature Tool

Frank Filice reported that the French high-temperature cable had failed in field tests, and that the ODP was no longer underwriting its development. PLASTELEC, Inc., is continuing development at its own expense. If this effort is successful, the company will approach the ODP for funds to enable construction of a length suitable for use in deep holes. Lysne commented that cables with capabilities similar to those of the French system had been in existence for over a decade.

Filice posed the following questions: (1) What is the actual demand for a cable operable to 260°C? (2) What wireline tools exist that exceed the 260°C rating of current wirelines? (3) What is the best method to splice a high-temperature cable to the cable presently on the ship? (4) What is the availability of a high-temperature cable head? (5) What are the real expenses associated with the development of high-temperature systems?

Lysne noted that these questions were appropriate and essential to the prioritization process. Hans Draxler reviewed the list of instrumentation available for use in the German KTB Program. He remarked that none of the industry-available tools possessed a rated temperature greater than 260°C, and this constraint was imposed by the cable. Green stated that the Camborne School of Mines Associates (CSMA) Resistivity tool had a design capability to 350°C. The panels noted that memory tools are used at very high temperatures, and they do not need an active wireline.

Filice reported that the French BRGM temperature tool was used successfully on Legs 139, 140, and 148, and it was planned for use on the TAG Leg. Modifications of the high-temperature seal surfaces had been made, and improved metal O-rings had been incorporated into the final design. Work is expected to be completed in December. The temperature limitation of this tool is imposed by the electric wireline; it is designed for use at higher temperatures.

b. CSMA Resistivity Tool

Andrew Green reviewed the status of the CSMA resistivity tool, which is a joint development venture between the UK Department of Energy and the BRG. This tool is designed for operation to 350°C, and it may be used in slim holes. It is a focused device, so that the current injected into the formation is only slightly perturbed by borehole effects. The tool also measures the borehole temperature and the borehole-fluid conductivity. Under some conditions, these measurements permit an estimation of porosity. The tool is on track, and it has been tested in cool holes. There is a difficulty in finding a suitable location and cable for land tests at high temperatures, and funds for these tests are not identified.

6. THE TAG LOGGING PROGRAM

Chairman's note: The TAG Logging program was introduced during the joint LITHP/DMP meeting; it was revisited by the DMP on the third day of the meeting, cf. Section 6. (Continued, page 15).

Filice reviewed the Schlumberger high-temperature tool suite (HEL tools). This suite includes a gamma density tool, a neutron "porosity" tool, a sonic tool, a induction resistivity tool, and a caliper. The most robust tools in this suite may be used up to 260°C. Rental of one set of HEL tools (no back-up) is \$43K per leg with an estimated additional cost of \$20K for mobilization. A high-temperature telemetry cartridge would be needed to support the HEL tools. Filice further noted that a temperature-qualification of the standard Schlumberger logging tools is required if these tools are to be run at their rated temperature, and the expense for this qualification must be borne by the program. The Panels questioned why the ODP should pay to bring the Schlumberger tools to their advertised rating. The BRG considers such expenses normal when tools are used in hot holes.

Specialty and third-party tools possibly available for use at TAG include the CSMA resistivity tool, the BRGM temperature tool, the DMT borehole televiewer (BHTV), and the BGR magnetometer tool. The temperature limit of these tools is imposed by the 260°C rating of logging cables. Memory tools do not have this temperature restriction. A Sandia temperature tool was used successfully on Leg 139, and similar tools are available from commercial sources.

Lysne stated that Sandia tools are intended for use to the critical point of sea water (407°C), and the suite now includes a spectral-gamma instrument which is in the prototype stage (Sandia tools were on display on the second day of the DMP meeting, but they were not part of the formal meeting proceedings). Lysne noted that use of the Sandia tools would require agreements between the DOE and ODP, since DOE support can only be used for DOE projects. Lysne and Pyle will investigate.

7. HIGH-TEMPERATURE, DIGITAL BOREHOLE TELEVIEWER (BHTV)

Filice reviewed the status of the DMT BHTV which has been under development since before Leg 134, and which has a poor history of performance. Difficulties are caused by numerous mechanical, electrical, and acoustic deficiencies. Recent work, supported in part by the BRG, is encouraging enough to justify a sea-test on Leg 152. However, this test is considered to be a do-or-die situation for the DMT BHTV. A back-up televiewer has been rented from Schlumberger.

The Panels noted that the development of the DMT BHTV has not proceeded in an optimal manner. The recent history seems to be that BCOM had requested that the project be terminated, but some thematic panels convinced PCOM that BHTV data were necessary. This situation sent a mixed signal to the BRG. The BRG invested about \$60K of remaining BHTV development funds to make the system operable for Leg 152. The DMP will revisit the BHTV issue after more is learned from Leg 152 exercises.

8. FLUID-SAMPLING ISSUES

Lysne identified four issues related to fluid sampling that had caused difficulty in the past: (1) commonly, borehole fluids are not representative of in-situ material, (2) most borehole samplers have inherent problems with valve closure, (3) contamination of the specimen by the sampler is not understood, especially at high temperatures, and (4) the means by which material in the sampler are stripped from the tool and analyzed must be tied to the sampler design, downhole conditions, and desired scientific results.

Lysne noted that the US Department of Energy (DOE) had a fluid sampling effort going for over a decade, but samplers were unreliable. Lysne is now supported by the DOE to develop a high-temperature borehole fluid sampler, and ancillary work to develop a system to strip samples from the sampler is funded by the ODP. Karen Von Damm and Marvin Lilley are leading the latter thrust. The combined effort is an example of cooperation between scientific programs with different funding sources.

Lysne recalled that a Sampler Sub-Panel of the DMP formulated a recommendation to PCOM that a RFP be supported to investigate the engineering constraints of pore-fluid (as opposed to borehole-fluid) sampler systems. Lewis stated that this plan had been rejected by PCOM because all of the necessary expertise to complete the RFP existed within the ODP. He further remarked that Joris Gieskes had initiated a group of ODP volunteers to explore the sampler initiative, and that PCOM supported this action. Lysne presented data from a diamond-cored scientific well that was flowed to clean out residual drilling fluids. This well produced vigorously, yet several months of intermittent flow were required before the ionic content of the fluids stabilized.

9. DIAMOND-CORING-SYSTEM ISSUES

Gene Pollard reviewed the situation of the secondary heave-compensation system which is the primary impediment to the deployment of the DCS. The land-test facility is 95% complete. However, there has been a two-month delay in the delivery of critical components; they should be on-line at the end of October. Some of the delay was caused by TAMU not being able to get the attention of an important contractor; this situation has been remedied. If there are no further delays, and the system operates as planned, TAMU is now recommending deployment of the DCS on an engineering leg scheduled after the ship leaves dry-dock, i.e. Leg 160 or later.

Land tests will use various simulated heave conditions. Tests will occur in an approximately 500m deep cased hole which simulates operations at the proposed VEMA drilling site, but which might be too shallow to represent optimal depths for use of the DCS. Pollard noted that the use of a rigid hole precludes flexures of the drill string that will occur when the system is used at sea; the effect of such additional flexures is unknown.

Pollard emphasized that when the ODP tries to develop high-tech on a shoestring budget it will have grief.

10. CORE-LOG-INTEGRATION (CLI) ISSUES

Adam Klaus reviewed CLI issues that are part of the TAMU RFP for an upgrade of the computing/data analysis system. He raised the question; What do we mean by CLI? He noted that Andrew Fisher and Peter Blum had written a draft plan for CLI that really meant the integration of all data taken on the ship, including drilling data.

Klaus noted that many people had their own versions of CLI (including some who have written Ph.D. dissertations on the subject). Goldberg reviewed a skeleton plan that contained the elements of data acquisition, parametric database, depth correlation, and parameter correlation. An iterative procedure using a depth function tied various parts of the system together. Lysne reiterated that PCOM was considering the formation of a small group to help refine the CLI plans.

Item 10 concluded the proceedings of October 12 and the joint meeting between the LITHP and the DMP.

11. REVIEW AND ADOPTION OF THE DMP AGENDA

The following modifications to the Draft Agenda for the DMP meeting of October 13 and 14 were proposed:

1. Change item 14.b to include contracts other than the main Schlumberger contract.

2. Add an item 14.e "Fluid Sampling/VSP for Barbados".
3. Continue Item 6 (The TAG Logging Program) at a convenient time when at least one of the TAG Co-Chiefs could be present.
4. Item 18 to include an update on the KTB project.

The Chairman noted that several key individuals would be splitting their time between the DMP and LITHP, and others were not able to attend the entire DMP meeting. Thus, some scheduling revisions of the agenda could be expected. With the above changes, the Draft Agenda was adopted as the working document for the remainder of the DMP meeting.

12. MINUTES OF THE DMP MEETING, SCRIPPS INSTITUTION OF OCEANOGRAPHY, MAY 25-27, 1993

The following changes were made to the Draft Minutes of the Scripps Meeting:

1. Change the acronym MWD (Measurement While Drilling) to read LWD (Logging While Drilling) throughout the document.
2. Make the following changes in item 14.f:
 - i. Change the sentence: "This initiative is of potential importance to the ODP due to its strong emphasis on technology development." to read "This initiative is of potential importance to the ODP due to its strong emphasis on development of new technologies for drilling, down-hole measurements, and long-term borehole monitoring."
 - ii. Replace the sentence "A consortium of US Department of Energy/Office of Basic Energy Sciences and industry sponsors is being sought to fund and develop the necessary technology." with "Funding for this project is being sought as part of a technology development program involving the US Department of Energy and private industry, perhaps as part of an international continental drilling program."
3. Page 11, paragraph 5. Change the sentence to read: "Difficulties also occurred with a loss of viscosity in....."
4. Page 22, paragraph 2. Change "Makoto Yamano had received no word concerning recent progress on the Japanese tool." to read "Makoto Yamano been informed that there was no progress on the Japanese tool."

With the above changes, the Draft Minutes of the Scripps Meeting were approved as a fair representation of the proceedings.

13. CHARTER OF THE DMP AND THE ADVISORY STRUCTURE REVIEW COMMITTEE (ASRC) REPORT

Lysne distributed the Charter of the DMP as it is written in the JOIDES Journal, Vol. XIV, December, 1988. He also distributed portions of the ASRC Report that dealt with the DMP and TEDCOM. He noted that TEDCOM is a service institution not unlike the DMP, so that comments to the two institutions should be read by the DMP members.

Lysne commented that if the DCS was operable, TAG would be conducted with this technology, but the program would not be optimal due to a lack of slim-hole, high-temperature instrumentation. In this case, criticism would be addressed to the DMP. Lewis noted that a subcommittee of PCOM has been formed to allow better communications between the service panels and PCOM. DMP can provide a useful service to PCOM by identifying new developments and associated costs. It can aid the JOIDES structure by providing brochures on downhole measurements. Richard Jarrard noted that the DMP has played a thematic role on some occasions, particularly in regard to activities at holes 504B and 735. Lysne proposed that thematic issues be the topic of future DMP discussions. Klaus noted that the distinction between TEDCOM and the DMP is murky on issues of measurement tools that look like part of the drill string. The DMP agreed to address the issue of purview on a case-by-case basis. The Panel noted that the issue of memory tools blurs the distinction between the BRG and TAMU. (The customary discriminator between these institutions is the electric wireline. The difficulty is that memory tools are deployed on a sand line, yet they yield downhole measurements.)

Jarrard, speaking on ASRC deliberations, noted that scientific and engineering personnel look at deadlines differently; science deadlines can be nebulous, engineers must meet schedules. On another issue, the ASRC had emphasized that TEDCOM and the DMP need to reduce surprises associated with lapsed development deadlines and increased costs. Pyle mentioned that some money exists in the NSF Ocean Sciences Program that might be useful for third-party tool development.

The Panel noted that brochures are being formulated for the geochemical tool and for the neutron "porosity" tool. Mike Williams offered to act as a contact for changes to the draft documents supplied by Peter Harvey. Lysne asked Goldberg to convey a "thanks" to Harvey for taking the initiative on this issue, and noted that it was the intent of the DMP that similar brochures would be prepared on all downhole measurement systems.

6. (CONTINUED) THE TAG LOGGING PROGRAM

Humphris had returned to the DMP, so attentions were focused again on the topic of the TAG measurements program. Lysne noted that three scenarios were possible: (1) a vigorous downflow occurs, and the holes are cooled sufficiently for use of the usual Schlumberger logging suite, (2) downflow occurs, but cooling is not complete and Schlumberger HEL tools are required, and (3) hole conditions remained near natural

conditions (or upflow occurs), and memory tools are required. Issues (1)-(3) were ranked in order of decreasing probability.

Keir Becker noted that Schlumberger engineers are reluctant to take their tools to the limits of their operational specifications. He commented that near equilibrium temperature could be measured if tools were introduced very quickly after a drilling segment was completed, and memory tools had been used successfully in such an endeavor in the Sedimented Ridges operations. Lysne reiterated that Sandia tools were loaned for this leg, and that a future loan must involve an agreement between the DOE and JOI. Humphris expressed a strong request that memory tools be available for TAG since static or upflow conditions are possible, and measurements in such holes would present a truly unique experience.

Lewis raised the question of the temperature limit for drilling equipment such as the drill pipe. Draxler commented that steel (as opposed to aluminum) pipe is good at high temperatures. Von Damm and Lysne commented that hydrogen and carbonate embrittlement of steel could be of consequence. The DMP referred this issue to TEDCOM, but noted that the DMP has expertise regarding corrosion and embrittlement problems.

Gilles Dubuisson questioned if Schlumberger would be interested in TAG as a test for their HEL tools, and thereby underwrite a portion of the deployment cost. BRG will investigate. Filice noted that if a tool is damaged due to exposure to above-rated temperatures, the ODP would be responsible. Draxler added that the KTB will take tool to the temperature limit. Henry Salisch felt that the order of drilling the TAG holes should be 3,2,1 (as defined in Section 3) so that experience be gained as the holes became hotter.

In view of the above considerations, the DMP makes the following statements and recommendations:

Drilling at the TAG hydrothermal sited during Leg 158 will provide a new set of challenges for downhole measurements. Previous experience during Leg 139 suggests that density differences caused by thermal effects will result in substantial downflow of cold sea water, thereby enabling the use of the standard Schlumberger logging tools. The alternative end-member scenario is that drilling operations result in the formation of new high-temperature vents, and this situation leads to very unique scientific opportunities. Under these conditions, downhole measurements would be limited to the deployment of high-temperature memory tools, but these tools are not part of the ODP repertoire. Situations intermediate to these scenarios require that ODP be prepared by extending its ability to work at temperatures beyond the capabilities of the standard suite of tools, and up to the 260°C limit of the Schlumberger HEL tools.

It is possible that the following high-temperature specialty and third-party tools will be available for TAG: (1) CSMA resistivity tool, (2) BRGM temperature tool, (3) BGR magnetometer tool, and (4) DMT high-temperature televiewer. The use of these tools is

contingent upon the availability of a special, high-temperature cable, and tools (1), (2), and (4) passing the third-party tool requirements.

To prepare for TAG operations, the DMP makes the following recommendation to PCOM:

93-4. The DMP recommends that the Logging Contractor inform Schlumberger that the standard suite of tools will be deployed at TAG to the limit of their temperature specifications, and that the tools should be capable of such operation. The BRG and Schlumberger should work together to insure that these conditions are met.

Chairman's note: Other recommendations pertinent to TAG involved the prioritization of resources. These recommendations are discussed in Section 14. d. below.

14. LOGGING CONTRACTOR'S REPORT

a. Detailed Organizational Structure of the BRG

Filice distributed the organizational structure of the BRG. This structure is similar to that used in the past; the new non-US participants in the BRG add expertise and an international flavor to the operation. Not all positions are filled at the present time since the JOI/LDEO contract only was validated on October 1. Offers are pending to fill critical positions; understaffing is short term. The role of the Chief Scientist at LDEO is to coordinate with the non-US groups. The panel noted that a lack of engineering support will compromise the deployment of third-party tools.

b. Schlumberger and Other Contracts with the BRG

The present contract with Schlumberger is about \$2M per year, and it includes basic services. Not covered are special tools, mobilization of specialty tools, temperature-qualification of tools, special technical support on the ship, and other non-standard services. Pyle asked how the BRG budgets for additional costs. David Goldberg noted that these costs are estimated on historical data, and absorbed by the BRG unless they are very high. Examples of high-cost services are HEL and Logging-While-Drilling (LWD) tools.

Lysne asked if a change in contractor had been considered recently. Filice answered affirmatively, but Schlumberger remained the contractor of choice due to the variety of its tool suite. Draxler noted that only Schlumberger offered geochemical and formation microscanner services. Lysne expressed a concern that Schlumberger is very reluctant to reveal the inner working of its tools and data-reduction packages, and that such information is necessary for an independent verification of log-derived data. He noted successful working agreements between Sandia and other logging companies had taken place.

Filice commented that a past difficulty was having different Schlumberger engineers on the ship for each leg; the new contract stipulates that engineers will remain in service to the ship for at least one year. Draxler noted that having a low turnover of staff allows for excellent logging results. He cited a reliability record of the KTB that approached 100%, and he contributed this success to having the same Schlumberger engineers on the program for extended periods of time.

Lysne commented on the poor history of small contracts within the BRG. Filice noted that he is dealing with old contracts written before he assumed responsibility for tool development. He felt that having a mechanical engineer on staff would aid his efforts. Draxler remarked that one always takes risks when dealing with small companies. Lysne commented that he had been burned in the past on development contracts, and the difficulty was not unique to the BRG.

Green suggested that the trajectory of contracts with small companies would improve if: (1) system specifications were detailed and carefully explained to the vendor, (2) difficult issues were identified early on, (3) the ODP institution in charge maintained a detailed monitoring of system advancement, (4) open and frank discussions were initiated if developmental difficulties arose, (5) continuity of ODP and vendor personnel was maintained, and (6) an honest recognition of system costs was made at the onset of a program.

Lysne stated that the DMP will review future development efforts with the above criteria in mind.

c. Prioritization of Logging Efforts

Filice provided a list of potential downhole measurements thrusts for comment by the DMP.

1. The Dipole Sonic Imager tool has been used on a trial basis on four legs and the data are in the analysis stage. Filice stated that the tool was no longer being deployed due to questions involving difficulties in understanding the data. Williams doubted that the tool will work in any environment. Filice noted that Halliburton has the best shear tool in the industry with Mobil's tool a close second. There is the possibility of future deployment using non-Schlumberger services.

No DMP action was taken due to the lack of a clear need for the use of the tool from the scientific community, and difficulties in understanding tool data.

2. A three-component VSP tool would be needed to support an experiment proposed by Graham Westbrook for the Barbados leg. This tool would cost about \$26K, and funds would have to be supplied by the experiments proponents. A discussion of this tool was tabled pending DMP discussions of the Westbrook proposal.

Chairman's note: The Westbrook proposal was not furthered by the DMP, so no action was taken in regard to the VSP tool.

3. A new Schlumberger Modular Formation Dynamics (MDT) tool is a candidate for fluid sampling exercises. Joris Gieskes had informally proposed that this tool be used at Barbados, and he asked for DMP guidance. The diameter of this tool is greater than the inside diameter of the drill pipe, so a "top hat" will be needed for deployment. The top hat will require engineering support at TAMU. A discussion of this tool was tabled pending DMP discussions of the Gieskes thrust.

Chairman's note: The Gieskes proposal was not furthered by the DMP, so no action was taken in regard to the MDT tool.

4. An improved geochemical tool is to be fielded by Schlumberger. Costs and the advantages of this tool over the current tool are not known. A top hat will be needed for deployment.

The new geochemical tool is not field-ready, so no action was taken by the DMP.

5. The GHMT magnetic susceptibility tool has been taken over by Schlumberger. So far this tool is free to the ODP; costs will be incurred after Leg 160. This tool is a candidate for inclusion into the standard suite of tools deployed by the ODP.

The DMP may make recommendations concerning the Schlumberger magnetic susceptibility tool after data from the tool have undergone a more complete analysis.

6. Borehole televiewer for use beyond Leg 152. It is estimated that the cost of BHTV instruments is \$14K per leg.

The DMP will review the televiewer situation after data from tool performance on Leg 152 have been evaluated.

7. Schlumberger HEL tools for TAG are under consideration, and are discussed in Sections 6 of these minutes. The cost for a one-off deployment for TAG is about \$60K.

8. Memory tools for TAG are under consideration and are discussed in Section 6 of these minutes. The purchase of a memory temperature tool is estimated to be \$50K.

9. Liaisons from the BRG to the thematic panels are recognized by the DMP to be very important to the downhole measurements effort. Goldberg will meet with the appropriate panel chairs to implement this thrust. The cost of liaison services will be borne by the BRG; it is estimated to be \$10-20K per year.

d. Logging-While-Drilling (LWD) at Barbados

Lysne reviewed the portions of the last DMP meeting that featured a discussion of possible LWD exercises at Barbados. Borehole stability problems have plagued logging exercises on accretionary prisms. Previous work at Barbados (Leg 110) realized a return of 85m of hole logged out of a potential of over 1800m of hole. Cascadia (Leg 146) was more successful, but at the expense of three lost bottom-hole-assemblies that were placed in jeopardy when not rotated during the logging operation. Given these considerations, Tom Shipley (Co-Chief for the upcoming Barbados leg) conveyed a request to the DMP that LWD be used during Leg 156. The Chief Proponent for this work is Casey Moore.

Filice reviewed the LWD strategy which includes passive and active gamma ray tools, neutron tools, and electric tools that are part of a special bottom-hole-assembly. In principle, these tools are similar to tools routinely deployed by the ODP. The chosen service would use memory devices that record log data; these data are retrieved when the bottom-hole-assembly is returned to the ship. LWD is not consistent with coring, so dedicated holes would be required. Schlumberger would provide equipment for 14 days (10 days for operations, 4 days for mobilization to and from the ship), an additional engineer for \$195K. This cost includes 30% contingency. Filice noted that the usual Schlumberger tools would remain on the ship and be ready for use if conditions were favorable.

The Panel discussed the trade-offs between conventional logging (including the potential loss of bottom hole assemblies), and the additional costs of LWD. It was noted that the loss of drilling equipment detracted from the TAMU budget, whereas LWD operations may be detrimental to the BRG budget. Hutchinson suggested that the LWD operations be conducted early in the leg so that log data could contribute to the success of coring and the setting of CORKs. Filice did not think this scenario possible due to safety considerations that required core; he will research the issue further. Draxler suggested that Schlumberger be contacted about running a sonic LWD tool since it is under development, and might be run free-of-charge. Worthington noted that LWD has been under discussion in the DMP for several years, and that a successful operation would advance ODP technology.

In view of all considerations, the DMP makes the following recommendations to PCOM regarding downhole measurements at Barbados and at TAG:

93-5. The DMP recommends plans for Logging While Drilling for Barbados be progressed subject to the availability of funds. The cost of the necessary services is estimated to be \$195K.

The DMP is cognizant of the very significant scientific advances the Downhole Measurements Program can contribute to the scientific success of both Barbados and TAG. However, DMP recognizes that it would be remiss if it did not prioritize its recommendations. Thus the following prioritization is made:

93-6. The DMP recommends that should there be financial conflict, the use of LWD technology at Barbados be accorded priority over the use high-temperature instrumentation at TAG. The rationale is based on probabilities. It is judged more probable that LWD instruments will be necessary to achieve downhole measurement objectives in the unstable environment at Barbados than high-temperature instruments will be necessary to attain similar objectives at TAG where downflow is expected.

e. VSP and Fluid Sampling Proposals for Barbados

Lysne had distributed a proposal by Graham Westbrook to conduct a VSP experiment at Barbados. Lysne noted that this proposal had received a positive recommendation from Shipley. It is aimed at delineating the structure of the accretionary prism at Barbados.

Green reviewed the theory of shear-wave splitting and noted that available receiver equipment may have resonances that preclude an accurate analysis of data. The panel agreed that the experiments would have to be done inside of cased holes due to the instability of the formation, and that this casing would have to be carefully cemented to avoid the recording of extraneous sound waves. The cementing operation is difficult, and would require an additional cement bond log to be available on the ship. Mark Hutchinson noted that experiments such as the proposed work are often successful in fractured media. The panel had additional questions regarding the placement of the explosive sources, and their applicability given the frequency content of such sources.

The DMP recognizes the work that Graham Westbrook has put into the development of a proposed VSP experiment at Barbados. While many panel members felt that the proposed experiment would be scientifically beneficial if it were carried out successfully, the panel did not feel that it could support the proposal due to technical difficulties.

Lysne had received an informal proposal from Joris Gieskes to conduct a fluid sampling experiment at Barbados in the event a cased hole were available for experimentation. The casing would require a cement bond so that fluids would be extracted from the formation, not just from the annulus between the formation and the casing itself.

Von Damm noted that cement would be detrimental to obtaining pristine fluid samples. Since the panel did not recommend that Westbrook's proposal proceed, a cemented and cased hole was not likely to be available, and the panel took no further action on the fluid sampling issue.

f. Logging Prospectus for 1995 Activities

Lysne noted that PCOM had requested a prospectus for 1995 activities to accompany the scientific prospectus covering the same time period. This request had stemmed from the PCOM perception that the DMP was behind the times in its Recommendation 93-1

which dealt with near-term drilling programs. Lysne commented that in the early days of the ODP, the DMP promulgated the logging program with a prospectus. However, this action now is counter-productive because it removes the focus of the Panel from cost and engineering issues that have become increasingly important due to tool deficiencies. A better approach is for the DMP to enter discussions after the drilling schedule had been finalized, and to work with the Co-Chiefs to help optimize and firm-up the science plans. Examples of this modus operandi are evident in the current DMP concentration on Barbados and TAG, and in Recommendation 93-1 which dealt with near-term issues. However, the DMP should aid PCOM in the identification of proposed legs that posed special logging challenges.

Filice presented an overview of candidate 1995 activities that included an extensive list of potential downhole measurements. From this information, the Panel concluded that downhole measurements at Sedimented Ridges II would be similar to TAG, and operations at Mediterranean Ridges would be similar to Barbados. In both cases, necessary technologies new to the ODP may be attempted in 1994. While the DMP is confident that these technologies will be successful, it is too early to say that they will be practical in an era of declining budgets. Thus, PCOM should proceed with caution in regard to Sedimented Ridges II and Mediterranean Ridges.

Filice will update the logging prospectus to include issues of cost outside of the usual BRG budget, and ship's time. Then the revised prospectus will be forwarded to PCOM.

15. WATCHDOG REPORTS

a. Third-Party Certification Process

Chairman's note: Watchdog reports were moved forward in the agenda so that Paul Worthington could be present during the proceedings. He had to leave later in the day.

Filice had written to Lysne requesting that certain tools be awarded the status of Developmental Tools and Certified Tools, but he had not included a statement detailing the progress of the tools through the certification process. Lysne had responded to Filice stating that the Panel needed written documentation involving the completion of third-party tool requirements, and that this information was required in advance of a DMP meeting so that the panel members could adequately assess a tool's status. This portion of the meeting was devoted to sorting out the certification process.

Worthington reviewed the need for the certification process and cited the case of GEOPROPS and the Japanese magnetometer as examples of tools that had been put up for ODP use when in an immature state. He stated that the certification process must be very formal, so that no person, institution, or member country could claim that it was treated unfairly. He further stated that all third-party tools must pass through the certification process; there could be no exceptions. Filice raised the issue of an investigator appearing on the ship with an uncertified tool, and pressuring the logging

team into its use. Lysne agreed such a situation places the team in an unfair position, and that the DMP must ensure that it would not occur. Lysne will take up this issue with PCOM.

Lysne proposed to the panel that the certification process be phased in over the course of a few years. Hickman and Jarrard proposed moving forward with the process as quickly as possible, with emphasis placed on tools that were candidates for use on near-term legs. They suggested that a timetable be made for selected tools.

Filice wondered about the certification process itself. Do all DMP members need to get tool manuals, etc. before voting on certification? What about proprietary issues? Draxler, the DMP Watchdog for the certification process, proposed that the BRG or TAMU (whichever is the appropriate institution) review the necessary documentation, and pass a resume on to the DMP with enough lead time to allow a proper reading by panel members. Lysne suggested that the DMP Watchdog aid in the generation of the resumes. Hickman continued this thought by suggesting that the DMP Watchdog be concerned with the scientific validity, precision, accuracy, and usefulness of a tool; but the BRG or TAMU be responsible for safety, cost, and other implementation issues. The Panel agreed on this point, and further agreed that Principal Investigators could be present during a discussion of the tool, but could not be a primary presenter.

The question was raised of when old tools become "new" due to modifications. A similar situation exists when a previously certified tool behaves in a less than optimal manner. The Panel requested that the BRG or TAMU should monitor third-party tools on a day-to-day basis, and bring unusual situations to the attention of the Panel.

Keir Becker noted that sensors used on CORKs are undergoing continual modification. The Panel noted that CORKs present a unique situation in that they are in demand, they are evolutionary, and they are not entirely under the purview of the DMP. It was also noted that Becker is both a Principal Investigator and a DMP Watchdog on CORKs. The Panel commented that it was in a transitory situation regarding certification in general, and CORKs in particular. It was agreed that Becker would remain the primary interface between the CORK program and the DMP. Becker will keep the Panel informed on the CORK situation by E-mail since issues are moving rapidly in this area.

Worthington noted that the CSMA resistivity Tool, and the German magnetometer are flagship cases regarding the certification process. This is true even though the resistivity tool is not strictly a third-party tool (it is under development at CSMA under a contract from the BRG). Worthington commented that the certification process will be better understood after these test cases are processed.

Bahr called the Panel's attention to the recent publication from TAMU, Guide to ODP Tools for Downhole Measurements, by Andrew Fisher and Keir Becker (ODP Technical Note No. 10, Revised, 1993). Becker noted that tools such as the drill-string-packer were in use, and he raised the issue regarding the need for their certification. The Panel

recognized the grandfathering problem, and also noted that the packer was an issue for TEDCOM. Perhaps TEDCOM and other panels should institute a certification process similar to that of the DMP. Lysne noted that the Guide gave an excellent summary of ODP tools, and that it partially answered PCOM questions as to what was available, and the cost of use.

Draxler had put considerable thought into the certification process. He suggested that information flow to the DMP Watchdog, and when the Watchdog decided that the time was right, a resume of the tool be prepared for the DMP. This resume must follow the outline detailed in the brochure, Guide to Third-Party Tools available from the BRG and TAMU. Hickman stated that the Principal Investigators should pay particular attention the calibration of tools, and the DMP will pay follow this advice in future deliberations.

At the next meeting, the DMP will consider resumes of the following tools:

1. CSMA Resistivity Tool.
2. German Magnetometer Tool
3. French (BRGM) Temperature Tool
4. DMT BHTV Tool
5. Memory tools for TAG

These tools are candidates for tools to be placed in the status of Development. The BRG will be responsible for preparing resumes for items 1-4; Lysne will aid in the preparation of resumes for the Sandia or other memory tools if they are to be used in the TAG program.

b. Land-Test Facilities

Mike Williams has compiled a list of land test facilities that may be used to provide temperature and pressure certification of tools. He may be contacted concerning information on facilities in the US and in European countries.

c. LAST-Tools

Hickman, the DMP Watchdog for the LAST Tools, reviewed their operational principles. LAST I consists of a hollow tube equipped with a pore-pressure transducer, and three strain gauges mounted on thin metal diaphragms distributed at uniform intervals about the circumference of the tool. When the tool is inserted into sediments, formation material flows into the tube so that material on the outside of the tube undergoes minimum compaction. Provided that certain assumptions are met, the three strain gauges provide a measure of the magnitudes (but not the orientations) of the horizontal stresses. The decay in fluid pressure recorded by the tool allows for an estimation of the sediment permeability and pore pressure.

LAST II is a solid device that is inserted into the sediment, resulting in more radial compaction of the sediments than is present during deployment of LAST I. An inflatable

packer element is located on the device, and a measurement of the packer volume as a function of inflation pressure provides information on the stress-strain behavior of the formation, and on the average horizontal stress magnitude, provided that compensation for the influence of the radial compaction on the undisturbed stresses can be made. Time-resolved measurements of pore pressure following tool insertion provide information on in-situ permeability and pore pressure.

Hickman had been in contact with Kate Moran, the Principal Investigator for the LAST tools. She agrees that a calibration of the LAST II system is needed, especially with regard to determination of in-situ stress magnitudes. Hickman will work with Moran in the generation of the resume leading to certification.

16. SCIENCE OPERATOR'S REPORT

a. Push-In Pressure Core Sampler (proposal)

Adam Klaus reviewed the principles and specifications of the PPCS that had been recommended for development by the SGPP. A cost estimate for the tool is \$75K, but this estimate does not include the time of a development engineer. The present proposal does not make a provision for handling the pressurized core when it arrives on deck. Von Damm noted that the manifold she is building to support the fluid sampler may be applicable to the PPCS. Bahr noted that important information can be obtained even if the specimen is allowed to bleed to ambient conditions in the extraction process. Lysne asked if the tool design took into account safety issues dealing with a pressurized vessel. Klaus responded that pressure-safety issues had been addressed. Jarrard noted that the tool may bend upon insertion, thereby trashing the hole.

The DMP noted that the PPCS falls under the purview of TEDCOM unless joint action is needed regarding coupling the fluid-sampler manifold system into the instrument.

b. Vibro-Percussive Corer (proposal)

Klaus noted that the VPC system was progressing after having experienced a slowdown when several companies either stopped development or failed to come to a contractual agreement with the ODP. A TAMU engineer has visited Russia where development is underway. An RFP is being readied for issuance.

Lysne noted that VPC is an ongoing development, not a proposal, and it should be monitored by TEDCOM. The DMP will help out if issues are found that fall into the purview of the DMP.

c. GEOPROPS (proposal)

The Panel discussed the history of GEOPROPS and the request by Dan Karig and Bobb Carson that its development be resuscitated. It was noted that the Panel had reviewed

GEOPROPS at its previous two meetings, and learned that the tool needed substantial revision. The present proposal starts with a test of whether the motorized core barrel can produce a hole that is stable enough to allow for the insertion of the GEOPROPS, and then goes through a development plan contingent upon the success of the insertion tests. Lysne questioned spending ship's time on insertion tests if development was not to proceed. Klaus noted that insertion tests provided generic information pertinent to tool development. Bahr reiterated that the SGPP did not endorse the GEOPROPS tool.

The Panel recognizes the considerable effort the Bobb Carson and Dan Karig have placed into the GEOPROPS program over the past several years, and the Panel further recognizes the work that they have done regarding the thrust to reinstitute development of the tool. However, the DMP cannot recommend further development of GEOPROPS in view of a lack of support from the Thematic Panels.

d. Drill-String Tools

Klaus reported that orientation tools are part of a suite of tools that provide diagnostics including the movement of core into the core tube and advancement of the bit into a formation. The core-scribing tool is operational, the orientation tool (Tensor Tool) should be operational by Leg 155, the sonic core monitor should be operational by Leg 153, and the digital bit depth indicator will be operational in one to three years. This latter tool produces data that are essential to core-log integration. Jarrard commented that the core monitor is very labor intensive; it may require four technicians for around-the-clock operations if the hole is advancing rapidly. Klaus noted that the system is nearly developed and will be tested on Leg 152; it should be operational by Leg 155.

The DMP notes that the package of tools under development at TAMU is essential for the integration of core and log data, and it should proceed as rapidly as possible. The DMP notes that drill-string tools fall into the purview of TEDCOM.

e. CORKs

Three CORKs are to be deployed at Barbados and one at TAG. Klaus noted that TAMU efforts are proceeding on schedule. The mechanical parts of CORKs cost about \$25K per copy. Becker is developing two thermistor strings, and Jean Paul Foucher is making a third. The CORKs are being modified by changing Teflon to titanium to improve fluid-sampling experiments. A salinity sensor has been proposed, but it needs a considerable development effort before deployment. Results of visits to several previous CORK sites indicate some systems are operational, and that others were damaged during deployment under conditions of high seas. Becker reiterated that he will keep the DMP informed on CORK developments through E-mail.

Becker discussed the significant scientific results that are starting to come in from the various CORK locations. He noted that the hole that was underpressured at the Sedimented Ridges is now a producer, and that the data logger is operable.

The DMP recognizes that CORKs are evolutionary. There is some question as how best to follow the rapid developments that occur at a rapid pace. For the time being, the DMP will monitor, but not review, the progression of events.

17. ESTIMATED COST TO CERTIFY TOOLS UNDER DEVELOPMENT

Klaus presented a set of vu-graphs used in a briefing to TEDCOM on the issue of the status and cost of developmental tools. Ten non-DCS projects are ongoing, and ten others are pending prioritization. While detailed cost estimates were given, Klaus felt that they were uncertain. The DMP questioned if manpower requirements had been factored into the development plans. The DMP concluded that the TAMU development program was the responsibility of TEDCOM, and that TEDCOM had been given information sufficient for prioritization.

Filice listed the following tools are being monitored by the BRG:

1. CSMA High-Temperature Resistivity Tool. This tool is in the acceptance and delivery phase. Acceptance involves testing in boreholes, but these tests are not planned at 350°C due to a lack of a suitable cable and test site. Testing of this tool at high-temperature is the responsibility of the BRG, but funds have not been allocated for this work. The necessary funds are difficult to estimate since holes-of-opportunity on land have not been identified.
2. German High-Temperature Magnetometer. The individual components of this tool have been tested at temperature, but the system as a whole needs evaluation. Draxler noted that the tool had performed satisfactorily in ODP operations, but a failure occurred in a recent KTB deployment. German programs are responsible for funding the certification process, and they will provide certification information to the BGR. The DMP will monitor certification, but no other action is warranted.
3. DMT Slim-Hole, High-Temperature Televiewer. This tool is in a do-or-die situation on Leg 152, cf. Section 7. The BRG is responsible for the tool; the DMP will monitor the certification process, but no action is warranted.
4. BRGM High-Temperature, Temperature Tool. This tool (actually two versions of the same general design) has functioned at low temperatures, albeit with some difficulty. Proof tests are the responsibility of BRGM; issues of a test site and cable are the same as those accompanying the CSMA tool. The BRGM is responsible for the tool; the DMP will monitor the certification process, but no action is warranted.
5. High-Temperature, Memory Tools for TAG. The status of these tools is uncertain, and none are part of the ODP tool suite. A temperature tool can be purchased for about \$50K. Other tools are under development at Sandia, cf. Section 6.

Filice estimated that in industry the cost for tool development exceeded \$1.5M. Lysne commented that he considered \$1M as the minimum cost of a tool that was a reasonable step-out from available technology. Williams concurred with these estimates.

The Panel noted that important scientific benefits will be lost if upflow occurs at TAG, and if memory tools are not available to monitor the event. The Panel agreed that the deployment of memory tools at TAG should be awarded a higher priority than the testing of the CSMA and similar tools on land. Thus, the DMP makes the following recommendation to PCOM:

93-7. The DMP recommends that, subject to the availability of funds, the ODP rent or purchase a memory-temperature tool for use at TAG. The purchase cost of the tool is estimated to be \$50K.

Lysne noted that a lack of suitable cabling may prohibit the use of many tools within the ODP. He commented that the development of the French cable does not seem to be on track. Furthermore, there may be no ODP funds available for suitable testing of wireline tools, yet these tools should be of interest to industry. He suggested that ODP representatives from countries with geothermal energy interests, primarily the United Kingdom, Italy, Japan, and the United States, get together to see if a plan for testing the CSMA resistivity tool, and other tools, could be developed. Members of the DMP will see what can be done.

18. THE POTSDAM MEETING AND AN UPDATE ON THE KTB

Draxler reported that 230 scientists had gathered at Potsdam to discuss the establishment of an International Scientific Continental Drilling Program, the problems that could be addressed by drilling, and to classify projects according to scientific benefits, national interests, geographic limitations, and ease of implementation. The conference produced strong agreements for the development of an international effort. A panel of approximately a dozen individuals has been formed to further the effort. The proceeding of the conference will be published.

The KTB suffered a setback when parts of the down-hole-assembly became stuck, and then parted during a bit-change trip. Fishing attempts were unsuccessful. The hole has been cemented back with a loss in depth of 900m. The maximum temperature in the hole is 229°C; limited additional funds have been granted to the program (\$18M).

Lysne noted that the VIIth International Symposium on the Observation of the Continental Crust Through Drilling will be held in Santa Fe, April 25-30, 1994. Hickman is a meeting organizer, and he may be contacted for information. Pedersen and Lysne will be presenters.

19. THE DMP E-MAIL SYSTEM

Lysne reported that all countries are on the E-mail system through DMP members or their alternates. He reminded the Panel that the address "dmp@sandia.gov" would forward mail to panel members and friends of the DMP, approximately 30 individuals altogether. He also noted that the JOIDES Office has an FTP system for the distribution of some documents of interest. Information may be found in the back of the JOIDES Journal. Goldberg reported that he had attempted to send a copy of the logging prospectus to DMP members using the Sandia E-mail drop, and the system did not work. Lysne will look into the problem. It was noted that if important mail is sent, senders should request conformation from intended recipients.

20. COMMENTS ON LOGGING SYSTEMS

At the last DMP meeting, Peter Swart commented that the geochemical tool was not used by geochemists because the assumptions and corrections that go into the Schlumberger data reduction package are unknown. Lysne had raised this issue, and the issue of transforms between elemental composition and mineral assemblages, with Peter Harvey, the Chief Scientist at Leicester in charge of geochemical tool. Harvey had responded with a letter stating the accuracy of the geochemical tool as determined by various investigators, and his assessment of the inversion issue (copies of all correspondence were distributed at the DMP meeting). Harvey had also responded with a draft brochure discussing geochemical issues. This draft is under review by the DMP.

Past DMP meetings have seen a series of questions directed toward the neutron "porosity" tool. Harvey submitted another draft brochure addressing issues surrounding this device, and it is in DMP review.

21. HOUSEKEEPING ISSUES

a. Panel Membership

The issue of future members of the DMP was discussed. Such issues are not placed in the DMP Minutes.

b. Duration and Timing of Meetings

Jean Bahr commented that the Tuesday-Thursday format that has been followed by the DMP for the past several years is inconvenient for individuals working in academia. She suggested that an over-the-weekend format be instituted. She added that such a format might save money on airfare. Due to the large number of academic people on the DMP, the Chairman will institute the suggested change at the next fall meeting (dates for the spring meeting are already constrained).

c. Suggestions to the Chairman

Hickman noted that the agenda for the current proceedings was extremely full, and suggested that only items of direct importance be part of future agenda. He also suggested that items of contention be concluded through a vote rather than be discussed for long periods of time without resolution. The Chairman agreed to both of these actions.

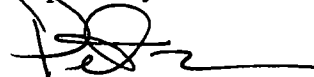
22. FUTURE MEETINGS

Since the DMP has had three consecutive meetings in the US, it was appropriate for a change of venue to occur. Non-US members of the DMP had been polled by the Chairman, and Laust Pedersen responded with a invitation for the next meeting to be held in Uppsala, Sweden. The DMP has accepted this invitation, and the next meeting, pending PCOM approval, will be in Uppsala, May 17-19, 1994. The following meeting will be at the headquarters of the BRG in Palisades, NY. Dates will be set at the spring meeting of the DMP.

23. ADJOURN

The Chairman thanked the participants for their support during the current proceedings; he hoped that they had an enjoyable stay in New Mexico. The proceedings of the JOIDES Downhole Measurements Panel were concluded at 1607 hours, October 14, 1993.

Respectfully submitted,



Peter Lysne
Chairman, JOIDES DMP