

MEETING OF THE JOIDES DOWNHOLE MEASUREMENTS PANEL

TEXAS A&M UNIVERSITY
COLLEGE STATION, TEXAS
JANUARY 18-21, 1993

EXECUTIVE SUMMARY

The incoming Chairman took the opportunity to express his views concerning interprogram development efforts, and to poll the Panel as to how its functions could be improved. The Panel recognized a need for a more critical review of downhole measurement systems, and reasons for such action surfaced repeatedly throughout the meeting.

All scientific drilling programs are suffering from a lack of qualified downhole instrumentation, cooperative development efforts can aid the situation, and the DMP is in a unique position to further such efforts. However, a challenge exists in that the goals and aspirations of other programs may not parallel those of the ODP. (Minutes, Item 4.)

The DMP will adopt the concept of "Watchdogs" to provide points of contact, and to better assess the operational principles, the engineering constraints, and the costs associated with downhole measurements. This action will minimize oversights that lead to false expectations within the ODP community. (Minutes, Items 4., 5.b.-d., 9.b., 10., 11.b., 11.e., 12.c., 13.a., and 13.c.)

The DMP instituted a new thrust involving measurements that provide information from the region far-removed from the borehole.

Cross-borehole acoustic techniques are used in the hydrocarbon industry to generate velocity and attenuation maps over distances up to several hundred meters. This technology is expensive and, perhaps, immature for use in the oceanic environment, but there is the possibility that cooperative efforts can further the concept. (Minutes, Item 16.)

Downhole radar can be used between holes, or from within a single hole. The distance of interrogation is less than that of acoustic experiments, but the technology may be relatively inexpensive. (Minutes, Item 17.)

The development of third-party logging tools is progressing nicely.

The booklet Guide To Third Party Tools is finished, and it will be distributed throughout the JOIDES structure. (Minutes, Item 18.)

The German magnetometer tool is the first to enter the ODP certification process. (Minutes, Item 13.d.)

The French sediment magnetometer has been accepted for commercialization by Schlumberger, and the tool will be available to the ODP for no cost during the engineering checkout phase. The new tool may be ready for Leg 150. (Minutes, Items 13.e. and 14.b.)

Traditional distribution of log data is cumbersome, and advanced methods are being developed.

Log data for Leg 139 (Sedimented Ridges) are now available on CD ROMs. Comments on this prototype issuance are requested. (Minutes, Item 11.c.)

Some groups had experienced a concern regarding the JOI, Inc. Request for Proposals for a Wireline-Logging Service Contractor.

The DMP is distressed that it did not have more involvement in the JOI solicitation for a Wireline-Service Contractor. PCOM is requested to review the situation. (Minutes, Item 7.b.)

Next Meeting.

The next meeting of the JOIDES Downhole Measurements Panel will be at Scripps Institution of Oceanography, May 25-27, 1993. The following meeting will be held concurrently with the JOIDES Lithosphere Panel in Santa Fe, October 12-14, 1993. A joint DMP/LITHP meeting will occur on October 12.

Farewell.

Andrew Fisher announced that he would be leaving the ODP in the near future. It is important that the ODP recognize the contributions that Andy has made in his tenure. The DMP finds his reports to be first rate, and his insight has greatly enhanced the Downhole Measurements Program.

MEETING OF THE JOIDES DOWNHOLE MEASUREMENTS PANEL

TEXAS A&M UNIVERSITY
COLLEGE STATION, TEXAS
JANUARY 18-21, 1993

MINUTES

Present

Chairman:	Peter Lysne	US
Panel Members:	Robert Desbrandes	US
	Johann K. Draxler	Germany
	Jean-Paul Foucher	France
	Joris Gieskes	US
	Stephen H. Hickman	US
	Mark W. Hutchinson	US
	Toshihiko Kanazawa	Japan
	Roger H. Morin	US
	Laust Pedersen	ESF
	Henry A. Salisch	Australia-Canada
	Karen L. Von Damm	US
	Michael D. Williams	US
Liaisons:	Susan Agar	TECP
	Jean M. Bahr	SGPP
	Andrew Fisher	ODP-TAMU
	Timothy J. G. Francis	ODP-TAMU
	David Goldberg	ODP-LDEO
	David Huey	ODP-TAMU
	Tom Pettigrew	ODP-TAMU
	Philippe Pezard	ODP-LDEO
Guests:	Earl Hoskins	US/DOSECC
	Susan E. Humphris	US/LITHP
	Bjorn N. P. Paulsson	US/Chevron

Apologies

	Gary Olhoeft (guest)	US/USGS
	Keir Becker	US
	Gerard J. Fryer	US
	Paul F. Worthington	UK

MEETING OF THE JOIDES DOWNHOLE MEASUREMENTS PANEL COLLEGE STATION, TEXAS

I. WELCOME AND INTRODUCTIONS

The first meeting of the JOIDES Downhole Measurements Panel for 1993 was called to order at 0840 hours on Tuesday, January 18, 1993 in the ODP Building on the Texas A&M University campus. A welcome was extended to Karen Von Damm, a new DMP member, to Susan Agar, a new liaison from the Tectonics Panel (TECP), and to Philippe Pezard, a new representative from the Logging-Service Contractor. The usual DMP participants then welcomed Susan Humphris, Chair of the Lithosphere Panel (LITHP), and a guest speaker on the subject of the RIDGE Program, and Earl Hoskins, Director of DOSECC, Inc., an institution promulgative of the US Continental Scientific Drilling Program. Bjorn Paulsson of Chevron Oil Field Research Company, and a guest speaker on cross borehole acoustic measurements was delayed; he was welcomed when he arrived later in the day.

Gary Olhoeft, an invited speaker on electrical cross-borehole techniques, was ill and could not attend the meeting. Apologies were also received from Kier Becker, Gerard Fryer, and Paul Worthington.

The Chair noted that the function of the liaisons were especially important to the success of the meeting, and encouraged liaisons to be very active participants. The Panel was then advised of the proposed joint DMP/LITHP meeting scheduled for Santa Fe on October 12, 1993, and that interactions with Humphris were thus of special importance. It was agreed that technical terms and jargon would be explained as required so as to improve communications between individuals with differing backgrounds.

Andrew Fisher was the host for the meeting, and his contributions on behalf of the DMP were recognized.

The following modifications to the Draft Agenda were proposed:

1. Inclusion of a discussion of the 1992 Panel Chairs Meeting in Agenda Item 3.
2. Designation of the present Item 7. as 7.a., and insertion of Item 7.b. dealing with the JOI Request for Proposals (RFP) for the Wireline Logging Service Contractor.
3. Deletion of Agenda Item 15. "Technology Review--Cross-Borehole Electrical Methods".
4. Deletion of Agenda Item 19. "Review of DMP Actions on Tool Development".

With these modifications, the Draft Agenda was accepted as the working document for the meeting.

2. MINUTES OF THE MEETING, VICTORIA B.C., SEPTEMBER 22-25, 1992.

The following changes were made to the minutes of the Victoria meeting:

1. page 5, paragraph 5, change: ...moves to internationalize the *JOIDES* Office.
2. page 6, paragraph 2, add: ...Schlumberger catalog as two separate tools *or a combined tool*.
3. page 10, paragraph 2, change: ...HEL tools, they *are now developing* AMS,
4. page 14, paragraph 3, delete sentence: *The sampling tool....disposable.*

With the above changes, the minutes of the Victoria meeting were approved as a fair representation of the proceedings.

3. PLANNING COMMITTEE AND PANEL CHAIRS MEETINGS

Peter Lysne reviewed documentation supplied by Paul Worthington concerning the latter's presentation to PCOM at the Winter, 1992 meeting. Raised issues and resulting actions are:

1. A concern that the recently published brochure on ODP downhole measurements was not receiving adequate circulation. Lysne checked with Phil Rabinowitz, and was assured that Worthington's latest publication lists were honored.
2. A request to PCOM that responsibility for the approval for third-party tools be delegated to the DMP for the purposes of deployment on Leg 148 (Hole 504B). In the normal course of events, PCOM's approval is required for deployment of third-party tools. However, PCOM would not meet prior to the departure of Leg 148, so qualified high-temperature tools could not be approved for use in hole 504B. A PCOM consensus gave DMP authority to approve third-party tools for the special case of Leg 148. The issue became moot when no tools were offered.
3. A request to PCOM that individuals from the logging-service industry (non-Schlumberger) be acceptable candidates for positions on the DMP. PCOM responded by leaving the nomination of non-Schlumberger logging service individuals to the discretion of the DMP Chair.

Lysne had substituted for Worthington at the 1992 Panel Chairs Meeting. The following issues arose and are of importance to the DMP:

1. LITHP, TECP, and the Ocean History Panel (OHP) continue to support the Diamond Coring System (DCS); support is not strong within the Sedimentary and Geochemical Processes Panel (SGPP). The concern is that the DCS is delaying other

technical developments. DCS testing on land is to precede sea trials. The next sea trial of the DCS must succeed, and success is defined as core on deck.

2. The panel chairs support the development of the new ship-board computing system, and consider it to be central to ODP activities. Core/log data integration capabilities will be a feature of the new system.
3. The panel chairs support consideration of a deep-drilling capability, but caution that actual hardware is a big-ticket item in the budget, and note that deep drilling has not been ranked against other technology-development items.
4. Long range planning will be addressed by the thematic panels.
5. Panel interaction with other global drilling programs, e.g. InterRidge, is encouraged.

4. VISION OF THE FUTURE

The incoming DMP Chair took the opportunity to outline his vision of the future. Lysne observed that the ODP budget is flat, there is little industry interest in the development of specialty tools for the ODP, past years have seen an increased reliance within the ODP on downhole measurements, and other scientific programs find themselves in a situation similar to that of the ODP in regard to a lack of specialty tools such as those compatible with slim, high-temperature holes. These observations led to the conclusion that cooperative development efforts must evolve, and that the DMP can lead this thrust.

The DMP is in a uniquely strong position to lead such a thrust since downhole measurements are common to all scientific drilling programs, the industrial-government-academic make-up of the DMP insures competence, an engineering staff will be available to aid third-party tool development at the facilities of the Logging-Service Contractor, and DMP members have strong ties with other scientific drilling efforts. However, a challenge exists in that the goals and aspirations of other scientists and their funding agencies may not parallel those of the ODP. Thus, diplomacy and bargaining will be required in the development of interprogram relationships. An example of an evolving program concerns the development of an *in-situ* fluid sampler (Agenda Item 6.).

The discussion was then open as to how the above vision could be implemented, and how the functions of the DMP could be improved. The following issues were raised by the Panel:

1. Traditionally the DMP has not provided critical, in-depth reviews of downhole tools. Thus, some tools in use or under consideration may be flawed in principle, and/or require inordinate engineering development. This oversight can lead to false expectations within the ODP community.

2. Some Schlumberger logs do not provided data as advertised, and some are not calibrated in formations other than those encountered in oil-field applications. The calibration of all tools, third-party as well as Schlumberger, should be traceable to national standards.
3. Schlumberger does not provide design information on its logging tools. This fact precludes an independent verification of tool responses based on theoretical tool models.
4. A prioritization of budgetary items is needed. Inadequately funded and staffed programs are not advanced in a continuous manner, and maintenance difficulties arise.
5. The thematic panels rely on the DMP to provide pertinent and accurate statements of log capability, and this obligation cannot be delegated outside of the DMP.

The Chair recognized the importance of the above issues, and noted that many deal with the credibility of the Downhole Measurements Program. Appropriate solutions will be sought in the current and in future meetings.

5. LIAISON REPORTS

a. Planning Committee

The PCOM representative was unable to attend the current meeting. PCOM actions pertinent to the DMP were dealt with in Agenda Item 3. (above).

b. Lithosphere Panel

Susan Humphris reported progress on the re-write of the LITHP White Paper, a five to ten-year view of lithospheric issues. This paper will be presented to sister panels for review and input this summer, a final draft to PCOM is scheduled for December. Humphris reiterated that LITHP is very dependent upon the success of the DCS, and strongly supports development provided that development is subjected to a review process. Furthermore, LITHP supports both the TEDCOM deep-drilling initiative, and the fluid-sampling thrust initiated by the DMP. LITHP looks to the DMP to provide a reality check on the logging systems, log data, and subsequent data analysis.

c. Sedimentary and Geochemical Processes Panel

Jean Bahr reviewed the SGPP ranking for future drilling, and noted that two PCOM-approved activities, Barbados and the TAG hydrothermal system, pose important and challenging downhole-measurement scenarios. SGPP asked that the DMP review logging activities 504B to insure that they do not compromise the hole. The SGPP continues its support of the high-temperature sampler, but notes this thrust is not a replacement for a

true *in-situ* sampler/pressure tool. The SGPP queried the DMP as to the availability of high-temperature tools, and to the availability of CORKs (Circulation Obviation Retrofit Kit, a device that plugs the top of a hole and records data taken at selected locations in the hole.) for Barbados and for TAG. Finally, the SGPP expresses extreme concern regarding the lack of success in the DCS project.

d. Tectonics Panel

Susan Agar presented the TECP report, and made the following comments to the DMP:

1. Because of the importance of the Pressure Core Sampler (PCS) to TECP, it is recommended that engineering efforts be made to reduce the complexity of the design, to enhance the reliability, or to increase the capabilities of the ODP technicians so as to improve confidence in the PCS.
2. Land testing of high-temperature logging tools should not be waived.
3. The DMP should have a liaison to TECP to address special tool requirements. Specific issues included CORKs, the PCS, the use of the Formation Micro Scanner (FMS) in high-resistivity rock, and high-temperature tool development and prospects.
4. TECP favors liaisons with other programs such as InterRidge, but not at the expense of the proposal-driven nature of the ODP.

The Chair deferred discussion on several of the issues posed by the thematic panels since they were items for discussion during the present meeting.

The Chair noted that communication between the DMP and the thematic panels needs to be enhanced. The DMP will attempt to increase its communicative abilities, but it is hampered by the industrial and governmental panel make-up of the Panel that is essential to its viability. Many DMP members cannot, by the nature of their jobs, serve a liaison function as often as would be ideal. A possible solution is for the DMP and the Logging-Service Contractor to offer discussions of a general or specific nature to the thematic panels on a regular basis, but not at each meeting of the individual thematic panels.

The DMP will copy the concept of "Watchdogs" as developed in the thematic panels so points of contact on specific issues can be maintained.

e. Technology and Engineering Development Committee

Hans Draxler attended the TEDCOM meeting, Cambridge, UK, October 7-9. The TEDCOM meeting on October 7 was divided into parallel sessions, one on the DCS and the other on the development of deephole drilling. These sessions were closed to liaisons, and this issue will be pursued by the DMP Chair.

The report of the working groups was given to TEDCOM participants on the second day of the meeting. It was noted that failure of the DCS on Engineering Leg 142 was caused primarily by a bent piston rod in the secondary heave compensator, with contributing factors caused by errors in the software used to control the compensation system. Two independent consultants had been tasked by TAMU to investigate the DCS, and they recommended that realistic land tests be undertaken before sea trials. TEDCOM is in favor of these tests being done in Tunisia; work would be accomplished through a lease of the DCS system to AMOCO.

Other TEDCOM issues concerned a study of retractable bit technology developed in Russia, and a TEDCOM recommendation that an RFP be issued to study the deep-hole concept. This latter study is based on drilling scenarios developed within the thematic panels. These scenarios are meant to provide a basis for the RFP; they are not put forth as actual drilling plans.

f. Kontinentale Tiefbohrprogramm

Draxler reported that as of January 15, the KTB hole was at 7167 meters and drilling ahead at 12.25 inches (0.31 m) in altered amphibolite with layers of gneiss. The side-tracking around the junk left in the hole after drilling difficulties was successful, and the hole is now nearly vertical. One two-meter core had been taken with 100% recovery. The core showed steeply-dipping foliation and evidence of tectonic events. A caliper log indicated a zone of saline water inflow between 6996 and 7010 meters. The production from this zone is about 500 liters in three hours.

g. US Continental Scientific Drilling Program

Lysne noted that the US CSDP is supported by three agencies: the Department of Energy/Office of Basic Energy Sciences (DOE/OBES), the United States Geological Survey, and the National Science Foundation (NSF). Katmai (Alaska) and Hawaii are programs that have had favorable final reviews within the CSDP, and they await implementation authority. Prime issues for both programs are receipt of drilling permits. Since Katmai is in a portion of a national park that is a wilderness area, and since some Native American groups oppose drilling on the island of Hawaii for religious reasons, so drilling authorization involves very sensitive issues. Appropriate discussions are in an advanced state, and the Draft Environmental Impact Statement for Katmai is approaching completion.

Other programs that have passed, or soon will pass, the workshop phase are: White Island, NZ; Bahamas Reef; Chicxulub (on shore); and the San Andreas Fault, CA. There is movement within the US CSDP to internationalize the program. White Island is a joint thrust between New Zealand, Japan and the US, and Germany is a potential US partner for the San Andreas effort. The Chicxulub workshop will involve proponents ODP activities, and a partnership for the entire program is being sought with Mexico.

6. *IN-SITU* FLUID SAMPLING

The Chair introduced the discussion by reiterating the fluid-sampling issues. The sampling problem was first visited a 1987 workshop led by Richard Traeger and Barry Harding that was jointly sponsored by the US DOE/OBES, and JOI, Inc. More recent action was initiated by the observation of Mike Mottl and Joris Gieskes that.. "no component of true basement formation water has been identified in...(395A, 396B, 418A, and 504B)", and by Lysne that all samplers used in the US CSDP have leaked when deployed in warm holes. Four difficulties have been identified: (1) commonly, borehole fluids are not representative of *in-situ* material, (2) most borehole fluid samplers have inherent problems with valve closure, (3) contamination of the specimen by the sampler itself 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, and to downhole conditions.

In 1991, Worthington and David Huey convened a JOIDES Working Group on *In-Situ* Pore Fluid Sampling to formulate recommendations for technology development addressing Issue (1), and to identify engineering options regarding means to bring pristine fluids into the borehole. The output of this meeting led to the formation of a DMP Sub-Panel with the charter to move the engineering study forward. The Sub-Panel's work resulted in a DMP recommendation to PCOM that an RFP be issued to enable engineering studies. While this recommendation has endorsement from LITHP and SGPP, it stands behind the DCS and the Information Handling System on PCOM's priority list.

In the mean time, the US DOD/OBES has instituted the development of a high-temperature sampler, Issue (2), within Lysne's group at Sandia (Agenda Item 9.d.). This work involves ODP and US CSDP scientists in an advisory capacity working through a Sampler Support Group formed by John Edmond. Edmond's group receives modest support from JOI to allow travel by ODP participants to points of contact. An output of Edmond's group is a proposal to JOI by Karen Von Damm and Marvin Lilley to address Issues (3) and (4) (Agenda Item 9.e.).

Some aspects of Issue (1) have been discussed in past DMP meetings in presentations by Robert Desbrandes (Victoria) and Hugh Crocker (Windischeschenbach). Topics involving interprogram relations received attention in a presentation to the DMP by John Edmond (Victoria). Edmond convened a meetings of his Sampler Support Group at the December AGU Meetings in 1991 and 1992. These meetings were attended by DOE/OBES and NSF/ODP program managers.

Joris Gieskes reported that the Sampler Sub-Panel had revisited the sampler RFP with the intent to make the package as strong as possible so as to enhance its position within the PCOM. The DMP Chair will forward the revised RFP to PCOM noting that the overall sampler thrust is receiving strong moral support from within the ODP, and major monetary support from the DOE/OBES.

7. CONTRACTUAL ISSUES

a. Information-Handling System

John Coyne, the new ODP Information Handling Manager, reported on the progress of the RFP for the processing hardware/software. In response to a need within the ODP for a better information-handling system, a working group assembled in Toronto in June of 1992 to draft criteria for a new system. TAMRF, the legal entity that deals with ODP contracts from Texas A&M, used these criteria to draft an RFP that was reviewed by members of the ODP community last December. The outcome of the December meeting was the decision to solicit Letters of Intent from interested parties that would enable a better writing of the work package for the information-handling system. The letters will summarize the capabilities of each responder, and outline how each responder intends to satisfy the criteria of the new system.

Early in 1993 a maximum of three responders would be funded up to \$US 50K each to develop detailed plans for the data-handling system. These proposals would be the property of TAMRF, so that the final work package can mix and match capabilities and/or ideas of the chosen responders. It is anticipated that the final choice for the contractor(s) will be made in the last quarter of FY 93. Work will begin immediately, and the main portion of the program is to be completed in two years. Coyne estimates that the system will cost \$US 2M.

Of particular interest to the DMP is Item 9. of the solicitation package that calls for a dedicated workstation to allow for the simultaneous display of core and log data.

b. Wireline Logging Services

Draxler reported the frustrations of a German group regarding the issuance of the JOI RFP for Wireline Logging Services. Two issues were of prime concern. First, it was felt that the DMP did not have sufficient say in the details of the RFP. He noted that the DMP was polled by Lysne on general issues regarding RFP topics over and above those contained in the present work statement for wireline logging services. However, this contact with the DMP was insufficient, and the DMP should have had a complete review of the technical work statement.

The second issue dealt with the time allowed to respond to the RFP, especially since the forty-one days available were interrupted by the Christmas Holidays. Of importance to the German group is the requirement that all major contracts be evaluated through an international post-and-bid process. This law adversely effected any German response to the RFP since there was not enough time to bring to fruition discussions with candidate logging subcontractors.

Robert Desbrandes reported that a team from Louisiana State University considered entering a bid, but found the time constraint prohibitive.

The Chair noted that the DMP did have a considerable influence on the Statement of Work. Specifically, the new minimum work package includes the establishment of engineering services at the logging contractor facilities to aid tool development, and a supplemental package, if accepted, would institute an group for the development of specialty logging tools.

In consideration of the above issues, the DMP felt the need to determine its position *vis a vis* input to major programmatic issues that effect downhole measurements. Specifically, the DMP is distressed in that it was not involved fully in the development of the technical work statement for the logging contractor. Furthermore, the DMP understands that potential participants, both US and non-US, were handicapped due to time constraints placed on the response to the logging RFP, and this situation is not in the best interests of the logging community. The DMP requests that PCOM investigate these matters, and report its findings back to the DMP.

8. THE RIDGE PROGRAM

At the Victoria DMP meeting Tom Pyle made note of an Executive Committee request that the ODP become more informed on other oceanic programs with a global significance. Consequently, Susan Humphris was invited to present an overview of the Ridge Inter-Disciplinary Global Experiments (RIDGE) Program. An information exchange with RIDGE is of particular interest to the DMP due to RIDGE involvement in the forthcoming TAG drilling exercise which will encounter hydrothermal formations (Leg 158).

Humphris noted that the goal of the RIDGE initiative is to understand the geophysical, geochemical and geobiological causes and consequences of energy transfer within the global rift system through time. The RIDGE initiative had its foundation in a 1987 US National Academy of Science workshop, and it has grown to a \$US 6.3M program. An equivalent amount is spent on related projects. The RIDGE program recognized early on that work on oceanic ridges is of international interest, so InterRidge, a consortium of fifteen nations, was initiated.

The RIDGE Program consists of five program elements: (1) Global Structures and Fluxes, (2) Crustal Accretion Variables, (3) Mantle Flow and Melt Generation, (4) Event Detection and Response, and (5) Temporal Variability of Ridge Crest Phenomena. Each program element is assigned a set of goals, an initial area of focus, and a defined set of programmatic components. These components stress multidisciplinary studies with theoretical and experimental thrusts. The evolution of events is monitored through repeat visitations to active sites, and through sea floor monitoring stations.

The Chair thanked Humphris for a most informative presentation, and invited her to keep the DMP abreast of future RIDGE activities. Humphris made note of the RIDGE Workshop scheduled for February 3-4 at Woods Hole Oceanographic Institution (WHOI). The workshop is directed toward the TAG program.

9. HIGH-TEMPERATURE INSTRUMENTATION

a. Camborne School of Mines Associates Resistivity Tool

The CSMA (UK) resistivity tool is being constructed as a joint development between the ODP and the UK Department of Energy. David Goldberg reported that there was a manufacturing delay concerning ceramic components used in the resistivity array. Earliest possible tests could occur in March, 1993.

b. French Temperature Tool and Cable

Goldberg reported that the tool body of the French temperature tool was subjected to temperature and pressure tests in an autoclave facility in Houston. Electrical connections to the tool were attempted in three experiments, but electrical failures occurred in the ancillary (non-tool) cables, and that this failure precluded testing the tool in an active mode. A final test subjected the tool to a temperature of about 400 °F and a pressure of 11,000 psi. Some leakage into the tool was noted.

An attempt to evaluate the cable and cable head was made at the Larderello geothermal field site in Italy. The tool became noisy and failed at about 110 °C. Failure was due to corrosion of the cable. The Logging-Service Contractor will obtain samples of the fluids within the Larderello hole, and they will be given to Karen Von Damm for analysis. The issue to be addressed is whether or not the Larderello fluids are representative of oceanic hydrothermal systems.

The DMP does not consider that either of the recent tests on the French tool have produced meaningful data, and that the high-temperature capabilities of this tool remain in question. Goldberg stated that the French tool is capable of performing its assigned tasks during present exercises in hole 504B since the ship's cable was not expected to suffer a degradation problem due to corrosion. It was noted that the circuitry used in the French tool is such that any degradation of the cable or cable head will directly influence the temperature measurements. The consequences of cable/cable head degradation, water leakage into the tool, and tool calibration will be revisited at a forthcoming meeting.

c. WHOI Multi-Purpose Tool

Dick Von Herzen is overseeing the development of a 54 mm diameter tool suitable for high-temperature holes. The project is funded by the NSF. Humphris presented the report on this tool.

The multipurpose tool is intended to measure: (1) pressure, (2) temperature, (3) fluid velocity in the borehole, (4) fluid electrical conductivity, (5) acceleration, (6) the location of casing collars, (7) borehole diameter (caliper), and (8) internal temperature. The tool experienced development delays, and was not a candidate for deployment on Leg 148 (Hole 504B).

d. US DOE Tools

Lysne reported the status of three Dewared memory tools being developed for DOE scientific and industrial applications. The low-cost pressure/temperature tool is on track, and final design decisions are being made. The tool will feature an Onset Model 5 computer that has been temperature cycled repeatedly to 150 °C without failure. Calibration of the tools is following DOE procedures that insure traceability. Tool deployment should occur this summer. It is partially funded by DOE/OBES, a point that may allow a loan of the system to the ODP for the TAG program.

The spectral-gamma tool has experienced a manufacture delay due to a failure of the photomultiplier tube at elevated temperatures. This tool was scheduled for delivery last October. The fielding date of this tool is uncertain. The tool is funded by the DOE/Geothermal Division, and special arrangements would be required to use it in non-DOE applications. The tool will be available for purchase through Geophysical Research Corporation, Tulsa.

The smart-sampler tool will follow the development of the pressure/temperature tool, and many components of the tools will be interchangeable. The prototype tool is scheduled for testing in about twelve months. The development is sponsored by DOE/OBES.

e. Fluid Sampler Support Equipment

Karen Von Damm reported on her proposal to JOI to construct an uphole sample-extraction/chemical-analysis system to be used in conjunction with the DOE/OBES sampler tool. Two criteria were identified for the design of an extraction device: (1) there is a need to preserve dissolved species, and (2) there is a need to preserve gas chemistry. It was noted that some species are in a low oxidation state that can be changed by contact with oxygen, and trace gases are lost or contaminated on contact with air. Thus, it is best to extract the sample into a sealed vacuum system.

It is envisioned that the gas will be separated from the gas/water specimen, and hydrogen sulfide will be stripped from the gas split through precipitation of cadmium or zinc sulfide after passage of the gas through a cell containing cadmium or zinc chloride. Precipitation within the sampler may be a difficulty that requires the sampler vessel be re-heated to *in-situ* conditions. A protocol for preparation of the sampler prior to deployment is being developed. Sample sizes of 0.5 liter are deemed adequate.

10. JOINT LITHP/DMP MEETING IN SANTA FE

The joint meeting in Santa Fe will be intended to set the stage for short- and long-term interactions between the DMP and LITHP. Humphris requested the following issues be discussed in Santa Fe:

1. High-temperature logging and fluid sampling for TAG. Where are we and what needs to be done?
2. Input to the LITHP White Paper. What tools and techniques are likely to be available in the five to ten-year time frame?
3. Measurements distant from the borehole. While LITHP supports the DMP thrust in cross-borehole-experimentation, more information is needed regarding feasibility, cost, and data acquisition/interpretation.
4. The status of the CORK system.

Humphris noted that she is stepping down as LITHP Chair, and Sherman Bloomer will assume her responsibilities.

11. LOGGING-SERVICE CONTRACTOR'S REPORT

a. Recent Logging Activities

Goldberg reported that operations logging operations on Leg 145 (North Pacific Transect) were successive in that four holes were logged with the standard tool string, and data from the holes looked good. The French sediment magnetometer was run successfully. Five holes were logged on Leg 146 (Cascadia) using the standard tool suite. Two of these holes required the use of the sidewall entry sub. Leg 147 (Hess Deep) saw the quad tool string run in an 80 meter interval. The BHTV suffered a telemetry failure. Operations also included five FMS passes in hole 894G over a 35 meter interval. The FMS stuck in the bit, but the tool was retrieved.

Fisher noted that the sticking of the FMS tool was caused by a particular difficulty with the arms of the FMS tool that are extended during deployment, and which may become jammed in an extended position causing extraction difficulties. This difficulty has caused some Co-Chiefs to fault all tools with arms even though most tools utilize arms that are fail-safe. The gamma-density tool is an example of a fail-safe tool.

Fisher also noted that any logging failure, be it due to the tool itself, the cable head, the cable, uphole equipment, or the operator is viewed as a failure by some ship-board scientists. The logging community should not split hairs with the other scientists as to the causes of logging difficulties since such action projects an unfavorable image on the logging program. Acceptable excuses may be made in the case of unstable hole.

b. Schlumberger Tool Reliability

Pezard reported on a reliability problem that had occurred regarding the Schlumberger tools. Specifically, the failure rate for tools in ODP applications a year or so ago was about a factor of two greater than that encountered in land-based operations. The

problem was raised with Schlumberger. The Panel understands that the difficulty improved with a change in management at Schlumberger. This issue will require repeated visitations by the Panel.

Mark Hutchinson noted that the concept of teaming had worked well in the hydrocarbon industry. If Schlumberger engineers had a vested professional interest in the success of the logging program, log quality would improve.

c. Data-Handling

Goldberg reported that plans for the issuance of log data on CD ROMs are well advanced. Prototype issuance for Leg 139 (Sedimented Ridges) are available, and comments are requested by the Logging-Service Contractor. Leg 143 (Atolls and Guyots I) production is scheduled for February; Leg 144 (Atolls and Guyots II) data are being formatted.

d. Temperature Capability of Schlumberger Tools

Pezard reported that the Schlumberger tools had undergone a temperature testing at the San Diego port call. Some Hostile Environment (HEL) tools are now certified for 260 °C, but other tools require that hole temperatures not exceed 166 °C. Hole cooling is required at 504B since the anticipated temperatures at the bottom of the hole are expected to be in the neighborhood of 200 °C.

e. Schlumberger Neutron-Porosity Tool

Neutron-porosity data presented by Pezard resulted in a lively discussion concerning the accuracy of data produced by this tool. Past work had indicated that the tool did poorly. The difficulty may be due to the tool not being deployed properly in that it is not in contact with the borehole wall, and/or it may be due to a more fundamental difficulty regarding calibration in formations that have peculiar (with respect to limestone) chemical compositions. Pezard noted that often he did not use the neutron tool because porosity information is suspect. The fact that the neutron tool was not used consistently was news to the Panel.

The discussion concerning the neutron-porosity tool raised the important issue of tool credibility. The thematic panel liaisons noted that their constituencies did not understand the nuances of logging tools, and that when a particular measurement was mentioned in a proposal, it was taken for granted that it could be made to the requisite accuracy.

The Chair noted that there is a clear need for the assimilation and dissemination of knowledge regarding tool credibility, and that this issue gets to the very crux of DMP activities. Tool Watchdogs will enhance credibility by providing a continuity of strategic thought within the Panel.

12. SCIENCE OPERATOR'S REPORT

a. Diamond Coring System and the Sonic Core Monitor

Dave Huey reiterated portions of the TEDCOM report. He noted that the bent hydraulic cylinder on the secondary heave compensation system likely occurred in transit to the ship; the damage was not noticed until late in the cruise. The DCS is being considered as a mini-riser system, but safety issues need to be addressed. These issues will likely involve a blow-out-prevention system being required for riser operation. It is unlikely that the DCS be used on TAG even if it is phenomenally successful on the preceding engineering leg. Difficulties would arise in crewing the ship with experienced DCS personnel on back-to-back legs.

Huey reported that the sonic core monitor was making slow progress since opportunity for sea-trials was limited. The system needs good drilling conditions in hard rock. If non-magnetic drill collars are used, the system can be used to orient core. A science-driven commitment is needed to progress the program.

b. CORK and the Pressure Core Sampler

Tom Pettigrew reviewed the previous four installations of CORKs. All CORK stations were making temperature measurements, fluid sampling experiments were hampered by under pressured boreholes. Other measurements may be considered, but separate proposals will be needed for development. A CORK emplaced on Leg 139 was damaged during an attempted retrieval on Leg 146. The difficulty arose due to hostile sea conditions.

The Panel noted that the CORK is the result of a principal-investigator initiated proposal, and these individuals should be contacted in person for information concerning future deployments. A proposal has been submitted to NSF for CORK systems to support Barbados and TAG.

Pettigrew noted that the PCS is an improving tool, but it lacks the continuous thrust that it is need to bring it to fruition. Pressure retention of the PCS is satisfactory, but there is no means to strip the core from the tool. A strong interaction with interested scientists is needed. Indifferent support from the scientific community will not lead to success.

c. Water Sampler, Temperature, and Pressure Tool

Andy Fisher supplied a review of the Water Sampler Temperature and Pressure (WSTP) tool. The pore-pressure sensing capabilities of the WSTP were removed prior to Leg 139 so that high-temperature electronics could be accommodated; the pressure sensor has not been replaced. Modeling studies suggest that the WSTP design results in uncertainties in pressure data. Specifically, the tool samples material about one meter ahead of the bit, and material in this region is too disturbed to yield accurate information.

Performance on Leg 139 was not encouraging. Fourteen deployments for fluid samples resulted in thirteen specimens, twelve of which were contaminated by borehole fluids. Furthermore, electronics are noisy, and an RFQ may be issued for an upgrade. Thirty-eight deployments for temperature yielded sixteen usable records.

Lysne noted that Sandia was working on recorder systems that may help the WSTP situation.

Joris Gieskes agreed to Watchdog the WSTP tool, and he will document the history of the tool as part of his efforts.

d. ODP Guide to Downhole Tools

Fisher presented the outline of his rewrite of Keir Becker's Guide to Downhole Tools. The present outline is comprehensive, and Andy is to be complemented for taking the initiative in this effort.

e. Engineering Developments

Fisher reported on the ADARA (company name) tool, a temperature tool that fits in the shoe of the piston core barrel, and which is deployed nine meters ahead of the primary bit. The tool was deployed twenty-three times on Leg 146 (Cascadia) with thirteen useful measurements. Four were caused by tool movement brought about by hostile sea conditions; six were due to battery failures. The battery packs are being modified to ameliorate the latter problem.

Fisher demonstrated a PC-based program used to analyze ADARA tool data. This program is very easy to use, and it leads an operator through a complicated analysis of the heat flow problem that attends reduction of ADARA tool data. The program may be a precursor for similar programs used with other memory devices.

Lysne will act as Watchdog for the ADARA tool.

f. Core/Log Integration

Fisher and Peter Blum, a new Staff Scientist at TAMU, have instituted the core/log integration thrust at TAMU. Their ideas have been documented in: A Data Integration System for the Ocean Drilling Program: Conceptual Plan and Present Status. Copies of the document were given to the DMP for review. The DMP Chair will apprise the Information Handling Panel and Shipboard Measurement Panel Chairs of the document, and suggest that their panels initiate a parallel review during their joint meeting at TAMU next month.

13. TOOL MONITOR REPORTS

a. GEOPROPS Use on Leg 146

Tom Pettigrew noted that the GEOPROPS (a multi-purpose tool for physical properties) is a real nightmare to work on and deploy. The idea of GEOPROPS is to insert a measurement station in a specially-drilled hole made with the motorized core barrel. This pilot hole is ahead of the main hole, and it is susceptible to filling due to sough before there is a chance to insert the GEOPROPS tool. Pettigrew noted that the concept of GEOPROPS may be flawed, but the ODP has learned from mistakes made in the development process. If such a tool is need, the project must be resuscitated from the ground up. Any development will be costly.

Pettigrew is working on a report concerning GEOPROPS that will include an assessment of the tool.

b. Lateral Stress Tool

Discussion of the LAST was deferred to a later meeting. Steve Hickman has agreed to Watchdog this tool, and he requested time to prepare a briefing from information supplied by Kate Moran.

c. Temperature Measurements on Leg 146

Jean-Paul Foucher made an extensive suite of temperature measurements on Leg 146 (Cascadia) using both the WSTP and the ADARA temperature tools. These measurements resulted in a suite of temperature gradients.

Sixty-two deployments were made, twenty-nine returned usable data, and thirty-three were rejected. Bad data were usually due to ships heave causing movement of the tool, and this condition was readily apparent from the temperature data. On a few occasions, seemingly good data yielded unphysical results, i.e., unrealistically low temperatures. This effect could be caused by a seepage of cold borehole fluids to the region of the temperature probe. The ADARA tool is not embraced by the drilling crew since it requires that the core barrel be stationary in the hole for ten minutes or longer. A stationary drill string exacerbates sticking problems.

A calibration difference of about 1.7 °C exists between the ADARA and WSTP tools. Fisher noted that the ADARA electronics package is calibrated as a unit, whereas only the temperature sensor is calibrated in the WSTP tool. Sea floor temperatures can be used to test the calibration of both tools in deep-sea conditions where currents are negligible.

Draxler reported that hole cooling by circulation allows the use on logging tools with low temperature ratings in otherwise hot formations. The KTB group has developed a code that will predict hole cooling. This code includes the effects of lost circulation.

d. BGR Magnetometer

Draxler reported that the sensitivity of the BGR magnetometer is in the range of 0.1 nT. The tool has been upgraded by the addition of two inclinometers for the determination of hole deviation. Final tests and calibrations were made before the tool was shipped to the JOIDES RESOLUTION in anticipation of use on Leg 146. The tool has been used in the KTB hole to a temperature of 162 °C.

Draxler noted that the tool has satisfied all of the ODP/DMP requirements for a Third-Party Development Tool, and that an application for the status of a Certified Tool was submitted to the Logging-Service Contractor. This application was dated June 11, 1992, and it contained waivers of certain costs that may be incurred as the tool progresses through the final stages of development. To date the German team has received no definitive response from the Logging-Service Contractor.

The Chair noted that it is the responsibility of the Logging-Service Contractor to act in an expeditious manner in the regard to third-party tools. The protocol for third-party tools requires that the Contractor submit a formal Request for Certification to the DMP, and the contents of the request are detailed in the JOIDES Journal and in the Guide to Third Party Tools.

The Panel is looking forward to a report from the Logging-Service Contractor on the status of the BRG magnetometer at its next meeting.

e. French Magnetometers

Foucher reported on the two French magnetometer tools that were used last in the ODP on Leg 145 (North Pacific Transect), and which are approaching the commercialization phase. Ultimately, Schlumberger will market the tools, but the tools are still undergoing engineering development. Since Schlumberger is interested in field tests of the tool, the French magnetometer system may be available to the ODP free of cost. However, use may require allowing Schlumberger to have ODP data before it reaches its final form. The Logging-Service Contractor will investigate any unusual contractual relations concerning a "free" use of the magnetometer system, and report back to the DMP. If protocol issues arise, the IHP will need to get involved.

f. Japanese Borehole Magnetometer

Toshihiko Kanazawa reported that no significant events occurred in the Japanese magnetometer program since the last DMP meeting.

14. DOWNHOLE MEASUREMENTS ON FUTURE LEGS

a. Leg 149, Iberian Abyssal Plain

Fisher reviewed the Leg 149 plan and objectives, and he noted that a prospectus was available for this expedition. Downhole measurements should include standard logging strings being run in all holes (side entry sub may be required in open holes). WSTP runs may be run in single-bit holes. Magnetic susceptibility and check-shot VSP are options at all sites.

Pezard noted that the new Schlumberger MAXIS data-processing system will be on the ship, but the present CPU system will remain until the MAXIS is fully checked-out. The CPU system will be necessary for use of the geochemical logging string. The MAXIS unit will enable use of the dipole sonic tool, a device that reportedly is superior to the present sonic sonde.

b. Leg 150, New Jersey Sea Level

Fisher reported that the Pre-Cruise II meeting will be held on February 5, 1992. Thus all details of the expedition are not in a final form. He also noted that the leg is decreased in extent due to safety issues dealing with potential gas-bearing formations.

Logging suites applicable for Leg 150 are identical to those identified for Leg 149 with the provisional comment that detailed temperature measurements would be supportive of programs dealing with global climate change.

Fisher reported that he and Von Herzen had submitted a proposal to the NSF to fund temperature measurements in shallow-water ODP holes. The concept is that global temperature changes institute a transient perturbation that propagates into the seafloor environment. It is felt that detailed logs of the temperature profile can be inverted to provide surface temperature information as a function of time. Decisions on this program must await the results of the NSF review.

It is noted that the French magnetometer may be available for use on Leg 150 pending discussions between the Logging-Service Contractor and Schlumberger.

c. Out-Year Legs 156 and 158

Fisher noted that drilling conditions on Leg 156 (Barbados) will be similar to those encountered on Leg 110 (Barbados) where hole collapse severely degraded the logging program. Furthermore, multiple CORK deployments are anticipated. Leg 158 (TAG) will encounter high-temperature formations, and consequently, a challenging logging exercise. One CORK is planned for Leg 158.

17. TECHNOLOGY REVIEW---DOWNHOLE RADAR

Laust Pederson reported on advances in downhole radar. These systems can be used in three modes: single hole reflection, cross borehole reflection, and cross-hole tomography. The all techniques provide information on features located some distance from the hole, and this distance is dependent on the electrical properties of the formation. Conductive formations are not conducive of the measurements, but insulating materials such as low porosity basalt are favorable.

Present single hole systems provide reflection data that are cylindrically symmetrical, and this means that the orientation of a feature cannot be determined. Work is progressing on antennas with a directional capability.

Variations in the arrival time and amplitude of direct waves traveling between boreholes have been used to produce maps of propagation velocity and attenuation. Cross borehole measurements coupled with tomographic inversion has less resolution than reflection, but provides better quantitative estimates of measured properties. Radar techniques may provide a means of interrogating the region removed from the borehole at a reasonable cost, and these techniques will be pursued in the future.

Information on borehole radar techniques may be found in: "Borehole Radar Applied to the Characterization of Hydraulically Conductive Fracture Zones in Crystalline Rock", Olsson, O., et al, Geophysical Prospecting 40, 109-142, 1992.

18. LOGGING BROCHURE AND OTHER PUBLICITY OPPORTUNITIES

The Panel was queried as to whether distribution of the Logging Brochure was proceeding expeditiously. Members and liaisons noted that they had not received copies from the Science Operator. Lysne reiterated that Rabinowitz had initiated distribution, and that copies should be in the hands of all JOIDES panel members in the near future.

The Guide to Third Party Tools that was distributed to panel members at the present meeting. The Chair will see to it that distribution is made to JOIDES Panel members, and to other interested parties. Karen Riedel was thanked for her services in developing the Guide.

20. THIRD-PARTY TOOLS

a. Third-Party Tools Proposed for use on Leg 148 (Hole 504B)

No proponents had approached the DMP regarding tool deployment on Leg 148.

c. Tool Specifications

Agenda item postponed until a future meeting.

d. Land-Based Test Facilities

Agenda item postponed until a future meeting.

21. HOUSEKEEPING ISSUES

The Panel was reminded that Joris Gieskes would retire from the DMP after the next meeting, and that candidates were sought for his position. It was reiterated that the new member should have an industry affiliation, and the individual could work for a logging company other than Schlumberger.

22. NEXT MEETINGS

The next meeting of the Downhole Measurements Panel will be at Scripps Institution of Oceanography, May 25-27, 1993. Joris Gieskes will host.

The following meeting will be in Santa Fe, October 12-14, 1993, and it will feature a joint session with LITHP on October 12. Jeanette and Peter Lysne will host.

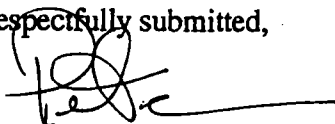
23. ADJOURN

The Chair thanked Andy Fisher for his excellent hospitality during the course of the meeting. He also thanked the panel members, the liaisons and the guests for their important contributions.

Andy announced that he would be leaving the ODP in the near future. It is important that the ODP recognize the contributions that Andy has made in his tenure. The DMP finds his reports to be first rate, and his insight has greatly enhanced the Downhole Measurements Program.

The proceedings of the JOIDES Downhole Measurement Panel were closed at 1239 hours, January 21, 1993.

Respectfully submitted,



Peter Lysne

Chairman, JOIDES Downhole Measurements Panel
February 17, 1993