# JOIDES Lithosphere Panel
# Minutes of the October 12-14, 1993 Meeting
# Santa Fe, New Mexico

## Executive Summary

**October 12, 1993: Joint Meeting of LITHP and DMP, La Posada Hotel**

The joint meeting heard liaison reports from NSF/JOI, PCOM, TECP, SGPP, TEDCOM, and OHP. Herzig and Humphris gave a review of the TAG drilling program, followed by a review of high temperature tool development and availability. The TAG logging prospectus was presented and the repairs to the BHTV were discussed.

- **Stress measurements in the lithosphere are an important objective of LITHP and the BHTV remains the best way to quantify breakouts in boreholes. We are pleased to see the work the BRG has put into repairing the BHTV and encourage PCOM to support them in this effort.**

Peter Lysne then reviewed the status of borehole fluid sampling and the third-party tool requirements. It was clear to the group that future tool development was going to have to come with participation from outside the program. The joint meeting concluded with a discussion of the progress of the DCS test and the requirements for core-log integration.

**October 13 and 14, 1993: Meeting of the Lithosphere Panel, The Inn at Loretto**

The Panel reviewed proposals and then ranked the proposals in the propsectus (with no additions) as:

**12.2 Rankings:**

| Rank | Proposal: | # of people voting | Score | Stan. Dev. |
|---|---|---|---|---|
| 1 | Return to 735B | 16 | 6.50 | 0.82 |
| 2 | Sed. Ridges II | 14 | 5.07 | 1.38 |
| 2 | VICAP-MAP | 16 | 5.00 | 1.37 |
| 4 | NARM-Volc. II | 16 | 4.75 | 1.24 |
| | (ranked NARM proposal is the Voring margin transect, not continuing East Greenland) | | | |
| 5 | East. Eq. Transform | 16 | 3.25 | 1.29 |
| 6 | Calif. margin | 16 | 2.13 | 1.15 |
| 7 | Alboran Sea | 16 | 1.81 | 1.05 |

The panel reviewed the status of the Caribbean proposals, particularly in light of OHP's intent to construct a leg or two focusing on paleooceanographic objectives. The consensus of the panel was that we needed to take a lead role in helping to develop a combined plan of drilling to address the K-T impact story and the origin of the Caribbean LIP. The availability of new site survey data (to be collected in April) and the results of shore-based studies of the LIP basalts by Duncan's students showing strong evidence for near-synchronous volcanism have changed the panel's opinion about the Caribbean as an appropriate site for a LIP study.

- The panel will ask that the proponents of the Caribbean proposals with some Lithosphere interests be invited to the Spring meeting and we will work with them to develop a proposal that we can recommend for drilling. If there are strong objections from PCOM to this plan, we will assign a subcommittee to work with the proponents on proposal development.

- The Panel would like some clarification on what the present policy about sampling basement, if it is reached, is to be. The objectives of many sites seem to require APC/XCB to basement. What basement penetration should be required at sites whose principal goal is sampling of the sedimentary section?

13. Recommendations for Leg 157

The Panel suggested that VICAP-MAP could be ready to drill in time
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o be scheduled as Leg 157. It is in an appropriate part of the Atlantic, and the site survey data is all in hand, wanting only some processing of the latest multi-channel seismic lines. [Peter Herzig contacted the proponent's group in the evening, and they felt that they could be ready to be scheduled as Leg 157.]

Alternatively, if PCOM chose to follow the SGPP strategy of combining a couple of shorter programs (Caricao Basin and Med. Sapropels) that the proposal to CORK Hole 395A could be accomplished during that leg. The ship will be finishing Leg 156 in the western Atlantic and spending 2-3 days to CORK 395A could easily be accomplished. LITHP rated the proposal to CORK 395A highly enough that we were willing to give up time on MARK or TAG to accomplish. it.

**13. Review of work on White Paper:** The panel revised its list of short-term (1993-98) and long term (1998-2003) objectives and assigned editing responsiblities to prepare a final draft by mid-November, for discussion at the PCOM meeting in December.

**14.1 BRG liaison:** The Borehole Research Group has proposed sending a liaison to one meeting of each thematic panel each year. The Lithosphere Panel strongly endorses this idea and recommends that the liaison attend the fall meeting, for the ranking of proposals in the prospectus.

**14.2 Movement of core repository: The Lithosphere Panel unanimously (16-0) supports the compromise suggested by T. Pyle, that a new repository be established at Bremen, that cores from Leg 151 on be stored at Bremen, and that cores from legs prior to 150 remain at the East Coast Repository.**

**14.3 Tool development:** The Vibro-percussive core will not be an important tool for most LITHP objectives and the Panel did not feel that they could offer any kind of informed opinion about its development. The development of the push-in pressure core sampler will be critical for some of our objectives in hydrothermal systems and mass balance experiments. **The Panel recommends that the development of the PPCS proceed as outlined in the proposal.**

**14.4 TEDCOM recommendations: The Lithosphere Panel strongly endorses the idea that TEDCOM become a more proactive group and believes that TEDCOM should have a more active role in the conception, design, and deployment of new tools and systems in the Program. That input should include smaller projects (things like the VPC for example) as well as larger projects like DCS.**

**14.6 Equipment prioritization:** The Lithosphere Panel recognizes that the Diamond Coring System has been the object of great deal of criticism. **The Panel still believes that the most critical equipment development needed for the successful completion of its long-term objectives is the deployment of a viable diamond coring system. The Panel unequivocally supports the continued testing and development of the DCS.** The diamond coring concept promises a tremendous increase in core recovery in a variety of difficult to drill sequences which include, but are not limited to, the fractured basalts of near-ridge environments. The Panel does believe that it is essential that adequate resources be supplied to allow a land test and computer simulation test of the system before it goes to sea again. The short term costs of the on land testing will certainly be balanced by the savings gained in finding, and solving, problems on the beach rather than at sea.

**14.9 Review process:** The Panel felt that there should continue to be two deadlines a year for proposals. The panel recommended removing the numerical ranking on the proposal review form and replacing it with a simple statement about the proposal's relevance to the panel.

One of the most difficult problems with the review process is that the lifetime of many proposals is longer than that of most panel members. The panel had two suggestions for improving the "memory" of the group. The development of a "briefing book" with abstracts, summary maps, and previous reviews of all active proposals would be invaluable in improving the corporate memory of the panel. Secondly, the panel suggests that PCOM consider reappointing a member of each panel occasionally, so that there is someone besides the chair with a longer memory of the proposals in the system than most of the panel members.

Finally, the Panel notes that we need a mechanism for accommodating interdisciplinary proposals in the system. The demise of the regional panels removed some of the flexibility of the system for looking at proposals that sought to answer a number of thematic questions through drilling in a specific region. The Caribbean K-T proposals have reminded us of some of the problems and the panel requests that the issue of encouraging and fostering interdisciplinary proposals be brought up at the PANCHM meeting in December.

While the Panel has requested that we bring the Caribbean proposal proponents to our next meeting, we do not believe that proponents should routinely attend panel meetings.

**15. Next meeting:** Yngve Kristoffersen has offered to host the next meeting at Bergen, Norway on March 28, 29 and 30, 1994.

**16. Membership issues:** The Panel has two members who finished their terms at the fall meeting, John Bender and Rob Zierenberg.

We recommend that Rob Zierenberg be reappointed for a second three year term.
An alternate replacement is John Slack of the U.S. Geological Survey .

We recommendJill Karsten to replace John Bender.
An alternate replacement is Emily Klein.

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**October 14, 1993: Meeting of the Lithosphere Panel, The Inn at Loretto**

**JOIDES Lithosphere Panel**
**Minutes of the October 12-14, 1993 Meeting**
**Santa Fe, New Mexico**

Attending: S. Bloomer (chair), J. Bender, M. Cannat, D. Caress, M. Coffin, P. Herzig, K. Gillis, A. Fischer, A. Sheehan, P. Kempton, Y. Kristoffersen, J. Ludden, J. Tarduno, K. Ozawa (alternate for Y. Tatsumi), D. Wilson, R. Zierenberg

Liasons: J. Miller (ODP/TAMU), J. Karson (TECP), B. Lewis (PCOM, for J. Mutter)

Guests: G. Pollard (ODP/TAMU), S. Humphris

**October 12, 1993: Joint Meeting of LITHP and DMP, La Posada Hotel**

The meeting was called to order at 0830 by Peter Lysne, Chair of DMP.

**Welcoming Remarks:**

P. Lysne welcomed the two panels, liaisons, and guests to Santa Fe and reviewed some logistics for the meeting. He then introduced new members of DMP; S. Bloomer added a welcome and introduced the three new members of LITHP, K. Gillis, A. Sheehan, and A. Fisher. The members and guests of both panels introduced themselves and Lysne then reviewed the agenda for the meeting, which was accepted without change.

**1.0 Liaison Reports**

**1.1 NSF/JOI**-- Tom Pyle: The program has now been formally renewed, with all partners having signed the MOUs. Canada/Australia will have a 7/12 membership this year and will continue to look for sources to make up the other 5/12 next year. New contracts have been signed between NSF, JOI, TAMU, and LDEO. The FY 94 budget has been set at $44.3M, with $0.6M additional funds allocated for the computer upgrade. 4% of the budget has been earmarked for special operations, including $560K for CORKs and hard-rock legs, $690K for DCS development, $100K for DCS shipping, and $70K for a real-time navigation upgrade on the ship. However, there is no money allocated for new tool development and there will be little money for any innovations in the program.

Pyle reviewed the history of the EXCOM directive regarding the possibility of establishing a new repository at Bremen and moving the existing East Coast Repository cores to Germany. Pyle had recommended a compromise to EXCOM that involved leaving all cores through Leg 150 at LDEO, and depositing all new cores from Leg 150 onwards in a new repository at Bremen. EXCOM turned down that suggestion; all cores are still going to Lamont and the issue is still unresolved.

**1.2 PCOM--Brian Lewis:**

*Short-term planning issues:* The summer PCOM meeting reviewed proposals for the FY 95 prospectus and included North Atlantic Arctic Gateways II, NARM Volcanic and Non-volcanic Leg 2, VICAP-MAP, Mediterranean sapropels, Mediterranean Ridge, Alboran Sea, Gas hydrates, Eastern equatorial Atlantic transforms, 735B Leg 1, California Margins, and Sedimented Ridges II.

PCOM directed that DMP develop a logging prospectus for the FY 95 prospectus to be presented at PCOM's December meeting. In response to the Advisory Structure Review Committee Report's Proposal 4, the PCOM chair will convene a one day meeting (DRILLOPTS) prior to the PANCHM meeting to review operational plans for FY 95.

Delays in the modification of the secondary heave compensator require that the DCS test scheduled for Leg 157 be postponed. TAG will remain as Leg 158, so an alternate Leg must be found for 157.

*Long-term planning issues*: PCOM noted that the period 1995-98 would be a critical one for the program and is asking the panels to look at what scientific problems can be solved in that time frame and what noteworthy results might be achieved. In the longer term, the thematic panels, in their White Paper revisions, are asked to define and prioritize objectives for post-1998 and to examine what platform characteristics will be required to meet those objectives. There will be a meeting in Japan in February of 1994, after the EXCOM meeting, to discuss the objectives and platform requirements for drilling in the next century, particularly in reference to the planned, new Japanese drilling vessel. Thematic panel chairs will be invited to the meeting to make a presentation.

*Budgetary issues, 1994-98*: The FY94 budget is $3.4M below the LRP projection. That shortage is largely dollars devoted to development initiatives (DCS, risers, etc.); the funds for those developments are now coming out of the base budgets.

*Other issues:* The DCS sea test will be postponed. Until the completion of the land test, there is still some question about the appropriateness of a site in less than 1000 m for a sea test of DCS.

Proposals for the computer upgrade have been reviewed and $600K has been allocated for the upgrade. The proposed systems are UNIX-based and heavily oriented to database development.

The consensus of PCOM and the PANCHM was that they endorse the internationalization of ODP and the establishment of a new core repository at Bremen, but that they cannot recommend that the core in the present East Coast Repository be moved. PCOM recommended that cores from Leg 151 onwards be sent to Bremen, if a new repository is established there.

There are no new dollars allocated for tool development; such development will have to be supported by funds from outside the program. DMP and TEDCOM have been asked to prepare a list of operational tools and of tools under development, with an estimate of the cost to bring them on-line. The panels need to consider a prioritization of the need for tools and consider how the development of the tools can be facilitated.

The PCOM chair is organizing a group to prepare a White Paper on the problem of core-log integration. There have been a couple efforts to examine this problem by SMP and Andy Fisher but there is no consensus on what CLI is, much less how to accomplish it. The BRG has taken the lead in some pilot efforts at CLI, and the 94 Plan allocates some effort to CLI, though BCOM did not earmark any funds for CLIP.

PCOM has asked the thematic panels for suggestions and comments on the proposal review process, in response to the ASRC recommendation . PCOM also encourages the panels to be more frank in their reviews, particularly if there is little chance of a proposed program being drilled.

In the preparation of the white papers, the panels are asked to focus on priorities for 1995-98 and for post-1998. The panel chairs will make a presentation on their respective white papers at the December PCOM meeting.

Herzig asked for some clarification about the proposal review concerns. There is some question as to whether the program really has two annual deadlines, as advertised, since proposals are only ranked relative to each other at the Spring meetings. It is also not clear that we are providing adequate, or clear enough, feedback to proponents of proposals.

Coffin asked if there are any initiatives to address the budget shortfalls, as in the solicitation of corporate contributions. or new international partners. Pyle answered that such efforts, to date, have been limited, but given that JOI has a new president and that the policies of the U.S.

Congress and NSF may be changing, he expected such initiatives were likely to be examined more seriously.

**1.3 Tectonics Panel: J. Karson and S. Agar:** TECP met in late Sept. in Corner Brook Newfoundland in a joint meeting with SGPP. Joint field trips and sessions led to extensive discussions of the roles of fluids in various tectonic environments. "Thought experiments" by Edridge Moores and Rick Sarg served to generate additional discussions of topics of interest to both panels. TECP worked on a draft of the new White Paper and reorganized the draft around the theme of quantifying active processes. TECP is eager to work with LITHP on its white paper with the goal of strengthening both documents in areas of mutual interest.
TECP ranked three prospectus proposals as very highly: Equatorial Atlantic Transform Margin, Mediterranean Ridge, Alboran Sea. These rankings reflect substantial improvements in the first two proposals and limitations of the third imposed by the Safety Panel. Two additional highly ranked proposals are NARM Non-volcanic II (modified by the panel) and NARM volcanic II (Add-2). These were very closely ranked.

TECP drafted a number of resolutions including two of special interest to LITHP. One of these is in support of development of new techniques in geochronology, geobarometry, geothermometry, and horizontal/vertical reference frames that will help quantify tectonic processes in oceanic lithosphere. In a second, TECP suggests broader advertizing of ODP activities, and particularly cruise participation opportunities to attract Earth Scientists who ordinarily study terrestrial problems.

Finally, the panel said goodbye to outgoing chairman Eldridge Moores and thanked him for his outstanding leadership during the past few years. Alistair Robertson will be the new chairman. Jeff Karson rotates off the panel and Sue Agar will be the new liaison to the LITHP. Yves Lagabrielle and Uri ten Brink are the mid-ocean ridge and transform watchdogs.

**1.4 SGPP: Jean Bahr, R. Zierenberg:** Rick Hiscott, of Memorial University, hosted the joint meeting of SGPP and TECP in Cornerbrook, Newfoundland. Discussion during joint sessions included reports of recent legs; Leg 148, (504B, Jeff Alt), Leg 149 (Iberian margin, Dale Sawyer), and Leg 150 (New Jersey sea level, Greg Mountain). Areas of joint interest between the panels that were discussed included fluid sampling and *in situ* measurements. An RFP for investigating *in situ* fluid sampling was not funded, but Joris Geiskes has stepped forward to try to poll the community for their needs and suggestions relative to fluid sampling and will prepare a report summarizing his findings. Joint interest in sea level changes were discussed including causes of global sea level fluctuations and strategies for separating eustatic and tectonic effects of local sea level response. Both SGPP and TECP have strong interest in proposed drill legs in the Mediterranean Sea, so potential for collaborative planning of legs with diverse thematic interest was discussed.

SGPP discussed the proposed development of the PCS, PPCS, and VPC. These tools have been and will continue to be of very high priority to SGPP to meet their scientific mandate. SGPP ranks development of these tools ahead of more expensive ventures such as the DCS and computer upgrades for the ship. Several scheduled or highly ranked legs will benefit from the use of these tools, so rapid development and testing is necessary. The PCS and PPCS are required for sampling gas hydrates, which is an important major thematic objective. Although much can be learned without these tools, their development and utilization will greatly enhnace the results of gas hydrate drilling. The panel recongizes the need for a sampling manifold for gases and liquids. Development of a manifold should preceed concurrently with development of the PCS and PPCS. Charles Paull will act as the SGPP liason to TAMU for the PCS and PPCS as well as for sample manifold development. SGPP also supports development of vibrapercussive corer. The lack of a sampler capable of retrieving unlithified sand has limited the choice of hole locations for sea level legs and sedimentary architecture objectives. Michael Underwoold and Richard Hiscott are assigned as watchdogs to coordinate with TAMU on continued development of a VPC. The importance of these tools to the accomplishment of high priority SGPP goals is so great that the

panel rescheduled their next meeting for College Stations so they could interact directly with the TAMU engineering staff.

SGPP added proposal 412, Bahamas sea level transect, to the 1995 prospectus and ranked all 13 proposals. The results of their ranking is as follows:

| Rank | Proposal | Score (max.=13) | |
|---|---|---|---|
| 1 | 423 | Gas hydrates | 11.0 |
| 2 | 412 | Bahamas sea level transect | 10.9 |
| 3 | 391 | Mediterranean Sapropels | 10.2 |
| 4 | SR II | Sedimented Ridges II | 9.6 |
| 5 | 380 | VICAP/MAP | 8.6 |
| 6 | 330 | Mediterranean Ridge | 8.3 |
| 7 | 386 | California Margin | 7.8 |
| 8 | 323 | Alboran Sea | 4.8 |
| 9 | NV-NARM | Iberia | 4.7 |
| 10 | V-NARM | E. Greenland | 4.1 |
| 11 | 300 | Site 735B | 3.8 |
| 12 | 346 | Equatorial Transform | 3.6 |
| 13 | NAAG II | N. Atlantic gateways | 1.8 |

The delay in testing of the DCS may require rescheduling of Leg 157. SGPP proposed that a substitute leg could include coring in the Cariaco Basin (Proposal 434) followed by the Mediterranean Sapropels leg. Because the Mediterranean Sapropels leg requires less than 30 days of drilling, it was also suggested that this effort could be accomplished following a two-week dry dock of the Resolution in Lisbon at the end of Leg 158.

SGPP will undertake the task of rewriting its white paper. The SGPP white paper is relatively up to date as the panel was recently formed. However, the panel will revise its white paper to be more concise and to prioritize drilling objective through 1998 and 2003. The new white paper will be reorganized under three main themes: 1. Sea level and facies architecture, 2. Fluid flow and geochemical fluxes, and 3. Geochemical budgets and carbon geodynamics.

Based on reports that SGPP has heard previously, it has no interest in further development of GEOPROPS. SGPP members were surprised to see that this was still an item of discussion at DMP meetings.

On another issue of interest to DMP, SGPP feels it is essential that technicians who are familiar with 3rd party tools be on-board for legs in which these are used. This recommendation was prompted by the report that no high temperature tools would be "certified" in time for the TAG leg.

SGPP has no priorities for "deep" drilling at this time.

SGPP would like to have a representative from the logging contractor attend at least one of its annual meetings. Apparently meeting travel for the logging contractor has been reduced in the new contract. Since many of the panel meetings are joint meetings between two panels, having a logging representative attend the joint meeting would be an efficient means of getting this representation.

**1.5. TEDCOM: Yngve Kristofferson:** A review and discussion of DCS development occupied a great deal of the last TEDCOM meeting. The panel reviewed the delays in the development of the secondary heave compensator and the consequent delay of the land test. The land test facility in Odessa, Texas is nearly complete, and TEDCOM will have a 4-person subcommittee review the results of the land test and the simulations. TEDCOM advises against scheduling a DCS sea test until all of the land-based test criteria hav been met.

An examination of existing retractable bit systems for the DCS proved that none were appropriate for ODP needs. There are ongoing disucssions with the Russians about modifying their technologies for retractable diamond bits and retractable tri-cone bits.

The Novatek design for the VPC has been abandoned and a second company has been asked to develop a working tool The Russians apparently have a working VPC and TAMU will review that system for compatibility with ODP systems.

The hard rock orientation tool will be run on Leg 153. It was tested in 1990 and 92 but yielded no reliable results. (John Tarduno, who had been aboard for one of the tests, commented that the view of the scientists on the leg was that the tool design was fundamentally flawed. He raised the question of how we could provide better scientific input at the early stages of tool design. It was pointed out that the orientation tool is still considered experimental, and it is too soon to tell if there is a design problem).

TEDCOM was uncertain if there were facilities to handle the cores from the PCS. (There was some discussion on the PCS and its present design and purpose).

TEDCOM has been asked to pursue an evaluation of deep drillng on its own, as there are no funds for the deep driling RFP. They will be asked to examine the sites proposed for FY 95, if any are deep, and make recommendations for the strategy to drill those holes. (For the new panel members, it was noted that "deep" in this context was drilling 4 km holes in about 4 km of water).

The TEDCOM members seemed somewhat frustrated by their role. They felt they should, and could, be more proactive in advising and setting priorities for drilling techniques and tools, and could monitor the progress in the development of those tools and techniques.

TEDCOM has asked TAMu to supply cost and manpower estimates for all planned projects and estimates of the total cost of past development projects.

**1.6. OHP: John Tarduno:** The principal business of the OHP meeting was the ranking of proposal in the FY 95 prospectus. The rankings were:

1. NAAG II
2. Med. sapropels/ Bahamas drift
3. California margins (this would have been number 2 but for concerns about the site survey data)
4. Eastern Equatorial Transforms
5. Alboran Sea
6. NARM Non-volcanic II-Iberian transect
7. Gas hydrates
8. VICAP/MAP

OHP has decided to take the lead in orgnaziing the paleooceanography objectives of the various Caribbean proposals. Jim Zachos will take the lead in this effort and will aim to develop at least 1, and likely 2, legs of Caribbean drilling.

**2.0 Review of the TAG drilling program**

**2.1 Peter Herzig, drilling objectives and strategy**: Herzig reviewed the geology of the TAG area, the dimensions of the hydrothermal mounds, the locations of the three proposed TAG drillsites, and the objectives of each of those sites.

**2.2 Susan Humphris: logging and monitoring effort at TAG**: Humphris reviewed the plans for pre-drilling surveying and monitoring of the mounds at TAG and reviewed the plans for downhole measurements including imaging the hole (FMS and televiewer), physical properties, and sampling. One CORK is planned, though it is not clear what order the drilling and the CORKing will proceed in.

**2.3 Discussion**: The discussion centered on what the physical conditions in the holes were likely to be, particularly in light of results at 504B and on Leg 139. The experience of Leg 139 in modifying hole temperatures by natural downflow and pumping were reviewed.

Break for lunch

Reconvene at 1300

**3.0 Review of High-temperature tool status**

**3.1 Temperature tools: Frank Felice**: The history of the French high-T tool was reviewed and it was pointed out that developing these tools requires not only design of the tool itself but also of the cables, cable heads and splices that go with it. In evaluating the development of these tools, it is essential to examine the total expenses in making the tool operational. Those expenses for wireline tools may well by a couple of $100K. That level of expense requires that we are careful in determining exactly what the demand for these high temperature tools are.

Memory tools may be easier to developfor these high-temperature applications, but they are limited in their power and memory. Things like the FMS and sonic tools are not appropriate for memory tools now.

It was pointed out that while there are tools rated to 260oC, to the panels' knowledge, none of those tools has actually been run a hole at those conditions.

**3.2 Resitivity tools: Andy Green**: The high-temperature resitivity tools are being developed for 350oC conditions and to be compatible with the Resolution's wireline system and the DCS. There were problems with ceramic insulators for the tool, but these have been solved and the tool may be ready for TAG.

**3.3 Hans Droxler: logging at KTB**: Droxler reviewed some of the hostile environment tools from Halliburton, Schlumberger, and Western Atlas that have been used or developed at KTB. He pointed out that the conditions defined for each company's HEL tools varies significantly, and that the available slimline tools are lower rated than most of the standard tools.

**4.0 TAG logging prospectus**: The logging package for TAG will include the basic logging package on the ship, subject to the temperature limitations. The logging will also include Schlumberger's HEL tools rated to 260oC, including the composite lithodensity tool, a sonic tool, resitivity tool, and caliper. Specialty or third party tools to be aboard include the CSMA temperature/resitivity tool, the BRGM temperature tool, and the DMT high-temperature televiewer. The geochemistry tool, standard FMS, and BHTV are only rated to about 148oC and will not be run if the predicted temperatures are reached. Gene Pollard pointed out that it is possible to cool holes up to 500 m deep by pumping on them, but such pumping may induce cracking in the hole, expanding its size and making the use of some tools more difficult.

**5.0 Status of the BHTV: F. Felice**: The history of the digital televiewer was reviewed. It worked well on Leg 134, but has not performed suitably since. It was taken off the ship after leg 140, worked on at Lamont and redeployed on Legs 147 and 148. The tool did not work and was returned to Lamont for a complete rebuild. There were a number of mechanical and electrical problems with the design of the televiewer

which have now been remedied. The tool is out on Leg 152 and will be tested there. If the test is successful, the tool will be rebuilt to high-temperature specifications before TAG. It is essential that trained logging engineers from BRG or DMT be the only people to run the televiewer in the future.

It was asked why the analog televiewer had been abandoned. Apparently it was difficult to run and much harder to analyze the data. The tool has not been used for nearly two years.

It was pointed out that it should be easier to let the community know what tools are truly operational. DMP has, in fact, appointed tool watchdogs and is preparing a set of summaries of tool capabilities and limitations.

6.
0 **Borehole fluid sampling: Peter Lysne**: Lysne reviewed some of his work with borehole fluid samplers and made several points: 1. it is difficult to answer whether you've taken formation or borehole fluids. 2. all of the fluid samplers used to date at Sandia in hot boreholes have leaked, 3., there are serious contamination problems by the samplers at high temperatures, and 4. the question of what to do with the sample once you have it is as important as the question of how to get it. He cited an example from the Valles drilling project that showed it took nearly 2-3 months for the hole to come back to equilibrium after drilling stopped and pointed out that this was a hole at which the pumping rate had been very low.

The RFP to examine the fluid sampler issue was not put out due to lack of funds. Joris Gieskes has volunteered to chair a group who will examine the fluid sampling issue (for conditions less than 260oC) and will make some recommendations to the advisory structure.

Karen vonDamm has some money form ODP to consult with Pete Lysne on DOE sponsored development of a high-temperature fluid sampling tool. This kind of joint development, as well as the kind of volunteer effort that Joris is spearheading may be the best way to develop the tools that we need.

**7.0 Third-party tool requirements: Peter Lysne**: Lysne reviewed the third-party tool guidelines that DMP has developed as a result of the experience with the Geoprops tool. Those guidelines now require a very substantial commitment from a PI. That commitment may discourage PI's from tool development, but without the guidelines we run the risk of serious tool disasters.

Tool development can proceed by the modification of existing systems, which is the easier way to go, or by fundamental new approaches to tool design. In either case, it is clear that we are going to have to pursue tool development outside of the program and that the panels are going to have to take some hard-nosed looks at their needs for tools and the priority they want to give to those tools

The Panel returned to the question of how to make the ODP advisory structure and participants better informed of the capabilities of current tools. The relative uses of the BHTV and FMS were reviewed and it was suggested that those two tools should be next on DMP's list for "tool synopses". It was also suggested that it might occasionally be worthwhile to add a day to a panel meeting for a presentation of the BRG logging school. This may be easy to accomplish if BRG is going to begin sending a representative to the thematic panel meetings once a year.

**8.0 Status of DCS: Gene Pollard**: The secondary heave compensation system was reviewed after Leg 142 and after sea heave dat a was collected on Leg 147. it was determined that the control system was inadequate and Paul Munroe was contracted to build a modified control system. There have been a number of delays in finishing that system but it should now be ready for the land test in mid-November. The test site in Odessa is complete, but it is unlikely that the test will be finished before late December. The drilling is planned to be about 300 m of dolomitized limestone.

The panels were somewhat surprised that the described computer simulation and land tests with real heave data had not been run before the last sea trial. Gene replied that ODP/TAMU has been developing the system on a very modes budget; they have limited commercial applicability and cannot generate much support from industry. It is clear that more pre-ship testing is critical to the success of systems like this, but that the manpower available at College Station to work on it is limited.

**9.0 Core-log integration: Adam Klaus and Dave Goldberg:** The problem with the core-log data integration debate seems to be that the fundamental questions of what data need to be integrated remains unanswered. ODP/TAMU does not have the expertise to do this on their own, and need input form the community. There are some fundamental questions to be asked, for example, the problem of how to reconcile depths from the various measurements at the drilling floor, logging shack and curatorial labs. The computer RFP asks for data to be as accessible as possible in real time, but makes no provision for merging old data into the system.

The BRG has used some commercially available packages to work with core and log data and has developed some tools of their own as examples of what could be done with core-log data. However, right now, BRG is stalled due to the lack of a full-time programmer.

Meeting adjourned at 1730

**October 13, 1993: Meeting of the Lithosphere Panel, The Inn at Loretto**

Called to order at 0830:

**10. Review of joint meeting with DMP:** The Panel felt that the joint meeting had been a very productive one and asked DMP if they could supply a list of what tools will be available for TAG and what tools are projected to be ready. (Bloomer relayed the request to Lysne, who said it was one of the agenda items for Thursday). LITHP offered a strong endorsement of DMP's plan to provide short write-ups on all of the downhole tools available for use. Gene Pollard (ODP/TAMU) commented that the engineering group had prepared such synopses for the various coring tools and systems. No one on the panel seemed to be aware of those synopses, and we asked that Gene have copies sent to all of the panel members.

**11. Proposal Reviews:**

The following proposals were deemed not to be within the mandate of the panel:

| | | |
|---|---|---|
| 372 Add2 | Cenozoic circulation, North Atlantic | Zahn |
| 354 Add2 | Benguela Current and upwelling | Wefer et al. |
| 406 Add | North Atlantic climate variability | Broecker et al. |
| 412 Add 2 | Bahamas transect and sea level | Eberli et al. |
| 423 Add | *Gas hydrate sampling, Blake Ridge | Paull et al. |
| 408 Add | Testing interpretations of N. Nicaragua Rise (discussed briefly for relevance to 415, but none apparent) | Droxler et al. |
| 434 | Late Quaternary Caribbean climate (discussed briefly for relevance to 415, but none apparent) | Peterson |

The panel first reviewed new proposals, revisions, and addendum that were not included in the prospectus:

**11.1 433:** A Proposal to Test a new Theory of Orogeny by Drilling the Eastern Mediterranean Sea, especially the area in the Vicinity of the Eratosthenes "Seamount"; Proponents: K.J. Hsu, G. Udintsev, J. Makris, X. Le Pichon, Y. Mart and W. Ryan

2. Does not address high-priority long range plan thematic objectives

This proposal addresses several issues of partial interest to the panel, although the panel concluded that there was insufficient data presented to support drilling to test the proponents' hypotheses. The orogenic model is interesting, but poorly constrained. Detailed petrographic descriptions of recovered rocks, regional gravity and magnetic data, and reasonable quality seismic data were not provided. In addition, it is not clear that the proposed hypotheses are testable in the presence of these data. Nor was it apparent that the proposed hypotheses are actually testable by drilling. For example, recovery of rocks from a tectonic melange south of

the Eratosthenes Seamount will not necessarily distinguish between various tectonic models presented by the proponents. With respect to this last issue, it was the consensus of the panel that the proponents presented a 'straw man' model (the idealized Wilsonian Cycle) that is probably not widely viewed as a realistic model for this part of the Mediterranean by many (if any) workers. The lack of references for several critical interpretations supporting the proposed hypotheses was also disturbing. In summary, LITHP finds this proposal to be of secondary interest, in an immature state, and requiring a complete rewrite for serious consideration.

**11.2 079-Rev2**: The Mesozoic Somali Basin: Tethys and the Birth of the Indian Ocean;
Proponents: M.F. Coffin, A. Bosellini, J.E.T. Channell, W.W. Hay, H. Jenkyns, J.G. Ogg and P. Blum

4. Addresses high-priority objectives, but with deficiencies

This proposal meets major LITHP objectives. The panel recognizes that this is a mature proposal but there are still a few deficiencies. There is a need for more detailed survey data; the panel encourages the proponents to proceed with their efforts to collect this data. Much of the LITHP support for this effort is based on the potential for comparisons with Site 801. A key element in such comparisons, missing from this proposal, is the physical characterization of the crustal section. The proponents should contact Leg 129 scientists involved in such studies. The proponents should also understand, however, that should they put this additional work into the proposal there is still another factor that might influence the degree to which LITHP can support the proposal. As it stands now, it is not clear that LITHP objectives can be met with a single leg of drilling. Time estimates for the proposed site are on the order of 80 days. The proponents should consider this issue in an exact site location based on new site survey data.

**11.3 425-Rev**: Offset Drilling within the rift Valley of the Mid-Atlantic Ridge in the 15°20'N Region: Drilling of lower Crustal Gabbros, Mafic/Ultramafic Transition Zones, and Residual Mantle along Magma-starved Ridge Segments;
Proponents: J.F. Casey, H.J.B. Dick, M. Cannat, H. Bougault, S. Silantyev and A. Sobolev

5. Address high-priority objectives of this panel

One of LITHP's highest priorities remains the recovery of significant lengths of lower crustal and upper mantle rocks at slow and fast spreading centers at both plume and non-plume sites. The 15 20'N Transform area offers an excellent opportunity to achieve many of the primary objectives of the offset drilling initiative, including the recovery of a crustal/mantle lithologic transition. At 15 20'N the plutonic and ultramafic exposures are not only extensive but are exposed along the rift valley walls both north and south of the Transform. The northern segment is "N"-type while the southern segment is associated with the "E"-type enrichment centered at 14 48'N.

LITHP, while enthusiastic about the overall potential of the 15 20'N, deemed an earlier version of this proposal as still immature. The proponents had not yet completed the interpretation/synthesis of the 1992 FARANAUT Nautile dive and mapping program. This information was needed tonot only locate the proposed drill sites but also necessary for proposing a specific set of petrologic and tectonic hypotheses.

LITHP's opinion is that this revised version has improved enough to warrant our highest endorsement. Drilling at 15 20'N offers an excellent opportunity to sample both plume and non-plume mantle and lower crust in the same region along a slow spreading center.

The Panel does have the following concerns/questions that it would ask the proponents to consider before planning the final drilling program.

1) It is estimated that during one leg of drilling that only two cased or three uncased 500m holes can be completed. Of the seven drill sites proposed (4 north; 3 south) which of these would be given the highest priority?
2) The future drilling at MARK (non-plume) is likely to recover long sections of both gabbro and peridotite. If MARK drilling is successful would the northern drill sites still be a high priority or would the program focus shift to the plume sites south of the transform? Before prioritizing drill sites at 15 20'N the MARK drilling accomplishments/results need to be thoroughly evaluated.
3) While LITHP concurs that seismic data is not necessary to site the proposed drill holes, it does believe that these data, especially refraction seismics, will significantly enhance the tectonic modelling portion of the study.

**11.4 400-Rev**: Determination of mass balance, fluid flow, and deformation mechanisms of the Middle America Trench and accretionary complex off Costa Rica; Proponents: E.A. Silver, K. McIntosh, M. Kastner, T. Plank, J. Morris, and T. Shipley

4. Addresses high-priority objectives, but with deficiencies

LITHP is very interested in this proposal because it is addressing the issue of relationships between geochemical fluxes in subduction system and arc magmatism, which is one of the highest priority objectives of LITHP. However, the proposal still has several deficiencies.

There is an ambiguity in the way to estimate the total amount of sediments accreted before a certain period of time (e.i., rate of accretion) that is going to be determined by drilling through the bottom of the apron sediments (at CR-3, -4). It may not be an easy task to delineate landward boundary of such accreted sediments and also to know the porosity variation in the prism. However, considering the importance in mass balance calculations, LITHP appreciates clarification of the basis for the estimation. This is especially crucial at the most arcward site, CR-4, given that the seismic data cannot clearly define the boundary between the accretionary prism and the seaward limit of the Nicoya ophiolite complex.

There is a rapid variation in Ba/La and 10Be contents for frontal volcanoes in northern Costa Rica and southern Nicaragua area. Because of this fact, the 10Be concentration for volcanoes on the extension of proposed transect may not be as low as stated in the proposal. This is crucial for the model of preferentially offscraping the top incoming sediments, which is proposed to test at CR-2, and we, therefore, strongly recommend to obtain (or present if they exist) the complete geochemical data set on those volcanoes, (especially 10Be).

Although the proponents are discussing mass balance constrains from arc volcanoes by comparing to Guatemalan data, there are more marked geochemical contrasts to Nicaraguan volcanoes than to Guatemalan volcanoes. This is the crucial observation that have lead Plank , who is one of the proponents of this proposal, and others to submit another drilling proposal off Central American. LITHP would like to encourage the proponents to more intimately collaborate with Plank et al. especially in the aspect of geochemistry of the volcanoes to maximize the scientific return by addressing mass balance problems in the subduction system of the Middle American Trench. This extreme contrast in subduction component signature in arc volcanoes belonging to the same subduction system serve the great opportunity to unequivocally pinpoint the crucial factors creating such remarkable geochemical contrasts.

LITHP also suggests Site CR-1 to drill more than 50m to sample alteration zone of incoming basaltic section as thick as the time frame permits.

**11.5 435**: Crustal Fluxes into the Mantle at Convergent Margins: Nicaragua and Izu-Marianas Margins; Proponents: T. Plank, M.J. Carr and J.B. Gill

4. Addresses high-priority objectives, but with deficiencies

The panel was very pleased to see two proposals addressing the objective of mass flux at subduction zones. The comments about this proposal should be taken in concert with some of the comments about Proposal 400-Rev in the Costa Rica margin.

The panel thought this was a clever approach to the problem of mass balance and appreciated the need to contrast a sediment-dominated system to a sediment-starved one. They also recognized the rationale for selecting the Nicaragua transect as that with the most clear sediment signature in the onshore volcanoes. However, the discussion of the Costa Rica margin proposal raised some question about the feasibility of doing the experiment on the Nicaragua margin. First, is it likely to be possible to obtain the same density and quality of seismic images of the accretionary wedge? The Costa Rica prism must be one of the best imaged around, and has the density of data which seems requisite to an experiment like this. Secondly, does the Nicaragua margin have the same slope cover as Costa Rica, which keeps material from being recycled down the slope and into the trench? Without that, it will be much more difficult to mass balance the prism. Third, is there a compelling contrast between Costa Rica and Nicaragua? It is clear that there is a discontinuity in chemistry, with a drop-off in 10Be, but it appeared from Ba/La that there is still a pronounced "subduction" signature in the volcanoes (though the volcanoes right along the Costa Rica transect don't appear to have any data).

So, the questions become: Are both transects required to solve the problem? Or, for a first-order cut, can we do one and live with the compromise that Costa Rica is well constrained at the prism, but more complicated (less well known?) than Nicaragua at the volcanoes, or with the compromise that Nicaragua is less-well constrained at the prism, but has a much clearer sediment signature in the volcanoes? We need the proponents to make a case one way or the other.

The western Pacific leg was relatively clear, since much of the drilling in the forearc and arc is already done. There were some questions raised about whether a couple holes would constrain the temporal and spatial variability of the crust adequately to link it to volcanic products. It is the understanding of some of us that the first-order systematics of the sediment/crustal chemistry are on the order of 1000's of km; it would be useful if the proponents included some discussion of the picture (admittedly incomplete) of the heterogeneity of these sediment sections.

On a logistical note, the program will probably be more manageable packaged as a two leg, or two proposal program to address the end-members of subduction zone mass balance. The western Pacific leg might be successfully combined with Proposal 368 A return to 801C (R. Larsen lead PI).

Sherm Bloomer is the watchdog for this proposal, and the proponents should contact him with nay questions about the proposal.

**11.6 334-Rev3**: Galicia Margin S' Reflector; Proponents: G. Boillot, M.O. Beslier, D. Rappin, E. Banda and M.C. Comas

3. Secondary interest to this panel if it is of high priority to another panel

Although this proposal is largely within the mandate of TECTP, LITHP recognizes the importance of drilling a major syn-rift detachment fault at a non-volcanic rifted margin. However, the continuity of the S' reflector with the S reflector has not been established; thus LITHP is not enthusiastic about drilling S'. Moreover, the GAL1 site on the peridotite ridge is unsatisfactory because the S' reflector is not apparent in the seismic stratigraphy.

**11.7 432:** A Deep Hole off Galicia to study the Mechanism of Continental Breakup: Sedimentary and Subsidence History and the Nature of the S Reflector; Proponents: T.J. Reston, G. Boillot, M.-O. Beslier, C.M. Krawxzyk, and J.-C. Sibuet

3. Secondary interest to this panel if it is of high priority to another panel

Although this proposal is largely within the mandate of TECTP, LITHP recognizes the importance of drilling a major syn-rift detachment fault at a non-volcanic rifted margin. In particular, LITHP is supportive of drilling the S reflector, providing that the feasibility of the proposed drilling can be demonstrated.

The proposed sites S1, S2, and S3 have penetration depths of 3100-3500 m with a drill string length of at least 8350 m required. This is at the very edge of the current technical feasibility.

One of the objectives listed by the proponents is to determine the sense of movement along the detachment fault by examining oriented core samples. The proponents should be aware that no oriented cores have ever been recovered by ODP in igneous or ultramafic basement. Tools to recover oriented cores are in development, but for now the proponents should consider alternative means of orienting cores (e.g. paleomagnetism).

**11.8 415 Add:** Caribbean Ocean History, Ocean Plateau and the Cretaceous-Tertiary Boundary Impact Event: Multi-objective drilling in the Caribbean Sea; Proponents: H. Sigurdsson, S. Carey, S. D'Hondt, L.J. Abrams, T.W. Donnelly, R. Duncan and C. Sinton

4. Addresses high-priority objectives, but with deficiencies

This addendum/revision directly addresses many of LITHP's concerns with the previous proposals, and LITHP commends the efforts of the proponents to improve justification of lithospheric objectives in drilling the Caribbean flood basalt province.

The province presents significant challenges for furthering our understanding of large igneous provinces (LIPs) through drilling. Its original structural setting, present areal extent (e.g., a map of the present-day Caribbean flood basalt province), and the effects of post-emplacement tectonicsm, for example, are difficult to assess. Lack of extrusive edges and of readily accessible "normal" oceanic crust are drawbacks in studying emplacement, lithospheric response, and plume character. However, the availibility of onshore exposures and the ongoing work on those exposures strengthen the case for ocean drilling.

The Caribbean flood basalt province is clearly interesting and intriguing. The panel reviewed the status of the Caribbean proposal, particularly in light of OHP's intent to construct a leg or two focusing on paleooceanographic objectives. The consensus of the panel was that we needed to take a lead role in sponsoring a proposal to address the K-T impact story and the origin of the Caribbean LIP. The availability of new site survey data (to be collected in April) and the results of shore-based studies of the LIP basalts by Duncan's students showing strong evidence for near-synchronous volcanism have changed the panel's opinion about the Caribbean as an appropriate site for a LIP study.

The panel will ask that the proponents of the Caribbean proposals with some Lithosphere interests be invited to the Spring meeting and we will work with them to develop a proposal that we can recommend for drilling. If there are strong objections from PCOM to this plan, we will assign a subcommittee to work with the proponents on proposal development.

**11.9 333-Rev2:** Cayman Trough: Ocean-Continent Boundary in a Transform Environment; Proponents: B. Mercier de Lepinay, P. Mann, U. ten Brink, E. Calais, and M.R. Perfit

3. Secondary interest to this panel if it is of high priority to another panel

This proposal presents a detailed evaluation of the tectonic evolution of the Cayman trough by drilling a series of east-west and north-south transects; the Cayman Trough now represents the northern boundary of the Caribbean plate. The LITH-panel interest in this proposal is penetration to basement in some sites which will permit characterisation of basement in an unambiguous conjugate transform margin associated with passive rifting.

Proposals to drill this region have been reviewed since 1989 and have received general encouragement based on the need to characterise basement at the onset of rifting as being a priority of LITH-panel. In particular site CAY 4-5 addressed LITH-panel objectives - in this proposal specifics for these sites are not presented as further preparatory studies appear to be warranted. An earlier proposal to drill the ridge axis (DCS system required) has been abandoned.

There is considerable doubt as to the nature of basement on the transects "leaky oceanic" early-rift alkaline etc.. The authors themselves state on page 19 that they "lack definitive information about the nature of crust in the outer parts of the trough - old trapped crust formed early in the rifting process, trapped transform crust, thinned continental crust". While these doubts may provide grounds for drilling on a regional basis, the information gained will not address global problems of the continent to ocean transition - such as addressed in NARM, Leg 122-123, Somali basin etc.

The geochemistry of basalts sampled in the Cayman spreading system are abnormal - "leaky" signatures - high Sr-isotopes (contamination, fluids alteration effect) more basement samples will provide information only of relevance to regional problems.

In the past LITH-panel may have provided more interest in drilling in this area than is reflected in its current global priorities. Despite very interesting problems associated with lithospheric thinning heat-flow and development of an oceanic basin. A detailed heat flow grid in the area may solve some of the problems identified in this proposal. The results to be obtained by drilling basement in this area are only of secondary interest given the current thematic objectives of Lith-panel. Consequently LITH-Panel will not rank this proposal highly in its global rankings.

The Panel did not feel that any of the proposals reviewed were sufficiently mature to warrant inclusion in the FY 95 prospectus.

Break for lunch

Reconvene 1330: reviews of proposals in the FY 95 prospectus. Proposal NAAG-DPG North Atlantic Arctic Gateways II and 423-Add Gas hydrate sampling were considered to be outside the mandate of the panel and were not considered further.

**11.10 323-Rev3**: Tectonic Evolution of an Extensional Marine Basin in a Collisional Setting: The Alboran Sea; Proponents: M.C. Comas, A.B. Watts, V. Garcia-Duenas, R. Kidd, A. Maldonado, J. Platt, R. Stephenson, and J. Woodside

3. Secondary interest to this panel if it is of high priority to another panel

The nature of basement is of some interest to LITHP, but lack of basement objectives at Alb-3 and Alb-4 reduces LITHP's interest relative to previous versions. LITHP still finds the proposal unclear in the planned analyses of the basement samples.

**11.11 386-Add**: Ocean Drilling in the California Margin and Southern California Borderland; Proponents: M. Lyle, S.D. Stott and J. Barron

3. Secondary interest to this panel if it is of high priority to another panel

The aspects of this proposal relevant to LITHP include the attempts to measure deformation of the Gorda Plate, and the two holes that will be drilled 50-60 m intobasement on the California Margin. LITHP notes that a large number of holes proposed in this proposal are drilled to basement and then stop as soon as basement is reached. LITHP recommends the continuation of drilling into basement on these sites until destruction of the XCB cutting shoe. This will add a minimul amount of time to the drilling (1-4 hours per site) with significant potential gain to the LITHP community.

- **[The Panel would like some clarification on what the present policy about sampling basement, if it is reached, is to be. The objectives of many sites seem to require APC/XCB to basement. What kind of penetration/recovery can we expect (and should we require) from continued XCB drilling into basement on legs with sedimentological/ocean history objectives?]**

**11.12 346-Rev4**: The Cote d'Ivoire Ghana transform (translational) margin (Eastern Equatorial Atlantic); Proponents: J. Mascle, C. Basile, R. Scrutton, M. Moullade, and C. Ruppel

3. Secondary interest to this panel if it is of high priority to another panel

LITHP recognizes the importance of trying to understand the ocean continent transition at a transform margin and acknowledges the improvements in this proposal in terms of addressing this problem. Nevertheless, the proposal remains of only secondary interest to this panel since the objectives are largely tectonic, sedimentological and ocean history.

**11.13 330-Add3**: Time Progressive Continental Collision: The Meditarranean Ridge Accretionary Complex in the Eastern Mediterranean (Phase 1 Shallow Drilling); Proponents: A. Camerlenghi, E. Suess and M. Torres

1. Proposal objectives not within mandate of this panel

This addendum demonstrates that there is now sufficient site survey data to achieve the goals of this proposal. Although LITHP is generally interested into the dynamics of of accretionary wedges, the specific goals are not within our mandate.

**11.14 391-Rev2**: Depositional History and Environmental Development During the Formation of Sapropels in the Eastern Mediterranean; Proponents: R. Zahn, M.B. Cita, G. de Lange, K-C Emeis and A. Cramp

1. Proposal objectives not within mandate of this panel

The latest revision is a significant advancement on the clarity and maturity of the proposal. The proposed drilling is outside of the mandate of this panel. Panel discussion did note the similarity of the genetic setting of giant Pb-Zn deposits (hosted by black shales, associated with high salinity fluids derived from evaporites, deposition in small, tectonically active ocean basins) with the Mediterranean, especially the Eratosthenes Seamount site. While it is extremely unlikely that mineralization of this type will be encountered, we would hope that the scientific party would recognize the scientific significance of a chance encounter of sulfide

mineralization and be willing to expend as much drilling and logging time as practical sampling such material.

**11.15 300-Rev**: Return to 735B; Proponents Dick et al.

[Although there was not a new version of this proposal, the panel briefly reviewed it prior to ranking the prospectus proposals. The proposal is for a two-leg program, of which we considered only the first, deep hole. That site is clearly ready to drill and could make a major contribution to our understanding of the architecture of the lower crust. The panel notes that it is essential that the hole be logged completely if it is drilled. The panel took note of the contingency sites that the proponents had proposed.]

**11.16 380-Rev3 and addition**: VICAP-MAP; Proponents: Schminke et al.

5. Addresses high-priority objectives of this panel

LITHP recognizes that this is a mature proposal and that the proponents have responded to previous LITHP reviews. The only reservations expressed by the panel again concern the implications of large scale slumping in tø the completion of drilling aimed at oceanic island evolution. However, LITHP recognizes that through new site survey data the proponents have made as much effort as is possible in addressing this issue. There may be scheduling problems in fitting all the presented sites into a single leg of drilling. LITHP supports completing the VICAP sites; if sites need to be cut LITHP would prefer that these be taken from the MAP program. In panel discussions LITHP has further recognized that its previous rankings reflect previous concerns in the proposal(s ) rather than how the program fits overall LITH drilling goals. The drilling fits highly ranked longstanding thematic goals and its present form will be highly ranked by LITHP for drilling.

**11.17 SR-Rev2**: Sed Ridges II: Revision of the Sedimented Ridges Detailed Planning Group Drilling Strategy Based on Results of Leg 139 Drilling at Middle Valley; Proponents: J.M. Franklin and R.A. Zierenberg

5. Addresses high-priority objectives of this panel

This proposal represents a revised strategy for a second leg of drilling hydrothermal systems at sedimented ridges and addresses a number of fundamental problems related to hydrothermal activity at oceanic spreading centers. The general objectives for drilling at Middle Valley (northern Juan de Fuca Ridge) and Escanaba Trough (southern Gorda Ridge) include: (1) to study the formation of massive sulfide deposits in sedimented ridge crest environments, (2) to investigate the hydrology of the vent fields, and (3) to study the formation of oceanic crust at sediment-covered ridge crests and its relation to hydrothermal circulation. It is important to note that the hydrothermal fluids at Middle Valley have a strong basalt signature whereas fluids at Escanaba Trough show significant reaction with sediments and thus are more sediment-dominated. This major difference makes drilling both at Middle Valley and Escanaba Trough important for the understanding of various types of massive sulfide deposits. The proposal contains most of the relevant information and data to support the proposed drilling strategy and is considered to be mature. Additional site surveys are planned for 1994 and this data will further strengthen the proposal.

**11.18 NARM-Add**: NARM - Non-volcanic Transect I: Deep Drilling in Northern Newfoundland Basin; Proponents: J.A. Austin, J-C Sibuet, S.P. Srivastava, B.E. Tucholke

3. Secondary interest to this panel if it is of high priority to another panel

The nature of the transition between oceanic and continental crust on a non-volcanic margin is of interest to LITHP. Site IAP-3 seaward of the peridotite ridge is important as it will sample the oldest oceanic crust, but in view of Leg 149 drilling, it is not clear that the deep Site IAP-1 will resolve the uncertainty of the nature of the nature of the crust along the rest of the transect.

Drilling in the Newfoundland Basin (NB-4) should be considered as the deep "U" reflector will yield important information of basin-wide significance even if the basement rocks here also may turn out to be enigmatic.

[The panel recognized that NARM-Add was not the non-volcanic margins proposal included in the prospectus, but we used the review of this proposal as the focus of our discussion of NARM-Non-volcanic II. The results of Leg 149, while interesting, appear to have raised a number of questions about the original interpretation of the margin and clearly have not resolved the problem of siting deep hole IAP-1. The panel does not feel that we are ready to rank a second leg of NARM-non-volcanic drilling until a more thorough interpretation of the Leg 149 results is completed and in particular we feel that it is premature to commit to a deep hole on the Iberian margin.]

**11.19 Narm - Add 2:** Amendment to the North Atlantic Rifted Margin Detailed Planning Group Report (Narm-DPG): Volcanic Margin Transect East Greenland (EG63-transect); Proponents: H-C Larsen, C.K. Brooks, K.G. Cox, and T.D.F. Nielsen

4. Addresses high-priority objectives, but with deficiencies

Investigation of volcanic passive margins continues to be a long-term, high-priority scientific goal of LITHP. NARM-Add2 proposes to exploit a unique opportunity to examine large igneous province development from a continent across the continental margin to oceanic crust. This transect, combining proposed deep continental drilling with ODP sites, would be a first. Due to uplift of the East Greenland margin, crustal levels originally several kilometers deep are now at the surface, permitting sampling at levels inaccessible on most, if not all other volcanic margins. This aspect, however, presents problems in determining timing of tectonic and magmatic events.

LITHP encourages development of a mature proposal from NARM-Add2. LITHP notes, however, that the proposal represents dominantly tectonic and subsidiary lithospheric objectives, in contrast to the NARM-DPG report on volcanic margins, which contains primarily lithospheric objectives. In its present form, the proposal does not adequately link the scientific objectives with the recent site survey data. Dikes, block rotations, and the breakup unconformity, for example, must be taken on faith in the present version of the proposal. The proposed tectonic model needs further documentation. Also, the final deep continental drilling site must be linked to the Leg 152 transect.

[The panel recognized that NARM-Add was not the non-volcanic margins proposal included in the prospectus, but we used the review of this proposal as the focus of our discussion of NARM-volcanic II. The Panel did not see how a second leg of drilling on the East Greenland margin could be scheduled until the results of Leg 152 were completed and at least partially digested. The results of that leg very likely will change the picture of the rifted margin story and consequently the plans for examining it with the drillstring. It may well show that additional drilling is not critical or that it needs to be sited differently--however, we have no way to sensibly evaluate the options. The panel felt that if a second leg of NARM-volcanic drilling were to be done, the best approach was that originally outlined in the NARM-DPG report, of doing a transect on the Voring margin. Mike Coffin had talked to one of the participants in the first Voring margin drilling and was of the opinion that 2 of the 3 Voring sites were adequately surveyed to be drilled now.]

Break for air

**12. Ranking of proposals in the Prospectus**

12.1 Definitions: The panel ranked 7 proposals. The NARM-Volcanic II leg referred to here is the Voring margin transect originally outlined in the NARM-DPG report. Proponents were not allowed to vote for their own proposal and scores were normalized to the number of people allowed to vote for a proposal. The individual voting sheets have been kept for reference.

12.2 Rankings:

| Rank | Proposal: | # of people voting | Score | Stan. Dev. |
|---|---|---|---|---|
| 1 | Return to 735B | 16 | 6.50 | 0.82 |
| 2 | Sed. Ridges II | 14 | 5.07 | 1.38 |
| 2 | VICAP-MAP | 16 | 5.00 | 1.37 |
| 4 | NARM-Volc. II | 16 | 4.75 | 1.24 |
| 5 | East. Eq. Transform | 16 | 3.25 | 1.29 |
| 6 | Calif. margin | 16 | 2.13 | 1.15 |
| 7 | Alboran Sea | 16 | 1.81 | 1.05 |

**13. Recommendations for Leg 157**

The Panel suggested that VICAP-MAP could be ready to drill in time to be scheduled as Leg 157. It is an appropriate part of the Atlantic, and the site survey data is all in hand, wanting only some processing of the latest multi-channel seismic lines. [Peter Herzig contacted the proponent's group in the evening, and they felt that they could be ready to be scheduled as Leg 157.]

Alternatively, if PCOM chose to follow the SGPP strategy of combining a couple of shorter programs (Caricaò Basin and Med. Sapropels) that the proposal to CORK Hole 395A could be accomplished during that leg. The ship will be finishing Leg 156 in the western Atlantic and spending 2-3 days to CORK 395A could easily be accomplished. LITHP rated the proposal to CORK 395A highly enough that we were willing to give up time on MARK or TAG to accomplish. it. [We talked with Keir Becker Thursday morning who said that he had a thermistor string ready, but that it might be difficult to fabricate the necessary latching hardware at TAMU in time. Keir felt that 4 days on site would be reuired to complete the work.]

Meeting adjourned for the day at 1830

**October 14, 1993: Meeting of the Lithosphere Panel, The Inn at Loretto**

Called to order at 0830:

**13. Review of work on White Paper**

**13.1. Work to date:** Bloomer reviewed the development of the White Paper to date. The existing draft consisted of a Part 1, summarizing accomplishments to date and specific objectives for scientific drilling in the periods from 1993-98 and 1998-2003. Part 2 consists of a review and discussion of the major scientific questions of interest to the Lithosphere Panel. Part 2 was the product of our work over the previous year, and had been largely finalized at the Spring, 1993. Part 1 was written largely by Bloomer and Humphris over the summer, in response to feedback from PCOM about the purpose and structure of the white papers. A proposal was submitted to USSAC to fund a small meeting (about 50 people) in Leicester, England in September, 1993 to discuss the contents of the draft white paper. That proposal was turned down, largely on the basis that it was inappropriate for USSAC to fund a meeting to revise what was to be JOIDES

document. Instead, copies of the draft have been mailed to most large earth science departments in the U.S., mailed to subscribers to the RIDGE and MARGINS mailing lists, and posted on an electronic bulletin board open to subscribers to the VOLCANO LISTSERV. To date, about a dozen comments had been received on the paper. Upon completion of a revised draft, LITHP members agreed to make a concerted effort to solicit comment from colleagues in their fields and countries.

**13.2 Discussion of accomplishments to date:** The accomplishments to date section was reviewed and a number of corrections made to descriptions of specific leg results. There was suggestion made that Table 2, summarizing all of the results, was useful but might be relegated to an appendix and replaced by a figure in the text. Rob Zierenberg will work on a draft of such a figure.

**13.3 Priorities sections:** Bloomer led a discussion on the prioritization list. The list of priorities for 1993-98 remained largely as it was (recognizing that several of the things on the list had been or would be accomplished in the next year). That list reflects items already in our global list and includes:

- •Characterization of the lower crust and upper mantle (in part addressed by Hess Deep, 504B and MARK)
- •Characterization of hydrothermal systems at sedimented and non-sedimented ridges (in part addressed by Sedimented Ridges I and TAG)
- • Evolution of the mantle and mantle plumes (in part addressed by VICAP)
- •Breakup of continents and the evolution of the ocean-continent transition (in part addressed by NARM volcanic and non-volcanic)
- •A test of the origin and extent of a large-igneous province
- •An experiment to constrain mass fluxes at convergent margins
- •A test of the supra-subduction zone ophiolite hypothesis
- •An experiment addressing the physical and chemical evolution of the oceanic crust

The Panel believes that we can make significant progress on several of these problems by 1998, assuming a strategy of about 1.5 legs a year drilling arrays of shallow to intermediate depth holes (<1000 m) as we having been doing to date. Some of these objectives can also be addressed on legs of interest to other panels, for example the problem of mass flux at convergent margins.

The discussion of priorities for 1998-2003 was more involved. The draft from Bloomer and Humphris emphasized the drilling of "deep" holes--in the sense of being deeper than what we had typically drilled with the Resolution. The Panel felt that those objectives had been written too much from the point of view of technological, rather than scientific goals, so we reexamined the problem by asking what we would feel we did not know in 1998 after this first phase of drilling. The objectives that emerged from that discussion for the period 1998-2003 were:

- To examine the characteristics of the reaction zones beneath large hydrothermal deposits
- Complete the offset section characterization of the lower crust, focusing on sampling long sections through the transition zones between principal layers
- To try to constrain the lower crustal structure of a large igneous province to examine issues associated with eruptive mechanisms and timing
- To sample the upper crust at or near a ridge axis to examine the processes of crustal construction and modification and to constrain models of ridge magma chambers
- To comple one of the mass balance experiments by sampling the deeper portions of a forearc to constrain fluid and mass partitioning
- To examine the link between mantle plumes and the development of continental margins by examining a volcanic continental margin away from a plume
- Study the genesis of large, stratiform ore deposits that might be analogs for the large terrestrial deposits

In

reflecting on this list, it was clear that most of these objectives, except perhaps the last, were likely to be answered by drilling fewer, but significantly deeper holes than we have been doing to date. By deeper, however, we are talking about holes which are likely to be 1-2 km deep, in 4 km or so of water. Each such site will probably require 2 legs of effort, and we recognize that only 3 or 4 of these objectives will likely be completely fulfilled by 2003. The prioritization of these objectives will depend on the quality of sites available to accomplish them, the interest of other panels in some of these objectives, and the quality of the proposals prepared to address these issues. **The Panel felt it was important to note that our objectives through 2003 are all well within the capabilities of the present drilling platform.** However, the sampling of near-ridge upper crust will require the development of a viable diamond coring system.

Bloomer will collate the comments form the panel discussion, as well as the written additions from panel members and will rewrite the section on goals and priorities for presentation to PCOM in December.

**13.4 Assignments for working groups on Part 2:** The Panel felt that the more general discussion of scientific problems in Part 2 was an important part of the document, but agreed that it needed to be trimmed down significantly. Rather than wade through each of the sections again, working groups were assigned to try to cut each major section by half. The groups will submit their changes to the chair who will try to finish a final draft by mid-November. Gillis, Ozawa, Bloomer, and Fisher will work on Convergent margins, Coffin will coordinate comment on the LIPS section, and John Bender will collate changes to the Mid-ocean ridge section.

**14. Other business**

**14.1 BRG liaison:** The Borehole Research Group has proposed sending a liaison to one meeting of each thematic panel each year. The Lithosphere Panel strongly endorses this idea and recommends that the liaison attend the fall meeting, for the ranking of proposals in the prospectus.

**14.2 Movement of core repository:** The Panel reviewed the issue of moving the East Coast Repository cores to Bremen. The Panel supports the internationalization of the Program but felt that the risk of any damage to core made moving them unacceptable. They also questioned how long the core would be unavailable if the move was as complex as has been suggested in some reports. **The Lithosphere Panel unanimously (16-0) supports the compromise suggested by T. Pyle, that a new repository be established at Bremen, that cores from Leg 151 on be stored at Bremen, and that cores from legs prior to 150 remain at the East Coast Repository.**

**14.3 Tool development:**

VPC: The Vibro-percussive core will not probably be an important tool for most of our objectvies and the Panel did not feel that they could offer any kind of infomred opinion about its development.

PPCS: The development of the push-in pressure core sampler will be critical for some of objectives in hydrothermal systems and mass balance experiments, where the gas content and chemical composition of fluids are important variables to measure. The PPCS appears to b an improvement of the PCS, which is viewed as an important tool for LITHP objectives. The Panel reccomends that the development of the PPCS proceed as outlined in the proposal.

**14.4 TEDCOM recommendations: The Lithosphere Panel strongly endorses the idea that TEDCOM become a more proactive group and believes that TEDCOM should have a more active role in the conception, design, and deployment of new tools and systems in the Program. That input should include smaller projects (things like the VPC for example) as well as larger projects like DCS.**

The Panel had little familiarity with people in engineering or academic positions who might be appropriate representatives to TEDCOM. There was a consensus that one of our former mebers,

Dan Moos (Stanford University), would be an excellent TEDCOM representative. Dan served as TEDCOM liaison during his time on LITHP, and is intimately familiar borehole measurements.

**14.5 Core-Log Integration:** The Panel discussed the issue of core-log integration for some time. At the joint meeting with DMP on Tuesday, the idea had been raised of consituing a sub-committee to review the problem and to delineate the principal problems, to proposed solutions , and to set some milestones for achievement. The Panel's general reaction to the problem was one of confusion; we felt that we could not recommend a course of action without some more concrete information. It is clear that while core curation in the Program has been excellent, the data curation has been somewhat lax. The Panel does not understand what the $600K for the computer upgrade allocated in FY94 is to accomplish, given that proposals for the upgrade are running in $3-5M range. It would seem that the issue of core-log integration is moot until there is agreement on the form of the new database. LITHP asked Andy Fisher to prepare a report for the Spring meeting on this issue, and to review for us who the players are, where the computer upgrade is, and what progress might be made on integration and curation of core and log data with or without the upgrade.

**14.6 Equipment prioritization:** The Lithosphere Panel recognizes that the Diamond Coring System has been the object of great deal of criticism. **The Panel still believes that the most critical equipment development needed for the successful completion of its long-term objectives is the deployment of a viable diamond coring system. The Panel unequivocally supports the continued testing and development of the DCS.** The diamond coring concept promises a tremendous increase in core recovery in a variety of difficult to drill sequences which include, but are not limited to, the fractured basalts of near-ridge environments. The Panel does believe that it is essential that adequate resources be supplied to allow a land test and computer simulation test of the system before it goes to sea again. The short term costs of the on land testing will certainly be balanced by the savings gained in finding, and solving problems, on the beach rather than at sea.

The Panel has the impression that some aspects of the land test may be being designed under the impression that there is a strong incentive to be able to drill in water as shallow as that at the proposed Vema site. The Panel recommended the Vema site as a target of opportunity at which a DCS test could provide some useful scientific information, but more importantly one at which the time -on-bit could be maximized because of the shallow water. The Vema site would also allow a test of the DCS's capabilities to drill limestone sequences. However, we believe that the land and sea tests should also be such that they will give us some confidence that the DCS system, particularly the secondary heave compensation system, will work not only along a shallow ridge like that at Vema, but also in the deeper water characteristic of most of the mid-ocean ridge system. The proposed sea test does not **need** to be at the Vema transverse ridge. We could suggest alternate sites if deeper water would be desirable. The Panel would like to request that we receive a briefing on the results of the DCS land test at our Spring meeting.

**14.7 Fall AGU:** The panel had a request from the U.S. Geodynamics Committee for someone to brief the Committee on the plans contained in our draft white paper. The Committee is meeting the Saturday before AGU and it does not appear that any panel members will be free at that time. Bloomer will send a current version of the white paper to the Committee chair and will provide any other information they need. John Tarduno volunteered to meet with the group at AGU if he is free at that time.

**14.8 Communication with engineering:** The Panel expressed some concern at our Spring meeting that the communication between the scientists and the engineers in planning hard-rock legs did not seem to be working very well. The scientists involved in planning the legs, including proponents, chief scientists, and panel members, are not always familiar with the technical requirements and limitations of drilling in different environments, and can be somewhat baffled by the array of terms and technologies available in the program. However, the scientists often have a very good idea of the physical characteristics of the rocks to be drilled and the geologic complexity of the site environment, which have a critical bearing on the selection of appropriate tools to be taken to sea. There seemed to be a general sense among recent co-chiefs and many

panel members that that expertise was not being communicated to the engineering group. Our concern was heightened by the confusion over the preparations for the MARK Leg, in regards to what hardware would be aboard the ship and whether we were building on the experience of the Hess Deep drilling.

Jay Miller (ODP/TAMU) and Gene Pollard (ODP/TAMU) led a discussion on their perception of the science-engineering communication. Jay believes that the situation is improving, in that there are much more frequent discussions between the Science Ops and Engineering groups. They now plan to make sure that the staff scientists and the engineers sit and review any leg on which unusual engineering problems are anticipated. Jay felt that the pre-cruise meetings needed to be restructured, perhaps to be 3-4 days long if possible, but in any case that they should focus on logistics and should postpone the briefings on publications and post-cruise problems till later.

It was clear that the Panel's link to the Engineering Group should be through our staff scientist liaison. Jay and Gene both pointed out that they had received no materials for this meeting, beyond the invitation to attend, and that neither had a very clear idea of what to expect. The Panel agreed that the chair should make sure that the staff scientist liaison, and any engineers attending our meetings, should receive all of the materials distributed to the Panel members, and that we should make sure we are including the staff scientist in all Panel discussion, so that they can be as fully informed as possible about our plans and intentions when they return to College Station. The Panel also asked that the Engineering group distribute copies of their drilling tool synopses to panel member and proponents of highly-ranked drilling proposals. The panel chair can distribute those copies as necessary.

The panel decided to appoint watchdogs for our highly ranked proposals in the prospectus. For those highly ranked proposals which are scheduled, the watchdogs will help the proponents in their planning for the leg and will facilitate discussions between TAMU, the panel, and the proponents. The watchdogs will provide a review of the leg planning progress at each meeting following its scheduling, until the leg is drilled. For those highly ranked proposals that are not scheduled, the watchdogs will follow them to make sure there s not a fundamental flaw in the program.

**14.9 Review process**: The Panel spent some time discussing the proposal review process. We agreed with PCOM's recommendation to be blunter in our reviews, particularly of proposals with little chance to ever be drilled. We have found that the watchdog approach has helped a lot. It gives the proponents more immediate, and personal, feedback and also helps them understand the system a little better. Many panel members have the impression that the ODP proposal process is opaque to many proponents and that it often takes one round of proposal review and comment before some of the complexities of the system become clear to the PIs. The Panel felt that there should continue to be two deadlines a year for proposals, while recognizing that proposal that come in in January may have a somewhat different history than those that come in in June. The two deadlines force people to think about proposals on a regular basis and help insure prompt revisions and improvements.

The panel recommended removing the numerical ranking on the proposal review form and replacing it with a simple statement about the proposal's relevance to the panel. The numerical system gives the impression of a ranking, and seems to generate a great deal of false hope and misunderstanding.

One of the most difficult problems with the review process is that the lifetime of many proposals is longer than that of most panel members. As a consequence, it is common for some of the development history of proposals to get lost. That history is often an important factor in the panel's understanding of why certain things exist in a proposal and why a proposal has been structured in a certain way. Unfortunately, that history is sometimes lost when panel members rotate and proposals may suffer as a result. The panel had two suggestions for improving the "memory" of the group. The first has been accomplished in part by the distribution of previous proposal reviews and summaries with the prospectus proposals this year. The development of a

"briefing book" with abstracts, summary maps, and previous reviews of all active proposals would be invaluable in improving ht the corporate memory of the panel. Secondly, the panel suggests that PCOM consider reappointing a member of each panel occasionally, so that there is someone besides the chair with a longer memory of most of the proposals in the system than most of the individual panel members.

Finally, the Panel notes that we need a mechanism for accommodating interdisciplinary proposals in the system. The demise of the regional panels removed some of the flexibility of the system for looking at proposals that sought to answer a number of thematic questions through drilling in a specific region. The Caribbean K-T proposals have reminded us of some of the problems and the panel requests that the issue of encouraging and fostering interdisciplinary proposals be brought up at the PANCHM meeting in December.

While the Panel has requested that we bring the Caribbean proposal proponents to our next meeting, we do not believe that proponents should routinely attend panel meetings. We have made he request in this case because we feel that a scientifically important question is going to go unaddressed without some planning.

**15. Next meeting:** Yngve Kristoffersen has offered to host the next meeting at Bergen, Norway on March 28, 29 and 30, 1994.

**16. Membership issues:** The Panel has two members who finished their terms at the fall meeting, John Bender and Rob Zierenberg.

The Panel requests that Rob Zierenberg be reappointed for another three year term. We are making this request in an effort to improve the "corporate memory" of the Panel. Rob has been a very effective and knowledgeable member of the panel and has provided important insight to our discussions of many of the proposals now being drilled and being considered for drilling. We feel that he is an excellent choice as what the ASRC termed a "best past member". Rob is willing to serve another term. If his reappointment is not acceptable, the Panel recommends that John Slack of the U.S. Geological Survey in Reston be appointed in Rob's place.

The panel recommends first, Jill Karsten of the University of Hawaii, and as an alternate choice, Emily Klein of Duke University, to replace John Bender on LITHP. Both have extensive expertise in the petrology and tectonics of mid-ocean ridges and will provide an important link to some of our most important constituents in the community.
Wither would be a good replacement for John as liaison to InterRIDGE. Bloomer will contact all of the proposed replacements to see if they are willing to serve.

Finally, the panel thanks John Bender and Rob Zierenberg for their work on the panel the last three years. It has been a great pleasure to work with them and they have provided many hours of valuable service and advice to the Panel and the Ocean Drilling Program.

**17. Proposal development:** We reviewed the status of the proposals in the system and assigned Kathy Gillis to be the watchdog for the Antarctic Discordance Proposal; the AAD proposal may be combined with the cold water carbonate proposal and we want to keep informed of the proponents' plans. Rob Zierenberg will contact the members of the EPR-DPG and ask them to provide an update or revision of plans for EPR drilling. There are no proposals active in the system which address our high priority objective of zero-age crustal studies.

The meeting was adjourned at 1400.