JOIDES PLANNING COMMITTEE SUMMER MEETING
20-22 August 1991
Bundesanstalt für Geowissenschaften und Rohstoffe
Hannover, Germany

AGENDA

Additional Attachments Page Number WHITE

As of July 26, 1991

JOIDES MEETING SCHEDULE

Date	Place	Committee/Panel
1991		
11-14 August	Copenhagen, Denmark	NARM-DPG
12-15 August	Woods Hole, MA	OD-WG
20-22 August	Hannover, FRG	PCOM
23 August	Houston, TX	DMP/Pore-Fluid Sampling
11-12 September	Victoria, BC	TEDCOM
11-14 September	Victoria, BC	IHP
early October*	Tokyo, Japan	SSP
01-03 October	Yamagata, Japan	OHP
09-11 October	Nicosia, Cyprus	LITHP
09-11 October	Nicosia, Cyprus	TECP
14-17 October*	Halifax, NS	SMP
15-17 October*	Halifax, NS	DMP
23-25 October*	La Jolla, CA	PPSP
04-06 November*	La Jolla, CA	SL-WG
08-09 November*	Zurich, Switzerland	SGPP
03 December	Austin, TX	Panel Chairpersons
04-07 December	Austin, TX	PCOM
1992		
14-16 January	Bonn, Germany	EXCOM
21-23 April	Corvallis, OR	PCOM
18-20 August	Victoria, BC	PCOM
Annual Meeting	Palisades, NY	PCOM

*Meeting not yet formally requested and/or approved

JOIDES Resolution Operations Schedule

Leg	Program	Cruise Dates	Days			In Port
			Transit	On Site	Total	
138	E. Equatorial Pacific	06 May-05 July '91	22	38	60	San Diego, 05-09 July '91
139	Sedimented Ridges I	10 July-11 Sept. '91	6	57	63	Victoria, 11-15 Sept. '91
140	504B*/Hess Deep**	16 Sep.-12 Nov. '91	18	39	57	Panama, 12-16 Nov. '91
141	Chile Triple Junction	17 Nov.-13 Jan. '92	18	39	57	Valparaiso, 13-17 Jan. '92
142	Engineering, EPR	18 Jan.-19 Mar. '92	25	36	61	Honolulu, 19-23 Mar. '92
143	Atolls & Guyots A	24 Mar.-19 May '92	12	44	56	Majuro, 20-24 May '92
144	Atolls & Guyots B	24 May-19 July '92	12	44	56	Yokohama, 20-24 July '92
145	North Pacific Transect	24 July-21 Sept. ' 92	20	39	59	Victoria, 21-25 Sept. '92
146	Cascadia	26 Sept.-21 Nov. '92	6	50	56	San Diego, 21-25 Nov. '92
147	Engineering EPR***/Hess Deep	26 Nov. '92-21 Jan. '93	14	42	56	Panama into the Atlantic

* If cleaning operations on early leg are successful , Hole 504B will be advanced during all of Leg 140
** If cleaning operations on early leg are not successful, the drillship proceeds to Hess Deep
*** If DCS Phase III System is ready

JOIDES PLANNING COMMITTEE SUMMER MEETING
20-22 August 1991
Bundesanstalt für Geowissenschaften und Rohstoffe
Hannover, Germany

AGENDA NOTES

Tuesday 20 August 1991 (9:00 AM)

Item A.
Welcome and Introduction

1. Welcome, and comments about meeting logistics and field trip (U. von Rad).

2. Introduction of PCOM members/alternates, liaisons, and guests.

Item B.
Approval of Minutes

1. The attached revised draft minutes of the 23-25 April 1991 PCOM Meeting at Narragansett, Rhode Island include corrections received at the JOIDES Office through 2 August, 1991.

2. ACTION Call for additional corrections or additions; call for approval.

Item C.
Approval of Agenda

1. Comments about content of the meeting and organization of its agenda (J. Austin).

The primary purposes of the Summer Meeting are to: 1.) confer with liaison groups to other international global geoscience initiatives (**Agenda Items F. and L.**); 2.) make modifications to the near-term drilling program necessitated by [potential] addition of "supplemental" science to the schedule (**Agenda Item I.**) and/or by other events occurring since the Spring Meeting (**Agenda Item K.**); and 3.) consider and conduct routine JOIDES business (**Agenda Items D., E., G., N., and P.**).

In addition, PCOM will: 4.) hear a summary of Leg 138 by one of the co-chiefs (**Agenda Item H.**); 5.) consider OPCOM's preliminary

recommendations for use of the $2.1M funding increment from NSF (**Agenda Item J.**); 6.) discuss format of the FY93 "North Atlantic Prospectus" (to be prepared by the JOIDES Office and submitted to the thematic panels by mid-September) (**Agenda Item O.**); 7.) review a geriatric study of all ODP proposals by the JOIDES Office, with a view to imposing a statute of limitations on proposal consideration by ODP's scientific advisory structure (**Agenda Item O.**); 8.) discuss impact of third-party tool development on ODP's scientific objectives, in light of recent developments re: Geoprops (**Agenda Item O.**); 9.) consider the issue raised by EXCOM of the propriety of active PCOM members serving as co-chiefs (**Agenda Item O.**); and 10.) engage in a general (re-) discussion of "focusing" the Long Range Plan (**Agenda Item M.**).

2. ACTION Call for additions to **Agenda Item O.**; call for other additions or revisions; call for agenda approval.

Item D.
ODP Reports by Liaisons to PCOM

1. **NSF** (B. Malfait, liaison).

- Budget issues and program plan, 1993-1996.
- U.S. field programs, 1992.
- Other.

2. **JOI** (T. Pyle, liaison).

- FY92 Program Plan.
- Status of high-temperature tools.
- Other.

3. **Science Operator** (T. Francis, liaison) (except engineering, **Agenda Item G.**).

Break 1000-1015 Coffee

4. **Wireline Logging** (X. Golovchenko, liaison).

- Operations and results since the last PCOM meeting (legs 137, 138, 139).
- Other developments.

5. ACTION Identification of action items from morning reports; take action or postpone (probably to **Agenda Item O.**) as appropriate.

Item E.
JOIDES Reports by PCOM Liaisons

1. EXCOM (J. Austin, liaison).

EXCOM met with the ODP Council in La Jolla, California at Scripps Institution of Oceanography on 9-11 July, 1991. The meeting was held to coincide with the San Diego port call of *JOIDES Resolution* in order to enable attendees to visit the ship. Reports by PCOM, JOI, BCOM, Wireline Logging and the Science Operator were well received.

EXCOM and ODPC discussed individual perspectives and scheduling for renewal. Even though fiscal years and decision points vary from partner to partner, a preliminary decision about renewal of ODP should be in hand by early 1992. The outlook for renewal, at least through 1998, is generally positive.

EXCOM spent much time discussing the need for alternate platforms, particularly with respect to national programs (and platforms) anticipated to come on-line later in the 1990's. EXCOM eventually nominated a subcommittee to investigate the problem further, to report back to EXCOM at its next meeting in January, 1992.

EXCOM approved the FY92 program plan with a caveat clarifying the goals of Leg 147, as detailed in the following motion:

EXCOM endorses the FY92 Program Plan as written, with the following caveat, as described to EXCOM by the PCOM chair:

1.) Leg 140 will be conducted in the Program Plan as described (return to 504B, with the back-up to be Hess Deep);

2.) If Leg 140 is Hole 504B, Leg 147 will be Hess Deep;

3.) If Leg 140 takes place predominantly at Hess Deep, the site of Leg 147 operations will be one of the following:
- *Hess Deep, if Leg 140 operations there are deemed by PCOM to be successful;*
- *EPR for continued DCS testing, if Leg 140 operations at Hess Deep are deemed by PCOM to be unsuccessful;*

- *the North Atlantic (for one of the anticipated highly-ranked programs there), if Hess Deep operations are unsuccessful and further EPR DCS testing is deemed not feasible by PCOM because of the pace of DCS Phase III development during FY92.*

EXCOM also reiterated its October 1990 motion and consensus urging PCOM to pay special attention to truly major scientific issues, in particular by drilling through the lower crust and upper mantle, and to continue to focus ODP on particular LRP themes (see **Agenda Item M.**).

EXCOM approved the change in wording for the DPG mandate as specified by PCOM at its April meeting.

Finally, EXCOM remains generally concerned about the role of PCOM within the JOIDES scientific advisory structure. In particular, they would like feedback from PCOM on the appropriateness of individual PCOM members serving as co-chiefs during their tenure on the committee. PCOM will discuss this under New Business (**Agenda Item O.**).

2. SMP (M. Cita-Sironi, liaison).

PCOM heard a report in April of SMP's 19-21 March meeting in College Station, but at that time PCOM did not have the full SMP minutes (attached to this Agenda Book). If PCOM members want to raise issues discussed by SMP that were not discussed in April, they can be brought up here.

3. PPSP (J. Austin, liaison).

PPSP met in College Station on 14-15 May. (The PCOM liaison was R. Moberly.) The panel conducted a final review of Leg 139 sites, and discussed sites proposed for legs 140-142. Details of specific sites approved are in the minutes (attached to this Agenda Book).

PPSP incorporated new hydrocarbon detection guidelines and a synopsis of H_2S and high temperature contingency plans into their updated procedure for safety review. The new guidelines should be submitted soon to JOI and the JOIDES Office (for probable publication in the fall '91 issue of the *JOIDES Journal*).

4. DMP (D. Cowan/K. Becker, liaisons).

DMP met 4-6 June at LDGO, Palisades, New York. The meeting was held in conjunction with SGPP. Draft minutes are attached to this Agenda Book.

PCOM should be aware that DMP's recommendation (91/10) regarding testing of Geoprops along with the Motor-Driven Core Barrel (MDCB) on Leg 141 cannot now be accommodated, in light of recent developments (see Geoprops corr.). Third party tool development and its impact on ODP will be discussed under **Agenda Item O.**

PCOM must also ensure that DMP's recommendation (91/14) for the Leg 140 logging program is communicated to co-chiefs, Wireline Logging and the Science Operator.

5. SGPP (P. Swart for U. von Rad, liaison).

SGPP met 4-6 June at LDGO, Palisades, New York. The meeting was held in conjunction with DMP. Preliminary draft minutes are attached to this Agenda Book.

The PCOM chair notes with concern that SGPP felt it necessary at this meeting to modify their March, 1991, "global" ranking significantly in light of the four-year plan passed by PCOM at its April, 1991, meeting. Specifically, SGPP produced in June a "regional" (i.e., "Atlantic") ranking which bore little resemblance to the March "global" ranking in its relative ranking of Atlantic programs. (The JOIDES Office will have a transparency to illustrate this point.) PCOM did not give SGPP a mandate to produce such a ranking, and the logic behind the production of the second list is not apparent, nor is it explained in the SGPP minutes. Therefore, **the PCOM chair instructs PCOM to ignore the SGPP "Atlantic" ranking during discussion (below) of format of the upcoming "North Atlantic" Prospectus (Agenda Item O.).**

The JOIDES Office notes with great concern that the outgoing SGPP chair [Suess] had the June SGPP minutes prepared by a third party (i.e., a panel member), which led to confusion and late submission of only partial (i.e., no executive summary) and fragmented minutes for inclusion in this Agenda Book. **The PCOM chair feels that a motion from PCOM emphasizing the following points is mandatory: 1.) panel minutes are the sole responsibility of panel chairs, and 2.) a complete executive summary (at minimum) of panel minutes must be submitted to the JOIDES Office in time (i.e., ~3 weeks before the next scheduled PCOM meeting) for inclusion in briefing documents for PCOM.** (Passage of this motion should be deferred to Item 9.)

6. NARM-DPG (U. von Rad for B. Tucholke, liaison).

The North Atlantic Rifted Margins DPG plans its second (and presumably final) meeting 11-14 August, 1991, in Copenhagen, Denmark (after mailing of this Agenda Book). U von Rad will give a summary of the meeting. H.-C. Larsen, co-chair (with D. Sawyer), has informed the JOIDES Office that the final DPG report will be available in time for mid-September inclusion in the FY93 "North Atlantic Prospectus", which the JOIDES Office will compile and mail to all thematic panel members, panel chairs, PCOM members, and liaisons (see **Agenda Item O.**).

7. OD-WG (B. Taylor/J. Natland, liaisons).

The Offset Drilling WG plans its inaugural meeting 12-15 August, 1991, in Woods Hole, Massachusetts (after mailing of this Agenda Book). The liaisons will give a summary of the meeting.

8. Synthesis of Indian Ocean Drilling Results (R. Duncan, co-convenor).

A meeting of ODP Indian Ocean co-chiefs and other interested parties met 16-18 July, 1991, at the University of Wales, Cardiff, UK. The stated goal of the meeting was to put together a volume synthesizing scientific ocean drilling results from that ocean. The PCOM chair asks the co-convenor to give a short summary of the meeting, with a particular view to its potential impact for emphasizing important LRP themes. A preliminary report from D. Rea, one of the co-convenors, is also attached to this Agenda Book.

9. ACTION Before recess: Identification of action items from morning reports; take action or postpone (probably to **Agenda Item O.**) as appropriate.

Lunch 1200-1300

Item F.
Reports of Co-Chairs (or representatives) of Liaison Groups

1. Federation of Digital Seismic Networks (FDSN) [G.M. Purdy or representative].

2. International Geosphere Biosphere Program/Global Sedimentary Geology Program (IGBP/GSGP) [written report by T. Bralower, attached to this Agenda Book].

3. Nansen Arctic Drilling Program (NAD) [written report by Larry Mayer, attached to this Agenda Book. None of the designated liaisons could attend.].

4. Joint Global Ocean Flux Study (JGOFS) [written report by M. Leinen, attached to this Agenda Book. T. Pedersen, designated liaison, could not attend.].

5. InterRIDGE (P.J. Fox, see **Agenda Item L.**).

Item G.
Engineering Report

1. Science Operator (T. Francis).

- Engineering results: Leg 137.
- Status report: DCS Phase II/Leg 142.
- Preliminary discussion of DCS Phase III concept studies/bearing on Leg 147.
- Progress on prioritized engineering projects (see 4/91 PCOM mtg. minutes).

(Approximately 1500) Coffee Break

2. Wireline Logging (X. Golovchenko).

- Status of engineering preparations for future legs.

3. ACTION Identification of action items from engineering reports; take action or postpone (probably to **Agenda Item O.**) as appropriate.

Item H.
Scientific Reports of Recent Drilling Legs

1. Leg 138 (N. Pisias, co-chief scientist).

This report to PCOM has purposely been scheduled as the last item of the day, to allow the esteemed former PCOM chair time to wax poetic about his recent successful sojourn into the eastern equatorial Pacific.

Wednesday 21 August 1991 (8:30 AM)
(Note: As the JOIDES Office is not able to estimate the time required for Agenda Items I. J. and K, the morning coffee break, lunch, and the afternoon coffee break will be set at specific times [1000-1015 hrs, 1200-1300 hrs, and 1500-1515 hrs] rather than on logical pauses in the Agenda.)

Item I.
Supplemental Science Proposals

1. Background and introduction (J. Austin).

PCOM will remember that the concept of "supplemental" science (i.e., short "add-ons" to previously scheduled drilling legs) was initially discussed and developed at the 1990 Annual Meeting in Hawaii. The avowed purpose of this program was to open up ODP to segments of the community who might feel disenfranchised by ODP's requirement to schedule science in ~56-day increments. The focus of PCOM discussion, which resulted in the two motions and the consensus listed below, concerned number and length of supplemental science programs, and procedures by which they would be submitted and reviewed:

Motion

PCOM moves that JOIDES allow and advertise the possibility of including short, one to four days proposals along the general ship track. Proposals will be reviewed by the thematic panels, SSP and PPSP for PCOM's decision.

Consensus

PCOM generally endorses the PANCHM recommendations [i.e., re: timing, from the Annual Meeting to spring of the following calendar year] *for the submission and review of "add-on" proposals.*

(Note: This timing was later refined by the JOIDES Office in the following way:

June 1 - deadline for submission of proposals to the JOIDES Office; July 1 - receipt of reviews from the thematic panels, August 1: receipt of reviews from SSP and PPSP. The June 1 deadline was publicized both in the spring '91 *JOIDES Journal* and as part of an *Eos* article on the FY92 program written by the PCOM chair which appeared in February, 1991.)

Motion
PCOM will consider scheduling up to 10 days of ad hoc drilling during legs 141 to 147.

Also at the 1990 Annual Meeting, PCOM decided to act on supplemental science proposals received and reviewed positively at its August 1991 meeting. Accordingly, PCOM must(?) now endorse at least one such proposal as part of the FY92 Program Plan.

2. Thematic panel reviews, reviews by SSP and PPSP, and additional comments (J. Austin).

The three proposals under consideration (copies of which will be available at the meeting) are:

- S-1 "Documentation of Lithofacies and Depositional Cyclicity, Navy Deep-Sea Fan, California Borderland".

Proposes 6 days of APC-coring while the drillship is in the eastern Pacific.

Thematic panel comments:

OHP: "This has relevance to sea-level. It requests six days (over the S-proposal limit). It is not clear what can really be achieved scientifically. It is not clear that a tiny bit of APC work could be as useful as some more conventional piston coring." [from the proposal review form]

SGPP: "This is an exciting and mature proposal, which clearly addresses several of the SGPP priorities: sea level change, active margin mass balances, facies architecture and calibration of seismic stratigraphy in turbidite systems, mass wasting and downslope resedimentation. In addition, it would provide an opportunity to test techniques for sand recovery. It is important to sample this deposit to determine facies and facies changes associated with morphology, and the timing of sedimentation with respect to the last glacial period sea level. Such information is critical for comparing modern and ancient turbidite systems and for understanding the relationships of such systems to relative sea level. Dating appears feasible, especially since stage 5e should be identifiable at sites 2 and 3. Small-volume isotopic techniques may be useful as well as C-14 on larger organic fragments for the last 40ky. However, all dating will need to be approached cautiously.

The proposed add-on drilling is 6 days in duration (3 sites to a maximum depth of 150 m each, slightly longer than that recommended by the JOIDES

Office). For the required objectives at least two sites are essential. We would therefore strongly endorse the need for 4 days of drilling. The relevant original seismic profiles and site survey data should be added as an addendum." [from the proposal review form]

"S-1 should be carried out with an enhanced engineering staff on board that can ensure the successful operation of a sand sampling tool. Under these requirements drilling should take place at the beginning of Leg 147 (East Pacific Rise or Hess Deep) and not impact Leg 146 (Cascadia margin)." [from the March 1991 minutes]

TECP: "This proposal essentially falls outside the mandate of the Tectonics Panel. TECP does have an interest in the record of eustatic changes in sea level, and in other possible tectonic implications of deep-sea fan deposition. These interests are only indirectly addressed by this proposal, however." [from the proposal review form]

LITHP: did not consider S-1 to be within its mandate.

Comments by SSP and PPSP:

SSP: "No new data have been forthcoming and the approach currently is very much at the "exploration/engineering/first shot" level.

In comparison with our latest guidelines, for this setting and limited penetration, the proponents have all three vital components; but the SCS is poor quality and poorly navigated. The 3.5 kHz and 12 kHz is fine and some is deeptowed but again the navigation will be suspect in these complex environments. Cores are available with which to assess engineering aspects. For the "desirable" factors; seismic penetration is probably deep enough for the drilling depths suggested, at least to allow for safety assessment [see below for PPSP comment]. DEEPTOW sidescan is available, but why has there been no attempt to delineate the fan setting of these data using the USGS published GLORIA surveys? This point is doubly important since no swath bathymetry is available.

Overall, at the site level, the survey data are barely sufficient for drilling and they certainly couldn't support a full program at Navy Fan. If one or two holes were drilled in the interests of engineering testing for subsequent drilling on the many better surveyed fans, it could help SSP's future assessments as well as partially answer some of the science proposed by the proponents."

PPSP: "...reasonably safe."

Additional comments on S-1: Despite the comments of SGPP, it seems clear that the scientific expertise and engineering capability which will be fielded for Cascadia are the most consistent with the scientific goals stated for S-1. Therefore, the PCOM chair suggests that, if PCOM opts for S-1, the time for it be made available within the time period allocated for Leg 146. PCOM must also decide whether one (or more) of the S-1 proponents should sail as part of the Leg 146 shipboard scientific party, to oversee the Navy Fan operation.

- S-2 "Downhole Measurements in Jurassic Oceanic Crust of Hole 801C".

Proposes completing logging objectives at the hole which sampled Jurassic oceanic crust during Leg 129. PCOM will remember that a complete logging program in this hole was curtailed because of initial equipment failure (i.e., loss of cable and a VIT) and a subsequent decision by the co-chiefs to spend remaining time deepening Hole 801C to 131 m into basaltic basement.

Thematic panel comments:

LITHP: "This proposal addresses several high-priority objectives and is thus of high interest to LITHP. The primary attraction of the proposed logging in Hole 801C stems from the Jurassic age of the oceanic crust and the fact that the crust was accreted at a relatively fast spreading center. Specific LITHP objectives addressed by this logging proposal include: 1.) determination of the permeability of old oceanic crust and the nature of hydrothermal circulation/convection, 2.) determination of the original porosity of the oceanic crust and how this porosity has been modified by alteration, 3.) determination of the in-situ physical properties of layer 2 and the relation of these to the permeability of the crust, 4.) measurement of the direction of in-situ stress in the western Pacific to constrain tectonic models (ridge push vs. trench pull), 5.) measurement of the final, integrated chemical composition of old oceanic crust accreted at a fast spreading center (shades of the Geochemical Reference Hole!), and 6.) investigation of the origin of the Jurassic quiet zone by constraining the orientation of the hard rock core. The 3.55 days required to divert the ship and run the logging tools are well-justified viewed from the perspective of the large number of first-order questions which can be addressed...

One operational suggestion concerns the relative importance of the various logs. The scanning logs may be more important than the proponents have

intimated as: 1.) they want to compare physical properties to morphology in a hole where units are quite thin and, although core recovery is high, accurate locations of these will be critical, and 2.) there may be breakouts, as these rocks may be weak (C_o ~70 MPa).

It is also not clear how the geochemical objectives will be met with the logs. If primary chemistry is the objective, then the fairly large uncertainties in the chemical yields - for example, ±3% Si and Ca; 0.5% Fe and Ti - within the range of variation of basalts makes this questionable. However, if determination of alteration effects are the objective, these uncertainties may be acceptable. Hence the geochemical goals need to be better defined.

The proponents might consider the following scenario that obtains logs in a priority order: 1.) occupy site; 2.) temperature logging down, perhaps on bottom of (3); 3.) seis-strat (centered, with digital sonic, not the old 4-channel tool, to get shear velocities and Stoneley for permeability and fracture properties); 4.) litho-porosity; 5.) FMS (to get 3-axis magnetic and scanning and hole size for packer); 6.) (a.) BHTV if FMS doesn't get a good image, and/or it looks like breakouts may be present, (b.) otherwise, packer; 7.) (a.) 3-axis magnetometer (if FMS magnetometer not precise enough), (b.) otherwise, digital BHTV, unless already obtained, (c.) otherwise, geochem., if there is time." [from the proposal review form]

TECP: "The characterization of old oceanic crust is a matter of high interest to TECP. Of particular tectonic interest is the stress measurement. The magnetic studies are also of interest, especially the development of in situ measurement of paleomagnetic pole positions using the three-component instrument or the FMS image-core comparison. TECP notes with concern that the BHTV and FMS measurements, which are the measurements of greatest tectonic interest, have the lowest priority in the proposal. TECP's support for this proposal is contingent on these measurements actually being carried out. Concerns...expressed by TECP members included: 1) the shallowness of the hole makes the significance of the magnetic or stress measurements problematic; 2) the justification of the magnetic measurements could be stronger; 3) the time spent on this proposal would be better allocated to the too-short Chile drilling leg; 4) setting a precedent whereby future "greedy" co-chiefs forego logging for the sake of a little extra penetration in anticipation that an irresistibly strong supplemental proposal can be submitted later." [from the proposal review form]

SGPP: "...strongly supports this supplemental science proposal and recommends that the requested logging be accomplished within the time frame of the scheduled Atolls & Guyots legs. The panel wishes to have the

proponents explain why it is necessary to log the hole now and not wait until it is deepened?" [from the proposal review form]

OHP: "No OHP interest. Was not a high priority part of the original proposal or it would have been done already." [from the proposal review form]

Comments by SSP and PPSP:

SSP: "...ODP 801C already has an extensive and sufficient survey package associated with it."

PPSP: "...safe."

Additional comments on S-2: If PCOM opts for this logging program, Hole 801C is most logically reached in the course of projected Leg 144 operations (probably en route from the Marshall Islands to M.I.T. guyot; the JOIDES Office will have a transparency to illustrate this point). PCOM must also decide: 1.) whether or not to follow LITHP's advice on the logging program (taking into account the TECP comments re: BHTV and FMS measurements), and 2.) whether one (or more) of the S-2 proponents should sail with the Leg 144 shipboard scientific party, to oversee the 801C operation.

The PCOM chair also calls PCOM's attention to recent correspondence from one of the Leg 143 co-chiefs (Winterer) to the JOIDES Office regarding the advisability of scheduling S-2 during Leg 144 (attached to the Agenda Book).

• S-3 "Proposal for a Cased Hole with Re-entry Cone for deployment of OSN Observatory".

Proposes another OSN hole in the North Pacific near proposed hole NW-1A (Leg 145).

Thematic panel comments:

TECP: "1.) to deploy an Ocean Seismographic Network is one of the highest priorities of the TECP as it is pointed out in our white paper; 2.) the OSN is...a truly international project; 3.) the data to drill Hole B on Site NW-1 are satisfactory since it is located only 10-20 m away from Hole A; 4.) the location of Site NW-1 is not only of high interest for tomographic studies but also for improvement in precision of trench [earthquake] event mechanisms (Japan, Kuriles and Aleutians); and 5.) the work could be accomplished in

four days, the required time for an 'add-on' proposal." [from the proposal review form]

LITHP: "The proposal for supplemental science during Leg 145 near hole NW-1A addresses high-priority LITHP objectives. Although a departure from the usual goals of the ODP, the objectives of the Ocean Seismic Network (OSN) are exciting, and the eventual deployment of the seismic array will provide important new data to constrain models for mantle convection and improve our understanding of the oceanic lithosphere. Such models are directly related to the major scientific objectives for the future ODP drilling, and for the earth sciences in general. Specifically, convection models are relevant to questions about magmatic processes throughout the Earth, plate kinematics, and the dynamics and structure of the oceanic upper mantle. As such, LITHP has consistently endorsed the OSN concept and has ranked specific proposals highly.

This proposal is to deploy a re-entry cone, and to drill and case a second hole very near to hole NW-1A to make the site an element of the OSN; hole NW-1A falls within one of 20 high-priority regions for deployment of an OSN station as there are no land areas in the region. Moreover, as is illustrated in Figure 2 of the proposal, the seismic station would be located near an unusually rich source of earthquakes at the Aleutian, Japan, and Kurile trenches.

While it is true that the testing of borehole mounted seismic network stations at the Hawaii site by OSN has not yet been conducted, the experience onshore indicates that the deployment of seismic sensors down boreholes significantly lowers seismic noise levels and improves data quality. One would not be very surprised to find that subsurface deployment also vastly improved data quality in the oceans as well. However, it is important that instrumentation and testing of a borehole deployment for OSN be done before many more OSN holes are drilled. Also, if the FDSN/GDN/OSN program is forced to reduce the number of OSN stations below the 20 presently planned because of the expense that will be involved in drilling, deploying and maintaining borehole seismic stations, would OSN-2 be a high-priority station, particularly if the POSEIDON program is undertaken?

LITHP supports drilling this hole as part of Leg 145; the modest investment of 4 days to drill and case the proposed hole now rather than in the future will result in cost savings. However, having drilled the hole does not necessarily justify its immediate instrumentation. That decision must await the results of the OSN-1 tests and the evaluation and prioritization of the entire OSN network." [from the proposal review form]

SGPP: did not consider S-3 to be within its mandate.

OHP: "No OHP interest. I [NJS, OHP chair] think that the OHP would be very concerned indeed to see time taken from an OHP leg to be used for a project that is essentially outside the ODP and outside the priorities of any of the thematic panels. There is already a very reduced number of days available for that leg in relation to the amount of science planned." [from the proposal review form]

Comments by SSP and PPSP:

SSP: "The seismic data for the original site [NW-1A] is aged and very ropey but it survived both SSP and PPSP review on the grounds of its limited objectives and the unlikelihood of better data being forthcoming. The drilling strategy for this hole is identical save for the specified 10-15 m of basement penetration rather than "to bit destruction" and also the additional need to case the hole. Consequently, there are no further SSP requirements."

PPSP: "... reasonably safe."

Additional comments on S-3: Despite the comments by OHP, S-3 has strong support from two thematic panels. Nonetheless, if PCOM opts for S-3, the time for other science scheduled for Leg 145 is reduced. As co-chiefs are now in place for that leg, the final decision of what to cut out in favor of S-3 could be left to them. There is also a budgetary implication (i.e., re-entry cone, casing) which must be assessed by the Science Operator. Further, PCOM should consider participation by one of the OSN proponents in the Leg 145 shipboard scientific party.

General Comments About Supplemental Science: In December, PCOM clearly viewed the issue of "add-ons" as an experiment worth trying, particularly with an eye towards renewal and enhanced community involvement. At that time, the PCOM chair thought that the JOIDES advisory structure might be inundated with many proposals for "add-ons"; that obviously has not happened (although he would predict an increase in the number of "S" proposals submitted next year if PCOM acts to put one [or more] on the FY92 schedule). Nonetheless, each of the three "S" proposals submitted has merit; all have at least some backing from thematic panels.

PCOM can act in one of the following ways (or perhaps in others, to be discussed): 1.) schedule one (or more) of the "S" proposals after consideration of thematic panel input, declare the "add-on" philosophy a

success, and advertise another "S" submission opportunity to the community for FY93; 2.) schedule one (or more) of the three "S" proposals currently in existence, but declare the practice a one-time phenomenon in light of only lukewarm community interest in responding to the opportunity; 3.) not schedule any of the existing "S" proposals, but continue the practice next year in hopes of attracting more(?), better(?), different proposals; 4.) not schedule any of the existing "S" proposals, perhaps using the rationale that they must by their nature displace (i.e., "subtract") other strong science already on the schedule, and discontinue the policy for the same reason. (PCOM members may think of other courses of action not listed here, and any or all of those can also be discussed.)

Whatever its action, PCOM should consider the precedent(s) being set. In light of the strong "S" proposals received (and their diversity), the PCOM chair favors a variation of option 1.): scheduling a single "S" effort and continuing the policy for another year, but without setting any long-term precedent that constrains PCOM to schedule "S" science every year.

3. ACTION Any PCOM decision(s) made on Supplemental Science should be in the form of one or more motions.

Item J
OPCOM

1. Introduction and background (J. Austin).

OPCOM, the "Opportunity Committee", was constituted and mandated at PCOM's April meeting to discuss strategies for the use of a $2.1M funding increment to be provided by NSF during FY92. OPCOM met at JOI, Inc., Washington, D.C., on June 7, 1991. Draft minutes are attached to this Agenda Book.

OPCOM formulated the following set of recommendations for PCOM's consideration at this meeting:

1.) OPCOM concludes that the most important priority for the "incremental" NSF funding for FY92 (and projected for FY93) is accelerating the development and testing of the Diamond Coring System. The bottom line for the future scientific success of ODP is that the DCS must work in the range of environments discussed in the LRP. The development should include due attention to the individual components (e.g., development of appropriate bits and core catchers for the relevant lithologies) and the cultivation of necessary expertise (a

systems engineering approach to understanding heave compensation approaches, choice of drilling fluids, operator expertise). Testing should include both land and sea tests, with an explicit focus on environments of scientific importance to ODP (e.g., basalts including highly fractured ones, shallow water carbonates, and alternating hard and soft lithologies such as cherts and chalks, including deep water environments). The testing at sea will involve engineering legs on the JOIDES Resolution as necessary.

We anticipate funding these efforts for a total of $1.9M, allocated as $1.675M in FY92 and $0.225M in FY93. This may need to be modified on receipt of results from DCS Phase III Design Studies anticipated in August. [see **Agenda Item G.**]

2.) *Our second priority is logging and fluid sampling development. We recommend the purchase of a logging resistivity tool (FY92) and community input and design feasibility studies on new, more effective approaches to in situ fluid sampling.*

We anticipate funding purchase of the resistivity tool for $0.15M in FY92 and funding development of fluid sampling for $0.175M in each of FY92 and FY93.

3.) *Recognizing the growing importance and potential scientific benefits of the use of alternate platforms, we recommend that JOI, Inc. use the most effective route to commission a feasibility study on alternate platforms for FY92 (or sooner if funds can be rearranged).*

We anticipate funding of $0.1M in FY92 for this item.

4.) *Of an anticipated $4.2M for FY92 and FY93, this leaves $1.7M unencumbered in FY93. Our first priority for these funds would be allocating resources for the use of alternate platforms, with a priority to augmentation/supplementation of scheduled FY92 and anticipated FY93 programs (explicitly, the Atolls and Guyots legs and New Jersey Sea Level). We recognize the key importance of support vessels for high-latitude North Atlantic drilling (anticipated $1.3M) and the possibility that this may not be found in SOE or may displace other vital parts of development. These possibilities will need reassessment after hearing ODP/TAMU's priorities for FY93 SOE funds.*

5.) *We also recognize the importance of careful consideration of staffing implications for the above priorities as further development occurs.*

The PCOM chair calls PCOM's attention to subsequent correspondence (attached to this Agenda Book) between the JOIDES Office and Mr. Herbert Zaremba, a retired consultant reputed to be an expert on the subject of alternate platforms. On the phone, he has indicated a willingness to produce a report on available alternate platforms for JOIDES. He plans to begin immediately, even though at present there is no guarantee that funds will actually be made available in FY92. The PCOM chair has invited him to attend the September meeting of TEDCOM in Victoria, so that he can see *JOIDES Resolution* and discuss his task with TEDCOM members. He will also get a copy of the North Atlantic Prospectus when it is produced in September, in order that he can begin to become acquainted with the kinds of drilling that ODP is pursuing.

2. ACTION PCOM must first examine and then either reject, modify or endorse OPCOM's initial input. PCOM should also decide whether or not OPCOM should meet again for further discussions, probably prior to the Annual Meeting. Ultimately, PCOM must make a recommendation to NSF for disbursement of these funds at some time during FY92, but that recommendation in final form need not come at this meeting, if PCOM feels that further OPCOM deliberations are appropriate.

All PCOM actions concerning OPCOM should take the form of one or more motions.

Item K.
Adjustments of Near-term Program

In light of any and all recent developments, including **Agenda Item I.**, panel recommendations, and engineering and other reports included with this Agenda Book, PCOM must decide if any additional adjustments are required in the FY92 program. How will any such adjustments affect scheduling? cruise staffing? engineering development?

1. Leg 140 (504B/Hess Deep).

The strategy for this leg has been decided by poll of PCOM members following the April meeting (i.e., begin operations at Hole 504B, and move to Hess Deep if and only if cleaning and deepening of Hole 504B is unsuccessful after one week to 10 days).

The status of Hess Deep site selection is detailed in a communication from H. Dick, one of the Leg 140 co-chiefs, attached to this Agenda Book. **PCOM**

needs to discuss this communication and either modify or endorse it as a contingency plan for Leg 140. According to the Science Operator, should Hess Deep become Leg 140, the necessary guide base(s) will be aboard.

2. Leg 141 (Chile Triple Junction).

Geoprops cannot now be tested on this leg (see pertinent correspondence attached to this Agenda Book). PCOM will discuss the impact of third party tool development on ODP science under **Agenda Item O.**, but PCOM should also decide whether or not a test of the MDCB on this leg is appropriate despite the lack of availability of Geoprops and advise the Science Operator accordingly.

3. Leg 144 (Atolls & Guyots II).

If PCOM chooses to log Hole 801C (supplemental science proposal S-2), Atolls & Guyots II will be impacted because, in order to minimize transit, 801C logging should be done en route from the Marshall Islands to M.I.T. guyot. (Note: The JOIDES Office will have a transparency to illustrate this point.) PCOM should either make a specific recommendation on how to cut drilling from the A&G DPG proposed schedule (see spring '91 *JOIDES Journal*) or instruct the designated co-chiefs (Premoli-Silva and Haggerty) to make the decision themselves.

The PCOM chair again calls PCOM's attention to recent correspondence from Winterer to the JOIDES Office (attached to this Agenda Book) detailing his opposition to S-2.

4. Leg 145 (North Pacific Transect).

NPT is still being developed by OHP, in conjunction with proponents and co-chiefs. If PCOM chooses to drill OSN-2 (supplemental science proposal S-3), PCOM should inform all parties concerned to adjust their drilling schedule accordingly.

5. Leg 146 (Cascadia).

This leg benefits from more days on site (~50) than any other leg on the FY92 schedule. If PCOM chooses to APC the Navy Fan (supplemental science proposal S-1) at the conclusion of Leg 146 (i.e., en route to San Diego), PCOM should either make specific recommendations on how to cut drilling from the Cascadia DPG proposed schedule (see fall 1990 *JOIDES*

Journal) or inform the designated co-chiefs (Westbrook and Carson) so that they can make adjustments in their drilling plan.

Cascadia may be further affected by recent developments re: Geoprops. PCOM will discuss this here and under **Agenda Item O.**, in the context of third party tool development and its impact on ODP science.

6. Leg 147 (Engineering EPR/Hess Deep/other?).

EXCOM's motion concerning the FY92 Program Plan (see **Agenda Item E. 1.**) gives PCOM flexibility in planning this leg, depending upon both the pace of DCS development and the outcome of Leg 140, which will not be known until the Annual Meeting. Consequently, the PCOM chair proposes to defer a final decision on Leg 147 to December.

7. ACTION Identify PCOM action items in reference to the above. All actions should detail specific instructions to co-chiefs, panels, Science Operator, Wireline Logging, etc. All PCOM actions re: the FY92 schedule should be in the form of one or more motions, preferably on a leg-by-leg basis.

Thursday 16 August 1990 (8:30 AM)

Item L.
Reports of Co-Chairs (or representatives) of Liaison Groups (cont.)

1. InterRIDGE (P.J. Fox, liaison).

Item M.
Old Business; Continuing Issues

1. STRATCOM revisited: should PCOM "focus" the Long Range Plan?

PCOM will remember that STRATCOM ("Strategy Committee") was formed as a subcommittee of PCOM at its April, 1990 meeting in Paris. STRATCOM's mandate was straightforward:

- to facilitate renewal of ODP.
- to examine various means of showcasing ODP's accomplishments.

STRATCOM met twice in 1990; executive summaries of both meetings are included with this Agenda Book. PCOM discussed STRATCOM I's recommendations in detail in August, 1990, at Scripps Institution of Oceanography. Minutes from that meeting are excerpted below:

"J. Austin led the discussion about facilitation of renewal of ODP...A salient point was the recommendation to PCOM that the following six themes become a focused approach to future ocean drilling:

- *high-resolution Neogene paleoceanography transects.*
- *sea level studies.*
- *deep-drilling to understand the structure and fluid dynamics of accretionary prisms.*
- *passive margin evolution.*
- *evolution of sedimented and unsedimented ridge crests.*
- *offset drilling for deep lithosphere objectives.*

The list had evolved from a comparison of the objectives of Phase I of the LRP with the highly ranked proposals from any ocean, with some committee adjustments in scope and wording.

A long discussion was held on the proposed focussing of ODP. Counter arguments made at the meeting were that many proponents believe that diversity has been an asset of the program, bringing in many scientists outside the oceanographic institutions; the notion that some small group of scientists should decide what will and will not be allowed is contrary to a proposal-driven program where any proposed science, if it is good enough, has a chance for selection; too few of the "global initiatives" could expect ODP support; and confusing signals would be sent during the renewal period if having just produced and endorsed the Long Range Plan we now change its most fundamental aspects to a different plan.

The result of these discussions was that ODP will stick with the Long Range Plan."

ODP is now a year down the road, and renewal for ~5 years (at least) seems likely. EXCOM, as evidenced by their recent reaffirmation of October 1990 motions (see **Agenda Item E. 1.**), remains concerned that the LRP by itself is not an adequate implementation plan for ODP in the 1990's. PCOM is left with the option of focusing the LRP (which EXCOM seems to favor), encouraging the thematic panels to do the same job (the thrust of one of the August 1990 motions which grew out of the STRATCOM discussions), or continuing the present course.

The PCOM chair, as former chair of STRATCOM, remains in favor of PCOM taking the lead role to focus ODP. He would like further discussion of the issue, which will also serve to elucidate individual scientific interests of PCOM members.

ACTION Any action relative to the LRP must be in the form of one or more motions.

Item N.
Membership and Personnel Actions

1. Panels and Panel Chairs.

The panels have in general (excepting DMP, see below) not made any nominations for replacements; therefore, appointments need not be made at this PCOM meeting. PCOM should, however, consider disciplinary balance on the panels that are affected by the following impending changes in membership. PCOM may also wish to specify areas for which appointments will be made at the 1991 Annual Meeting.

- **LITHP**

The JOIDES Office has invited S. Bloomer (Boston Univ.) to replace M. Perfit. At the April meeting, PCOM suggested that in future thematic panel chairs always provide PCOM with more than one nominee for inspection. S. Humphris agrees, but will not approach multiple nominees in advance for their willingness to serve. PCOM also suggested that LITHP augment their expertise in tectonics. That will be discussed when LITHP meets with TECP in Cyprus in October.

- **OHP**

The JOIDES Office has learned that N. Shackleton intends to retire as chair after the Annual Meeting. He will bring a nominee for his replacement to that meeting for PCOM discussion and approval. No action is necessary at this time.

- **SGPP**

J. McKenzie (ESF) has replaced E. Suess (member-at-large) as chair. MacKenzie reminds PCOM that Suess will rotate off the panel after SGPP's November meeting, leaving a gap in fluids expertise. (S. Dreiss, the other hydrogeologist, will also rotate after the November meeting.) MacKenzie also notes that necessary expertise in both metallogenesis and paleochemistry is currently under-represented by panel membership. (McKenzie has

supplied information supporting this contention, which the JOIDES Office will have at the meeting.)

McKenzie proposes that her position as chair remain an at-large membership, and that ESF nominate a new member to round out panel expertise. This has reportedly been agreed to by the ESF PCOM representative, and A. Camerlenghi (Univ. Milano) has been nominated (The JOIDES Office will have his C.V. at the meeting.). McKenzie would like Camerlenghi to attend the November meeting.

PCOM should discuss Camerlenghi's nomination, keeping in mind that PCOM's stance in the past is that it would like panel chairs to submit at least two nominees for each panel vacancy, and that the preferred time for filling vacancies is at the beginning of the calendar year.

- **TECP**

No action is necessary at this time.

- **DMP**

B. Carson (Lehigh) has rotated off the panel. P. Worthington, DMP chair, has forwarded two nominees, R. Desbrandes (Louisiana State Univ.) and S. Hickman (U.S. Geol. Surv.), to the JOIDES Office as a replacement. Both are willing to serve. Worthington suggests that PCOM nominate Desbrandes, and "save" Hickman as a 1992 replacement for other DMP members due to rotate at that time. (The JOIDES Office will bring C.V.'s of the two nominees to the meeting.)

- **IHP**

I. Gibson (Univ. of Waterloo, Ontario, Canada) is in place at IHP chair. No other action is necessary at this time.

- **PPSP**

No action is necessary at this time.

- **SMP**

PCOM will remember that in March a joint IHP/SMP subcommittee nominated R. Chaney (Humboldt State Univ.) to replace I. Gibson (off to chair IHP). As Gibson was from Canada, PCOM decided in April to postpone a decision about Chaney for ~1 month until the CAN-AUS PCOM member could forward C-A nominees for PCOM perusal and approval. No C-A nominee was forthcoming, so the JOIDES Office has invited Chaney to serve on SMP.

- **SSP**

No action is necessary at this time.

- **TEDCOM**

C. Sparks, TEDCOM chair, informed the JOIDES Office in early July that no new ESF nominee had been received to take the place of H. Strand, who has rotated off. Sparks wanted PCOM to nominate S. Thorhallsson (Iceland), suggested for his experience with high-temperature drilling environments, and he has been officially nominated by ESF. The JOIDES Office has invited Thorhallsson to become a member of TEDCOM.

2. Detailed Planning Groups and Working Groups.

- North Atlantic Rifted Margins Detailed Planning Group will have had its second (and presumably final) meeting 11-14 August, 1991, in Copenhagen, Denmark. No further membership action is required. The final report of this DPG will be presented at the PCOM Annual Meeting.

- Offset Drilling Working Group was established at the April PCOM Meeting. OD-WG will have had its first meeting 12-15 August, 1991, at Woods Hole Oceanographic Institution. A list of members will be shown to PCOM at this meeting. PCOM should consider any changes to the WG's membership, including liaisons.

- Sea Level Working Group has met once and will meet again on 4-6 November, 1991, at Scripps Institution of Oceanography. The SL-WG chairperson, P. Crevello, would like to invite three additional invited speakers to the November meeting.

3. PCOM membership and liaison work.

- Any general change of PCOM liaison responsibilities (see table)?

	EXCOM	LITHP	OHP	SGPP	TECP	DMP	IHP	PPSP	SMP	SSP	TEDCOM
J. Austin	*							*			
K. Becker						*					*
M. Cita-Sironi									*		
D. Cowan						*					
R. Duncan			*								
H. Jenkyns			*								
Y. Lancelot							*			*	
M. Leinen									*		

J. Malpas		*									
B. Taylor				*?							
J. Mutter		*									
J. Natland											*
A. Taira					*						
B. Tucholke					*						
U. von Rad				*							
J. Watkins										*	

PCOM Liaisons to DPGs and WGs:

B. Taylor (J. Natland?)	OD-WG
J. Watkins	SL-WG

4. Co-Chief Scientists.

Co-chiefs have been nominated and have accepted through Leg 146. The PCOM chair suggests deferring nominations on Leg 147 (Engineering EPR/Hess Deep/other?) until the Annual Meeting, when science to be tackled on that leg will be decided.

5. ACTION Acceptance of slates of members. It will be easiest if PCOM incorporates all personnel changes in a single motion. Any other instructions to panel chairs should be in the form of separate motions aimed at specific panels.

Item O.
New Business

1. Content and format of FY93 "North Atlantic Prospectus".

"FY93" extends from 21 January, 1993 (the conclusion of Leg 147) to September 30, 1993. If Leg 147 is conducted in the eastern Pacific, approximately 9 months in the North Atlantic and adjacent seas must be scheduled at the Annual Meeting of PCOM with Panel Chairs. PCOM must fill that time either with ~5 legs for science, or ~4 legs for science and an engineering leg.

Based upon global rankings conducted by thematic panels at their spring 1991 meetings (see attached summary put together by the JOIDES Office for the April meeting), the JOIDES Office plans to put the following programs into a "North Atlantic Prospectus" for consideration and ranking by thematic panels in the fall of 1991: NAAG-DPG report, NARM-DPG report, TAG

Programs Selected for North Atlantic Prospectus 1991 from Global Ranking of Proposals by Thematic Panels, April 1991 (list truncated at rank 10)

Rank	LITHP	OHP	SGPP	TECP
1	387-Rev Hess Deep	**NAAG-DPG** **N Atl./Arctic gateways**	355-Rev2 Gas hydrate	**NARM-DPG** **N Atl. rifted margins**
2	**361----** **TAG hydro.**	**348----** **New Jersey sea level**	**391----** **Med. sapropels**	**323-Rev** **Alboran Basin/gateway** **330----** **Med. Ridge**
3	EPR-DPG East Pacific Rise II	339---- Benguela Current 354---- SE Atl. upwelling	SR-DPG Sedimented Ridges II	362-Rev2 Chile Triple Junction II
4	**NARM-DPG** **N Atl. rifted margins** **(volcanic: 392-396)**	**388----** **Ceara Rise**	**348----** **New Jersey sea level**	**346-Rev** **Eq. Atl. transform**
5	SR-DPG Sedimented Ridges II	253---- Shatsky R. black shales	**380-Rev** **VICAP Gran Canaria**	GENERIC Hess Deep II (tectonic)
6	376---- Vema FZ: layer 2/3 382---- Vema FZ: deep crust	347---- South-eq. Atl. paleo.	233-Rev3 Oregon acc. complex	343---- Caribbean crust
7	369---- MARK deep mantle	Bering Sea (Pac. Prosp.) Bering Sea history 390---- Shirshov Ridge	354---- SE Atl. upwelling	265---- Woodlark Basin
8	NARM-DPG N Atl. rifted margins (non-volc.: 334, 365)	386-Rev California margin	059-Rev2 Sediment instability	378-Rev Barbados acc. wedge
9	325---- Endeavour Ridge	345---- West Florida sea level	EPR-DPG East Pacific Rise II	334-Rev Galicia margin
10	142-Rev Ontong Java Plateau	NARM-DPG N Atl. rifted margins	337---- New Zealand sea level	363---- GB-Iberia plume volc.

hydrothermal (#361), New Jersey sea level (#348), Ceara Rise (#388), Mediterranean sapropels (#391), VICAP Gran Canaria (#380 Rev.), Alboran Basin/gateway & Mediterranean Ridge (#323 Rev. + #330) and equatorial Atlantic transform (#346 Rev.), a total of 9 programs (for perhaps twice that number of legs).

The "North Atlantic Prospectus" will include all revisions or addenda to the programs named above received by the JOIDES Office through ~ 1 September, 1991. Lead proponents have already been contacted to provide such information, if they so desire. Programs will be included, probably in either alphabetical or numerical order, along with a cover letter from the PCOM chair explaining the genesis and evolution of the document. At the same time, instructions for re-review and ranking will be given to thematic panels.

The Prospectus will be mailed to all members of PCOM, SSP and thematic panels, other panel chairs, and to all subcontractors and liaison groups by mid-September.

At this time, PCOM members are solicited for input on both the stated content and format of the Prospectus.

- PCOM Watchdogs: "North Atlantic Prospectus" Programs

PCOM may wish to assign watchdogs for those highly-ranked North Atlantic programs under consideration for drilling in FY93 which do not yet have one. As of August 1990, the following were PCOM watchdogs for those programs:

NAAG-DPG	M. Leinen
NARM-DPG	B. Duncan [volcanic]/ U. von Rad [non-volcanic]
TAG hydrothermal	K. Becker
New Jersey sea level	B. Tucholke
Alboran Basin/ gateway & Med. Ridge	M. Cita-Sironi*
Eq. Atl. transform	J. Watkins
Ceara Rise	?

Med. sapropels	?
VICAP Gran Canaria	?

(*denotes proponent. PCOM may wish to modify this appointment to ensure impartiality.)

2. JOIDES Office geriatric study: statute of limitations on ODP proposals.

At its April meeting, PCOM briefly discussed instituting a time limit (~ 3 years) beyond which a proposal in the JOIDES review system would be declared inactive. A decision was made to wait until the August meeting so that the JOIDES Office could prepare a summary of proposals submitted to ODP and their fates. (Performance Evaluation Committee III is also interested in and has requested such a summary from the JOIDES Office.)

P. Blum has just completed this summary (attached to the Agenda Book), which has been checked by the PCOM chair. Blum will present details to PCOM. **PCOM members are requested to examine this summary for accuracy**, with a view to finalizing the work before presentation to PEC-III in November and to panel chairs at the Annual Meeting. Input on form and content is also requested.

This summary, even in its preliminary stage, is adequate for PCOM to examine the issue of instituting a statute of limitations for ODP proposals. As the proposal list grows and thematic panel memberships change, the JOIDES Office finds that new panel chairs are often not very sure what to do with proposals scheduled for global ranking at spring meetings. Approaches are certainly not consistent among the thematic panels. Consequently, the JOIDES structure, as a responsibility toward proponents, faces the task of formalizing ranking procedures more clearly.

From Master List A, it is apparent that thematic panels have ranked proposals with submission dates mostly younger than early 1988. For example, only five ranked proposals were submitted during 1986/87 (Ross Sea, Juan de Fuca Ridge, Woodlark Basin, Loihi Seamount, Shatsky Rise). An update for Shatsky Rise was received in June 1991 and is in review now, which reduces the number to four. Woodlark Basin, TECP's rank 7 (April, 1991), is a "very immature" proposal that needs to see a major update before TECP could recommend it for drilling. Ross Sea is OHP's (April 1991) rank 11, Loihi is LITHP's (April 1991) rank 15, and Juan de Fuca is LITHP's (April 1991) rank 16. Since ranks below ~5, and certainly below ~10, probably do not have any impact on near- and middle-term drilling schedules, all

currently "highly" ranked ODP proposals have in effect been submitted since the beginning of 1988.

Therefore, the effect of a "natural" phasing out of proposals older than ~ 3-4 years by a formal statute of limitations would have only a mild impact in terms of "killing" proposals (or asking proponents to update their proposals), and would clarify the issue of the meaning of "active" proposals for the JOIDES advisory structure.

The JOIDES Office proposes the following wording, which could form the basis of a PCOM motion on this subject:

PCOM recommends that proposals which have not been updated for three full calendar years before the present calendar year (i.e., January 1, 1988 for 1991 activities, to roll to January 1, 1989 on January, 1992 for 1992 activities) be declared formally "inactive". Thematic panels will be given the directive by the JOIDES Office not to review inactive proposals formally, but rather to initiate submission of proposal updates from proponents if there is sufficient panel interest. The community will be informed about this change in policy through the JOIDES Journal.

ACTION Any PCOM action instituting a time limit for proposal activity must take the form of a motion, which will then be publicized in the fall '91 issue of the *JOIDES Journal.*

3. ODP dependence on 3rd party tool development.

PCOM members are directed to recent correspondence between the Science Operator and D. Karig (Cornell) re: Geoprops, whose fate is at present uncertain. In view of the importance of Geoprops for Leg 146 (Cascadia) in particular and for downhole fluid sampling/physical properties measurements in general, **PCOM should discuss the fate of Geoprops and make a recommendation to the Science Operator for immediate action.**

The potential deleterious impact of third party tool development on the achievement of primary scientific ocean drilling objectives concerns the PCOM chair. Guidelines for third party tool development were updated by DMP and published in the February, '91 issue of the *JOIDES Journal*, but these do not specifically address the issue of long-term responsibility for successful deployment and operation of these tools.

PCOM must examine third party tool development with a view to reducing ODP's vulnerability to unforeseen outside influences, and make

recommendations both to the Science Operator, Wireline Logging, and to NSF/JOI for future activities. A modification to third party tool development guidelines may also be in order. (The JOIDES Office will have transparencies of the guidelines for comment and/or modification.)

ACTION Any action on Geoprops in particular and third party tool development in general should be in the form of separate motions.

4. Co-Chief Scientist items.

Two issues have arisen with regard to co-chiefs since the April meeting.

The first stems from a recommendation made during the 6th Annual Co-Chief Scientists' Review Meeting, a yearly affair designed primarily to give the Ship Operator feedback on its operation:

re: pre - cruise planning: *"Formalize the interaction between Co-Chief Scientists and the JOIDES panel structure to ensure good communication when cruise operations are discussed at panel meetings and PCOM prior to the cruise sailing date."*

This seems like a good idea, particularly in view of the evolutionary aspect of some legs on the FY92 schedule (e.g., North Pacific Transect, Hess Deep). However, short of inviting co-chief designates to all panel meetings where their leg might be discussed, what action could/should PCOM take to implement the suggestion? The JOIDES Office could certainly see to it that designated co-chiefs are provided with panel minutes, etc., and perhaps invite them to panel meetings as occasion warrants.

The second concerns a continuing EXCOM concern, i.e., in order to avoid conflict of interest, should PCOM members serve as co-chief scientists during their tenure on PCOM? No formal stance exists on this issue, and EXCOM is not necessarily ready to act. Nonetheless, they want formal feedback from PCOM as input to discussion at their next meeting in mid-January. The PCOM chair is sympathetic to the exclusion of U.S. PCOM members from this particular role for their ~4-years of service to the committee, but the international partners are not bound by these rotation guidelines. PCOM should discuss this issue, with a view to having the minutes reflect opinions on this issue.

ACTION Neither one of the above items demands a motion.

Item P.
Future Meetings

The 1991 PCOM Annual Meeting will be hosted by J. Austin and the JOIDES Office at the University of Texas at Austin, Institute for Geophysics (Thompson Conference Center), from 4-7 December 1991. The meeting will be preceded by the Panel Chairperson's meeting at the same location on 3 December 1991. A one-day field trip will be held prior to the meeting on Monday, December 2, for participants willing and able to arrive in Austin by Sunday, December 1. The field-trip's content will depend on weather (if good, a drive ~100 miles west of Austin to Enchanted Rock State Natural Area, a ~1 billion year old exfoliation dome of pink granite; if bad, something more local, perhaps fossil collecting in mid-Cretaceous platform limestone exposures around Austin). The JOIDES Office will attempt to get a firm tally of those interested in the field trip at this meeting (an earlier count showed 15-20 people interested in participating).

The 1992 Spring PCOM meeting will be hosted by R. Duncan at Oregon State University, College of Oceanography, from 21-23 April 1992. A one-day field trip will be held on Monday, 20 April, in the Coast Ranges. Attendees can fly either to Eugene or Portland and arrangements will be made through Allison Burns at JOI, Inc. to collect people at airports.

The 1992 Summer PCOM meeting will be hosted by J. Malpas in Victoria, British Columbia (?), Canada from 18-20 August. A field trip will be held following the meeting. Subsequent discussions between Malpas and the PCOM chair suggest that the venue may change to Newfoundland. PCOM should settle the issue at this meeting.

The 1992 PCOM Annual Meeting will be hosted by J. Mutter at Columbia University, Lamont-Doherty Geological Observatory. No further details are available. PCOM could set the dates for that meeting at this time. (The American Geophysical Union meeting in San Francisco is scheduled for 7-11 December.)

Item Q.
Adjournment

A two-day field trip to the Harz Mountains immediately follows the meeting.

SPRING MEETING JOIDES PLANNING COMMITTEE
23 - 25 April, 1991
University of Rhode Island, Graduate School of Oceanography
Narragansett, Rhode Island

REVISED DRAFT MINUTES
(August 2, 1991)

Planning Committee (PCOM):

J. Austin, Chairperson - University of Texas at Austin, Institute for Geophysics
H. Beiersdorf (for U. von Rad) - Bundesanstalt für Geowissenschaften und Rohstoffe (Federal Republic of Germany)
M. Cita-Sironi - University of Milan (ESF Consortium)
D. Cowan - University of Washington, College of Ocean and Fishery Sciences
R. Duncan - Oregon State University, College of Oceanography
H. Jenkyns - Oxford University (United Kingdom)
Y. Lancelot - Université Pierre et Marie Curie, Paris (France)
M. Langseth (for J. Mutter) - Columbia University, Lamont-Doherty Geological Observatory
M. Leinen - University of Rhode Island, Graduate School of Oceanography
J. Malpas - Memorial University (Canada-Australia Consortium)
R. Moberly - University of Hawaii, School of Ocean and Earth Science and Technology
J. Natland - University of California, San Diego, Scripps Institution of Oceanography
P. Swart (for K. Becker) - University of Miami, Rosenstiel School of Marine and Atmospheric Science
A. Taira - Ocean Research Institute (Japan)
B. Tucholke - Woods Hole Oceanographic Institution
J. Watkins - Texas A&M University, College of Geosciences

Liaisons:

T. Francis - Science Operator (ODP-TAMU)
R. Jarrard - Wireline Logging Services (ODP-LDGO)
B. Malfait - National Science Foundation
T. Pyle - Joint Oceanographic Institutions, Inc.

Guests and Observers:

P. Crevello - Marathon Oil Company
N. Bogdanov - Institute of the Lithosphere, Moscow (USSR)
R. Duce - University of Rhode Island, Graduate School of Oceanography
P. Dauphin - National Science Foundation
A. Dziewonski - Harvard University
G. Greene - US Geological Survey, Menlo Park, California
S. Hart - Woods Hole Oceanographic Institution
J. Hawkins - University of California, San Diego, Scripps Institution of Oceanography
D. Heinrichs - National Science Foundation
E. Kappel - Joint Oceanographic Institutions, Inc.
R. Larson - University of Rhode Island, Graduate School of Oceanography
M. McNutt - Massachusetts Institute of Technology
D. Rea - University of Michigan
A. Sharaskin - Geological Institute, Moscow (USSR)
M. Storms - Science Operator (ODP-TAMU)

JOIDES Office:

P. Blum - Executive Assistant and non-US Liaison
C. Fulthorpe - Science Coordinator

SELECTED ACRONYMS AND ABBREVIATIONS

ARC	Australian Research Council
BGR	Bundesanstalt fur Geowissenschaften und Rohstoffe
BGS	British Geological Survey
BHTV	Borehole Televiewer
BIRPS	British Institutions Reflection Profiling Syndicate
BMR	Bureau of Mineral Resources
BRGM	Bureau de Recherches Géologiques et Minières
CSDP	Continental Scientific Drilling Program
CSG	Computer Services Group (ODP)
DCS	Diamond Coring System
DFG	Deutsche Forschungsgemeinschaft
DP	Dynamic Positioning
DPG	Detailed Planning Group
ECOD	European (ESF) Consortium for the Ocean Drilling Program
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
ETH	Eidgenossiches Technische Hochschule
FMS	Formation Microscanner
FSDN	Federation of Digital Seismic Networks
FY	Fiscal Year
GSGP	Global Sedimentary Geology Program
IDAS	Isothermal Decompression Analysis System
IFREMER	Institut Francais de Recherche pour l'Exploitation de la Mer
IGBP(/PAGES)	International Geosphere/Biosphere Program (/Past Global Changes)
ILP	International Lithosphere Program
IOC	Intergovernmental Oceanographic Commission
IPR	Intellectual Property Rights
IRIS	Incorporated Research Institutions for Seismology
JAMSTEC	Japan Marine Science and Technology Center
JAPEX	Japan Petroleum Exploration Company
JGOFS	Joint Global Ocean Flux Studies
KTB	Kontinentales Tiefbohrprogramm der Bundesrepublik Deutschland
LBL	Lawrence Berkeley Laboratory
LANL	Los Alamos National Laboratory
LRP	Long Range Plan
MCS	Multi-Channel Seismic
MDCB	Motor-Driven Core Barrel
MOU	Memorandum of Understanding
MRC	Micropaleontological Reference Center
NADP	Nansen Arctic Drilling Program
NAS	National Academy of Science
NERC	Natural Environment Research Council
NSERC	National Scientific and Engineering Research Council
ONR	Office of Naval Research
OSN	Ocean Seismic Network
PCS	Pressure Core Sampler
PDC	Poly-crystalline Diamond Compact (drilling bit)
PEC	Performance Evaluation Committee
PPI	Producer Price Index
RFP	Request for Proposals
RIDGE, InterRIDGE	Ridge Inter-Disciplinary Global Experiments (US and international)
SCM	Sonic Core Monitor
SNL	Sandia National Laboratory
SOE	Special Operating Expense
STA	Science and Technology Agency (of Japan)
USSAC	US Scientific Advisory Committee
USSSP	US Science Support Program
VPC	Vibro-Percussive Corer
WCRP	World Climate Research Program
WG	Working Group
WOCE	World Ocean Circulation Experiment

FY92 Programs:

A&G	Atolls and Guyots
CA	Cascadia margin
CTJ	Chile Triple Junction
EPR	East Pacific Rise
HD	Hess Deep
NPT	North Pacific Transect
504B	(Deepening) Hole 504B

DPGs and WGs:

A&G-DPG	Atolls and Guyots DPG
NAAG-DPG	North Atlantic-Arctic Gateways DPG
NARM-DPG	North Atlantic Rifted Margins DPG
OD-WG	Offset Drilling WG
SL-WG	Sea-Level WG

SPRING MEETING JOIDES PLANNING COMMITTEE
23 - 25 April, 1991
University of Rhode Island, Graduate School of Oceanography
Narragansett, Rhode Island

EXECUTIVE SUMMARY

PCOM Motions

- PCOM approves the minutes of the 28 November - 1 December, 1990 PCOM meeting (p.7).
- PCOM adopts the agenda for the 23 - 25 April, 1991 PCOM meeting (p.7).
- PCOM sets the direction of the drilling vessel for the next four years as follows:
  1) In the remainder of FY 91, confirmed as is in the current Program Plan.
  2) In FY 92, and beyond to January 1993, confirmed as is in the Program Plan approved at its November 1990 meeting in Kailua-Kona, Hawaii, through Leg 147, Engineering EPR (in the event that DCS Phase III is not ready, Hess Deep will be substituted), ending in Panama on or about 21 January 1993. The Program Plan may include up to 10 days of supplemental science as moved at the November 1990 meeting.
  3) Until April 1994, in the North Atlantic. FY 1993 Program to be finalized in December 1991 at the Annual Meeting of PCOM with Panel Chairs.
  4) In April 1994 through April 1995, in the general direction of highly ranked proposals in the Atlantic Ocean and adjacent seas and the eastern Pacific.
  5) PCOM's long-range commitment to engineering development in support of highly ranked thematic objectives must be considered in planning specific cruise tracks.

  PCOM reaffirms its stand that at its spring 1992 meeting, and at subsequent meetings, it will evaluate again the state of panel recommendations, technological developments, and the overall state of the Ocean Drilling Program, and again set the general direction of the drilling vessel for the subsequent four years, with a relatively firm early track and a relatively flexible later direction (p.31).
- PCOM prioritizes engineering development as follows:
  1) Improvement and development of the Diamond Coring System.
  2) Improvement and development of the XCB Coring System.

  After these major priorities, PCOM believes that development should respond to the needs of scheduled legs. This implies that the next priorities are:

  3) Cork/PCS/high temperature preparations, in preparation for Leg 139.
  4) Orientation needs (hard rock orientation, Sonic Core Monitor, electronic multishot), in preparation for Leg 141.
  5) Vibra Percussive Corer, in preparation for scheduled 1992 SGPP objectives.
  6) Motor Driven Core Barrel, in preparation for the use of GEOPROPS in Cascadia drilling, Leg 146.

  Each of these development activities should be reevaluated after testing on the appropriate leg(s).

  Other active development efforts should continue on an as-possible basis.

  If there are short-term perturbations of the schedule, PCOM assumes that engineering development will respond to the schedule.

PCOM expects reports on the development schedule in the future so that it may reevaluate the priorities (p.37).

- PCOM establishes an Offset Drilling Working Group (OD-WG) to be charged with:
  a) establishing and setting into priority scientific objectives and a drilling strategy of a program for drilling offset sections of oceanic crust and upper mantle;
  b) identifying target areas where specific objectives can be addressed;
  c) identifying other survey information necessary to establish the geologic context of an offset drilling program; and
  d) identifying the technological requirements to implement the strategy (p.40).

- In view of the awkward wording of paragraph 2 of the DPG mandate, PCOM moves that Paragraph 2 be stricken and replaced with:
  "The DPGs are composed of a balance of U.S. and non-U.S. members, and proponents and non-proponents. The size of the DPG should be commensurate with the charge of the group" (p.41).

- PCOM thanks the North Atlantic Arctic Gateways Detailed Planning Group (NAAG-DPG) and the Atolls and Guyots Detailed Planning Group (A&G-DPG) for their expeditious and informative reports. We consider both DPGs to have fulfilled their charge and accordingly disband them (p.41).

- PCOM moves that the persons nominated for panel, DPG and WG membership be invited to serve (p.46).

- PCOM recommends against the setting of a liner in Hole 504B unless it is absolutely necessary to compensate for failing casing in the hole (p.55).

- PCOM moves that Hole 504B should be advanced in future with continuous coring procedures, especially in light of critical transitions to be sampled (p.55).

PCOM Consensuses

- PCOM recommends that the highest priority for downhole tool acquisition or development be a sensitive downhole magnetic susceptibility tool.
  Ideally, a susceptibility tool that can be incorporated into each tool string should be developed. In the interim, or alternatively, existing susceptibility tools such as the French magnetometers should be used on Leg 141 and subsequent legs to implement core-log correlation (p.38).

- PCOM supports the convening of a specialist group to consider downhole fluid sampling. The meeting is to be organized by P. Worthington (DMP chairperson) and should be held, if possible, in conjunction with the June 1991 joint meeting of DMP and SGPP. If the specialist group does not meet at that time, it should meet as soon as possible. The specialist meeting is to be separate from the DMP meeting agenda (p.40).

- PCOM approves the change from an off-axis location, as originally recommended by the EPR-DPG, to an on-axis location for the first site to be drilled during Leg 142 on the East Pacific Rise (p.43).

- PCOM expresses its appreciation and thanks to T. Moore for his long and outstanding service as IHP chairperson. PCOM hopes that his schedule will permit him to remain on IHP as a member (p. 45).

- PCOM notes the tendency for shipboard scientific parties to be too large. Concerns are:

1.) The difficulty of managing large groups.

2.) The high ratio of scientists to technical support staff.

3.) Crowding of laboratory facilities and work stations.

4.) Amounts of time and effort needed to support individual scientists' needs (e.g., sampling) (p. 53).

Mandate

- Preliminary OPCOM Mandate

1.) DCS development and testing, including:
   (a) Deployment from alternate platforms, for continuous testing.
   (b) Consideration of downhole measurements.

2.) Deep drilling.
   (a) 2 to 2.5 km holes, leading to maximizing the capabilities of the *JOIDES Resolution.*
   (b) Long-term planning, beyond *JOIDES Resolution.*

3.) Alternate platforms.
   (a) 1995 - 1996: linkage with "other" programs (e.g., global change).
   (b) Long coring facilities.

4.) High-latitude support vessels (FY93 and beyond).

5.) Staff costs for the above.

For each of the above, there must be discussion of the subject, costs and timing (i.e. flow charts) (p. 51).

Spring Meeting JOIDES PCOM
Tuesday, 23 April 1991

888 WELCOME AND INTRODUCTION

PCOM Chairperson Austin called the 1991 Spring Meeting of the JOIDES Planning Committee to order. R. Duce welcomed the attendees to Rhode Island. During his remarks, he said that he would have to leave the meeting that day to attend a ceremony in California at which a piece of Captain James Cook's vessel, *Endeavour*, would be presented to NASA to be carried into space aboard the new shuttle *Endeavour*.

Leinen explained meeting logistics, including a clambake hosted by the University of Rhode Island, Graduate School of Oceanography and JOI, Inc. Austin then called for introductions around the table.

889 APPROVAL OF MINUTES, 28 NOVEMBER - 1 DECEMBER 1990 HAWAII PCOM MEETING

Austin called for comments, corrections and approval of the minutes of the 28 November - 1 December 1990 PCOM Meeting held at Kailua-Kona, Hawaii. The minutes included modifications through April 10, 1991. There were no further corrections.

PCOM Motion

PCOM approves the minutes of the 28 November - 1 December 1990 PCOM meeting.
Motion Leinen, second Natland Vote: for 16; against 0; abstain 0; absent 0

890 APPROVAL OF AGENDA

Austin stated that the main purpose of the meeting was to plan the general direction of the drilling vessel for the next four years. Another was to devise a list of engineering priorities for ODP-TAMU. Other important, but subordinate, purposes were: to decide matters related to various reports from liaisons to PCOM, from PCOM liaisons to panels and from new DPGs and WGs, to make any adjustments in the planning structure necessary to prepare for the next four years in general and for Fiscal Year 1993 (FY93) in particular (approximately late January, 1993 - late September, 1993), to hear recent scientific results from drilling off Vanuatu (Leg 134), in the Lau Basin (Leg 135), and off Hawaii (OSN-1 pilot hole, Leg 136), and to conduct routine PCOM business.

Austin summarized the agenda and then called for any new items to be added to agenda Item O (Other Business). Responding to a question from Duncan, Austin said that progress at Hole 504B (Leg 137) would be presented in the Science Operator report. He then called for adoption of the agenda.

PCOM Motion

PCOM adopts the agenda for the 23 - 25 April 1991 PCOM meeting.
Motion Moberly, second Malpas Vote: for 15; against 0; abstain 1; absent 0

891 ODP REPORTS BY LIAISONS TO PCOM

EXCOM

Austin said that EXCOM had not met since October, 1990. Since then, the USSR has joined ODP and representatives were expected at the present meeting. Leinen reported that Bogdanov was expected that day, and Sharaskin the next. Heinrichs said that the USSR would become a member on May 1, 1991, but that they should be viewed at this meeting as members, not observers. Austin added that there were tentative plans for a delegation from ODP to visit the USSR in May. Formal participation by shipboard scientists from the USSR would begin with Leg 138.

NSF

Malfait began his report (see handout distributed at meeting) by noting that the NSF budget for FY91 increased by 11.1%. The Ocean Sciences budget rose by 11.8% and ocean drilling by 9.3%. The present US administration has strongly supported NSF's budget. In FY92, the budget for ocean drilling is projected to rise by 4%.

In FY91, NSF has augmented the original ocean drilling operations target budget of $39.6M with a $1.54M supplement to cover increased fuel costs. Fuel costs have since fallen and it is uncertain whether a fuel supplement to the $41.4M FY92 budget will be required. However, a seventh international partner, the USSR, is joining ODP and, based on this and other developments, NSF has proposed a new target FY92 budget of $43.5M to bring it into line with the Long Range Plan (LRP) budget for FY92. The additional $2.1M is viewed by NSF as providing an opportunity to achieve a more complete implementation of LRP objectives, including access to additional facilities and technology. This budget addition was communicated to JOI, Inc. during the week preceding the Spring PCOM Meeting.

Malfait then summarized FY91 and FY92 field programs (see handout). Lancelot pointed out that the French did not participate in the joint US-French Marquesas survey because a change of dates for the survey led to a conflict in the French ship's schedule.

Malfait noted that Dauphin has now joined NSF's ocean drilling staff. USSAC has been approved by the National Science Board for the next three years and Leinen and Duncan have been selected to be among the first participants in a new USSAC distinguished lecturer program. The US government has extended its indemnification of ODP to September, 1993. (ODP is insured to $200M, and US government indemnification applies above this figure.)

Malfait went on to summarize recent developments in the US academic research fleet. *RV Knorr* returns in late 1991, and *RV Melville* in early 1992. *RV Thompson* and *RV Nathaniel Palmer* will be in operation in late 1991 and late 1992, respectively. *RV Thomas Washington* will be retired in early 1992. Proposals for the planned AGOR 24 and 25 research vessels are being submitted to ONR. They will be similar to the *Thompson*, and they will be in operation in 1994 and 1996, respectively. Heinrichs noted that proposals can be for AGOR 24, 25 or both.

The crystal ball: planning for renewal

Heinrichs informed PCOM that the NSF plan is to get the basic framework for renewal settled during calendar year 1991. NSF will ask for a single extension of ODP and will seek agreement "in principle" to a ten-year renewal. During the first five years, *JOIDES Resolution* will continue to be the primary vessel. Technology development will proceed concurrently. Other platforms might be adopted in the post-1998 period. Examples of such alternative platforms include the Japanese vessel, now in the design stage, the European NEREIS project, and a drillship under development in the USSR.

On the US side, all presentations to the National Science Board (NSB) have been very positive. NSF will request that Frank Press ask the National Academy of Science (NAS) to establish an *ad hoc* committee to review the LRP. Input will be obtained from the member countries, following which an NSF committee will be established to examine all input and make a recommendation. Heinrichs added that he assumed that the recommendation would be to continue ODP.

Cita-Sironi asked if she could cite Heinrich's statement on renewal periods in the ESF renewal document. Heinrichs stated that the ODP Council (ODPC) framework is to obtain agreement in principle to a ten year renewal with a mid-term review. This would involve a hard commitment to five years and general agreement to ten. Heinrichs responded to a question from Austin on the timeframe for the reviews by stating that all national reviews would be complete by the end of calendar year 1991 and NSF would be in a position to sign formal MOUs by mid-1992. The details of running and managing ODP with the international partners will be addressed in late 1991 to early 1992. Austin asked if there was a role for PCOM and Heinrichs replied that PCOM will play a central role in providing input on the science plan to EXCOM.

JOI, INC.

Pyle began his report (Appendix 1) by noting that a deficit had been carried over from FY90, largely because of increased FMS logging. He recommended that PCOM consider the recent practice of holding post-cruise meetings away from ODP-TAMU. Austin said that this item would be added to Item O. Pyle continued, noting that only $0.5M - $1M of the $1.54M fuel supplement from NSF will be needed. The USSR will begin scientific participation on Leg 138, and their first financial contribution is expected in the last quarter of FY91.

The publicity film shot during Leg 105 is virtually complete. NSF wants further editing, but it will be sent to the Arts & Entertainment network by the end of April. Malpas asked about broadcasting rights outside the USA, and Pyle replied that this was not yet possible, but that rights were being negotiated. Interested parties should contact JOI, Inc. Responding to Duncan, Pyle said that the film will be of 45 to 50 minutes duration (one hour minus time for commercials) and is directed at a general public audience. A difficulty in editing the film has been that no extra footage could be shot following Leg 105. Duncan noted that there is a video camera on the ship and asked if an archive of film footage could be built up. Pyle, however, said that JOI, Inc. had had no luck in that regard. Swart noted that an Australian film crew had filmed during Leg 133. Pyle expressed interest and may contact P. Davies, co-chief of Leg 133, for more information.

Work in establishing liaisons with other international earth sciences research programs is proceeding. Pyle foresees a greater role for PCOM once he has made initial contacts. In

addition to those programs that have been contacted previously (Appendix 1), the US Global Change Research Program has expressed interest in working with ODP (see handout distributed at meeting).

The third Performance Evaluation Committee (PEC-III) has been established under John Maxwell of the University of Texas at Austin. (S. Hart, a member of PEC-III, attended the first part of the meeting and M. McNutt, also of PEC-III, attended the remainder.) PEC-III would complete its work by the end of calendar year 1991.

Pyle went on to discuss the status of high temperature tools. The JAPEX temperature, pressure and flow tool has been leased and will be going to ODP-LDGO soon. The BRGM temperature tool has also been leased, as have water samplers from LANL and LBL. A meeting with BGS and Camborne School of Mines (UK), to discuss joint development of a resistivity tool, is scheduled for April 29 - 30. A non-DMP panelist is needed for discussions with KTB and Sandia.

The FY92 program plan is outlined in Appendix 1. The draft program plan has been sent to NSF for evaluation. The next step will be to send it to EXCOM in July. The new budget begins in October. (The FY92 budget, together with SOEs, are outlined in Appendix 1.) In response to a question from Beiersdorf, Francis said that the SOE for Hess Deep (HD) is for guidebases and drilling motors. If Leg 140 is Hole 504B, this SOE money will go to DCS development.

Pyle referred to "Opportunity '92", the additional $2.1M over and above the FY92 program budget to be provided by NSF to further progress on the LRP. Possible uses for the funds include an alternate platform for shallow-water drilling and long coring from another vessel for paleoceanography. PCOM should advise JOI, Inc. on this matter, perhaps through an advisory group analogous to STRATCOM, that might include panel chairpersons. Austin noted that the Sea Level Working Group (SL-WG) and Atolls and Guyots Detailed Planning Group (A&G-DPG) had asked for alternate platforms, and that this issue would be discussed later in the agenda. Responding to a question from Duncan, Austin said that discussions on the expenditure of these new funds would cover more than alternate platforms. He added that the decisions should be made quickly and reported to JOI, Inc. before October 1. Pyle concluded by noting that next year a four year program plan (FY93 - FY96) would be written and the schedule for its review and approval accelerated.

BCOM

Moberly referred to the BCOM report (Agenda Book white pages 75 - 80). There are four dollar amounts to be kept in mind: 1.) the initial target of $41.4M, 2.) the draft budget of $41.6M, 3.) the long-term estimate of $42.5M, and 4.) the new funds which raise the budget to $43.5M.

BCOM proposed that PCOM should evaluate each item of engineering development and decide whether to terminate some in order to progress more rapidly with others. Moberly said that the $125,000 SOE for additional technological developments had now been increased by the additional NSF funds. If the program is not renewed, BCOM would have to address a close-down budget in FY93. Malfait pointed out that FY93 would be an operating year, even in the event of non-renewal, but Moberly said that the budget would still have to be modified, as there would be, for instance, no purchase of new equipment.

Austin said that PCOM would return to the issue of engineering prioritization, stating that this was not simply a question of money, but also of manpower. Heinrichs said that the additional $2.1M is not an ordinary SOE, in the view of NSF, because it is to further the achievement of scientific goals. He added, however, that this could involve engineering development.

SCIENCE OPERATOR

Francis thanked NSF for helping ODP-TAMU through the period of elevated oil prices.

Leg 135 began with a port call in Fiji. In spite of the *JOIDES Resolution* having been required to remain at anchor outside the port for a whole day, the port call was accomplished on schedule. The drill-in casing with funnel was not used on this leg. Recovery rates were poor in the breccia, fractured vesicular basalts, and vitric sands encountered. Recovery rate was as low as 1% in parts of some holes, emphasizing the importance of logs. The MDCB was run, but with little success. The scientific party left the ship at Pago-Pago, but the SEDCO staff stayed aboard until Honolulu.

Francis deferred the report on Leg 136 (OSN-1) to the following day, at Austin's suggestion. Leg 137 (in progress at the time of the meeting) involved the cleaning of Hole 504B. Francis reported that the bottom of the hole had reached 1615 - 1620 mbsf (it had been 1562 mbsf). Leg 111 junk had been successfully cleaned from the hole. Before cleaning operations, a temperature log was run in the undisturbed hole. The temperature at the bottom of the hole was 165°C, indicating a linear temperature gradient, below the top part of the hole, of 61°C/km. LANL and LBL fluid samplers were tested for use on Leg 139. Nine runs were made and eight samples obtained. The samples are considered useful, but somewhat contaminated. Hole cleaning began with fishing followed by milling. The casing is in good condition and there is no sign of caving. A tricone bit was used to advance the hole to 1570 mbsf, followed by coring with a rotary core barrel (RCB) to 1615 mbsf. Recovery was 14% of the penetration of 45 m. The RCB bit showed damage, and it was feared that there might be some junk remaining. Tricone drilling was, therefore, resumed. If the hole is clean, a conventional diamond core barrel (DCB) may be used, together with a permeability test, borehole televiewer (BHTV) and the NaBr tracer experiment proposed by J. Gieskes and approved by DMP. Francis said that legs 136 and 137 have provided a useful "breather" for ODP-TAMU, requiring fewer technicians and permitting necessary alterations to the ship and computers.

Langseth asked about the MDCB, and Francis replied that it had been run on legs 134 and 135. It was thought to have been misassembled for one run on Leg 135. Hawkins (Leg 135 co-chief) added that the MDCB had been tried about four times on Leg 135 in fairly hard, vesicular, jointed basalt and that he had not been impressed with the tool. Greene (Leg 134 co-chief) said that the MDCB had also been tried about four times on Leg 134. The corer had worked, but there had been no recovery. Storms reported that, following legs 134 and 135, the MDCB was analyzed and errors found in the design computer program. The weight-on-bit used in the tests had been two to three times too great. Storms believed that problems with the system have now been identified. Austin closed this discussion, noting that engineering matters would be addressed later in the meeting.

Francis went on to discuss near-term planning. The expectation is that Leg 138 will recover a great deal of core, perhaps 5 km. Clearances are required for two sites, from Ecuador and France. The scientific party has decided that individual sampling will not be carried out aboard

ship, but will be deferred until August, when shore-based sampling will be carried out. Between 5,000 and 10,000 samples will be taken on board, with a further 20,000 to 30,000 in August. Cita-Sironi, Swart and Moberly expressed reservations about this decision, and Lancelot asked whether all of the scientific party had been consulted. Austin said that this strategy might impact the publications schedule. Francis emphasized that only personal sampling would be deferred. Smear slides, etc. would still be taken. Leinen pointed out that this sampling plan was in the prospectus and that sufficient samples will be taken for shipboard stratigraphy. The reason for deferring personal sampling is the need for intensive sampling for Neogene stratigraphy. In addition, the introduction of core-log integration involves an extra workload on the scientific party. Austin said that he saw this as a leg-specific strategy, not a precedent, and Lancelot added that PCOM should welcome this decision as long as no rules are broken (i.e., publication deadlines are met). Francis continued, pointing out that computerized visual core description will be fully operational for the first time on Leg 138 (having been tested on Leg 136). It is also hoped that computerized paleontological input will be available. Two color imaging systems will be used on the split cores: 1.) the ODP-TAMU imaging system, which generates a great deal of data (about 1 Mb per 10 cm of core), and 2.) reflectance spectroscopy, a one-dimensional system requiring less data storage (about 2 Mbyte per core), but capable of greater color resolution.

Staffing of Leg 138 is complete. Leg 138 will carry two scientists from the USSR. USSR participation requires compliance with US government security regulations concerning technology. The operations superintendent will be responsible for appropriate procedures. Access to certain areas (e.g., the Dynamic Positioning (DP) room and Masscomp computers) will be restricted to authorized personnel. ODP-TAMU hopes to treat the entire scientific party equally, and the new arrangements will not impact science operations. Beiersdorf asked whether the USSR had been informed. Malfait reiterated that the procedure has been set up so as to have zero or minimal impact on science operations, and Heinrichs said that he had discussed the arrangements with Bogdanov. Procedures will apply to all members of the scientific party and, in any case, it is not common practice for scientists to be in the DP room during operations. USSR personnel will still be able to use the ship's computers. Austin said that a potential problem is embarrassment to an individual (i.e., a USSR co-chief) who may be unaware of the procedures. Francis noted, however, that there will be no USSR co-chief for at least a year, and that the restrictions may be eased. Austin said that he was more concerned about morale problems and the possible impression that there are first and second class citizens; care must be taken to avert these problems. Moberly said that PCOM should be pleased that the USSR will be participating, and that if they are willing to operate under these restrictions, fine.

Francis reported that planned JGOFS involvement in Leg 138 had not materialized. Leinen added that this was the result of funding problems experienced by JGOFS personnel. Francis stated that experiments will be performed with flow control on the XCB, but that the LAST tool will not be available.

Preparations for Leg 139 have involved three persons from ODP-TAMU and three from SEDCO participating in H_2S safety training in Canada. A detector and alarm system has been purchased, the lab ventilation system will be revamped to get positive pressure in the lab stack, and portable breathing systems will be available. High temperature bits and core liners will be used together with special muds and cement. A drill string safety valve will prevent the well from flowing. Cores will be monitored for H_2S and some may have to be split outdoors. Outdoor refrigerated storage will be provided for core containing H_2S. Cores may be sealed to prevent degradation of sulfides. The WSTP tool has been modified. Leg 139 will cost $300,000 more than an ordinary leg as a result of these measures. Safety will be reviewed at the May PPSP meeting. Staffing is complete.

The indications at the time of Francis' report were that Leg 140 will be Hole 504B. Co-chiefs will be H. Dick and J. Erzinger. The leg is being staffed. Austin noted that the JOIDES Office had received comments about staffing of this leg. He added that ODP-TAMU had indicated that there might be flexibility, depending on whether the leg was Hole 504B or HD. Francis said that there would be no change in the co-chiefs.

Leg 141 (Chile Triple Junction) co-chiefs will be J. Behrman and S. Lewis. ODP-TAMU is presently performing a review of oceanographic conditions, in view of its limited experience in this region. There is a BSR at one or two sites. The MDCB, pressure core sampler phase I (PCS I), GEOPROPS (if it passes an extra land test), and the sonic core monitor (SCM) and hard rock orientation will all be tested, as will a commercial orientation device. Further development of flow control on the XCB is also scheduled. Austin noted that PCOM would return to aspects of this leg later in the agenda during discussion of the FY92 Program Plan.

Francis said that Leg 142 would be discussed later in the meeting. Regarding the staffing of future legs, A. Meyer requires nominations for legs 143 and 144 by 1 June and for legs 145 and 146 by 1 August. (See Appendix 2 for figures showing proportional international participation as shipboard scientists and co-chiefs.) An offer is pending to a new staff scientist to replace M. von Breymann.

ODP-TAMU investigated the use of Majro (the new name for Majuro) as a port call between legs 143 and 144, as requested by the A&G-DPG. It was necessary to send R. Olivas on a reconnaissance visit in early March. Hotel accommodation is skimpy and transportation would probably have to be by charter aircraft. The most difficult problem is that of obtaining fresh water. However, SEDCO feels that the ship can generate enough water on board to enable it to go without taking on additional water at Majro, and that the Majro port call is acceptable. Yokohama will be the port call between legs 144 and 145, helping both A&G drilling and the North Pacific Transect (NPT). Leg 145 will end in Victoria, instead of Seattle, saving some time and also in response to a Canadian request. The new operations schedule was handed out at the meeting (see also Appendix 2).

Appendix 2 contains proposed distribution dates for ODP volumes in FY91 and FY92. An article will be published in *EOS* following each leg, beginning with Leg 136, and comprising about 3000 words and four figures. This is in addition to *Geotimes* and *Nature* articles. Austin added that the intent is to maximize exposure of ODP, and that *EOS* has also given approval to publish the ship's schedule every year. Francis said that *Nature* tends to be more finicky, having recently rejected reports of legs 133 and 134. ODP-TAMU would like feedback from PCOM on its poster display. This is maintained at ODP-TAMU and comprises a map showing recent legs, legs in progress and future legs, together with some text about leg achievements. Francis said that ODP-TAMU is prepared to supply this display, updated every six months, to institutions of interested PCOM members. Francis envisioned a total of about twenty. Anyone interested should supply the name and address of a contact person to A. Meyer.

Responding to a question from Natland, Francis said that he would prefer to defer discussion of the Leg 136 deep hole until the following day. Beiersdorf said that the FRG receives ODP-TAMU press releases four weeks after legs have ended. He asked that Francis investigate having this process speeded up (fax the releases) and also attempt to include more scientific information.

WIRELINE LOGGING

Jarrard noted that, while every western Pacific leg had hole stability problems, he anticipated that such problems would be fewer for the eastern Pacific legs. Appendix 3 contains summaries of logging results.

Leg 134 saw the first use of the German digital televiewer, which was successful. It subsequently had problems on Leg 135 and is back out on Leg 137. The French susceptibility tool, for determining reversal stratigraphy, was also successfully run on Leg 134. The FMS was run with two passes, which yielded excellent replication. Some holes can be washed out to diameters large enough so that only two of the four FMS pads obtain data. Such hole ellipticity can indicate stress direction. One pair of FMS calipers generally chooses the long direction, and the other pair the short direction. The FMS can also be used as a dipmeter.

On the financial front, Jarrard reported the good news that ODP-LDGO has replaced its obsolete Masscomp computers at 20% of the normal cost. However, generally ODP-LDGO is in very a poor financial state, going into the red last year to cover contingencies. The same costs apply this year, but last year's deficit must also be made up. Furthermore, the workload has increased, with greater data acquisition and more frequent logging schools. Three new technicians, scheduled to join ODP-LDGO in October, should help reduce the workload. Jarrard announced that he would be leaving ODP-LDGO in September to take up a position at the University of Utah. The new PCOM liaison has not yet been established.

In response to questions from Cita-Sironi, Jarrard said that half of the fifteen ODP-LDGO staff are dedicated full-time to ODP, with the remainder of the staff being committed to ODP for between three and nine months per year. ODP-LDGO is now sending two people on about one third of all legs. Jarrard noted that he would discuss engineering developments later in the meeting, in conjunction with the ODP-TAMU engineering presentation and PCOM's engineering prioritization/discussion

892 REPORT OF RECENT DRILLING LEG: 134 (VANUATU)

Green said that Leg 134 had been a long leg, characterized by a variety of holes. Site 827 suffered from hole collapse. Approximately 400 m had been drilled, recovering an upper unit of turbidites derived from the arc; hole trouble began in basement volcaniclastics. Tectonic deformation was evident in the lower part of the hole, but the décollement was not reached. Site 828 was on the d'Entrecasteaux Ridge seaward of the toe of the accretionary prism. The four units cored provided a reference section for evaluating progress toward the décollement at sites 827 and 829. The slope of the accretionary prism was steeper at Site 829 than at Site 827. Once again, the décollement was not reached because hole instability was encountered. However, several thrust sheets, with lithologies similar to those at Site 828, were penetrated. The thrust faults act as conduits for fluid. Offscraping of sediment from the d'Entrecasteaux Ridge is evidently taking place, since Site 828 units can be identified at Site 829. The BHTV and French susceptibility tool yielded good data.

Sites 830 and 831 were drilled in the area of Bougainville Guyot. Site 830 suffered from caving and was a disappointment. Two units were cored, an upper volcanic silt and a lower volcanic breccia. Site 831 was drilled on the guyot and was a successful hole despite poor recovery of very soupy lagoonal deposits. Logging results were good and will fill in gaps left by low recovery. The Eocene to Oligocene section was present, but most of the Miocene was

missing. Responding to Natland, Greene said that his description of sediment as "soupy" indicates a feeling that the sediment contained more water than was being circulated. Soil horizons indicated several periods of emergence of the guyot.

Sites 832 and 833 were drilled in the intra-arc basin (North Aoba Basin), both to 1000 mbsf. Good logging results were achieved, though there was some hole collapse.

Green summarized Leg 134 preliminary conclusions. Two ridges are colliding with the central New Hebrides arc. The North d'Entrecasteaux Ridge is more streamlined and is passing cleanly under the arc, with sediment being offscraped. In contrast, the southern d'Entrecasteaux chain is characterized by lighter basement rocks and Bougainville Guyot might be being obducted, rather than subducted. Results from the intra-arc basin suggest that the history of arc polarity reversal may be decipherable.

Discussion

Moberly asked whether hydrocarbons had been encountered in the intra-arc basin, and whether there was evidence of silled basins. Greene replied that the Rock-Eval had not been working, but that little organic material had been recovered from the Aoba Basin. Hydrocarbons were therefore absent, but there had been little diagenesis and permeabilities remained high, so that migration would be no problem. He added that part of the section had been barren, so that shipboard analysis of benthic forams could not provide evidence of sills. Responding to Taira, Greene said that good temperature readings were not obtained at sites 828 and 829, but were obtained in the intra-arc basin, where temperatures were high. Natland asked Greene to comment on this approach to collision problems. Greene replied that he thought the approach good, but that there had been many objectives to reach. If more time had been available, the décollement could have been penetrated. Cowan noted that the leg did achieve its objective of documenting that offscraping had occurred.

893 JOIDES REPORTS BY PCOM LIAISONS

DMP

Jarrard gave the DMP report, since the PCOM liaison to DMP (Becker) was at sea on Leg 137. DMP concluded that borehole stability in tectonically active regions can be improved by casing, washing holes for logging, staged logging and the use of heavy muds. PCOM should consider devoting part of a future engineering leg to evaluating hole stability strategies. DMP also recommended increasing the number of shipboard computer personnel for core-log integration, returning to Site 801, and convening a specialist meeting to evaluate tool engineering and sampling (especially the wireline packer).

SMP

No PCOM liaison, was present at the meeting, but Cita-Sironi sent a written report to the SMP meeting. Cita-Sironi reported that SMP requested a second shipboard systems manager to provide twenty-four hour coverage. (IHP and DMP also made this recommendation.) Francis said that ODP-TAMU would support this. Austin added that SMP still wants to augment shipboard technical support (an issue first raised by the SMP chairperson at the 1990 Annual PCOM Meeting), but that discussion of this item would be deferred to later in the meeting.

Leinen stated that SMP has studied magnetic contamination in APC cores and found that the rust derives from the inside of the drill pipe. SMP suggested that a pig be run down the pipe to help clear it of rust. Francis said that a pipe pig was not always effective, as its diameter is restricted. Zinc coating is more important; this had been a SOE item, but was made a base budget expense by BCOM. Leinen pointed out that SMP viewed use of a pig as a short-term solution. Storms said that new joints added to the top of the string was the primary source of rust, and that recoating was the only good solution.

Leinen reported that SMP, DMP and IHP now agree that shipboard integration of core and log data is a first order objective; the establishment of reference depth is the key. Leinen referred to lists of hardware and software purchasing priorities for core-log integration in the SMP meeting summary (Agenda Book white pages 192). The top two items in both the hardware (natural gamma and downhole susceptibility) and software lists, plus the additional shipboard systems manager, are the main priorities. Responding to a question from Austin, Leinen said that the first software item is envisioned to be an in-house development requiring one person-year. The second software item will be purchased after evaluation of several off-the-shelf packages. In response to Natland, Leinen said that SMP felt that sediment drilling posed more critical problems than basement drilling because of the high resolution required. Austin said that PCOM might wish to take up these items later as part of the scheduled discussion on how to spend the additional NSF money available for FY92. He deferred further discussion.

IHP

IHP had met jointly with SMP; no PCOM liaison had been present. Lancelot gave the report, referring to the IHP minutes (Agenda Book white pages 193). IHP recommendations included the need for core-log integration and a second shipboard systems manager. Lancelot agreed and felt that a quantum leap in the amount of data collected aboard ship is occurring. The data management system at ODP-TAMU has been reorganized. It is now all under A. Meyer, who has reported that four positions are changing in that department. The programming required for many panel recommendations can probably be accomplished in-house by hiring a programmer for the Computer Services Group (CSG). (A CSG report was distributed at the meeting.)

IHP discussed having a scientist make corrections to the data archive system on board ship. The shipboard database is difficult to use; it is protected and cannot be easily interrogated. A shipboard "working" database is desirable. This would allow correction to the shipboard database, provided these are controlled and recorded. This is a complex matter. Greene said that a system of this type was available on Leg 134, but that participants on Leg 134 had to carry large numbers of computer diskettes off the ship and advocated condensing data storage, e.g., by use of CDs. Lancelot said that ODP-TAMU needs time to work on the shipboard database and that users can provide their own diskettes if the system exists. A "working" shipboard database would simplify the system. Austin suggested that a second systems manager might help expedite this, but Francis added that this is separate from the issue of a new systems manager and that the system on Leg 134 was experimental. Greene said that the system on Leg 134 allowed them to display all stratigraphic and log data on a "master" column, which was very valuable. Lancelot added that this will be supplemented when visual core descriptions can be entered into Macintoshes (to be available on Leg 138). IHP also discussed the problem of core depth versus logging depth.

Lancelot reported that IHP recommended amendments to the ODP-LDGO data distribution policy. Austin, however, noted that such a policy already exists and has been published in a

recent bi-monthly report. Lancelot said that IHP also recommended that rejected scientific papers be considered (in altered form) for consideration by the Editorial Review Boards as data reports. In addition, ODP-TAMU should also introduce an Email sample request system. DSDP leftover funds should be used to enter into the database data that have not been included.

Discussion

Cita-Sironi reported that J. Saunders had written to her proposing that palynomorphs be added as a standard microfossil at Micropaleontological Reference Centers (MRCs), and also that a workshop on curation and database management for the MRCs be held. Swart asked about the development of ODP CD-ROMs analogous to the DSDP CD-ROMs. Lancelot replied that such a system is being manufactured, though with a different format from that of the DSDP system. The push is to achieve online access to data, rather than the CD-ROM. Swart commented that many scientists do not find the CD-ROM system useful, as there is no software for data retrieval. Lancelot responded that it was up to the user to develop software, which could then be shared.

Austin noted that IHP had identified a staffing need and a hardware need and deferred discussion. In response to Lancelot, Francis reported that there will be a second systems manager on Leg 138, since W. Meyer will be sailing as assistant lab. officer. Replying to a question form Beiersdorf, Cita-Sironi and Moberly stated that there are about 8 MRCs and Austin added that the meeting that MRC curators are trying to plan for the fall will address the issue of usage.

Before proceeding with the next report, Heinrichs introduced N. Bogdanov of the USSR, who had just arrived.

SSP

Watkins reported that SSP had expressed concern that the site survey data at HD were inadequate to establish objectives and drilling sites. SSP would also like to see wider distribution of site survey guidelines. Austin reported that these would be in the next issue of the *JOIDES Journal*. Watkins continued, noting that they should also be sent to proponents with acknowledgement letters and Austin said that this will also happen. SSP felt that single-channel seismic data are insufficient for evaluation of basement objectives in the Cretaceous guyots component of the A&G program. SSP felt that NARM-DPG had not clearly defined a drilling program, and is concerned about the amount of time available to define such a program. SSP feels that the new site at Detroit Seamount (NPT, Leg 145) is poorly defined and requires location and data. With reference to an equatorial Atlantic proposal, SSP reiterated that their guidelines require MCS for penetration greater that 1000 mbsf.

SSP is also concerned about the short time available for the safety review of supplemental science proposals, and recommends allowing at least thirty days for mail review.

Discussion

Natland said that when single channel data are used in conjunction with Seabeam and dredging results for the A&G program, basement picks are clear. Lancelot stated that good seismic data are required for NPT and that PCOM should recommend their acquisition.

Referring to SSP comments on HD, Austin said that SSP had treated their guidelines intransigently. PCOM is not required to take all the recommendations of its advisory panels. Proposal submission guidelines, including site survey guidelines, will be published in the next issue of the *JOIDES Journal*. Copies of the guidelines will also accompany acknowledgement letters to proponents. Austin stated that he believes that a data synthesis will be available for HD prior to drilling, especially if it proves to be Leg 147. There will be no MCS data, though available near-bottom information should permit initial siting. Lancelot noted that if HD is Leg 147, there may be an additional French cruise before drilling.

Austin pointed out that the results of Leg 137 will soon be available, and that PCOM will have to decide how it will decide whether Leg 140 will be Hole 504B or HD. Responding to Moberly, Austin said that this would involve deciding on what constituted a returnable hole at 504B. Austin stated that he had informed Kidd, the SSP chairperson, that he would accommodate a meeting of a subset of SSP together with HD co-chiefs, but that SSP had preferred to let the matter go on immediately to safety review. Malpas reported that the Canadian member of SSP had gone so far as to threaten to resign unless a written reply to SSP's objections was forthcoming from PCOM. PCOM was not sympathetic to this demand. Lancelot said that there was a need to demonstrate that MCS data would be helpful at HD, but Austin pointed out that a US proposal for MCS data collection at HD had been turned down by NSF because of steep topography in the area.

Duncan said that there are two perspectives: SSP has in mind the long-term program, but there is enough information available now to proceed with the first leg. Cita-Sironi reported that the ESF member of SSP had told her that SSP "lived with the ghost of Leg 118", viewed as SSP's worst performance, when the *JOIDES Resolution* conducted the site survey. Austin responded that the site survey work for Leg 118 had been good, but that the vessel had been unable to drill the designated sites. Austin replied to a question from Natland, noting that SSP will submit revised guidelines for review. These could be circulated to PCOM, but this would have to be done quickly to ensure that the guidelines could still appear in the *JOIDES Journal*. Austin had informed SSP that their role is advisory and that they do not possess veto power. Duncan pointed to the conflict between SSP, who wanted an MCS survey at HD, and the NSF reviewers who felt that such a survey would be worthless. Watkins stated that MCS is not the issue. The concern is that there are insufficient data to evaluate two competing tectonic models. Austin restated that he believed that a synthesis of available data will be sufficient for the first part of a long-term HD program.

PPSP

Austin reported that PPSP had not met since the last PCOM meeting. PPSP will discuss safety aspects of Sedimented Ridges (SR), Chile Triple Junction (CTJ) and East Pacific Rise (EPR) legs at its meeting in May. PPSP chairperson Ball feels that PPSP could review a HD synthesis package by mail, though this will be unnecessary if HD is Leg 147. Austin might not be attending the PPSP meeting, because it conflicts with a planned trip to the USSR. He requested that, in that event, Moberly serve as PCOM liaison to the May PPSP meeting. Moberly agreed to do so.

TEDCOM

Natland reported that TEDCOM had not met since the last PCOM meeting. TEDCOM's next scheduled meeting will be in San Diego in July and will coincide with the visit of the *JOIDES Resolution* to California and include a tour of the ship. TEDCOM chairperson Sparks had thought that it might be necessary to move the meeting forward if DCS Phase III development proceeded faster than expected, but this had not occurred. Austin noted that information on deep drilling sites had been provided by TECP. LITHP and SGPP are also working on candidate deep sites for TEDCOM consideration.

LITHP

Natland stated that LITHP had discussed DCS II and III development and recommends that a group evaluate the wireline packer. Other LITHP recommendations were that a petrologist be added to the NARM-DPG, and that orientation of basement cores for paleolatitude determination, or the use of a downhole magnetometer, is important at A&G sites. LITHP also recommended that the EPR engineering leg (142) switch to an on-axis site, where the observed rubble zone is thinner. A site on a ponded flow has recently been identified based on observations from the submersible *Alvin*. Two guidebases will be carried on Leg 142 and a new diamond core barrel (DCB) will be evaluated. LITHP felt that PCOM had missed an opportunity in not setting up an Offset Drilling Working Group (OD-WG). LITHP minutes (Agenda Book white pages 235) contain further details of these recommendations and on proposal reviews.

Discussion

Austin said that the issue of an OD-WG, or OD-DPG, would be discussed later in the meeting. Malpas asked whether there was any news about clearances for the Red Sea. Heinrichs said that no further information was available, but that such clearance was expected to be refused. Francis noted that LITHP have requested that an ODP-TAMU engineer attend each meeting, but that this would be a drain on manpower, especially if meetings are in locations such as Cyprus. Austin explained that the next LITHP meeting will be held jointly with TECP and that the proposed venue is Cyprus. He added that it might be beneficial for an engineer to attend joint thematic panel meetings. However, although LITHP feels that this is important, they should not expect an engineer at every meeting.

OHP

Duncan explained that one of OHP's tasks had been to act as a DPG by devising a NPT leg (145). NPT involves a number of paleoclimate and basement objectives. OHP eliminated NW-3, one of two deep central Pacific sites. NW-4 was thought to be of higher priority. NW-1 was retained. Basement penetration was eliminated at DS-2 and a fourth DS site was added to maximize Neogene high-resolution transect objectives. Penetration to basement was retained at DS-1 and DS-3. (Original and revised drilling plans are presented in the OHP minutes, Agenda Book white pages 296 - 297.) The final plan involves 39.7 drilling days and 20.3 transit days. Austin stressed the need to nominate co-chiefs for this leg.

SGPP

Moberly referred to the SGPP minutes (Agenda Book white pages 305). The meeting began with a workshop on Gas Hydrates and Ocean Drilling. The workshop influenced much of the meeting and influenced subsequent panel rankings (e.g., a generic gas hydrates leg was ranked first). Engineering concerns discussed included sampling of hydrates and fluids, packers, and sand recovery. One supplemental science proposal was reviewed, but it had been written before proponents knew of the four-day limit imposed by PCOM at its Fall 1990 meeting. Austin interjected that it had not been his intention to discuss supplemental science proposals until August, but that PCOM could choose to do so.

Discussion

Natland introduced a the Clathrate Study System Progress Report, by G. Brass and M. Kastner, which was subsequently distributed at the meeting. The system is under development at the University of Miami.

Austin asked if there had been any discussion at the SGPP meeting on how to publicize results of the gas hydrates workshop. Moberly replied that, to his knowledge, there had been no such discussion. Austin emphasized the need to publicize such workshops and feed their recommendations into the planning process. Kappel said that USSAC workshops are summarized in the USSAC Newsletter; workshop reports are also available through JOI, Inc. Austin, however, noted that the workshops in question were not JOI-USSAC meetings, and PCOM should consider how to publicize their findings, e.g., in the *JOIDES Journal*. Cita-Sironi asked how many *JOIDES Journals* are distributed. Kappel replied that the number was about 2500. Responding to Austin, Moberly said that the gas hydrates issue will feed into the rewrite of PPSP safety guidelines, which will also appear in the *JOIDES Journal*.

TECP

Tucholke explained that TECP discussed a number of draft documents they have been preparing on proposal presentation and review processes, tectonics of mid-ocean ridges, and a checklist for the tectonic content of proposals. Austin said that the proposal guidelines will be re-published in the *JOIDES Journal* and that the TECP checklist may also be published. Tucholke continued, noting that TECP has created model deep drilling sites to feed to ODP-TAMU and TEDCOM. One site involves 2300 m penetration (6300 m string) in the Newfoundland Basin, and is considered achievable with the present system within 0.75 leg. The site would test the ship's present capabilities; the other is a deep basement (1700 m sediment and 1800 m basement penetration, 8680 m string) site on the Galicia margin, considered beyond the capabilities of the *JOIDES Resolution*.

TECP concerns include the lack of sufficient drilling time at CTJ (Leg 141). TECP recommended extending the leg by four to six days. TECP also expressed concern about the balancing of cross-sections at HD. TECP is trying to deal with twelve major themes, none of which are prioritized, and is therefore reviewing a large number of proposals. TECP did assign watchdogs to its themes, and suggested that inactive proposals be dropped from the system after three years.

Discussion

Austin said that the JOIDES Office plans to review the proposal list to assess its complexity, i.e., define which proposals have been drilled, which others have not, etc. PCOM could defer discussion of this to the August meeting, when this information will be available. Larson said that he believed that there used to be a policy that, once the drillship had left an area, the proposals for that area became null and void and resubmission was required to demonstrate the intent of the proponents. Austin asked whether PCOM endorsed a time limit for proposals. He cautioned that ODP had changed since Larson was PCOM chairperson and was now thematic and not regional. Tucholke felt that consideration of a cut-off date would be worthwhile. Leinen suggested that proposals be dropped because of: 1.) low global ranking and 2.) lack of continued interest by proponents. Moberly suggested that all proposals be dropped that have been in the system for more than three years. Malpas said that proponents of old proposals should be encouraged to re-submit, since the ship may be coming back into their areas in the next four years. Leinen, however, pointed out that this would conflict with the thematic emphasis of ODP. Austin recommended that PCOM defer a decision until the JOIDES Office had carried out its proposed analysis. The matter could be placed on the agenda for the August meeting. Moberly recalled a graph by Scholl for USSAC, showing proposals received per month, which might indicate a natural cut-off. In response to a request from Austin, Kappel said that she could provide the JOIDES Office with a copy.

Tucholke replied to a question from Duncan that TECP had not been specific as to how to carry out the HD (tectonic) leg. Austin said that TECP will submit RFPs to *EOS* for two themes without proposals, adding that TECP will also find proponents for the HD (tectonic) proposal, or produce a proposal as a panel. Cowan stated that balanced cross sections cannot be produced if the pre-deformation configuration is unknown, as is true at HD. Tucholke replied that TECP has made the point that it should be possible to achieve balanced cross sections by making reasonable assumptions.

894 SPECIAL REPORTS THAT WILL INFLUENCE THE PLANNING OF THE IMMEDIATE FUTURE

A&G-DPG

Rea reported that the A&G-DPG meeting began with presentations of the two candidate proposals by proponents Winterer and Duennebier (see A&G-DPG report, Agenda Book white pages 368). By the end of the first day, complete agreement had been reached on site priorities. "Huevo" and MIT(E) are to be the only sites of deep penetration to basement. The two proposed legs are summarized in the DPG report. Leg 143 is from Honolulu to Majro and Leg 144 from Majro to Yokohama.

Rea discussed the question of recovery. At Bougainville Guyot (Leg 134), the recovery rate was only 5% at a site near the guyot center. However, much can be achieved, even with such a low recovery of core, in conjunction with logs. It was the opinion of the A&G-DPG that recovery rates would be better near the back reef, where diagenesis was more advanced. Most sites in the A&G legs are, therefore, in the backreef area, except those devoted to pelagic caps.

Discussion

Responding to a question from Tucholke, Rea said that sea level history should be decipherable even if recovery rates are low, when cores are related to logs. The seismic signal is lost in the reef itself so that nothing could be gained by drilling there. Austin added that in the reef, only benthic forams would be available, limiting stratigraphic interpretation. Langseth asked about the distribution of recovery. Rea replied that there was generally a little in each core, rather than occasional full cores. Francis noted that the schedule left little time before the first site of Leg 144 and only one day after the last site of Leg 143. Some time would be needed before returning to port to shut down the ship's computers and prepare for the next leg.

Rea stated that sixteen people had attended the A&G-DPG, although only five were in the original group. He was also concerned that G. Foss of ODP-TAMU had been unable to attend. Rea was concerned about the number of attendees making the decision-making process difficult. Only ten people had attended the NAAG-DPG. Rea, therefore, suggested limiting the number of attendees at DPGs. The A&G-DPG had nevertheless gone well. Austin said that PCOM would address the issue of limiting DPG attendance later in the meeting.

NAAG-DPG

The NAAG-DPG report was distributed at the meeting (see also Appendix 4). Leinen, the PCOM liaison, said that the NAAG-DPG objectives had been: 1.) tectonics of ridges in the region, and their importance in opening up flow paths, and 2.) origins of water masses. The proposed drilling is distributed between a northern gateways region, the Greenland margin, a Greenland-Norway transect, and a southern gateways region (Appendix 4). Holes will be double APC cored, with triple coring in important zones.

NAAG-DPG recommended two legs because of the large array of sites and also because of weather constraints. Site YERM 5 is only possible in a particularly good year for ice. NAAG-DPG also produced a fall-back, single-leg program. Both legs require an August to September weather window for minimum ice cover. Ice forecasting and surveillance will be required and an ice support vessel should be present while drilling, especially for the northern sites. Francis said that ODP-TAMU is exploring the ice situation with P. Wadhams of the Scott Polar Research Institute, Cambridge, and Torgny Vinje of Norsk Polarinstitut. Costs will be available for the Annual PCOM Meeting. Francis anticipated more problems than were encountered in the Weddell Sea, because Arctic ice fronts move quickly in response to wind.

Tucholke said that he would feel more comfortable if core control and magnetics were available for basement sites. OHP should consider this. In response to a question from Cita-Sironi, Tucholke said that tentative NARM sites are not close to NAAG sites.

NARM-DPG

The NARM-DPG report was distributed at the meeting (see also Appendix 5). Tucholke, the PCOM liaison, began by noting that he is a proponent, but that he would endeavor to be fair and would not answer questions on his proposal. Austin pointed out that five PCOM members are proponents and that PCOM will have to discuss this issue before choosing the four-year general direction of the drilling vessel in the fall. Tucholke went on to say that the purpose of the NARM-DPG was to produce a preliminary, but relatively complete, science and drilling plan to cover important processes of rifted margin formation. The study is focussed on the

North Atlantic. NARM-DPG has met once. Requirements of the second meeting are to produce concrete drilling plans, provide advice on additional surveys, integrate additional proposals, specify more completely longer-term priorities, and generate a prospectus synthesizing all input (including thematic panels and SSP).

The two top priority transects (both conjugate margins) are Newfoundland Basin - Iberia Abyssal Plain (non-volcanic) and Southeast Greenland - Hatton Bank, with one Voring Plateau site (volcanic). A long-term priority is to drill the deep detachment on the Galicia margin (S-reflector). Approximately 500 m penetration of seaward-dipping reflectors (SDRs), below about 1000 m of sediment, is desired. Responding to a question from Cita-Sironi, Leinen said that bottom currents are strong in the region (as high as three knots in the Denmark Strait) and sites are, therefore, not located on crests of ridges. Tucholke said that two to three legs will be required for the Southeast Greenland - Hatton Bank transect. The Newfoundland Basin - Iberia Abyssal Plain transect will require a minimum of 148 drilling days. One proposed site involves 2500 m penetration, deeper than any site drilled so far by ODP.

Discussion

In response to a question from Natland, Tucholke said that as yet unreviewed proposals include hotspot-type proposals and that they would, therefore, still have to be included in the NARM-DPG report. However, NARM-DPG should not go back to the beginning at its second meeting. Austin said that PCOM must decide how to deal with the new proposals. Most have not been highly ranked, though there is a tendency for the panels to assume that NARM-DPG will consider the proposals and the panels are, therefore, reluctant to rank them. Lancelot commented that the Newfoundland Basin seismics are not very good. Austin said that there are plans to collect more seismic data, but that he did not think that the existing data can be improved. Responding to Natland, Tucholke said that the NARM program will require a total of six to seven legs. Natland suggested that the legs be placed in a prioritized sequence. Austin replied that NARM-DPG intends to do this.

Austin said that he supported a second meeting of NARM-DPG and asked how the new proposals should be handled. Malpas suggested that NARM-DPG should consider the six new proposals. Austin asked whether there should be a deadline for further proposals. Malpas said that to have two meetings was not setting a precedent and did not involve a longstanding commitment. Natland agreed that NARM-DPG should meet again and should look at the six new proposals. If more proposals come in, then NARM-DPG could meet again if PCOM wishes it. Austin replied that the plan at the moment is that the second meeting will be the last and that a report will be produced before the Annual PCOM Meeting. Blum said that LITHP has ranked the new proposals highly because they are interested in the hotspot question. PCOM should give LITHP a response to their signal.

Blum added that the present chair of NARM-DPG is a proponent of two proposals and that this might cause problems. Tucholke responded that DPGs are composed of proponents and he felt that Larsen behaved impartially at the first meeting. Austin emphasized that Larsen was the chairperson and NARM-DPG would be considering new proposals, of which he is a proponent. Watkins and Lancelot said that this would look bad, but Duncan noted that the proposals have, however, been ranked highly. Austin expressed the view that changing the chairperson at this stage would result in a loss of momentum, but Leinen feared that the present situation could be perceived as representing a return to an "old boys' club". Malpas suggested appointing a co-chair. Austin said that both the NARM-DPG chairperson and LITHP have requested that NARM-DPG be augmented with petrologists and that he will do that unless

PCOM objects. Cita-Sironi supported the idea of a co-chair. Austin said that he could appoint a co-chair and that Larsen will leave the room when his proposals are being discussed. Tucholke reiterated that DPGs are made up of proponents and that it would be wrong to penalize Larsen for being the chairperson. Austin pointed out that the NARM-DPG report will supplant the proposals, which will cease to be a part of the system. He asked if he should suggest a co-chair. Beiersdorf felt that the other proponents will "keep an eye on" Larsen. Austin stated that Larsen has been very fair so far. Watkins said that it looks bad and that a different chair should be appointed; Larsen can still sit in. Moberly felt that this issue was only a problem because it involved, potentially, seven legs. Malpas commented that readers of the minutes will be aware that PCOM was concerned about this matter. Austin said that he felt that the consensus was in favor of a second meeting, at which a second group of proposals would be evaluated. There is concern among PCOM that Larsen is a proponent and suggested that PCOM nominate at least a co-chair, adding that this is the most ambitious of the DPGs. A co-chair would help with the workload. Several nominations for co-chairs were suggested by PCOM, in priority order. Austin promised to get a co-chair from that list.

SL-WG

The Agenda Book contains a summary letter and abbreviated report (Agenda Book white pages 381). A further summary was circulated at the meeting, and further information is included in Appendix 6.

Crevello outlined the organization of the SL-WG and noted that he was reporting on the first of at least two meetings. SL-WG had concluded that there is a need for more sea-level proposals, which would have to be submitted before August to get into the review system in time for the first year of Atlantic drilling. The sea level problem is complicated by the lack of a reference datum, interference from other signals, and time lags. In addition, determination of amplitudes involves assumptions. Transects of holes are required for the sequence approach, because the geometry of sequences is such that some elements are missing at individual sites. SL-WG proposed focussing on three time intervals: Neogene ("ice house"), Cretaceous "(hot house") and Paleogene ("doubt house"). One problem related to drilling transects on continental margins involves the need to drill in shallow water. One existing proposal (the New Jersey Margin) also requires the drilling of holes on land to recover the landward ends of sequences. Supplemental drilling platforms are, therefore, required. Austin interjected that this may be one way to spend the additional $2.1M from NSF.

Crevello stated that recovery in carbonates was a further concern. Recovery rate had been <10% on Leg 133. In contrast, drilling in the Bahamas by R. Ginsburg (Miami), using a jack-up platform and a DCS, had recently achieved an average recovery rate of ~80%. This drilling cost ~$1M for two holes. A draft of the SL-WG mission statement would be available for discussion at its proposed second meeting in November. Crevello said that he would like to invite two to three additional people as guest speakers, and suggested E. Kaufman and W. Schlager. He was open to further suggestions from PCOM.

Discussion

Langseth asked if there are many places where sequences can be drilled by the *JOIDES Resolution*. Crevello replied that shallow-water drilling appears unavoidable, and that he was not aware of alternative sites. Responding to Lancelot, Crevello said that ~500 ft of penetration is required off New Jersey. Lancelot stated that a French barge, based at Muroroa, could be used at low cost. It is operated by the French nuclear agency. Francis said that anchoring the

JOIDES Resolution is out of the question. It would cost $8-10M to add the necessary winches to maintain tension. The shallowest water in which the *JOIDES Resolution* can drill in DP mode, in very favorable weather and with no swell, is ~60 m.

Crevello said that drilling off New Jersey may encounter sands, leading to further recovery problems. Swart said that the jack-up platform used in the Bahamas had cost $350,000 for six weeks. Cita-Sironi asked whether the SL-WG saw the need for the *JOIDES Resolution.* Crevello replied that it did because holes are also required out in the basins. Austin said that the SL-WG will probably meet again in early November, and that PCOM will decide on SL-WG's continued existence at its Annual Meeting.

895 REPORT OF RECENT DRILLING LEG: 135 (LAU BASIN)

Hawkins began his report by commenting on the good attitude and level of support he had encountered aboard *JOIDES Resolution.* Problems associated with geological evolution of the Lau Basin (Appendix 7) are: nature and age of the back-arc basin, timing and mechanisms of basin extension, sub-basin filling and sediment provenance, relationship between arc and back-arc magmatism (coeval or episodic), nature and age of the forearc crust (arc, oceanic or forearc), and uplift and subsidence history (e.g., nature of Horizon A). The Lau Ridge, bounding the Lau Basin at its western edge, is a remnant arc. Parts of it are probably present in the Tonga Ridge, in the forearc, from which it separated to form the Lau Basin. The timing of separation has been proposed to be 2.5 Ma to > 5 Ma (but < 10 Ma).

Hawkins went on to describe the drilling results. At Site 834, a sill was encountered (about 4 Ma), below which was more sediment. A second sill was encountered with an age of about 5 Ma. This was not necessarily the true basement, but provides a minimum age of spreading. To the east, the minimum age encountered (at hole bottoms) decreased to 3.5 Ma and finally to 0.7 Ma near the ridge. (Once again, however, these ages may be of sills and not basement.) These ages conflict with those of seafloor magnetic anomalies, suggesting that the latter are not true magnetic stripes, but represent ponding in grabens. Processed seismic data provided no improvement over raw shipboard data. Two sites were drilled in the forearc and pre-upper Eocene basement was encountered at one.

The style of basin opening appears to be intermediate between seafloor spreading and Basin and Range-type extension. A plot of Ba vs. Zr for Lau Basin basalts shows them to lie partially in the arc field and partially in that of MORB. Glass shard data show that the sediment fill of the basin displays a bimodal provenance pattern. Sediments are predominantly volcaniclastic turbidites. Sedimentation rates were initially rapid, but slowed at ~5 Ma.

At the two forearc sites, the following section was encountered: 1.) a thin (<100 m) carbonate cover; 2.) lower Miocene to upper Pliocene volcaniclastic turbidites, probably derived from the Lau Ridge; 3.) diabase sills in upper Miocene turbidites; 4.) reticulate leached zones in turbidites. Leaching follows bedding planes before branching away, and may represent alteration associated with dewatering; 5.) lower Oligocene shallow-water carbonates with volcanic clasts; 6.) upper Eocene reefal limestone, now subsided to 5600 m below sea level; 7.) high-silica dacite at the bottom of the hole (70 - 80% silica, 1 - 1.5% K_2O). The dacite is quasi-continental, and could derive from Australia via the Lord Howe Rise. This continental fragment has apparently been transported eastward and, because of its 5600 m subsidence, its root has evidently been removed.

Discussions

Moberly asked about logging, and Hawkins replied that all but two holes had been logged, including a chemical log at the last site. In reply to a question on tectonic aspects from Duncan, Hawkins said that the effects of collision with the Louisville Ridge had not been observed. Replying to Austin regarding seismic data, Hawkins said that seismic data had been useful for the study of the sediment cover, but not for seeing basement. The reason for drilling in the forearc was to penetrate Horizon A, which turned out to be a diagenetic front and not a depositional or tectonic feature. Cita-Sironi asked about the thickness of the reticulated leached intervals, and Hawkins answered that they are 50 - 100 m thick. In reply to Watkins, Hawkins said that the XRD and XRF systems had only a single operator and long delays were encountered in obtaining analyses. The analyses were excellent, but a second operator should be available to ensure 24-hour operation. It was not possible to run the XRD and XRF concurrently. Swart commented that scientists can run the XRD. Austin said that this topic will be discussed later in the meeting under technical staffing. Lancelot said that the reticulate structures are reminiscent of gas escape structures, formed by the escape of dissolved clathrate. Hawkins replied that there had been some concern about hydrocarbons in the forearc, but that very little methane had been encountered.

896 REPORT OF RECENT DRILLING LEG: 136 (OSN-1 OFF HAWAII) AND RELATED ENGINEERING DEVELOPMENTS

Dziewonski explained that the primary purpose of the leg had been to drill a hole to be used for future experiments with a broad-band seismometer. Additional goals were to test the borehole seal and to investigate deposition of volcanic ash from Hawaii. The site had to be located close to an island to enable noise comparison between an ocean bottom seismometer site and an island seismometer site.

At Site 842, the hole collapsed, though most of the sediment recovery was obtained at this site. Hole problems resulted in a move to Site 843. The average sediment accumulation rate was 3.8 m/m.y. Standard logging was carried out in both sediments and basement. In addition, the FMS, BHTV and geochemical logs were run in basement. Approximately 70 m of basement penetration was achieved.

A smooth borehole wall is required for seismometer deployment, and the caliper log showed only two 10 m intervals that were suitable. The seismometer is about 5 m long. Unfortunately, no seismometer was available for deployment. The indications from Japanese work are that, in addition to covering new regions, such seismometers will record data never previously observed. Dziewonski added that the Ocean Seismic Network (OSN) is an international project. Large regions, especially south of the equator, are outside seismometer coverage. The seismometers in question are for the study of long-wavelength, earth-scale motions. The Federation of Digital Seismic Networks (FDSN) may submit a general proposal this year for future OSN sites. Dziewonski urged the appointment of an additional person from each of FDSN and ODP to broaden the international base of the liaison group. In reply to a question from Duncan, Dziewonski said that the seismic experiment should start within a year. NSF funding is being sought, then a DPS ship will be required for deployment of the instrument.

Engineering Developments

Francis described engineering developments during Leg 136. A new bit was tested: the whirl-resistant poly-crystalline diamond compact (PDC) bit (Appendix 8). PDC bits have replaced roller cone bits in industry for soft formations, but wear out in hard rocks. Rapid wear in hard rocks is believed to be the result of the bit not rotating about its axis. The bit tested is a new design for hard rocks (basalt). Little time was available for coring. Three cores were obtained with the PDC and one with a RCB. The RCB achieved good recovery in basalt, but its penetration rate was low. The PDC penetrated faster but with poorer recovery. Responding to Natland, Francis said that he was not sure whether the basalt was fractured or massive. The PDC bit cost $15,000, compared to $5,000 for a RCB.

Also tested was the "cork" or borehole seal. A reentry cone is used that has a groove in its casing to allow the cork to latch (Appendix 8). One or two joints of pipe are used as a stinger below the cork. When the pipe is in the hole, the thermistor and data logger are lowered and the cork set. Cork retrieval is difficult because the inverted cone used to catch the top of the tool is only about 1 m in diameter. A jet system allows the drill string to be steered so that the tool can be latched. Francis showed a video of this operation being carried out on Leg 136.

Discussion

Austin said that DMP had expressed concern that three borehole seals may not be available for Leg 139. Francis replied that two more seals are under construction. He added that the ODP-TAMU end of the cork project is under control, but the data logger and thermistor string for the cork are not being developed at ODP. It may be a "close-run thing" to get all the gear ready. Lancelot asked about the plans for installing seals, noting that if a hole is sealed, use of the NADIA shuttle and submersible reentry will be precluded. Moberly said that the use of seals will be planned and not random. Francis added that the original proposal was for six corks, three of which were for use on Leg 139. There had been a plan to use one on Leg 142, but this had been dropped. The next leg to use corks would be Cascadia (CA, Leg 146). Francis commended T. Pettigrew, project engineer for the cork, for doing a very good job.

897 THEMATIC RANKINGS OF PROGRAMS

Austin referred to summaries of the global ranking of proposals by thematic panels in the Agenda Book (blue pages 14 and 15). He explained the map, prepared by the JOIDES Office, showing highly-ranked proposals, which was both displayed and distributed at the meeting. TECP ranked a few generic programs which do not have specific locations. SGPP also ranked a generic gas hydrate leg. (It is shown off Peru on the map but will not necessarily be located there.) Austin asked PCOM liaisons to summarize thematic panel activities.

LITHP

Natland said that LITHP divided proposals into themes. There was some ranking of composite programs: e.g., volcanic rifted margins were considered as a group, as were non-volcanic rifted margins. There were no proposals for some themes, e.g., targets for deep crustal drilling. LITHP considers this important but did not vote on it. Proponents did not vote on their proposals. HD was the clear winner.

After the vote, Natland asked why some highly-ranked proposals were not on the list, e.g., a geochemical reference site, or a return to Hole 735B. The answer was that about 2/3 of panel membership had changed since these proposals were last discussed. Many panel members have not read older proposals and this influences ranking, which is, therefore, not truly global. Lancelot said that it is important to keep programs that require a long lead time in mind. This is especially important if engineering development is required, so that such work is not wasted. Natland reported that LITHP had wanted him to point out that offset drilling ranks highly. If offset drilling proposals were ranked as a program analogous to NARM, they would rank higher still.

Austin said that another reason why rankings may not be truly global is the perception that the ship will not be visiting certain regions. In the rankings on Agenda Book blue pages, p. 14, DPG reports have been included even when the report is not final. Furthermore, though LITHP ranked non-volcanic and volcanic margins separately, the DPG report will ultimately replace those proposals. Austin highlighted Lancelot's comment that corporate memory must be maintained, noting that the JOIDES Office rotates, too. Tucholke said that dropping proposals, as discussed earlier, would help; in addition, watchdogs should ensure that proposals are kept to the fore. Malpas suggested asking the panels to explain why previously highly-ranked proposals have moved down their ranking list.

Austin commented that panels now want to defer some of the review process to the DPGs. Panels must rank proposals, however, because DPGs should receive only highly-ranked proposals. Langseth said that formation of a DPG is an acknowledgement that the program is going to be a drilling target, and suggested that associated proposals be removed from the ranking process. Austin felt that programs should have to justify themselves, however. Malpas said that only the top five or ten programs need be ranked. Moberly supported Tucholke's suggestion that some proposals be dropped from the system. Langseth stated that it was natural that a proposal would drop out of a panel's consciousness when prospects of the ship going to an area are low. HD ranks highly because the ship is there, he added. Blum pointed out that panels had asked the JOIDES Office about which proposals they should rank, but each JOIDES Office only exists for two years and does not have a basis for such a judgement. Austin reiterated that the JOIDES Office will provide a list tracking proposals by the August PCOM meeting, which may let some proposals fall out naturally from future panel consideration.

OHP

Duncan explained that OHP divided proposals between five themes (Agenda Book white pages 299 - 300). Proposals were first prioritized within themes without proponents in the room. Then OHP voted on the five first place proposals, with subsequent votes on the remaining five top-ranked proposals. OHP produced a list of twelve ranked proposals. Proponents were allowed to vote, because if a proposal remained at the top of its theme for a number of voting rounds, a proponent would be excluded for some time. Proponents left if voting was close enough to be influenced by the proponent's vote. In response to a question from Austin, Duncan said that he felt that this system had been fair. Duncan added that OHP now has a better balance between Neogene and pre-Neogene specialists. Replying to a question from Leinen about the mix of old and new proposals in the ranking, Duncan said that Shatsky Rise and Bering Sea were the only old proposals. OHP had predominantly looked at new proposals, but there is some memory of older proposals.

SGPP

Moberly reported that SGPP considers itself a new panel, so it did not consider old proposals. Proponents left the room during discussions and voting. The two highest-ranked proposals, gas hydrates and Mediterranean sapropels, are essentially generic, the latter because it lacks specific sites. SGPP recommends that a gas hydrates leg should take place after CTJ and CA drilling, and the sampling equipment should also be ready. SGPP ranked the Oregon accretionary complex, but this should have been CA, since the CA-DPG report has replaced the proposal. Austin and Blum explained that this is the JOIDES Office position, but that panels sometimes differ and, in this case, SGPP has returned to one of the original, pre-DPG proposals. Moberly said that one histogram on the global ranking map should cover both programs, adding that this might also apply to the southeast Atlantic upwelling and Benguela proposals, which OHP would like to combine. Swart acknowledged that the Mediterranean sapropels proposal is immature, but SGPP wanted to express its support.

TECP

Tucholke said that TECP looked at new proposals first, then selected watchdogs for themes. Watchdogs looked through the proposal list, so that all proposals were considered, though the procedure may have yielded spotty results. All panel members voted on the top twenty proposals, but proponents left during discussion. Proponents voted, but when votes were tallied, their votes were subtracted. NARM was ranked first (Agenda Book blue pages 14). The second-ranked proposal (Alboran Basin) is somewhat generic (immature). Two of three new panel members have a strong interest in the Mediterranean. The fifth-ranked proposal is for a second leg at HD, oriented toward tectonic objectives. This is also generic, since no proposal exists. Barbados ranked lower than previously because Westbrook has rotated off TECP. The Galicia S-reflector will not be drillable in the near future.

Taira observed that collision processes have been a long-standing interest of TECP. He asked whether there had been any discussion of strategies to tackle this problem. Tucholke said that there had been no such discussion. In response to a question from Cowan, Tucholke said that Cascadia II slipped in the ranking.

898 SETTING THE GENERAL DIRECTION OF THE DRILLING VESSEL TO SPRING 1995

Austin felt that PCOM should set the general direction of the drilling vessel for the next four years before considering engineering priorities, since scientific priorities should guide engineering priorities. He referred to Agenda Book blue pages 19 for factors to be considered in formulating the plan: balance among scientific themes, efficiency (drilling vs. transit time), temporal aspects, and objectives of COSODs I and II and the LRP. Austin presented a JOIDES Office straw motion (Agenda Book blue pages 19). He stressed the importance of this year's plan, because NSF will be asking for a four-year plan in the next few months.

Austin pointed out that there were five proponents of ranked proposals on PCOM, and proposed that they leave the room so that PCOM could be seen to be impartial in setting the four-year plan. He added that he had already asked Leinen to lead the discussion in the event that this suggestion was adopted. Even if proponents left, a quorum would be maintained. He asked for discussion.

Natland observed that PCOM members differ from normal panel members because they represent their institutions, adding that requiring PCOM members to leave might generate comments at their home institutions. Austin acknowledged that there might be comment if proponents leave, but felt that there would be even more discussion if they do not. In response to a question from Malpas, Austin said that the balance between US and non-US members would be preserved if proponents left. Austin added that this issue had been discussed at the last (Hawaii) PCOM meeting, when it was realized that the option of proponents remaining in the room but not participating in the discussion was unworkable, since they are invariably asked questions. This would be an experiment. During PCOM voting, proponents would be classified as absent. Austin reiterated that the JOIDES Office will perform a statistical survey of proposals before PCOM discusses which remain active, probably at its August meeting. PCOM may then wish to provide more instruction on ranking to thematic panels.

At this point, the five proponents on PCOM left the room. Leinen assumed the role of chairperson.

Leinen again presented the JOIDES Office straw motion on the four-year direction of the drilling vessel. She asked if PCOM could assume a consensus on sections 1 and 2 of the straw motion. Moberly added the caveat that there may be supplemental science in FY92, and that the FY92 schedule might, therefore, be modified in August. The motion was altered to this effect.

Francis noted that Austin had asked that the ship be brought to the Atlantic before the end of January, 1993. Leinen called for discussion of section 3 of the straw motion. Consensus approval was given to section 3 as written (but see below). Leinen moved on to section 4 of the straw motion. Moberly proposed that the section refer simply to "the Atlantic", without geographical constraints, this region to include the Mediterranean. Francis pointed out that between November 1993 and November 1994 the *JOIDES Resolution* must spend ten days in dry dock. Lisbon is a favored location, but South American ports would be less favorable. Malpas recommended that the dates in the motion be altered. Section 3 (North Atlantic) should apply until April, 1994. He said that this would be the FY93 program to be finalized at the 1991 Annual PCOM Meeting.

Cowan said that many of the top five panel rankings are not in the Atlantic, and questioned restricting the vessel to the Atlantic. Duncan agreed that the option of transiting the Panama Canal should be maintained, adding that some Pacific sites are closer than South Atlantic sites. Leinen asked whether the flexibility to conduct engineering legs, e.g., at EPR, should be maintained. Lancelot said that such flexibility is necessary, and that PCOM should not set a date for transiting the Panama Canal. Duncan agreed with Lancelot, and stressed the importance of merging an engineering schedule. Leinen, therefore, suggested that the "eastern Pacific" be included in section 4 of the motion. Cowan questioned the emphasis on the Atlantic, when so many highly-ranked proposals are in the Pacific. Malpas replied that more proposals will follow the ship track and that, furthermore, NARM is a multi-leg program. Moberly stated that the North Atlantic proposals all need summer weather and that he would, therefore, like to see two summers dedicated to the North Atlantic. Malpas said that, as written, the motion allowed that option, together with targets for the winter months.

Francis asked where DCS III could be tested, in the event that Leg 147 is not a test of DCS III, but that DCS III is ready by, say, mid-1993. Malpas replied that a test could be performed at TAG. He suggested adding to the motion a note to the effect that, when the final science plan is considered, every effort must be made to consider engineering legs. Francis observed that, if Leg 147 is not an engineering leg, there will be a long gap between engineering legs, perhaps

until April 1994. Leinen suggested a fifth section to the motion concerning PCOM's commitment to engineering development. Moberly asked if eastern Pacific was to be taken to mean anything from Sedimented Ridges to CTJ, rather than simply near the Panama Canal. There was a consensus to this effect. The following motion was passed.

PCOM Motion

PCOM sets the direction of the drilling vessel for the next four years as follows:

1) **In the remainder of FY 91, confirmed as is in the current Program Plan.**
2) **In FY 92, and beyond to January 1993, confirmed as is in the Program Plan approved at its November 1990 meeting in Kailua-Kona, Hawaii, through Leg 147, Engineering EPR (in the event that DCS Phase III is not ready, Hess Deep will be substituted), ending in Panama on or about 21 January 1993. The Program Plan may include up to 10 days of supplemental science as moved at the November 1990 meeting.**
3) **Until April 1994, in the North Atlantic. FY 1993 Program to be finalized in December 1991 at the Annual Meeting of PCOM with Panel Chairs.**
4) **In April 1994 through April 1995, in the general direction of highly ranked proposals in the Atlantic Ocean and adjacent seas and the eastern Pacific.**
5) **PCOM's long-range commitment to engineering development in support of highly ranked thematic objectives must be considered in planning specific cruise tracks.**

PCOM reaffirms its stand that at its spring 1992 meeting, and at subsequent meetings, it will evaluate again the state of panel recommendations, technological developments, and the overall state of the Ocean Drilling Program, and again set the general direction of the drilling vessel for the subsequent four years, with a relatively firm early track and a relatively flexible later direction.

Motion Moberly, second Cowan — Vote: for 11; against 0; abstain 0; absent 5 (proponents of ranked proposals absent)

899 PREPARATION FOR DETAILED PLANNING

Before discussion of engineering matters, Francis gave PCOM an update on Leg 137 (in progress at the time of the meeting). The latest report received (dated April 23) indicated a total depth of 1620 mbsf, no evidence of junk, and the conclusion that the hole is clean. The DCB had been recovered, as it had not been making much hole. Austin commented that PCOM will have to decide a procedure for determining whether the hole should be considered clean, with regard to implications for Leg 140.

Austin introduced preparations for detailed planning. A DCS/Leg 142 status report would be presented first, followed by discussion of none-DCS engineering priorities, following which a motion would be required.

DCS STATUS REPORT

Storms began by noting that Leg 142 (Valparaiso - Honolulu) will be the third engineering leg (Appendix 9). The co-chief (R. Batiza), the EPR-DPG chairperson (E. Davis) and others now prefer drilling an on-axis site, rather than the original off-axis site. A recent *Alvin* cruise (D.

Fornari and others) has identified such a site. Duncan asked whether LITHP had examined this site. Austin replied that Batiza has been in contact with Fornari and Humphris (LITHP chairperson). He added that the move to an on-axis site has been decided: PCOM has been polled, yielding no dissention, and LITHP has endorsed the change. Storms continued, explaining that Leg 142 will comprise about 34 days on site and 13 days in transit. This works to ODP-TAMU's advantage. It was originally feared that all of the equipment would have to be put aboard a leg early. Now, however, while some of the equipment will be installed on the ship on previous legs, the DCS will be put aboard in Valparaiso and rigged up during the transit. There will also be rig-down time at the end of the leg.

Leg 124E was the first engineering leg. Only two weeks were allowed for DCS drilling, but only about 20 hours of operating time and 5 hours of coring time were achieved. On Leg 132E, about 20 hours were spent coring with the DCS and the system made 79.6 m of hole.

The primary goal of Leg 142 is to spend more time actually coring with the DCS. A hard rock guidebase and drill-in-BHA must first be deployed (Appendix 9). If time permits, a new diamond reaming bit may be evaluated, as will a second stage drill-in-BHA system and a new DCB (Appendix 9). ODP-TAMU would like to attempt slimhole logging, especially caliper and temperature logs, then try to ream the 4" hole to 7.25". If there are no problems, logging will proceed with the whole array of standard diameter tools. If hole problems are encountered, the second stage BHA will first be deployed to stabilize the hole.

Pyle asked about the highest permissible temperature for drilling operations. Storms replied that this would be left to the judgement of shipboard personnel. In response to a question from Austin, Storms said that the minimal goal is to drill 100 mbsf with 50% recovery. He did not think that 200 mbsf will be achievable because of the slow pace of DCS drilling and because high temperatures will probably limit drilling depth. The goal is to core with the DCS until something prevents operations. If the DCS reaches 100 mbsf or more, the DCS will have been proved and there would be a switch to reaming and the second stage drill-in-BHA. Francis, referring to Pyle's question about temperatures, said that this matter would be discussed by PPSP. He added that the nearest black smoker is more that 500 m from the proposed site. Storms said that there appears to be 50 to 60 m of rubble at the proposed site, but that temperatures are unknown. Austin commented that Batiza has done a good job of accessing the advisory structure on this site location problem.

Storms listed secondary engineering goals (Appendix 9). A second hard rock guidebase will be on the ship, but there are no plans to use it at present. If everything goes very well, a second guidebase might be set. Specific engineering goals are listed in Appendix 9.

Storms went on to address the status of DCS phases II and III (Appendix 9). Most contracts for DCS II have been awarded and work is in progress. Two significant contracts remain to be awarded: the slingshot safety test and the secondary heave compensator. RFPs have been sent out for DCS III and responses are due by mid-May. ODP-TAMU hopes to have a contractor and preliminary design for DCS III in mid-May in time for TEDCOM. It should then be possible to estimate costs and times, which should be available at the August PCOM meeting.

In reply to questions from Natland and Austin, Storms said that ODP-TAMU plans to proceed with the full-scale slingshot test, which will cost about $150,000. The development schedule could be delayed if the shock system does not function in the test. There would still be time to make modifications before Leg 142, but the system could not be used at sea since SEDCO could not accept it if it failed the test. The test has yet to be scheduled: negotiations with

DRECO are proceeding. Austin said that PCOM will need to know the results of the test before its August meeting. Replying to Tucholke, Storms said that if a redesign is required following a failed test, the system would have to be re-tested. Austin noted that in the event of DCS II failing the slingshot test, it might be necessary to replace Leg 142, e.g., with HD. he added that BCOM supported continued development of DCS II together with the concept of an acceleration of DCS III, but there had been no mention of the consequences of failure of the slingshot test.

NON-DCS ENGINEERING PRIORITIES

Francis said that ODP-TAMU feels that it is advancing on too broad a front and that engineering projects are taking too long. BCOM has expressed the same view. DCS is the largest project and takes most of the personnel. After DCS are a number of smaller projects, each with an engineer. In addition, some legs are consuming engineering manpower, e.g., Leg 139 with its H_2S safety considerations. ODP-TAMU has examined its important projects and concluded that there are insufficient engineering personnel for all of them. ODP-TAMU has also evaluated how its engineers spend their time. They attend meetings, go to sea about once per year, and are involved in operational matters. They spend only 30-35% of their time on development engineering, and this is the reason that ODP-TAMU resists their attendance at meetings. ODP-TAMU would like PCOM either to cut the number of projects or authorize increasing the number of engineers. Francis said that the former appeared more likely. The planning system works well for allocating ship time, but not for coordinating engineering projects because the limited number of engineers has not been appreciated.

Austin said that there had been a feeling, early in ODP, that there were many engineers at ODP-TAMU and that a great deal could be accomplished. There was also a tendency for engineers to refer to equipment as "quasi-operational". Now the engineers are saying "enough" and Austin thought this a good thing. He asked that PCOM be told how manpower is distributed within the list of projects (Appendix 10). Francis, responding to a question from Cita-Sironi, said that there are five project (development) engineers at ODP-TAMU. Austin cautioned that PCOM should bear in mind that some panels have strongly requested specific tools. Storms noted that ODP-TAMU has suggested that panels have at least one meeting per year in College Station, in order to ease the burden on the engineers. This policy has in practice worked against the engineers, as many panels have complied forcing engineers there to attend these meetings.

Storms presented a list of active ODP development engineering projects (Appendix 10). The DCS is the largest project and the first seven items on the list are DCS items. Austin asked how much manpower is involved in the DCS work. Storms replied that DCS work accounts for 2.5 full-time engineers, or 50% of available personnel.

Going down the list, Storms explained that the high temperature and H_2S preparations are for Leg 139. XCB flow control work is aimed at improving XCB performance in some formations. The vibra-percussive corer (VPC) is back with the manufacturer (Novatech of Salt Lake City) for work on corrosion protection. A full-sized version of the VPC has been completed by Novatech, which encountered many of the same problems as the ODP half-scale version. Design changes may be made which will benefit ODP. In response to Austin, Storms said that he did not know the schedule for this work. Austin noted that SGPP has made a strong statement that coring of sands will be needed in FY92. Storms said that the VPC has not been scheduled for any leg. Continuing down the list, Storms said that the MDCB is designed to improve recovery in certain formations and also for use with Geoprops. The sonic core monitor (SCM) needs to be made more durable for use with rotary coring. It is scheduled for

deployment during Leg 141. Hard rock orientation involves scribing and the electronic multishot is also for core orientation.

Natland suggested expanding on tool descriptions for the benefit of visitors from the USSR, but Austin said that such a briefing would have to be deferred. Storms continued with the list, stating that two additional cork systems are being fabricated for Leg 139. Austin said that he understood that parts of the cork system are being developed by third parties and asked who is the outside contact. He expressed concern that ODP is "paying too many pipers". Storms replied that a redesign had to be carried out; the project is now virtually independent of outsiders. ODP-TAMU has agreed to build a second pressure core sampler (PCS), but this will not transfer core under pressure, the latter being part of a phase II PCS. ODP-TAMU does not want to use resources on phase II until use of the tool has been defined. There is no point in studying transfer of cores under pressure when there is currently no chamber to accept the core. SGPP agreed with this stance. Malfait commented that NSF is expecting a proposal for development of a transfer chamber, but that he did not know when it would arrive. Moberly expressed the opinion that phase II is the community's problem and not ODP's. Storms said that ODP-TAMU is building a second stainless steel version of the PCS. Obtaining input on the manifold has also been a problem. Everyone has different ideas. SGPP thinks that ODP-TAMU should coordinate with co-chiefs and geochemists and build a manifold. T. Pettigrew is the engineer in charge. The PCS harpoon is optional; it penetrates the top of the core to obtain a sample from inside the core. Francis noted that it will be necessary to begin development a year in advance if the PCS is needed for Cascadia (Leg 146). Storms said that lead time is always a problem, as is the budget, which is insufficient for construction of titanium PCSs.

The next item on the list is work on XCB cutting shoes. Lancelot asked how the XCB is rated by ODP-TAMU. Storms replied that his feeling is that the XCB has not been fairly judged. The APC had problems early in its development. The XCB was to extend the depth at which piston cores could be obtained from 200 mbsf to 300 mbsf. However, it is now being used to 800 mbsf. It does not recover interlayered hard and soft lithologies, hence the requirement for the MDCB. Storms did not go into details about remaining items on the list, but noted that the TOTCO system and beacon upgrades are low priority items.

In response to a question from Austin, Storms said that ODP-TAMU is over-committed by one to two engineers based on this list alone. Moberly asked whether any of these projects could be subcontracted, but Storms said that they already are. Francis stated that it is important to balance the numbers of in-house engineers versus consultants. He asked that PCOM allow ODP-TAMU to manage this problem, but that PCOM provide ODP-TAMU with a prioritized list of projects. Storms added that some projects lend themselves to the use of consultants, while others do not. Natland asked about the amount of time required by the various projects on the active list. Storms replied that the DCS required most time. Next came XCB flow control, MDCB and SCM, each requiring approximately equal time. Below these came hard rock orientation and electronic multishot, again approximately equal in time consumption. The cork is no longer very time-consuming, and the rest of the list is at a lower level of time consumption. In reply to a question from Beiersdorf, Storms said that ODP-TAMU welcomes visiting engineers, but that they can be a mixed blessing, some being excellent and others costing ODP-TAMU engineers time.

Storms addressed the list of dormant engineering projects, not scheduled for 1991-1992 activity (Appendix 10). Work on the breakaway piston head for the APC ended when a visiting engineer left. Austin commented that SGPP linked this to the VPC, but Storms said that it was erroneous to do so. They are parallel systems; the breakaway piston head will not be used together with the VPC. The breakaway piston head will improve the APC in some lithologies.

The anti-whirl PDC bits drilled well in basalt on Leg 136. Storms replied to a question from Natland by pointing out that if a dormant project becomes relevant to a leg, an engineer would have to be assigned to the project. This may be the case with the mini-HRB (RCB version) for HD.

Storms went on to discuss the list of unscheduled projects (Appendix 10). An engineer will be required for the deep drilling study. The purpose of the powered liner removal system is to reduce disturbance during liner removal

Lancelot said that Storms had presented impressive lists of projects and added that PCOM will not be able to get the items it needs unless it takes action. Austin asked whether it would help if PCOM told ODP-TAMU simply to pursue the active list. Storms replied that it would not, and that, furthermore, with HD in the future, extra projects will be unavoidable. The active list must be trimmed to provide the time necessary to work on contingencies. Austin said that, since the DCS will not be cut, only 2.5 engineers are available for the rest of the list. Lancelot noted that several panels had recommended that an extra systems engineer be provided. Should PCOM not, therefore, consider the option of extra engineers? Cita-Sironi said that the MDCB has not been successful and suggested dropping it. Storms, however, said that ODP-TAMU feels that it is close to becoming a reality: the problems have been identified. While it is not a "sacred cow", dropping it would also impact Geoprops. Leinen said that PCOM must make some choices, but asked whether, if choices were made, this would result in significant progress on the selected items within a year, or whether they would still require three years. Storms said that this is a difficult question and is linked to the issue of legs of opportunity for testing systems. For example, if DCS is not ready for Leg 147, but is ready for Leg 149, time may be lost before there is an appropriate leg for testing. The same applies to other systems. Leinen noted that to some extent this can be predicted. For example, SGPP has stated that the VPC is necessary for FY92, so it is known that the ship will be drilling in sandy environments next year. She asked whether, if PCOM prioritizes developments, it can expect that tools will be in hand for legs on which they are scheduled and that they will be capable of solving problems for which they were designed. Storms said that it is "probably a fair bet" that if the number of projects can be reduced, the chances of remaining tools being on line for legs on which they are scheduled will be increased. Storms added that he could not, however, guarantee that tools would be more likely to function well, e.g., a VPC that vibrates well may still not recover sediment for which it was designed. ODP-TAMU has tried to increase chances of success by adopting more than one approach to each problem. Austin, however, noted that the expectation will be that, if engineering developments are prioritized, success will follow.

Natland asked whether any projects will soon be completed and therefore leave the list. Francis replied the high temperature and H_2S preparations for Leg 139 will only be relevant for one to two more months and that the cork is almost finished. Storms, however, pointed out that the cork requires modification for use with the mini-HRB for EPR. Francis responded that ODP-TAMU might decide to drop any further work on the cork until the results of Leg 139 are known. Storms said that this would release an engineer for other work, e.g., VPC. Langseth agreed that the cork is an experiment and that modifications should not be made until it has been tested. Beiersdorf said that engineering efforts must be focussed to improve efficiency. Jenkyns commented that SGPP has discussed the VPC and the breakaway piston head for coring sands, and asked whether anyone other than J. Pheasant, of BGS, could work on the breakaway piston head. Storms answered that Pheasant had thought he might be able to work on it at the BGS, but this has not been possible to date. Austin commented that it seemed that the international exchange program can be a hindrance as well as a help. The question of how to optimize engineering input to ODP might arise. There is engineering expertise at places other than ODP-TAMU, but it might not be free of charge. In further response to Jenkyns, Storms

added that the breakaway piston head has a problem of premature separation. In reply to a question from Taira concerning the XCB, Storms said that plugging of the ports in the cutting shoes has been a problem in some formations, and ODP-TAMU has long thought that flow control might be the answer. This is now being tried, but design changes are required.

Austin stated that if the XCB could be made to work, it would solve the long-standing problem of recovery of alternating hard and soft formations. Storms agreed that it was very worthwhile. Austin pointed out that 50% of the engineering effort is devoted to the DCS, which is perceived by much of the drilling community as a hard-rock device. Something should be done about sediment recovery. Leinen proposed that the XCB work be made the second priority, after the DCS. She suggested that subsequent prioritization be related to specific leg deadlines, e.g., hard rock orientation for Leg 141, then the VPC (which SGPP requires for several FY92 legs) and MDCB for Leg 146 at CA (which requires the use of Geoprops). In response to Austin, Storms explained that the SCM, hard rock orientation and electronic multishot are linked and should be prioritized together. Austin suggested stopping the cork for evaluation after Leg 139, since it is an experiment. He then asked whether this would comprise a realistic prioritization. Moberly proposed that the PCS also stop at phase I (Leg 139). Storms said that ODP-TAMU would like the flexibility to place MDCB above VPC if need be. Austin agreed that, since fluids will be important in FY92, MDCB is likely to rise above VPC in priority. Francis noted that further land tests of the Geoprops probe are required, but Malfait said that these will be funded. In answer to Swart, Storms said that the second PCS tool construction will not be affected by PCOM prioritization, since it is well advanced. Moberly asked where guidebase preparation would fit in if HD became Leg 140. Storms felt that this would not involve a one-for-one exchange in the prioritized list, since this was not a big job. Austin stated that PCOM would have to allow for sudden changes when it writes a motion to prioritize. Storms said that modifications for HD would be assigned to T. Pettigrew, along with the VPC. He would switch over to HD. Francis thought this level of detailed input to ODP-TAMU was probably unnecessary, however.

Austin asked if PCOM's prioritization had missed any panel priorities. Moberly responded that LITHP will want an engineer to work on the deep drilling study. Austin, however, commented that this will probably not require an engineer full time: the Deep Drilling WG (DD-WG) recommended that panels give deep drilling information to TEDCOM and this would be followed by an iterative process between TEDCOM and ODP-TAMU engineers. Austin has wanted TEDCOM to take the larger role in design for deep drill holes, but they have been reluctant. Natland said that the engineer involved would probably, in any case, be one of the DCS engineers. Duncan asked if there still might be too many items on the list. Austin replied that five priority items are important for FY92 and all should be met. Jarrard stated that a submersible is to be employed to evaluate the data loggers two weeks after Leg 139; it should then be possible to decide whether to proceed with the cork. Austin said that PCOM will receive feedback from panels and may have to modify its list later. Storms stated the need to eliminate or defer one of the major projects, or the engineers would still be stretched too thinly. Malpas responded that a prioritized list does just that. If all projects cannot be accomplished, then the last one on the list should be dropped. Duncan wondered whether an extra engineer might be necessary, if an item cannot be dropped. Austin commented that, to some people, the XCB works, yet it has been made the second priority. In contrast, MDCB may be needed and will generate publicity, yet it is number five or six. Storms, however, said that the XCB also generated publicity, adding that people remember when recovery is low. Moberly commented that Geoprops might be number five in terms of timing. The following motion was presented.

PCOM Motion

PCOM prioritizes engineering development as follows:

1) Improvement and development of the Diamond Coring System.

2) Improvement and development of the XCB Coring System.

After these major priorities, PCOM believes that development should respond to the needs of scheduled legs. This implies that the next priorities are:

3) Cork/PCS/high temperature preparations, in preparation for Leg 139.

4) Orientation needs (hard rock orientation, Sonic Core Monitor, electronic multishot), in preparation for Leg 141.

5) Vibra Percussive Corer, in preparation for scheduled 1992 SGPP objectives

6) Motor Driven Core Barrel, in preparation for the use of GEOPROPS in Cascadia drilling, Leg 146.

Each of these development activities should be reevaluated after testing on the appropriate leg(s).

Other active development efforts should continue on an as-possible basis.

If there are short-term perturbations of the schedule, PCOM assumes that engineering development will respond to the schedule.

PCOM expects reports on the development schedule in the future so that it may reevaluate the priorities.

Motion Leinen, second Natland Vote: for 16; against 0; abstain 0; absent 0

PRIORITIES FOR DOWNHOLE MEASUREMENTS

Jarrard discussed the list of near-term technology developments (Appendix 11). Some developments derive from ODP-LDGO, some from ODP-TAMU, some from third parties and others from combinations of these groups. The flow permeability tool will be used at Sedimented Ridges I, if successful at 504B. Geoprops has been rescheduled to CTJ from Leg 139. Even here, its use depends on MDCB readiness. The status of the 28-element geochemical tool, presently scheduled for Leg 140, is uncertain as it must be borrowed. ARCO has one and a long-term loan is possible. Schlumberger is developing a tool that might be leased in the future. Jarrard would prefer a long-term loan from ARCO. ARCO's tool is a germanium crystal cryogenic tool and must be inserted and removed from the hole quickly in order to maintain superconductivity. The Schlumberger tool is more advanced and is non-cryogenic. The dewared resistivity tool will be discussed with BGS and the Camborne School of Mines during the week following this meeting. Leg 142 reaming has not been scheduled, although it may occur if DCS operations go well.

Regarding future needs, DMP and LITHP have generated a long list of high-temperature tools which require too much development for ODP-LDGO to perform. Four developments that are worth considering are the following: 1.) Core-log integration. This involves making the same measurements both downhole and on core. A core gamma ray instrument and a downhole susceptibility tool are required. 2.) Next-generation geochemical tool. 3.) Maxis, a next-generation data acquisition system that will involve a $200,000 to $300,000 transition cost. 4.) Wireline packer. LITHP and SGPP both want this, but the current tool must be evaluated as it is a high-risk project (Appendix 11). Formation of a group to study wireline sampling systems has been recommended by DMP. Austin added that DMP feels that the present packer is a failure and has requested a meeting to discuss further developments. Swart asserted that ODP needs a capability to sample fluids, whether by the wireline packer or some alternative. The

packer is flawed because it has to expand too much to be able to return to a small enough diameter to re-enter the pipe. A straddle packer (drill stem packer) may be preferable. Jarrard said that there is a British system developed by J. Cann which uses the existing drill stem packer, and this would no doubt be taken up by the DMP specialist group, if PCOM approves such a meeting. Langseth commented that the method to be used is dependent on lithology. Swart pointed out that the oil industry uses straddle packers and suggested that it should be possible to adapt these for lithologies that cannot be squeezed to obtain water samples, e.g., those to be encountered at A&G, where fluids cannot be sampled without some sort of tool.

Austin asked whether PCOM needed to prioritize downhole developments. Langseth suggested the susceptibility tool, for use in core-log integration. Jarrard said that this might be the French susceptibility tool, which it might be possible to combine with other tool strings, but added that it was not certain that Sclumberger would be taking over routine use of this tool. An alternative would be to build a tool that is attached to the bottom of strings at a cost of about $75,000. Natland said that LITHP noted the need for a downhole magnetometer for A&G. Jarrard responded that the Japanese had suggested a tool, and Rea commented that this was for basement sites. Austin stated that a motion would be required if PCOM wished to endorse the use of a susceptibility tool or downhole magnetometer in FY92. Langseth noted that the downhole susceptibility tool is the highest priority, since it is needed for core-log integration. He asked for more information about the French susceptibility tool. Lancelot said that it might be necessary to purchase the tool. He added that it is a Schlumberger tool and, therefore, compatible. It is very sensitive and capable of obtaining good reversal stratigraphies in carbonates. Beiersdorf recalled that there had been a susceptibility tool on Leg 106, but Jarrard said that that was a hard rock tool. The issue is now to develop/acquire a much more sensitive tool for carbonates. The French tool is the only one, to Jarrard's knowledge, completely developed. One could develop a new tool. Another way to gain sensitivity, and resolution (benefitting core-log integration), is by using a pad-type tool, but this is a development and not an existing tool. Lancelot commented that the best vertical resolution by the French susceptibility tool was 50-60 cm. Taira drew attention to DMP's response to the Japanese magnetometer (Agenda Book white pages 93), noting that DMP did not recommend its use at A&G (legs 143 and 144). Austin noted that A&G-DPG had endorsed the use of the Japanese magnetometer (Agenda Book white pages 369). He stated that a PCOM motion was not necessary, since the magnetometer will get incorporated into a leg prospectus anyway, but that PCOM should have a consensus to the effect that it endorses the LITHP (and A&G-DPG) recommendation that three-component magnetometer work be carried out on legs 143 and 144. Langseth prepared a consensus on the susceptibility tool.

PCOM Consensus

PCOM recommends that the highest priority for downhole tool acquisition or development be a sensitive downhole magnetic susceptibility tool.

Ideally, a susceptibility tool that can be incorporated into each tool string should be developed.

In the interim, or alternatively, existing susceptibility tools such as the French magnetometers should be used on Leg 141 and subsequent legs to implement core-log correlation.

NEW DPGs AND WGs

Austin explained that NAAG-DPG and A&G-DPG have met and NARM-DPG will meet again. PCOM must decide whether any new DPGs are required and should charge them and provide

nominations for members. The SL-WG will meet again. PCOM must decide whether any new WGs are required. OHP has recommended a Bering Sea WG (BS-WG) and LITHP has recommended an Offset Drilling WG (OD-WG).

Moberly recommended that PCOM defer action on a BS-WG. Leinen said that DPGs were originally set up when legs had been firmly scheduled, but Austin responded that they are for highly-ranked proposals, when panels need assistance. Swart commented that Bering Sea proposals were not highly ranked, and Austin said that, though the need for a BS-WG may arise in the future, it can be deferred. Duncan reported that OHP felt that the Bering Sea program is a composite of proposals and was also looking forward to future USSR proposals. They, therefore, felt the need for a DPG. Austin responded that a WG, rather than a DPG, is needed for the Bering Sea because it is an area of interest that lacks a strategy or very highly-ranked proposals. He added that WGs generally require more than a single meeting. Natland suggested deferring the BS-WG until some of the anticipated proposals arrive, though Moberly noted that if existing proposals can be improved, there may be no need for new ones. Austin said that, while forming a BS-WG might energize proponents, he preferred to wait.

Austin stated that LITHP and TECP have, through minutes and letters, urged the formation of an OD-WG. In this case, highly ranked proposals are available, but LITHP and TECP assert that no drilling strategy exists, indicating that a WG, rather than a DPG, is required. Watkins asked about the number of proposals. Natland listed OD proposals as: MARK deep mantle, Vema FZ (two proposals) and Oceanographer FZ in the Atlantic, HD in the Pacific, and Hole 735B in the Indian Ocean. Leinen recalled that at the November 1990 Annual PCOM Meeting, there had been no objections to an OD-WG other than a concern that there were too many DPGs and WGs. Austin reported that on the same day he received the LITHP/TECP letter requesting OD-WG, he received a letter from the chair of the US Scientific Advisory Committee stating that travel costs for US panel members are too high. Austin said that he wanted to discuss travel costs with international partners. Malpas said that the international partners are very aware of the high cost of travel, but that the OD-WG has a strong case. Lancelot agreed. Austin then asked whether PCOM favored a WG or DPG, noting that LITHP and TECP prefer a WG, which involves a longer-term commitment. Duncan felt that it should be a WG, and that it must bring together people interested in petrology and structure.

Austin expressed the opinion that an OD-WG should not become a forum for HD discussions. The initial HD leg is well defined. Only future HD, and other, legs should be considered by OD-WG. H. Dick has accepted responsibility for preparations for HD I. In response to a question from Watkins, Natland said that technological aspects of OD are drilling on steep slopes and deep drilling (i.e., 2-3 km penetrations). Austin asked what the role of proposals should be within OD-WG. Natland said that the OD-WG may solicit proposals, like the SL-WG. Responding to a question from Malpas, Duncan said that petrological aspects may need only one meeting, but that TECP concerns may take more time.

Austin presented the suggested mandate for OD-WG he had received from LITHP. Malpas said that reference to the "tectonic context" was redundant since this is covered under the umbrella of "scientific objectives". Moberly recommended dropping the reference to "sites" as being too specific, and replacing it with the term "target area". In addition, engineering developments should be considered.

Austin then showed LITHP's nominations for OD-WG membership. He felt that it would be useful to have petrologic/tectonic co-chairs. TECP nominations were not available, however. The JOIDES Office, in consultation with LITHP and TECP, will obtain names of nominees if

PCOM approves OD-WG. Names were suggested by PCOM. Austin said that it would be useful to obtain more names from the international partners, including the USSR. Austin will try to have OD-WG meet before the August PCOM meeting and will poll PCOM members with a suggested list of members. Natland stressed the importance of considering the balance of disciplines. Austin reiterated that he would poll PCOM on the membership issue. Austin pointed out that the OD-WG will not be prioritizing targets but that it may, however, transition to a DPG in the future. It should therefore meet early. PCOM passed the following motion.

PCOM Motion

PCOM establishes an Offset Drilling Working Group (OD-WG) to be charged with:

a) establishing and setting into priority scientific objectives and a drilling strategy of a program for drilling offset sections of oceanic crust and upper mantle;

b) identifying target areas where specific objectives can be addressed;

c) identifying other survey information necessary to establish the geologic context of an offset drilling program; and

d) identifying the technological requirements to implement the strategy.

Motion Moberly, second Langseth Vote: for 16; against 0; abstain 0; absent 0

Austin repeated that DMP has recommended a specialist working group or workshop to consider downhole fluid sampling and that LITHP has endorsed this recommendation. It could be held in association with DMP's joint meeting with SGPP in June. Austin asked whether PCOM should endorse the specialist group and in what form.

Lancelot suggested that it be a USSAC workshop, but Austin replied that this would be too formal and slow to arrange. Swart stated that holding the meeting in conjunction with the June joint panel meeting would be ideal. Austin cautioned that there would be a budgetary impact. Cowan noted that DMP has recommended that no further action be taken on the wireline packer until such a specialist group has met. PCOM reached the following consensus.

PCOM Consensus

PCOM supports the convening of a specialist group to consider downhole fluid sampling. The meeting is to be organized by P. Worthington (DMP chairperson) and held, if possible, in conjunction with the June 1991 joint meeting of DMP and SGPP. If the specialist group does not meet at that time, it should meet as soon as possible. The specialist meeting is to be separate from the DMP meeting agenda.

Austin went on to raise the issue of Rea's complaint that the A&G-DPG had been too big. Austin referred to the Agenda Book blue pages 22, where the section from the ODP Policy Manual on DPGs is reproduced. He commented that the membership policy as outlined in this statement was adopted in full at the A&G-DPG (see letter from Rea to Austin, Agenda Book white pages 367). There were 16 invited attendees, including A&G-DPG members, representatives of international partners and non-voting liaisons.

Natland queried the reason for the attendance of so many people when only two proposals were involved and the mandate was so specific. Austin responded that the A&G program is very popular. Duncan suggested striking the second paragraph of the statement in the ODP Policy Manual. Responding to a question from Austin, Moberly said that EXCOM would have to approve such an action. Austin said that there would still be pressure to include representatives from international partners, since this is included in MOUs. Beiersdorf felt that the second paragraph could be removed, since it is covered by the MOU and, therefore, international partners can still send representatives. Moberly cautioned that DPGs have more power than panels in terms of sites drilled. Pyle said that the paragraph is written in an odd way and should be dropped. Austin said that its deletion would not change staffing, but Tucholke agreed with the deletion. Watkins pointed out that only three international partners had sent representatives, but that there had been seven liaisons. Natland felt that, having received this complaint, PCOM will in future take some care to include people on DPGs who can serve multiple functions.

Austin noted that the ODP Policy Manual DPG statement is poorly worded, since it does not discuss balancing proponents and non-proponents, yet that is something PCOM does routinely. Lancelot suggested removing the paragraph and then asking the international partners to send representatives with specific skills. Moberly said that, in view of the awkward wording of paragraph two, it should be stricken and streamlined wording passed to EXCOM for approval. Tucholke commented, and Austin agreed, that some words should be included to describe how DPGs should be constituted, rather than leaving this to corporate memory. Jarrard stated that ODP-TAMU and ODP-LDGO should have liaisons to DPGs and Francis agreed. Austin asked whether PCOM should, therefore, amend the third paragraph. Rea reported that the ODP-LDGO liaison had been very useful. G. Foss, of ODP-TAMU, could not attend because of time commitments, but Rea obtained a great deal of information from him by phone. Rea proposed allowing the chairperson to invite the participants he or she wants, but Austin noted that the chairperson already has this authority. Malpas suggested adding a note that PCOM should decide the size of the group such that it be commensurate with the task at hand. PCOM passed the following motion.

PCOM Motion

In view of the awkward wording of paragraph 2 of the DPG mandate, PCOM moves that Paragraph 2 be stricken and replaced with:

"The DPGs are composed of a balance of U.S. and non-U.S. members, and proponents and non-proponents. The size of the DPG should be commensurate with the charge of the group".

Motion Tucholke, second Duncan Vote: for 14; against 0; abstain 2; absent 0

PCOM passed the following motion thanking the NAAG and A&G DPGs.

PCOM Motion

PCOM thanks the North Atlantic Arctic Gateways Detailed Planning Group (NAAG-DPG) and the Atolls and Guyots Detailed Planning Group (A&G-DPG) for their expeditious and informative reports. We consider both DPGs to have fulfilled their charge and accordingly disband them.

Motion Cowan, second Leinen Vote: for 16; against 0; abstain 0; absent 0

900 OLD BUSINESS: CONTINUING ISSUES

FY92 PROGRAM PLAN

Austin introduced the issue of whether Leg 140 would be Hole 504B or HD. An update from the *JOIDES Resolution* will be presented by Francis on the next and final day of the PCOM meeting. (Leg 137 was nearing the conclusion of its operations at Hole 504B at the time of the PCOM meeting.) It may be possible to make the decision about Leg 140 at that time. PCOM must, however, decide on a procedure for deciding on Leg 140 if final word on the status of Hole 504B is received after the PCOM meeting. If Hole 504B is clean, then Leg 140 can return there. PCOM must decide how to proceed if the cleanliness of Hole 504B is in question.

Beiersdorf observed that even if Hole 504B is clean, the liner may be in poor condition. Storms said that the condition of the liner was unknown as yet, but that the hole has proved particularly stable and a liner may not be needed. Storms added that there was a question as to whether to spend money on guidebases for HD or on hardware for Hole 504B. Austin, however, said that FY92 money would be used for the liner, but that the HD guidebase would not be paid for from FY92 money if HD is Leg 147. He asked why not spend the money in hand on Hole 504B, a FY92 project? Francis responded that he had thought that the (HD) money was to be spent on DCS III if HD was deferred. Moberly, however, noted that BCOM has recommended that money for HD will be carried forward to the year in which it is drilled, rather than being transferred to DCS III automatically. Storms said that money was available for Hole 504B or HD, whichever became Leg 140. Austin agreed, but stated that if Hole 504B is Leg 140, and it needs a liner, then that will be the top priority; both Francis and Storms agreed.

Austin asked about Leg 140 decision-making, should the status of Hole 504B be uncertain. Malpas recommended dropping Hole 504B in that event and proceeding to HD, though he noted that this would probably result in objections from SSP and TECP. Austin agreed with the switch to HD under such circumstances, adding that proponents say that they can have a survey package together in time for Leg 140. Lancelot agreed and Austin noted that TECP is happy with the initial approach adopted for HD. Natland said that whether Hole 504B is either clean or junked, the procedure is clear; the problem is whether Hole 504B should be attempted if the situation is cloudy. A leg with contingencies may be required. Austin responded that contingencies already exist. Lancelot said that if the status of Hole 504B is cloudy, Leg 140 should be HD; Duncan agreed. Langseth cautioned that a decision should be deferred until July, when the new survey package is in hand, adding that it is just as risky to go to HD as to return to an uncertain Hole 504B. He asked whether ODP-TAMU can accommodate such a delay. Francis, however, replied that July would be too late and that three months lead time is required. Tucholke said that it was not known whether there was a good drill site at HD. He said that the situation is reminiscent of that at SWIR (Leg 118), which was almost a disaster because photogeology for site identification was unavailable. Fortunately, Leg 118 was rescued by an accidental, exciting Hole 735B. Austin responded that a Leg 140 co-chief has given assurances that sites exist, based on a preliminary examination of the data. Lancelot stated that the data and sites are available and that only the final selection remains to be made. He added that HD would be less risky than SWIR or a cloudy Hole 504B. Malpas suggested polling PCOM at the end of Leg 137. Austin said that Francis will send a synopsis of Leg 137 to the JOIDES Office and that this will be sent to PCOM members. In response to a question from Langseth, Francis said that the engineers need to have a decision on HD by early May.

Austin reported that the next issue to be resolved within the FY92 schedule is the TECP recommendation that 4 more drilling days be added to Leg 141 (CTJ). He asked if anything could be achieved by changing the Panama and Valparaiso port calls. Francis replied that changing the port calls will not help. The SEDCO time at sea is critical and "the meter starts to run" after Panama. Leg lengths must be maintained at 56 days to avoid staff burnout. Co-chiefs should use the time at their disposal. The 39 days on site scheduled for Leg 141 is comparable to other legs. Francis concluded by stating that he would resist lengthening the leg. Natland endorsed Francis' stance. Austin summarized the situation by noting that PCOM had realized that there would be complaints about numbers of days on site versus days in transit when it set the FY92 program, but that he did not feel that PCOM could take any action to improve matters.

Regarding Leg 142, Austin expressed the opinion that there was little need for further discussion. The leg has an active co-chief, an ODP-TAMU engineer has been aboard the *Alvin* cruise and surveyed the primary on-axis site, and PCOM has been polled without dissention about the change to such an on-axis site. He asked whether a motion was required, but the feeling of PCOM was that a consensus would be sufficient. PCOM reached the following consensus.

PCOM Consensus

PCOM approves the change from an off-axis location, as originally recommended by the EPR-DPG, to an on-axis location for the first site to be drilled during Leg 142 on the East Pacific Rise.

Storms pointed out that PCOM should discuss where to set a second HRB if high temperatures are encountered at the primary site and a move to a second site is required. Moberly said that both an on-axis and an off-axis site should be reviewed by PPSP. Batiza and Storms can then make the decision aboard ship if the situation arises. Storms presented a potential scenario in which the primary (on-axis) has been successfully drilled to ~175 mbsf and time remains to place a second HRB to test the DCB. He asked whether this HRB should be placed next to the DCS hole, so that the results of DCB and DCS drilling can be compared. If it was placed at a separate location, the test may not be fair. Natland said that, since HRBs can be moved, there might be some point in setting up for a scientific target if time is available at the very end of the leg. Austin expressed reluctance to interfere too much in shipboard decisions. He added that there is, however, a budgetary implication since, though a second HRB will be carried on Leg 142, it is intended for use at HD. Moberly proposed leaving the decision to the co-chiefs, who can call for assistance if necessary. Austin said that the minutes would reflect that feeling by PCOM.

Austin said that the issue of port calls between legs 143, 144 and 145 has already been resolved. Moberly asked whether use of Hakodate (on Hokkaido) might be preferable to Yokohama at the end of Leg 144, since it would result in one less travel day on Leg 145 (North Pacific Transect). Austin cautioned that, in August, PCOM would be considering a supplemental science proposal that would take time away from an A&G leg. Francis said that it might be logistically difficult to use Hakodate. Austin said that ODP-TAMU should investigate the use of Hakodate. Francis agreed to investigate.

Tucholke suggested that the scientific party for Leg 141 (CTJ) be allowed to embark at Valparaiso, instead of Panama, since this would save them 8 days. Francis asked that this issue

be deferred, because there is a possibility that the *JOIDES Resolution* may have to put into Valparaiso in any event for clearance purposes.

Thursday, April 25 1991

PROJECT "APTICORE"

Austin began the session by allowing an announcement by R. Larson of URI on his proposed Project "Apticore", part of the Cretaceous Greenhouse Coring Project. Larson distributed a handout at the meeting. Studying the onset of the Cretaceous greenhouse may enable prediction of how the modern greenhouse may occur. Larson explained that rates of production of oceanic crust from mantle plumes and continental flood basalts (also from mantle plumes) have not been constant, but experienced a pulse at ~120-125 Ma, followed by a gradual decline. He suggested that a large amount of lowermost mantle material had become detached and erupted, initially in the Pacific Basin as a "super plume", and subsequently spreading to other basins. Larson plans to examine the geologic consequences of the super plume. The pulse is also visible again in the Aptian at ~120 Ma, when total oceanic crust production (from both mantle plumes and mid-ocean ridges) is considered. Coeval with the pulse were black shale deposition, oil in the Middle East, a magnetic reversal frequency of zero, and elevated temperatures and sea level. Project "Apticore" will study how these processes and events occurred by initially coring the impulse at the earliest Barremian-Aptian section in Italy. Systems such as plankton evolution, anoxic events, etc. will be examined, together with their interrelations, including phase leads and lags and modulation by location relative to plumes. Larson would like this to be a combined terrestrial and marine program, and noted that the same interval can be cored in the western Pacific and North Atlantic. Responding to a question from Austin, Larson said that he had not yet related this study to IGBP or other Cretaceous groups, but that it should be possible to work together.

901 MEMBERSHIP AND PERSONNEL ACTIONS

DMP

B. Carson is rotating off the panel. Austin said that names of three nominees will be sent by the panel chairperson to the JOIDES Office. The FRG representative, H. Villinger, will be replaced by J. Draxler. Beiersdorf notified PCOM that Draxler is head of the borehole group in KTB and is an ex-Schlumberger employee. He added that Draxler will tie KTB and ODP more closely. Leinen reported a SMP concern that J. Gieskes, the DMP liaison to SMP, has never attended a SMP meeting, yet DMP has declined to nominate another liaison. Moberly explained that DMP has stated that they will send appropriate liaisons, but that Gieskes would continue to be the named liaison. Austin said that he will raise the issue with Worthington. Langseth recalled that there has previously been some concern about the size of DMP and suggested that a replacement for Carson might be unnecessary. Austin proposed deferring further discussion, adding that he will contact PCOM by mail when he receives the nominees.

SMP / IHP

I. Gibson, SMP liaison to IHP, has been nominated as the new chairperson of IHP. (T. Moore, present IHP chairperson, wishes to retire.) Austin explained that if PCOM endorses this plan, a new SMP member should be chosen. SMP wanted a replacement with computer systems expertise and R. Chaney is the nominee. The new SMP member may also be the

liaison to IHP. Malpas felt that since Gibson is the representative of Canada-Australia (C-A), he should be replaced by a C-A nominee. He added that Gibson has been involved with JOIDES panels since 1982. Lancelot expressed the opinion that Gibson would be a good chairperson. Austin said that discussion of a replacement for Gibson on SMP could be deferred until C-A nominees are received and reiterated that the replacement should have computer expertise. Malpas said that nominees should be available in three weeks when their ODP council meets. Lancelot noted that W. Sager was also nominated by IHP as an alternative if Gibson could not serve. In the event that no nominee is forthcoming from C-A, the consensus of PCOM was that Chaney's nomination would be accepted. PCOM reached the following consensus.

PCOM Consensus

PCOM expresses its appreciation and thanks to T. Moore for his long and outstanding service as IHP chairperson. PCOM hopes that his schedule will permit him to remain on IHP as a member.

SSP / PPSP

No action required.

TEDCOM

A new ESF representative is required, since H. Strand has rotated off the panel. TEDCOM would prefer someone with experience in high-temperature drilling, but no names have yet been received. Duncan reported that he had sent the names of two Icelanders to Sparks (TEDCOM chairperson). Cita-Sironi said that she would discuss the issue at a meeting in two weeks. Austin stated that the new member is required for TEDCOM's proposed 8-9 July meeting.

LITHP

M. Perfit is rotating off the panel. LITHP wants to add expertise in the geology and geochemistry of the lower crust and upper mantle. S. Bloomer has been nominated and is willing to serve. Moberly felt that Bloomer was appropriate, but said he thought that PCOM had asked to be provided with a choice of nominees. Austin said that PCOM can ask for another name. Tucholke suggested adding tectonic expertise to avoid "lithologic tunnel vision". Natland, however, responded that Cloetingh and Karson (TECP's liaison) have tectonic expertise and Austin added that LITHP has requested a joint meeting with TECP. Austin said that he can reinforce PCOM's decision that there always be a choice of nominees and will ask Humphris (LITHP chairperson) for another name and emphasize a tectonic background.

OHP / SGPP / TECP

No action required.

NARM-DPG

LITHP has asked that one more petrologist be added to NARM-DPG. The request has been echoed by the NARM-DPG chairperson, who has also asked that R. Buck be re-invited. (Buck was invited to the first meeting but was unable to attend.) Tucholke reported that the NARM-DPG, though large, had functioned efficiently. It has a large topic to address and there is a need for a petrologist. He added that there was no LITHP liaison at the first meeting. Cloetingh is the designated LITHP liaison, but he is not a petrologist. LITHP has suggested Saunders as the additional petrologist. Austin agreed that there is a need for more petrological input. Austin added that he would try to arrange an appropriate LITHP liaison and that Buck is also welcome to attend. The second meeting will be held in August and the NARM-DPG chairperson will report at the August PCOM meeting.

PCOM passed the following motion.

PCOM Motion

PCOM moves that the persons nominated for panel, DPG and WG membership be invited to serve.

Motion Moberly, second Natland Vote: for 16; against 0; abstain 0; absent 0

PCOM LIAISONS

Austin asked whether any changes in PCOM liaisons were anticipated prior to the August PCOM meeting. He referred to the list of upcoming meetings and table of PCOM liaisons on Agenda Book blue pages 25 and 26.

Moberly notified PCOM that he will be leaving PCOM and will not attend the August meeting. He reported that his replacement will be B. Taylor. Moberly said that he could, however, attend the PPSP meeting in May (if Austin is in the USSR at that time) since no report to PCOM would be required. He felt, however, that it would be inappropriate for him to attend the June SGPP meeting.

Swart stated that he will be attending the SGPP meeting and that he would also be replacing Becker at PCOM's August meeting. Cowan explained that Becker will be at DMP, but not at PCOM, and volunteered to report on DMP at the August PCOM meeting. Austin asked that Moberly attend the PPSP meeting if he is unable to attend because of a possible conflicting meeting in the USSR. Austin noted that Natland can attend the TEDCOM meeting. The matter of a PCOM liaison to SGPP can be deferred, as Swart will be at SGPP in June..

Austin noted that Watkins and Tucholke are PCOM liaisons to the SL-WG and NARM-DPG, respectively. He added that he will contact LITHP and TECP chairpersons in the next week or two for nominees to the OD-WG, and that a PCOM liaison will be required. Moberly suggested Taylor and Austin agreed, asking Moberly to inform Taylor that OD-WG will meet in late June or July. Tucholke informed the panel that he would not be available as PCOM liaison to NARM-DPG in August, or at the August PCOM meeting. Beiersdorf offered von Rad's services as liaison to NARM-DPG. Austin asked that Beiersdorf check that this was convenient for von Rad. Duncan said that he could serve as NARM-DPG liaison if von Rad cannot.

PCOM WATCHDOGS FOR HIGHLY RANKED PROGRAMS

Watchdogs might be necessary for programs that might be on the FY93 schedule, but are not covered by liaisons. The JOIDES Office will generate a FY93 prospectus, whose format will be discussed in August. PCOM's feeling was that, with the availability of DPG reports, there was no need for immediate action.

PCOM ROTATION DATES

Austin noted that Taira and Tucholke have been PCOM members for a long time. Rotation is supposed to occur after four years, with a 5th year in some cases, though international partners can set their own policies. Tucholke noted that he was originally an alternate on PCOM and has not been a member for the entire period.

LIAISON WITH OTHER INTERNATIONAL GLOBAL EARTH SCIENCE PROGRAMS

T. Pedersen is a member and co-chair of the liaison group between JGOFS and ODP. PCOM must now nominate a non-PCOM ODP liaison to JGOFS. Leinen pointed out that Shackleton is already in JGOFS and Austin said that he would ask Shackleton.

J. Bender (LITHP) is the ODP liaison to InterRIDGE. InterRIDGE is reciprocating. Austin explained that a chair and a member will be selected from the three InterRIDGE nominees listed below. Bender will be the chair for ODP. J. Franklin (LITHP) has been nominated as ODP member. The chairperson from the InterRIDGE liaison group will be at the August PCOM meeting.

InterRIDGE	JOIDES
P. Fox	J. Bender
M. Sinha	J. Franklin
J. Francheteau	

CO-CHIEF SCIENTIST NOMINATIONS

PCOM recommended co-chief scientists for the following drilling legs. All recommendations are in alphabetical order and no order of priority is implied. (* Indicates proponents).

Legs 143 and 144, Atolls and Guyots

US: F. Duennebier* (Hawaii), J. Haggerty (Tulsa), M. McNutt* (MIT), W. Sager* (TAMU), B. Sliter (USGS), E. Winterer* (SIO)

Non-US: K. Konishi (J), I. Premoli-Silva (ESF), W. Schlager (ESF)

Leg 145, North Pacific Transect

US: J. Barron (USGS), L. Keigwin* (WHOI), J. Morley* (LDGO), D. Rea (Michigan)

Non-US: I. Basov (USSR), B. Bornhold* (C-A), T. Pedersen* (C-A), R. Stein (FRG)

Leg 146, Cascadia

US: B. Carson* (Lehigh), M. Goldhaber (Colorado Sch. Mines), C. Moore* (UCSC), G. Moore* (Hawaii)

Non-US K. Emeis (FRG), R. Hyndman (C-A), J. Ogawa (J)

Leg 147, Hess Deep or Engineering EPR

Discussion deferred until August PCOM meeting.

PCOM expressed a clear preference in favor of proponents serving as co-chiefs, where feasible. In response to a question from Moberly, Francis said that it has been rare to have two US co-chiefs on the same leg. Lancelot suggested that MOUs be modified to specify that a US/international balance be maintained in the scientific party as a whole, but not necessarily among co-chiefs. Austin said that he would present this to EXCOM.

902 FUTURE MEETINGS

The 1991 Summer PCOM meeting will be hosted by U. von Rad at the Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover FRG, from 20-22 August 1991. A two-day field trip to the Harz Mountains, led by F. Koppel, will be held following the meeting (handout distributed at the meeting). Beiersdorf informed PCOM that the cost of hotel rooms will be $85-$90 per night and includes breakfast. The hotel is located in the center of Hannover.

The 1991 PCOM Annual Meeting will be hosted by J. Austin and the JOIDES Office at the University of Texas at Austin, Institute for Geophysics (Thompson Conference Center), from 4-7 December 1991. The meeting will be preceded by the Panel Chairperson's meeting at the same location on 3 December 1991. A one-day field trip will be held prior to the meeting on Monday, December 2, for participants willing and able to travel to Austin on Sunday, December 1. A head-count showed 15-20 people interested in the field-trip.

The 1992 Spring PCOM meeting will be hosted by R. Duncan at Oregon State University, College of Oceanography, from 21-23 April 1992. A one-day field trip will be held on Monday 20 April, preceding the meeting, in the Coast Ranges. Attendees can fly to either Eugene or Portland and arrangements will be made through Allison Burns to collect people at airports.

The 1992 Summer PCOM meeting will be hosted by J. Malpas in Victoria, British Columbia, Canada from 18-20 August. A field trip will be held on August 21, following the meeting.

The 1992 PCOM Annual Meeting will be hosted by J. Mutter at Columbia University, Lamont-Doherty Geological Observatory. No further details are available.

903 NEW BUSINESS

OPCOM

Austin introduced items of new business: the letter from Francis regarding use of the drill ship for deployment of seafloor observatories (Agenda Book white pages 399), use of alternate platforms for shallow-water drilling for A&G or SL-WG objectives, and discussion of how PCOM will respond to the new $2.1M from NSF. Austin observed that improving the XCB is one of the priorities of the LRP, supporting PCOM's prioritization of engineering objectives, as is use of supplemental platforms. Regarding the additional funds, Austin stated that NSF would like the discussion to be as far-ranging as possible, either within PCOM, or a sub-group to be formed by PCOM at this meeting.

Malpas acknowledged that there should be some discussion of the extra funds by PCOM, but that there was insufficient time to reach a conclusion on how to spend the money. He suggested reconstituting STRATCOM to formulate new ideas. Austin cautioned that the plan is needed before October 1, but Malfait pointed out that this was not essential, adding that NSF has communicated to JOI, Inc. that the "opportunity" is there to move to a higher budget level. NSF sees the new funds as a great opportunity to implement aspects of the LRP. The budget and program plan can be amended at any time during the FY. Pyle commented that October represents the earliest date at which the funds can be made available. Malpas suggested that PCOM discuss the issue briefly now, then have an augmented subcommittee meet and return with further ideas in August. Francis asked whether the $2.1M would be a step-function increase in the annual budget, or a one-year infusion. Malfait answered that, provided that things do not change dramatically over the 1992 - 1994 timeframe, NSF would like to meet budget levels identified in the LRP for that period. Moberly commented that a riser is out of the question unless such funding levels continue. It would, however, be possible to begin planning how to move toward riser drilling. Austin informed PCOM that ODP is taking some action on every implementation plan mentioned in the LRP except use of alternate platforms. The LRP makes no specific mention of a riser.

Watkins suggested that the money not be tied up, but retained for targets of opportunity, but Austin countered that the results would not be visible and that it was important to do something new. Swart stated that the basic jack-up platform used in the Bahamas cost $350,000 (without rig) and $800,000 for the whole project, adding that alternative platforms would use up the extra money quickly. Such platforms are not very mobile, but can be arranged quickly in the present economic climate. Austin noted that the New Jersey sea level program is a high-profile target that requires shallow-water drilling and is geographically close to sources of alternate platforms.

Francis reminded PCOM of ODP-TAMU needs: DCS III, increasing technical support staff, a second computer systems manager (involving two individuals, as it is a seagoing position), and an ice support vessel for NAAG at a cost of about $1M per leg. Cowan asked whether spending more money would yield DCS III sooner and Francis answered that it would. Langseth felt that the extra money provided an opportunity to put DCS III funding on a rational basis, and added that he would like to see a plan for DCS III, including cost estimates, and an evaluation of the cost required to accomplish the task within a specific timeframe. Austin reminded PCOM that a meeting on the DCS had been held in December and had concluded that

funds were not available to develop DCS III quickly. NSF turned down a request for additional funds made at that time. NSF has now come through with money; NSF wants PCOM to consider a broad range of options for its use. Langseth reiterated that PCOM should have DCS III projections before it.

Malpas noted that the LRP recommends expanding the community involved in ODP, e.g., into global change. He suggested using the money for long coring facilities and possibly alternative platforms. Natland reviewed TEDCOM discussions and recommendations. TEDCOM wants deep drilling targets to be provided to ODP-TAMU so that plans for deep drilling can be devised. Some additional money could be used for extra personnel at ODP-TAMU to make the required studies. TEDCOM has also given its opinion that the DCS will never be made a reality with only one leg in ten devoted to it, and that a dedicated platform will be required for testing. Moberly felt that PCOM should be provided with quantitative information concerning development and testing of the DCS. Taira expressed support for Natland, noting that the DCS is an important commitment and that deep drilling is important for the future of ocean drilling.

Austin said that he would like to involve panels, perhaps panel chairpersons, and also obtain more input from ODP-TAMU, before a decision is made. He proposed that, as suggested by Malpas, a group be convened, preferably at JOI, Inc., prior to the August PCOM meeting, and that PCOM be ready to recommend a strategy to NSF in August. The group would be similar to STRATCOM, but also include thematic panel chairpersons. Moberly said that the TEDCOM chairperson (Sparks) should also be present. Watkins volunteered to represent sea-level interests.

Austin, discussing the mandate of the group, for which the name OPCOM (OPportunity COMmittee) was suggested by Duncan, said that actual and estimated costs of DCS development and testing, deep drilling, and alternate platforms will be needed. He noted that there is a competing global change program, NEREIS. Lancelot explained that the French attitude is to push deep drilling and have an alternative platform for shallow objectives. The timeframe would be 1995 - 1998, and not interfere with ODP renewal. He proposed linking programs such that NEREIS would be under the aegis of JOIDES. Austin responded that this will be an EXCOM item. He asked if linkage should be at the level of science and/or funding. Lancelot replied that it is a medium-term issue. Moberly noted the short-term importance of long-coring. Langseth said that it might be premature to include deep drilling in the discussion since it will take a long time, and a lot more money, to make the leap from 1.5 to 3 km penetrations. Austin said that perhaps PCOM should refer to maximizing the capabilities of the *JOIDES Resolution*. Natland reiterated that his suggestion had only been to allocate some of the money to carry out deep drilling studies. Austin cautioned that the LRP cost estimates are outdated, yet are used by other groups as a basis for budgeting. Francis suggested including staff costs. Austin said that staffing will be part of the cost estimates of the other items. In answer to a question from Duncan, Austin said that PCOM will prioritize OPCOM-identified items in August. Tucholke said that he would like to see subjects with costs and also timing, i.e. flow charts. Langseth said that logging in DCS holes should appear.

The preliminary mandate for OPCOM, which will require some cost estimates before its initial meeting, is as follows.

OPCOM Mandate

1.) DCS development and testing, including:
- **(a) Deployment from alternate platforms, for continuous testing.**
- **(b) Consideration of downhole measurements.**

2.) Deep drilling.
- **(a) 2 to 2.5 km holes, leading to maximizing the capabilities of the *JOIDES Resolution.***
- **(b) Long-term planning, beyond *JOIDES Resolution.***

3.) Alternate platforms.
- **(a) 1995 - 1996: linkage with "other" programs (e.g., global change).**
- **(b) Long coring facilities.**

4.) High-latitude support vessels (FY93 and beyond).

5.) Staff costs for the above.

For each of the above, there must be discussion of the subject, costs and timing (i.e. flow charts).

Lancelot volunteered to serve to discuss long coring and the use of the French platform in Polynesia (but cannot attend on the selected date and will supply a written report). Moberly suggested G. Brass to serve high-latitude interests. Austin said that he would like to keep the group small, with no more than four from PCOM. In response to a question from Natland, Austin said that if OPCOM meets after TEDCOM, Natland should raise the issue at TEDCOM. Francis asked if there should be an ODP-TAMU representative. Austin replied that there should be someone who can explain cost estimates. Francis volunteered. A need was also expressed for a representative from ODP-LDGO. Jarrard was selected. Austin also felt it important to have NSF representation. The preliminary membership list for OPCOM is as follows.

J. Austin (PCOM)
G. Brass (Miami)
T. Francis (ODP-LDGO)
S. Humphris (LITHP)
R. Jarrard (ODP-LDGO)
J. Malpas (PCOM)
J. McKenzie or E. Suess (SGPP)
E. Moores (TECP)
N. Shackleton, or representative (OHP)
C. Sparks (TEDCOM)
J. Watkins (PCOM)
P. Worthington (DMP)

Austin said that OPCOM's report must be ready for PCOM in August. Pyle noted that new ideas presented at the meeting will not have cost estimates. Austin acknowledged that the report may be preliminary. Pyle suggested starting preliminary discussions early in June, before the July date envisaged for OPCOM, and Austin added that two meetings might be necessary. Moberly recalled that a number of international members at EXCOM had commented that it might be bad to have a last-minute funding increase close to renewal. This could be a renewal issue and is, therefore, important enough to justify two meetings. Austin said that he would try to arrange a first meeting of OPCOM in early June. Duncan suggested having only one meeting, but having ODP-TAMU engineers bring new cost estimates to the August PCOM meeting. Beiersdorf stated that results should be received by international partners for discussion 2 to 4 weeks prior to the August PCOM meeting. Austin responded that at least an executive summary would be ready three to four weeks before the August PCOM meeting. The first meeting of OPCOM was scheduled for June 7 at JOI, Inc., in Washington, D.C. Austin will write up a charge to OPCOM, based on PCOM discussion. He added that scheduled

PCOM discussion of seafloor observatories and alternate platforms will be deferred to OPCOM.

SHIPBOARD STAFFING AND SCIENTIFIC PARTY

Austin referred to Agenda Book blue pages 29. SMP and IHP have endorsed a second, full-time seagoing computer-system manager on each leg. SMP also still wants to increase the number of shipboard technical staff. He asked when the limit imposed on personnel numbers by the size of the *JOIDES Resolution* will be reached. Francis informed PCOM that there are 51 spaces for ODP. The usual complement comprises a technical staff of 18, 1 - 2 engineers and a scientific party of about 28, for a total of 47-48.

Austin suggested that the size of these scientific parties should be reduced. Natland pointed out that there will be a co-chief scientists' meeting at the end of May and that they should discuss this issue; Austin agreed. Lancelot commented that this was discussed at the last co-chief's meeting. He suggested that it might help if technical staff could be considered as foreign participants under revised MOUs.

Francis presented a listing of ODP-TAMU shipboard technical staff (Appendix 12), pointing to an existing shortfall of 4 persons. Austin recalled that the feeling at the 1990 Annual PCOM Meeting was that cruise participants, including students, prefer to sail as scientists rather than technicians. Lancelot said that international partners could be asked to provide technicians, not students, but Francis said that ODP-TAMU is responsible for the quality of technical support. Austin noted that this would involve an increase in costs to international partners. Lancelot agreed that France cannot pay for a technician to work at ODP for two years. Austin commented that this would still be too *ad hoc* and not a reliable source of technical support. Lancelot added, however, that France could send technicians instead of scientists. Cita-Sironi felt that international technicians would not solve the problem and, furthermore, that it would be difficult for a consortium such as ESF to organize such an exchange. Jenkyns thought that provision of UK technicians would be acceptable, but only on an *ad hoc* basis. Malpas offered to pursue the possibility of organizing a two-year appointment of a C-A technician. Austin asked Lancelot to explore similar possibilities in France. Taira said that Japan would be restricted to *ad hoc* provision of technicians. Austin remarked that ODP-TAMU must not have to provide funds for international technicians.

Austin added that PCOM should still make a statement about the growing size of scientific parties. Leg 101 had 22 scientists. Now the number has reached 28, and this is part of the reason for the need for greater technical support. Lancelot supported the concept of smaller scientific parties. Natland raised the issue of limited work space in labs. Swart expressed the opinion that quality, not quantity, of technical support should be increased, adding that some technicians are not interested in their jobs. Francis challenged this perspective, noting that the general message from co-chiefs has been supportive. Lancelot said that the quality can be variable. Francis responded that there is a rapid turnover among technical staff. Austin stated that ODP-TAMU does a good job of keeping technical staff, who tend to get burnt out. Moberly recalled that a confidential letter used to be sent by co-chiefs commenting on the performance of technicians. Francis said that this has been replaced by a post-leg overview from each member of the scientific party. Austin warned that, as the oil industry picks up, it will become harder to keep technicians in College Station. Francis added that, although ODP-TAMU technicians are paid 80% over their base salary when at sea, they can earn even more in a land-based job in the environmental industry. Austin deferred suggesting a numerical limit for

the scientific party until ODP-TAMU can provide a histogram of scientific party size for review at the August PCOM meeting. PCOM reached the following consensus.

PCOM Consensus

PCOM notes the tendency for shipboard scientific parties to be too large. Concerns are:

1.) The difficulty of managing large groups.

2.) The high ratio of scientists to technical support staff.

3.) Crowding of laboratory facilities and work stations.

4.) Amounts of time and effort needed to support individual scientists' needs (e.g., sampling).

SOFTWARE / HARDWARE ITEMS

Francis presented a list of software and hardware items requested by SMP, DMP, PPSP and the co-chiefs' meeting (CC), with the status of each item (Appendix 12). Moberly asked how many will not have been covered by the end of FY91, adding that there should be a residual list for SMP and PCOM to prioritize, to assist with deciding how the $160,000 budgeted by BCOM for scientific equipment should be spent. Austin said that real time navigation, for example, will not begin in FY91. He added that this list should be updated and presented at every PCOM meeting. Moberly said that at some time, ODP-TAMU will have to be told how to spend the $160,000, but Francis felt that this might be micromanagement. Langseth suggested a similar list for logging tools and Austin agreed, noting that this was a task for Jarrard or his successor.

Austin reminded PCOM about availability of the ODP-TAMU poster display. Francis said that interested individuals should send to Audrey Meyer the name of a contact person in each institution, to receive updates to the poster (approximately every 6 months).

POST-CRUISE MEETINGS

Austin observed that post-cruise meetings are being held outside College Station more frequently and that this was expensive. Natland suggested that the first post-cruise meeting should be held in College Station and the second at a location decided on the basis of cost. Austin noted that US travel costs are exceeding the budget. Although he would like to have the minutes reflect his opinion for now, he encouraged purchase of cheap tickets and stated that post-cruise meetings should be examined on a case-by-case basis. Costs should be considered.

Swart said that post-cruise meetings are also becoming too long, with one for 5 days now scheduled in Spain. Pyle explained that this is a diplomatic issue. JOI, Inc. had tried to allow some flexibility with regard to post-cruise meetings, but things are going too far. The primary concern of JOI, Inc. are the costs to subcontractors, ODP-TAMU and ODP-LDGO. Kappel added that no formal mechanism exists for post-cruise meeting site selection and it is, therefore, difficult to refuse when a site is requested by co-chiefs.Pyle saw recent developments as part of a trend. Lancelot commented that increasing visibility of ODP has been considered important and, therefore, international meetings have been authorized. This must be kept within reason, however. Austin asked whether PCOM wished to make the process for approval of post-cruise meetings more formal. Jenkyns pointed out that there is a scientific

rationale for the Leg 133 location in Spain, related to the presence of Messinian reefs. Beiersdorf suggested meeting at the center of gravity of cruise participants' home institutions to keep costs down. Austin asked for a list of upcoming meetings to enable PCOM to judge the situation. Cowan suggested that the center of gravity principle also apply to panel meetings, but Austin replied that he approved panel meetings and demanded that chairpersons justify venues. Pyle noted that the only principle is that venues should rotate between member countries, but venues such as Cyprus (proposed for the Fall 1991 LITHP-TECP joint meeting) need justification. Kappel provided the following list of locations of post-cruise meetings:

125	California	129	California	132	Engineering Leg
126	Hawaii	130	Hawaii	133	Spain
127	Japan	131	Japan	134	Villefranche
128	Japan				

Austin felt that the list was not unduly disturbing, but suggested that JOI, Inc. feel free to refuse occasionally. Pyle, however, responded that it is not clear where the authority lies. Austin said that co-chiefs could apply to him, as PCOM chairperson, for approval. Watkins suggested a budget cap. Pyle reminded PCOM that JOI, Inc. concerns only involve ODP-TAMU and ODP-LDGO. Natland stated that, prior to JOI, Inc., travel funds came from DSDP. Austin offered to review applications for post-cruise meetings, adding that he would need an updated list including numbers of days, field trips, and budget. There was general consensus supporting this course of action.

HOLE 504B

Francis provided an update on Leg 137 operations. After the second run with the DCB, the bit was again found to have suffered excessive wear, probably because the matrix is too soft. The hole was clean and contained no junk and the issue did not appear to be cloudy as of this report. The plan was to start packer permeability tests, with flowmeter, followed by the digital BHTV and a final permeability slug test. PCOM should discuss the following: 1.) The liner. G. Foss has commented that, from the point of view of long-term drilling, a liner is desirable. However, this would prevent study of interesting fluid flow into the hole. 2.) Drilling ahead. Options are RCB, DCB (with improved bit), or tri-cone bit drilling with spot coring, relying on logging to bridge gaps (the fastest option).

Natland asked when the liner would be placed. Francis answered that it would not be on Leg 137 and, furthermore, that it would reduce the diameter of the hole and affect the choice of drilling system. Malpas said that the hole has been very stable and that a liner may, therefore, be unnecessary. He added that Hole 504B is approaching a critical boundary, the layer 2 - layer 3 transition, within ~200 m, and recommended against spot coring. Austin agreed that spot coring would set a bad precedent. Lancelot stated that a liner was proposed in the event of there being problems with the casing. If the casing is acceptable after inspection, a liner should not be needed. Austin expressed the need for PCOM to generate a consensus or motion indicating opposition to installation of a liner if the casing is intact and opposition to spot coring. Austin noted that Hole 504B is clean, and that it is unlikely that unremovable junk will be left behind. In reply to a question from Duncan, Francis said that drilling operations should be left to the drillers, adding that the DCB can be modified and improved before Leg 140.

PCOM Motion

PCOM recommends against the setting of a liner in Hole 504B unless it is absolutely necessary to compensate for failing casing in the hole.
Motion Malpas, second Natland Vote: for 15; against 0; abstain 0; absent 1

PCOM Motion

PCOM moves that Hole 504B should be advanced in future with continuous coring procedures, especially in light of critical transitions to be sampled.
Motion Malpas, second Lancelot Vote: for 15; against 0; abstain 0; absent 1

Natland noted that Moberly was cycling off PCOM and commended him as having been not only a PCOM member and chairperson, but practically a charter member of scientific ocean drilling. He has been a shipboard scientist, co-chief and connoisseur of fine wines. On behalf of PCOM, he commended Moberly for his exemplary record of long service and offered him the best wishes of PCOM. Approved by acclamation.

904 ADJOURNMENT

The meeting was adjourned at 12:40 PM.

APPENDICES ATTACHED TO THE 23 - 25 APRIL, 1991 PCOM MEETING

1. JOI, Inc. report, supplemental information.
2. Science Operator report, supplemental information
3. Wireline Logging report, supplemental information
4. NAAG-DPG, supplemental information
5. NARM-DPG, supplemental information
6. SL-WG, supplemental information
7. Leg 135, supplemental information
8. Leg 136, engineering developments
9. Leg 142, DCS status report
10. Non-DCS engineering priorities
11. Priorities for downhole measurements
12. ODP-TAMU technical support group and status of equipment recommendations

LIST OF HANDOUTS DISTRIBUTED AT THE 28 NOVEMBER - 1 DECEMBER PCOM MEETING

1. NSF Report
2. Research strategies for the US global change research program
3. ODP operations schedule

4. Summary of CSG activity since last IHP meeting
5. The clathrate study system progress report
6. Addendum to TECP minutes (Hess Deep cross-sections)
7. NAAG Drilling Prospectus
8. Preliminary report NARM-DPG
9. SL-WG summary report
10. Project "Apticore" (R. Larson, invited presentation to PCOM)
11. PCOM Summer 1991 Meeting field trip information

EXCOM MOTIONS FROM JULY 9-11, 1991 MEETING
SAN DIEGO, CA

EXCOM Motion

EXCOM reconfirms the following motion and consensus from its October 1990 meeting.

"EXCOM commends PCOM for its development of the program and encourages PCOM to pay special attention to truly major scientific issues that would bring the program greater visibility in the period prior to renewal. In particular EXCOM urges that no opportunity be missed within the Program Plan to drill through the lower crust and upper mantle."

"EXCOM urges PCOM to develop strategies for implementation of the Long Range Plan with particular attention to identifying themes for special emphasis in the mid-90's."

Motion Dorman, second Merrell — Vote: for 13; againts 0; abstain 4; absent 0

EXCOM Motion

EXCOM endorses the FY92 Program Plan as written, with the following caveat, as described to EXCOM by the PCOM chair:

1) Leg 140 will be conducted in the Program Plan as described (return to 504B, with the back-up to be Hess Deep);

2) If Leg 140 is Hole 504B, Leg 147 will be Hess Deep;

3) If Leg 140 takes place predominantly at Hess Deep, the site of Leg 147 operations will be one of the following:
- **Hess Deep, if Leg 140 operations there are deemed by PCOM to be successful;**
- **EPR for continued DCS testing, if Leg 140 operations at Hess Deep are deemed by PCOM to be unsuccessful;**
- **the North Atlantic (for one of the anticipated highly-ranked programs there), if Hess Deep operations are unsuccessful and further EPR DCS testing is deemed unfeasible by PCOM because of the pace of DCS Phase III development during FY92.**

Motion Caldwell, second Helsley — Vote: for 17; against 0; abstain 0; absent 0

EXCOM Motion

EXCOM ratifies the following motion passed by PCOM at its April, 1991 meeting:
In view of the awkward wording of paragraph 2 of the DPG mandate, PCOM moves that paragraph 2 be stricken and replaced with:
"The DPGs are composed of a balance of US and non-US members, and proponents and non-proponents. The size of the DPG should be commensurate with the charge of the group."

Motion Hayes, second Helsley — Vote: for 17; against 0; abstain 0; absent 0

SUMMARY

Panel discussions included a review of each of the shipboard laboratories; upcoming legs; an implementation plan for core-log data integration; and technical staff requirements considered with shipboard equipment requirements. In addition, the panel met jointly with IHP, primarily to discuss the implementation of core-log data integration. The following is a summary of SMP concerns and recommendations.

Shipboard labs review

John King presented the results of his study on APC contamination. APC cores are seriously contaminated with rust which comes from the inside of the core pipe. This contamination is seen in sediments of low magnetic susceptibility (e.g. carbonates) and more extensively in the top 5-7 APC cores of each hole. However, the contamination probably occurs in all APC cores to some unknown extent. The problem has been compounded for ODP over DSDP because full string pipe losses were relatively frequent during DSDP and have essentially not occurred for ODP. Consequently, new pipe is not replaced all at once and the current string is old and rusted. ***The panel recommends that the practice of running a pipe pig be routinely performed during the down-going pipe trip for each hole that will be sampled using the APC.*** During legs where recovery will consist of material of low magnetic susceptibility, 'U' channel samples should be taken as continuously as possible in the top 5-7 APC's for magnetic susceptibility measurement and palaeomagnetic analyses. The panel will continue its investigation of core disturbance.

Dave Huey presented the results of his core liner handling study. ***The panel recommends adoption of Huey's recommendations as standard shipboard procedure.***

Electrical resistivity measurements are not presently made on the ship due to equipment problems. These measurements are essential for Leg 139 for determination of pore fluid advection. Discussions are ongoing among SMP members and TAMU concerning this problem; the likely solution is to borrow existing equipment for Leg 139. In addition to routine, discrete measurement of electrical resistivity, the panel discussed the equipment which was provided and used by Peter Jackson (BGS) on Leg 133 for electrical resistivity 'imaging' of the split core. The equipment which was successfully used on the Resolution was a prototype. However, his proposed phase II version of this equipment is ideally suited for shipboard core measurements which can be directly correlated to the formation microscanner. SMP supports the research and development of this shipboard technique.

Upcoming Legs

Leg 139 requires equipment for the discrete measurement of electrical resistivity (see previous paragraph). Other lab requirements which were identified by the panel for this leg have all been addressed by TAMU. The panel agreed that because Mike Mottl (co-chief on

Leg 139) is a member of the panel, special shipboard measurement requirements were identified early for this leg and solutions (in most cases) were found and have been implemented. The panel agreed that for any future legs where special shipboard measurement requirements are identified, one of the co-chiefs should attend an SMP meeting as early as possible pre-cruise.

The panel identified the Atolls and Guyots legs and the Cascadia leg as requiring special consideration. Development of procedures for elemental analyses using the XRF is required for calibration of the geochemical logging tool for both Atolls and Guyots legs. The panel will continue investigation and discussion of this requirement. The Cascadia leg may suffer similar problems as the Nankai leg where little to no log data is collected. In this situation, it will be necessary that some of the core measurements be performed at a smaller depth interval. The panel requests that one of the co-chief scientists for the Cascadia leg be approved as a guest at the next SMP meeting.

Implementation Plan for Shipboard Integration of Core and Log Data

SMP prepared a list of hardware and software needs (in priority order) required for the implementation of shipboard data integration. The most important obstacle to core-log data integration is the determination of ***reference depth*** for core data. This ***reference depth*** can be determined using a two step procedure: (1) nominal depth is corrected using software for sonic core monitor (SCM) data; and (2) the shipboard core-log data correlation specialist uses an interpolation software package to determine core ***reference depth*** by incorporating any key marker horizons and one of the following four data sets, in priority order:

downhole gamma log and natural gamma core log
downhole magnetic susceptibility log and core measured susceptibility log
downhole density log and core measured density log
downhole p-wave log and core measured p-wave log

Hardware priority list:

1. Natural gamma equipment for measurement of cores (previous SMP recommendation)
2. Magnetic susceptibility downhole logging tool
3. Sonic core monitor (TAMU development - available for Leg 141)
4. Automation of the physical properties laboratory (previous SMP recommendation)
5. Core/log data integration workstation
6. Resistivity imaging equipment (under development at BGS)

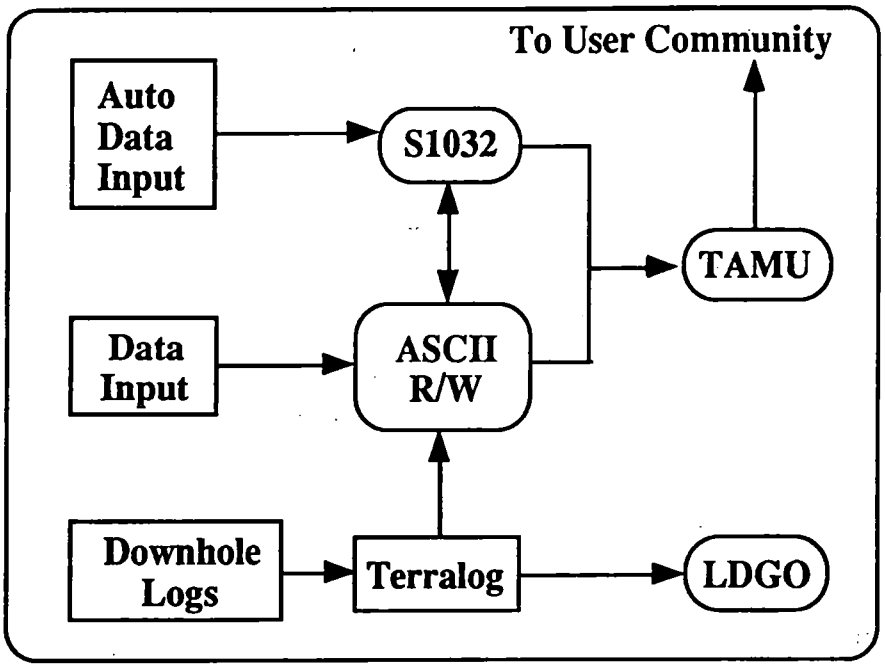
Software priority list:

1. Core data interpolation/integration software
2. Interpolation software for core-log data
3. Depth conversion software for SCM
4. Common spreadsheets

IHP/SMP agreed that the current shipboard data acquisition and data processing system

should be modified to allow for the implementation of core-log data integration. The most important addition to the current process is the ability to manipulate and edit ASCII data files, shown schematically below.

The ASCII files should be archived for future user availability. These files should be the responsibility of the shipboard scientific party and "final" versions of these files should be made available as a "data base" for user access. Also, specific tasks must be performed to implement core-log data integration. Therefore, IHP and SMP recommend addition of a second seagoing computer system manager and one person-year for development of software tools (see software priority list items #1 and #2). IHP endorses the previous joint SMP/DMP recommendation that a core-log data correlation specialist be identified as part of the scientific party for each leg.



Technical Staff and Shipboard Equipment Requirements

SMP considered the continuing pressure on scientists to do more and more work shipboard and the problems that are caused by the static level of technical support. It was the view of SMP that deferring work to post-cruise laboratories would not provide a solution to this problem. Post cruise scientists would have great difficulty in finding enough equivalent time and funding to do the deferred work and the result would be an overall reduction in the scientific productivity of the program. The majority of work now performed by the technical support staff are the time-critical (i.e. essential) shipboard measurements; thus reducing the total scientific workload by decreasing the available equipment does not constitute an option. Based on these considerations and the previous technical staff evaluation, SMP does **not** modify its recommendation made at the fourth meeting (and

presented at the PCOM annual meeting) for increasing the technical staff.

Panel Membership

IHP stole one of our superb panel members, Ian Gibson, and recommended him for chair of their panel. Consequently, ***SMP recommends to PCOM the nomination of an individual to replace Ian.*** The nomination is a person who has an extensive amount of experience in the development of measurement standards and in data/computing methods. This individuals CV will be forwarded to the PCOM chair. Ian Gibson was the SMP liaison to IHP. The panel nominates Adrian Richards as the new SMP liaison to IHP.

MINUTES

I Introduction

Members, liaison, guests, and observers were introduced. Ellen Thomas and John King were unable to attend and sent reports and regrets. Margaret Leinen and Maria Cita Sironi sent regrets. The following attended the meeting:

J. Baldauf (ODP/TAMU liaison)
I. Gibson (member)
D. Graham (ODP/TAMU liaison)
K. Moran (member, chair)
M. Mottl (member)
M. Rhodes (member)
A. Richards (member)
H. Tokuyama (member)
J.P. Valet (member)
R. Whitmarsh (member)
P. Worthington (guest and DMP liaison)

II Minutes from the fourth meeting were approved with one change.

In the summary of the panel's ship visit, under Geochemistry, the third item should be changed to read: "Colorimeter method should be replaced with an electro-chemical method for determining chlorinity of pore waters. This will be tested on Leg 136."

III Business Arising

Paleomagnetics

J. Baldauf reported that Laura Stokking is currently re-writing the paleomagnetics handbook. J.P. Valet will be on Leg 138 and will review the draft handbook and provide input to it where required. **J.P. Valet to report on the status of the handbook.**

J.P. Valet reported that the spinner requires some modifications which include changing the interface from serial to parallel, the software requires upgrading in the method of data file creation (presently, one file is created for each measurement) and to handle anisotropic magnetization. **ODP/TAMU to report on status of spinner upgrades at the next meeting.** The cryogenic magnetometer software requires upgrade as discussed at the fourth SMP meeting and the possibility of upgrading the Bartington susceptibility meter to an intermediate

integration mode should be discussed with the manufacturer. (ACTION: **ODP/TAMU to report on status of cryogenic magnetometer software and the possibility of an intermediate integration mode for the susceptibility meter).**

K. Moran presented John King's contamination study report. APC cores are seriously contaminated with rust which comes from the inside of the core pipe. This contamination is seen in sediments of low magnetic susceptibility (e.g. carbonates) and more extensively in the top 5-7 APC cores of each hole. However, the contamination probably occurs in **all** APC cores to some unknown extent. The problem has been compounded for ODP over DSDP because full string pipe losses were relatively frequent during DSDP and have essentially not occurred for ODP. Consequently, new pipe is not replaced all at once and the current string is old and rusted. ***The panel recommends that the practice of running a pipe pig be routinely performed during the down-going pipe trip for each hole that will be sampled using the APC (91-1).***

This core contamination is most severe on sediment of low magnetic susceptibility. The panel previously had recommended purchase of a magnetic susceptibility probe attachment for the Bartington meter so that discrete measurement of contaminated core could be made in the centre of the sample, in an uncontaminated zone. J. King evaluated this probe attachment and found the accuracy to be poor. However, J.P. Valet will test one on Leg 138. **ACTION: J.P. Valet to report on the evaluation of the attachment probe at the next meeting.** In the interim, during legs where recovery will consist of material of low magnetic susceptibility, 'U' channel samples should be taken as continuously as possible in the top 5-7 APC's for magnetic susceptibility measurement and palaeomagnetic analyses. The panel will continue its investigation of core disturbance. **At the next panel meeting, core disturbance will be discussed in detail.**

Physical Properties

D. Graham reported that the electrical resistivity equipment was removed from the ship. Staff scientist, Tom Janecek contacted Peter Jackson (BGS) for advice on repair of the existing system. Jackson's recommendation was to build an entirely new system. These measurements are essential for Leg 139 for determination of pore fluid advection. The solution for Leg 139 is to borrow existing equipment **(ACTION: M. Mottl and D. Graham will investigate equipment for Leg 139).** In addition to routine, discrete measurement of electrical resistivity, the panel discussed the equipment which was provided and used by Peter Jackson (BGS) on Leg 133 for electrical resistivity 'imaging' of the split core. This equipment, which was successfully used on the Resolution, was a prototype. However, his proposed phase II version of this equipment is ideally suited for shipboard core measurements which can be directly correlated to the formation microscanner. ***SMP supports the research and development of this shipboard technique, in particular as a key piece of equipment in a split core MST.***

Upgrades to the existing equipment for discrete measurement of bulk density are ongoing. D. Graham reported that Tom Janecek has been investigating spreadsheet data entry for the balance and pycnometer. Bobb Carson sent a PMAIL message from the RESOLUTION to the panel chair outlining his concerns about this existing equipment. The panel agrees with Carson's concerns. However, neither the panel nor Carson have specifically identified any existing alternatives. It is critical that changes to the current methodology occur soon because it directly impacts the implementation core-log data integration. One of the obvious problems is the limitations of the GRAPE system where partially filled cores and biscuited cores cannot be measured. Consequently, anything but APC's cannot be 'automatically' measured with GRAPE. One option is to replace the GRAPE with another system that could potentially eliminate the limitations of the GRAPE system. Another option is full automation of the measurement of core plug samples. In either of these two options, consideration must be given to the potential of measurement of density using an instrument on a split core MST. **(ACTION: Moran to request and organize a one-day special meeting to develop plans for replacement or modification to the existing system of discrete measurement of density).**

Moran reported that a letter requesting a physical properties workshop was sent to the PCOM chair. Richards suggested that the other member countries may be willing to support the workshop. **(ACTION: Moran to contact PCOM chair for answer to request).**

Natural gamma options for the physical properties lab have been investigated by T. Janecek. Two existing systems were evaluated. One system (Harbert Engineering) has very poor signal to noise ratio and the other (Halliburton) is run at speeds too slow for shipboard use (5 cores/hour). Core Labs in Dallas have a very different system and evaluation of their system has not been completed. **(ACTION: ODP/TAMU present evaluation of Core Labs system at next meeting; R. Whitmarsh to investigate the BP system and report at the next meeting).**

Micropaleontology

J. Baldauf reported on the status of the of the reference slide collection. Ellen Thomas is organizing a meeting for this fall of foram specialists. These specialists will meet in Washington, D.C. to prepare the foram reference slide collection for the ship. Ellen is expecting to get travel money support for some of the scientists from JOI **(ACTION: E. Thomas to report on the results of the fall meeting at the next DMP meeting).**

J. Baldauf and D. Graham reported on the status of computerization of the micropaleo laboratory. Five Macintosh SI microcomputers were purchased and are

now onboard the RESOLUTION. The data acquisition software will be developed by contract. The software will be developed by taking an oil company version (BUGIN) and modifying it for ODP use. The goal is to have a prototype version on the ship for Leg 138. **(ACTION: J. Baldauf to report on the results of computerization from Leg 138).**

E. Thomas sent a report which included her own concerns and those of micropaleontologists who have recently sailed. With the new computers in the lab, space will again be a problem and effort should be made to include shelf and file cabinet storage space. There should be some space adjacent to the microscope/computer work station. The recently sailing scientists have again noted their concern of the lack of technical support. One major concern is the total number of micropaleontologists sailing per leg. In some cases, 9 have been sailing on heavy paleo legs. It appears that this is really too large a group for efficient research given the available lab space. It is a waste of time if a scientist's work time is restricted while at sea . Ideally, each scientist should have her/his own microscope. It is also not productive if a scientist has to stop working at the end of a shift punctually so that the next shift can use the microscope. Prospective micropaleontologists should be told whether or not they will be required to share a microscope in the letter of invitation.

Petrology

D. Graham reported that training of the electronics technicians in repair of the ARL XRF had been rescheduled for sometime in April. Also, a turn over in technicians has left the program short of experienced XRF technicians. One experienced technician was had to sail two legs back to back because of this problem. **The panel is concerned about this lack of XRF expertise and encourages ODP/TAMU to invite an experienced XRF specialist to sail on Leg 140. ACTION: M. Rhodes to assist ODP/TAMU by encouraging specific XRF specialists to apply for Leg 140.**

M. Rhodes prepared a report and summarized the results of his study of the XRF for sulphur analysis. The technique looks very feasible and can most likely be used on Leg 139. There are problems with contamination from the spectrograph. The detection limit is 8-10 ppm. ***The panel thanked Mike for this timely and much needed study. His efforts are very much appreciated.*** **ACTION: ODP/TAMU review the Rhodes report with the XRF technician (Don Simms). Don should contact Mike Rhodes prior to Leg 139.**

M. Rhodes also reported that our recommendations concerning the grinding vessels may have fallen through the 'cracks'. **ACTION: ODP/TAMU report at the next meeting on the status of the WC and Agate grinding vessels and the shipboard sample procedures for routine shipboard measurement and for preparation of samples which are taken away by individual scientists.**

Computers

Bill Meyer reported on computer hardware upgrades and on core-log data integration from Leg 134. The microcomputers have been significantly upgraded. Twenty-one PC's have been upgraded to 386 with 25 MHz clock speed, colour VGA monitors and 4 Mb of memory. These machines can now effectively utilize Microsoft Windows software. The Mac II's have had a memory management upgrade and Mac SE's have been upgraded to SE 30's. The 3.5" 1.4 MB disk drive is now the shipboard standard. Three new laserwriter printers have been or will shortly be purchased. One is designated for the yeoperson office and one for the core description area.

On Leg 134, Bill worked on core-log data integration which took up a significant amount of his time as systems manager. During this leg, software was used to integrate the core data which are measured at different intervals. This proved to be a great success and much of the software and hardware exists. However, other needs were identified. Managing the core data integration took up a considerable amount of time; consequently, a second systems manager is required. The data sets are very large and therefore a more powerful machine is likely required for integration, for example a Mac IIfx or a workstation. Bill was successful in integrating the core data, but noted that the work he completed was on data that used the same depth reference; the next step of integrating the data with log data will be more difficult. Considering the complexity of the core data integration exercise, it is likely that a scientist sailing as the core-log data correlation specialist will require some training prior to the leg. The core-log data correlation specialist should visit ODP/TAMU prior to sailing for training. The panel discussed core log data integration jointly with IHP (see SMP/IHP Joint Meeting).

Sedimentology/Visual Core Description

J. Baldauf reported that the digital image scanner (DISC) has been onboard for evaluation over the past 3 legs. It has seen light use with initial interest shown by scientists, but has not yet been extensively evaluated. Some problems have been identified, for example the camera did not focus well. It is hoped that the instrument will be evaluated on Leg 138. **ACTION: J. Baldauf to report on the evaluation of DISC at the next meeting.** At the last SMP meeting, A. Richards reported on automation of smear slides. The hardware for this application is in place and readily available. Software has not been developed for our specific application. The panel agreed that we now need to define the ODP imaging specifications for smear slides. **ACTION: All members prepare for discussion of sedimentological guidelines for smear slide imaging techniques.** K. Moran reported on infrared techniques for sedimentological analysis of samples. She had contacted CORELABS of Calgary. The CORELABS methods are not available to the public and are under trademark. The normal infrared is very slow, but CORELABS has developed software to improve the

speed and resolution. They can analyse for chlorite, illite, smectite and kaolinite. P. Worthington has additional information on this method. **ACTION: M. Rhodes to evaluate and report on infrared information provided by P. Worthington for the next meeting.** H. Tokuyama provided information to the panel on the new Minolta colour scanner which provides data in both the Munsell colour scale and standard SI colour units. Tok will try to borrow a system for demonstration at our next meeting. A. Richards prepared a detailed report on modifications required for ODP/TAMU improve the X-Ray system currently available onboard. The equipment which exists is more than adequate for whole core x-ray analysis, but requires some modifications which Adrian provided in his report. ***The panel recommends that ODP/TAMU upgrade the existing shipboard X-Ray equipment (91-1).*** **The panel thanked Adrian for the detailed, timely report he provided to the program.** J. Baldauf reported that the computerized visual core description (VCD) system was tested on Leg 136 and is in good working order. It will undergo a rigorous evaluation on Leg 138. **ACTION: J. Baldauf to report on the VCD evaluation on Leg 138.**

Geochemistry

B. Julson, ODP/TAMU laboratory officer, reported on the status of the acquisition of the Rock Eval. Based on advise provided to them from Barry Katz and George Claypool. They recommended the purchase of a Geofina hydrocarbon meter which could work in conjunction with the Rock Eval and as a back-up system, if necessary. This system should be much easier to maintain than the Rock Eval. In addition, during Leg 135, most of the Rock Eval parts were replaced. **ACTION: ODP/TAMU send information on the Geofina system (operations manual) to Leg 139 geochemists'.**

M. Mottl reported that a new geochemistry handbook has been put together in 'loose-leaf' format so that additions can easily be made. ***The panel recommends that the two procedures which have been written, Chemical Methods for Interstitial Water Analysis on the JOIDES RESOLUTION and Wet Chemical Analysis of Sediments for Major Element Composition on the JOIDES RESOLUTION by Gieskes and Gamo be incorporated into the new handbook (91-2).*** M. Mottl reported that the geochemistry survey has been prepared and will be sent out shortly. **ACTION: M. Mottl to report on status of the survey at the next SMP meeting.** M. Mottl reported and reminded the panel of the status of CNS and CHN apparatus in the geochemistry laboratory. Approximately 2 years ago, the CHN analyzer was replaced with a CNS analyzer. This placed a limitation on the analyses by eliminating hydrogen and consequently the analysis of water in solids could not be done. B. Julson reported that the Carlo Erba CNS, currently onboard, can be relatively simply upgraded to measure hydrogen, at a cost of approximately $1k for parts and supplies. M. Rhodes commented that a new four element standard may be needed for this modification and the hydrogen peak may interfere with the sulphur peak. ***The panel recommends that the Carlo Erba CNS analyzer be***

upgraded for hydrogen analyses and a new four element standard should be acquired for this upgrade (91-3).

Underway Geophysics

D. Graham reported that the HIG high speed streamer is not available for loan to the program for testing. However, other tests can be performed to improve air gun data quality collected while steaming. Streamer tests, as outlined by Bob Whitmarsh, should be performed using the existing equipment. **ACTION: D. Graham report on the results of the streamer tests at the next SMP meeting.** J. Baldauf reported that the navigation equipment had not yet been purchased due to budget constraints in the fall. However, the equipment will be acquired in the near future. Panel members expressed their concern over the delay and suggested prompt action on the acquisition of this much needed equipment.

IV PCOM Report

M. Leinen and M.C. Sironi both sent regrets that they were not able to attend the meeting. M.C. Sironi sent comments and questions to the panel. She wanted to know the status of the index property manual, the status of the acquisition of the Rock Eval, and information concerning the manufacturer of the XRF which was identified as a concern at the last SM meeting. The responses to the status of the index property manual and the Rock Eval are straight forward. The status of the XRF concern has changed. D. Graham reported that electronic technicians from the program are now scheduled for training by the manufacturer (ARL) in the repair of the XRF. **ACTION: Moran to respond to M.C. Sironi.** In addition, M. C. Sironi expressed concern at the lack of participation of physical properties specialist onboard the RESOLUTION from the European consortium. K. Moran and A. Richards reported that physical property expertise is not lacking among the European communities, but that communication of opportunities with ODP may not be reaching the appropriate research centres. **ACTION: Moran to contact Prof. Jamiolkowski of the Univ. of Turino and Richards to contact appropriate individuals at the Norwegian Geotechnical Institute and Delft.** K. Moran summarized SMP issues which had been discussed at the annual PCOM meeting. PCOM endorsed the core-log data integration program; but deferred discussion of the SMP recommendation on increased shipboard technical support. The request to hold a physical properties workshop was discussed at the PCOM meeting. Meetings like this should be held in conjunction with normal panel meetings and requested in the same manner. Moran reported that she had sent a letter of request to the PCOM chair for a physical properties meeting with the objectives as defined in the past three SMP meetings. **ACTION: Moran to contact PCOM chair for response to physical properties meeting request.**

V ODP Sampling/Downhole Tools

Dave Huey presented the status of the sampling tools and the results of the recent core

handling study. The presentation was a most useful summary for all panel members. **The APC** has recently been improved. The rods have been increased in size and strength which has resulted in an increase in the maximum pullout force which can be applied to the tool. A design change in the system also will now allow for wash drilling over the sampling tool as a last ditch effort to recover a stuck tool. The new **Adara temperature sensor** which fits into the shoe of the APC/XCB will be tested on Leg 137. There are a total of ten tools which will be available when fully operational. The **break-away piston** has seen two cycles of design and development, first on Leg 96 and recently on Leg 130. The system is hydraulically activated and failed during its recent tests on Leg 130. Because of other engineering priorities, this development is currently on hold. **The Sonic Core Monitor (SCM)** is an acoustic monitoring system which will detect when core is entering the barrel. The SCM, when used with core scribing, will provide hard rock core orientation. The SCM was tested on Legs 127 and 134 and requires improvements to the electronics. The SCM is scheduled for testing on Leg 141. **The Pressure Core Sampler (PCS)** phase I development is complete. The tool can be run with the APC/XCB/MDCB. The sampler has been run 5 times with 2 successes. The core is collected under borehole hydrostatic conditions. Once on deck, the core cannot be accessed under pressure. However, gas and fluid can be extracted under pressure by way of a sampling manifold, where users must specify their own manifold. If laboratory studies for future legs require a sample under pressure, the development of sample pressure chamber must come from third party users as ODP/TAMU does not have this development in their budget. **A vibra-percussive corer** has been under development by a visiting engineer from Britain, Jack Pheasant. The corer is advanced using percussion and was tested on Leg 134. Although core was recovered with this tool, there is no evidence that the percussion actually worked downhole. Improvements and further tests are required. However, this tool development currently overloads the TAMU engineering group. Shell Canada is supporting the development of a large version of this tool which is currently being tested. Dave presented the results of his **core liner handling study.** There is a line of sight from the drill floor to the catwalk. However, a stongback to support the liner during transfer for two persons to carry cannot practically be made to provide both additional stiffness and be light-weight. Many options were considered in the study, but the final recommendation was to provide a minimum of seven people to carry the liner from the drill floor to the catwalk. In addition to initial core liner bending, the study pointed out other types of core disturbance which include: twisting/jarring when removing the liner from the core barrel, coring methods/tool geometry and core splitting. ***The panel recommends adoption of Huey's recommendations as standard shipboard procedure (91-4)*** The panel agreed that core disturbance effects have not been comprehensively reviewed in the program. **ACTION: All panel members review core handling procedures in their respective labs for discussion on core disturbance at the next SMP meeting.** The **Motor Driven Core Barrel (MDCB)** has been completely re-designed. The new tool has three main components: barrel, motor and thruster. The tool has been tested on Legs 134 and 135. Further modifications based on the results of these tests were made and the tool will be ready again for testing on Leg 141. The Geoprops tool fits into the pilot hole made by this tool. The hole **Cork** is a tool designed to seal a hole for future access by submersible or surface ship. The Cork is presently being tested on Leg 136 and is scheduled for use on Leg 139.

VI Upcoming Legs

M. Mottl reported on the status of Leg 139, Sedimented Ridges. The MDCB will not be available for the Leg (see V). The cork will be used for the first time as part of the scientific objectives of a Leg. Sensors will be installed onboard, particularly in the core storage facility for detection of H_2S. The maximum temperature limit for drilling has not yet been set, Safety Panel recommends 350° C. Two different models have been run to predict hole cooling; one model's results show hole cooling will not be effective in reducing temperatures and the other model's results show the opposite. Most of the laboratory requirements have been met with the additions of the sulphur standard, M. Rhodes' XRF method, and the CHNS. However, the laboratory still requires electrical resistivity equipment (see II, Physical Properties).

Legs 140 and 147 will require heavy use of the XRF. Because of the lack of experienced XRF technicians at the present time, the scientific staffing of these legs should include specialists in XRF. **ACTION: M. Rhodes to contact Leg 140 co-chiefs regarding this concern.**

Legs 143 and 144, Atolls & Guyots I and II will see heavy use of the Geochemical Logging tool. Because this tool will be run in sediments, the panel needs to address the difficult issue of routine XRF analysis of sediment. M. Rhodes suggested two possible options: (1) ignition of the sediment to drive off H_2O and $CaCO_3$ for analysis on an anhydrous basis; and (2) use of pressed powders. The major problem is that there is no 'cookbook' procedure for sediments. The panel agreed that procedures for sediment XRF analyses are required. **ACTION: M. Rhodes to evaluate options for standardizing sediment XRF methods.**

Leg 146, Cascadia/ Vancouver Is. Margins, is an active margin Leg. Considering the past difficulties in logging these types of margins, the panel expressed concern regarding core interval measurements. In this situation, it will be necessary that some of the core measurements be performed at a smaller depth interval. The panel requests that one of the co-chief scientists for the Cascadia leg be approved as a guest at the next SMP meeting. **ACTION: Moran to request participation of one of the Leg 146 co-chiefs to the next panel meeting.**

The panel agreed that because Mike Mottl (co-chief on Leg 139) is a member of the panel, special shipboard measurement requirements were identified early for this leg and solutions (in most cases) were found and have been implemented. The panel agreed that for any future legs where special shipboard measurement requirements are identified, one of the co-chiefs should attend an SMP meeting as early as possible pre-cruise.

VII Implementation Plan for ODP Shipboard Integration of Core and Log Data

SMP prepared a list of hardware and software needs (in priority order) required for the

implementation of shipboard data integration. The most important obstacle to core-log data integration is the determination of ***reference depth*** for core data. This ***reference depth*** can be determined using a two step procedure: (1) nominal depth is corrected using software for sonic core monitor (SCM) data; and (2) the shipboard core-log data correlation specialist uses an interpolation software package to determine core ***reference depth*** by incorporating any key marker horizons and one of the following four data sets, in priority order:

downhole gamma log and natural gamma core log
downhole magnetic susceptibility log and core measured susceptibility log
downhole density log and core measured density log
downhole p-wave log and core measured p-wave log

Hardware priority list:

1. Natural gamma equipment for measurement of cores (previous SMP recommendation)
2. Magnetic susceptibility downhole logging tool
3. Sonic core monitor (TAMU development - available for Leg 141)
4. Automation of the physical properties laboratory (previous SMP recommendation)
5. Core/log data integration workstation
6. Resistivity imaging equipment (under development at BGS)

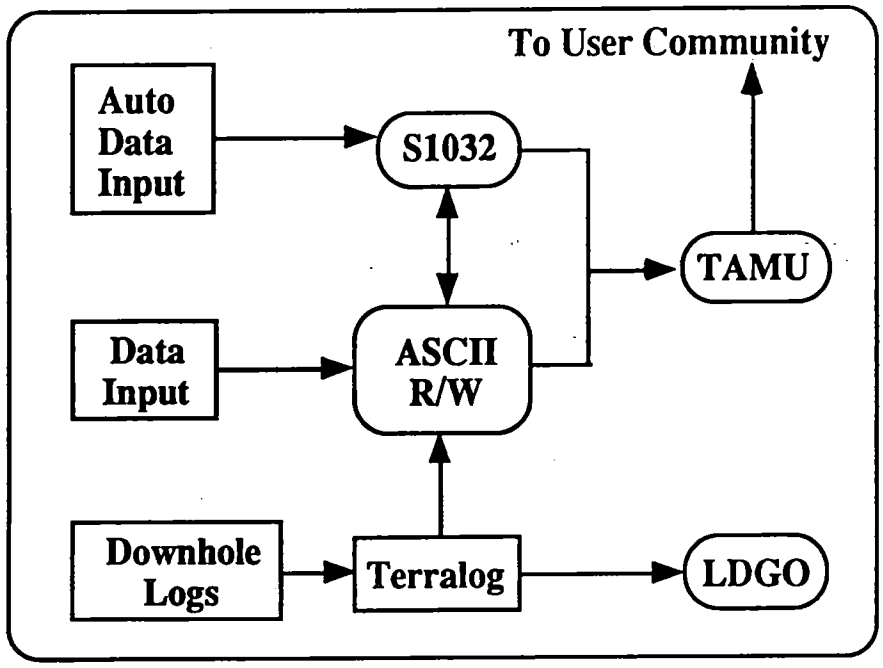
Software priority list:

1. Core data interpolation/integration software
2. Interpolation software for core-log data
3. Depth conversion software for SCM
4. Common spreadsheets

VIII Joint IHP/SMP Meeting

IHP/SMP agreed that the current shipboard data acquisition and data processing system should be modified to allow for the implementation of core-log data integration. The most important addition to the current process is the ability to manipulate and edit ASCII data files, shown schematically below.

The ASCII files should be archived for future user availability. These files should be the responsibility of the shipboard scientific party and "final" versions of these files should be made available as a "data base" for user access. Also, specific tasks must be performed to implement core-log data integration. Therefore, ***IHP and SMP (91-5) recommend addition of a second seagoing computer system manager and one person-year for development of software tools*** (see software priority list items #1 and #2).



The panels discussed the proposed new format for barrel sheets and agreed that all data except core photos and graphic lithologies should be plotted with respect to *reference depth*. The panels discussed SMP's proposal to consistently use SI units in the program. There was no objection to this proposal, however, SMP is still reviewing potential impact of this change on each laboratory.

IX Technical Staff/Lab Equipment Priorities

SMP reviewed and revised the equipment priority list based on discussions during the meeting as follows:

1. Rock Eval (SMP/PPSP recommendation)
2. Natural gamma for MST (Joint DMP/SMP recommendation)
3. Core/log data integration workstation (SMP recommendation)
4. MacII (or PC w/ Windows) for PP and Paleomag labs (SMP and Joint DMP/SMP)
5. Automated carbonate bomb system (SMP recommendation)
6. Xerox for whole core hardrock imaging (SMP recommendation)
7. Magnetometer (ODP/TAMU recommendation)

SMP considered the continuing pressure on scientists to do more and more work shipboard and the problems that are caused by the static level of technical support. It was the view of SMP that deferring work to post-cruise laboratories would not provide a solution to this problem. Post cruise scientists would have great difficulty in finding enough equivalent time and funding to do the deferred work and the result would be an overall reduction in the scientific productivity of the program. The majority of work now performed by the

technical support staff are the time-critical (i.e. essential) shipboard measurements; thus reducing the total scientific workload by decreasing the available equipment does not constitute an option. Based on these considerations and the previous technical staff evaluation, SMP does **not** modify its recommendation made at the fourth meeting (and presented at the PCOM annual meeting) for increasing the technical staff.

X Other Business

Panel Membership

IHP stole one of our superb panel members, Ian Gibson, and recommended him for chair of their panel. Consequently, ***SMP recommends to PCOM the nomination of an individual to replace Ian (91-6).*** The nomination is a person who has an extensive amount of experience in the development of measurement standards and in data/computing methods. This individuals CV will be forwarded to the PCOM chair. Ian Gibson was the SMP liaison to IHP. The panel nominates Adrian Richards as the new SMP liaison to IHP.

Next Meetings

The next meeting will be requested to be held jointly with DMP in Halifax as follows:

Tuesday, 15 October.....SMP meeting and DMP meeting (separate)
Wednesday, 16 October...SMP meeting and DMP meeting (separate)
Thursday, 17 October.....Joint SMP/DMP meeting
Friday, 18 October.....Technical presentations

The proposed location of the spring meeting of SMP is Honolulu to coincide with a RESOLUTION port call, 20-22 March, 1992.

United States Department of the Interior
GEOLOGICAL SURVEY
BOX 25046 M.S. 940
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

Office of Energy and Marine Geology
Branch of Petroleum Geology

May 28, 1991

Memorandum

To: James Austin, Chairman, JOI-PCOM

From: Mahlon M. Ball, Chairman, JOI-PPSP MMBall

Subject: PPSP meeting of 5/14-15/91

This meeting was held in a conference room of the Ocean Drilling Program, College Station, Texas.

Attendance:

Yutaka Aoki, JOI-PPSP
Mahlon Ball, JOI-PPSP
George Claypool, JOI-PPSP
Lucio Deluchi, JOI-PPSP
Claude Delas, JOI-PPSP
Mimi Fortier, JOI-PPSP
Lou Garrison, JOI-PPSP
Art Green, JOI-PPSP
David MacKenzie, JOI-PPSP

Glen Foss, TAMU-ODP
Brad Julson, TAMU-ODP
Dan Rendelauber, TAMU-ODP
Mike Storm, TAMU-ODP
Jamie Allen, TAMU-ODP

Ralph Moberly, JOI-PCOM
Steve Lewis, JOI-SSP, PPSP Liaison and Leg 141 Chief Scientist

Kevin Burke, ODP Safety Panel
Thomas Thompson, ODP Safety Panel
Henk Vories, ODP Safety Panel
Fred Lepine, Canadian Oil and Gas Lands Admin.

Carl Brenner, LDGO, JOI Data Bank
Henry Dick, Chief Sci. Leg 140
Jorg Erzinger, Chief Sci. Leg 140
Rody Batiza, Chief Sci. Leg 142

Mahlon Ball opened the meeting by requesting self introductions from and circulating a signature list to attendees.

Henry Dick and Jorg Erzinger led a discussion of the regional geology and proposed sites for Leg 140: Hess Deep and re-entry of 504B. The re-entry site was previously approved by the safety panels and doesn't require additional approval. The Hess Deep sites are sediment free and pose no apparent hydrocarbon, high temperature, or hydrogen sulfide hazards. These

five sites were approved, as proposed, to penetration depths of 500 m sub-bottom:

HD-1: 2°15.7'N; 101°33'W; 4500 m water depth.
HD-2: 2°15.2'N; 101°33'W; 5000 m water depth.
HD-3: 2°18'N; 101°31.6'W; 3075 m water depth.
HD-4: 2°16.8'N; 101°26.6'W; 4100 m water depth.
HD-5: 2°22.1'N; 101°16.8'W; 1650 m water depth.

Tim Francis reviewed drilling results for Legs 133, Northeast Australian Margin; 134, Vanutu; 135, Tonga; 136, Ocean bottom seismograph, South Hawaii; 137, 504B cleanout; and 138, eastern Pacific Neogene.

Ralph Moberly reviewed PCOM activities bearing on safety panel operations. The major news from PCOM was the recent emplacement of the USSR in the 20-nation ODP partnership.

Steve Lewis led a discussion of the regional geology of Leg 141: Chile Triple Junction. As emphasized by David Robert's letter of 5/9/91 and reiterated in Lewis' presentation to JOI-PPSP and ODP, the Chile Triple Junction (CTJ) is an area of high geothermal gradients with sufficient sediment thicknesses to have thermogenic oil and gas present. Furthermore, the CTJ is a region of widespread occurrences of bottom simulating reflections (BSRs) indicating presence of gas hydrates, perhaps overlying some quantity of free gas. CTJ drilling will be the first occasion for safety panel approval of drilling through BSRs.

With these facts in mind, the safety panel proceeded with a site-by-site scrutinization of Lewis' proposed drilling locations. Regarding the transect along seismic line 745 in the collision zone, all three sites are loci of BSRs and were moved to avoid highs on BSRs and deeper, potentially trapping configurations. Furthermore, an order of drilling was specified so that the deepest, safest site would be drilled first and the shallowest and potentially most hazardous site last with the understanding that if free gas, in dangerous quantities, is encountered in an earlier drilled site, drilling is to be suspended on this transect. The approved sites in their specified drilling order are as follows:

SC-3 Approved to basement at CDP 1075 on line 745 in 2850 m water depth.
SC-2 Approved to a sub-bottom penetration of 900 m at CDP 1375 on line 745 in 2200 m water depth.
SC-1 Approved to a sub-bottom penetration of 1200 m of CDP 1620 on line 745 in 1700 m water depth.

Two additional sites; more or less analogous to SC-3 near the toe of the landward trench slope, were approved:

SC-4 Approved to a sub-bottom penetration of 765 m and moved to CDP 1520 on line 750 in 2250 m water depth.
SC-5 Approved to a sub-bottom penetration of 700 m at CDP 900 on line 751 in 2475 m water depth.

A sixth site was approved on the offshore extension of the Taitoa Ridge. This ridge is composed of ophiolitic material onshore and its seismic and magnetic character offshore indicate that it is either ophiolitic or oceanic crust:

SC-6 Approved to a sub-bottom penetration of 875 m in the range of CDP 600-350 on line 762 in water depths ranging from 1280-1500 m.

Regarding the drilling transect along seismic line 769 in the post-collision zone, the approved sites in their specified drilling order are as follows:

SC-7 Approved to a sub-bottom penetration of 700 m at CDP 830 on line 769 in 1875 m water depth.

SC-7' Approved to a sub-bottom penetration of 1200 m at CDP 1000 on line 769 in 2100 m water depth.

SC-9' Approved to a sub-bottom penetration of 550 m at CDP 1855 on line 769 in 1725 m water depth.

SC-9 Approved to a sub-bottom penetration of 400 m at CDP 1630 on line 769 in 1200 m water depth. This site is the only one on this trasect with a BSR. The proposed location of this site is low on the BSR.

SC-8 Approved to a sub-bottom penetration of 1200 m and moved to CDP 1250 on line 769 in 2250 m water depth. This site was moved to get farther downdip on a wedge of sediments that possibly contains updip pinchouts. As pointed out by Thomas Thompson, updip pinchouts can still occur in the site's approved, structurally lower, location. The panel feels that at the new structurally lower location, this site is reasonably safe if drilled last, as specified.

The safety panel feels that a hydrocarbon chemist must be included in the scientific party for Leg 141. George Claypool, JOI-PPSP, will attend the Leg 141 pre-cruise meeting to provide advice on hydrocarbon detection procedures and specific clathrate work elements planned for the CTJ.

Rodey Batiza led a discussion of the regional geology and proposed drilling sites for Leg 142, East Pacific Rise Crest near 9°30'N. Two holes to penetrations of 100 to 200 m are planned for this leg. At the shallow drilling depths, combinations of presence of H_2S and high temperature fluids are not deemed to be likely problems. These potential hazards will, however, be reassessed in light of H_2S and high temperature monitoring on Leg 139, sedimented ridges of Juan de Fuca and Escanaba Trough. PPSP approved these sites as follows:

EPR-1 Approved to a sub-bottom penetration of 200 m at 9°30.2'N and 104°15.1'W in 2600 m water depth.

EPR-2 Approved to a sub-bottom penetration of 200 m at 9°30.2'N and 104°14.5'W in 2600 m water depth.

It is understood that H_2S and temperature precautions at these sites will be conditioned by the drilling experience on Leg 139.

The safety panel conducted a final review of Leg 139: Sedimented Ridges I, Juan de Fuca and Escanaba Trough. Preparations for this leg have been particularly onerous as a result of the need to protect against H_2S and high temperature hazards. The development of adequate H_2S contingency plans required considerable time following the safety panels' site-by-site review of the Leg 139 drilling proposal. Additional multi-channel seismic data were obtained and drilling order, depths, and locations underwent changes as a result of these new data. The safety panel unanimously approved changes in drilling order, depths, and locations for Leg 139 as included in this leg's scientific prospectus. The approved sites and penetration depths are as follows:

- MV-1 Approved to 120 m penetration plus basement to bit destruction at 48°27.40'N and 128°42.50'W in 2460 m water depth.
- MV-2 Approved to 120 m penetration plus basement to bit destruction at 46°26.96'N and 128°40.86'W in 2460 m water depth.
- MV-3 Approved to a penetration of 470 m plus basement to bit destruction at 48°26.62'N and 128°42.65'W in 2460 m water depth.
- MV-4 Approved to a penetration range of 650 to 1230 m plus basement to bit destruction at 48°27.45'N and 128°46.28'W in 2460 m water depth.
- MV-5 Approved to a penetration of 260 m plus basement to bit destruction at 48°27.15'N and 128°41.58'W in 2460 m water depth.
- MV-6 Approved to a penetration of 400 m plus basement to bit destruction at 48°27.00'N and 128°40.43'W in 2460 m water depth.
- MV-7 Approved to a penetration of 140 m plus basement to bit destruction at 48°26.61'N and 128°38.55'W in 2460 m water depth.
- MV-8 Approved to a penetration of 500 m plus into an inferred sill to bit destruction at 48°30.00'N and 128°45.20'W in 2460 m water depth.

The specified order of drilling is MV-7, MV-2, MV-3 (MV-4 alternate), MV-1, MV-6 (MV-5 alternate), and MV-8.

If temperatures exceeding 350° C are encountered, drilling is to be terminated.

As pointed out by Claude Delas, the decision of the safety panels to approve changes to Leg 139 drilling plans after formal site-by-site safety review was a result of the necessity of allowing an unusual time separation for development of H_2S and high temperature contingency plans before initiation of Leg 139. This exception to normal procedures does not establish a precedent for future safety reviews. The safety panels approved Marta Von Breymann's rendition of updated hydrocarbon detection guidelines and agreed to inclusion in the updated safety guidelines of a synopsis of H_2S and high temperature contingency plans authored by Steve Howard, ODP. Ball and David Mackenzie will do the initial editing of these changes and additions and they will be submitted to all safety panel members for correction and addition. Our aim is to complete this upgrading and submission to JOI of guidelines by August 1991. It was agreed that the next meeting of PPSP will be at Scripps, 10/24-25/91 in conjunction with the San Diego meetings of GSA.

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Lamont-Doherty Geological Observatory
New York

4-6 June 1991

EXECUTIVE SUMMARY

1. This was the second of three meetings of the JOIDES Downhole Measurements Panel (DMP) planned for 1991. A principal component of the meeting was the joint session with SGPP on 5 June 1991. Other important features were a briefing session with LDGO BRG on log data acquisition, processing and distribution, and the need to identify ahead of the OPCOM meeting on 7 June 1991 those technological developments that the Panel would like to see proposed.

2. Panel considered that, because of the coupled nature of drilling and logging programmes, the Offset Drilling Working Group should include someone with downhole measurements expertise.

3. Panel congratulates the ODP Logging Contractor, the Borehole Research Group of the Lamont-Doherty Geological Observatory, on their fruitful efforts which have brought about a highly favourable recognition of the value of log data within the ODP community.

4. Pursuant upon DMP Recommendation 91/2, the Geoprops Probe should be tested at sea at least two legs ahead of its proposed scientific deployment as Cascadia. Chile Triple Junction affords the only suitable opportunity to conduct a sea trial in an unstressed hole. Time should be made available to test the Geoprops Probe with the Motor-driven Core Barrel during Leg 141.

[DMP Recommendation 91/10: to PCOM, ODP/TAMU, Geoprops Proponent and Leg 141 Co-Chiefs]

5. Third-party downhole tools should be designed with a mass of at least 50 kg if free and 100 kg if constrained by bow-spring centralizers or otherwise, provided that the centralizers still pass freely through the 4-inch diameter drillpipe.

[DMP Recommendation 91/11: to LDGO BRG]

6. Panel encourages the design and development of a universal weighting system for ODP downhole tools to allow the requirements of DMP Recommendation 91/11 to be fully met. The weighting system should be kept on board ship at all times.

7. The joint DMP/SGPP meeting noted that many future ODP legs require high- or low-temperature pore-fluid samples. The technology must be developed to allow this to happen. Substantial engineering input is needed in a brainstorming session as a prelude to an engineering feasibility study of the best option(s). The JOIDES working group meeting on In-Situ Pore-Fluid Sampling, scheduled for 23 August 1991 in Houston, would address the first

stage. It was anticipated that funds would be made available for the engineering feasibility study in early FY92. It is, of course, possible that what we are trying to do cannot be done. However, the effort should be driven by the scientific goals which remain a top ODP priority.

8. All proposed re-entry holes should have casing programmes designed to facilitate wireline re-entry in the long term.

[DMP Recommendation 91/12: to PCOM]

9. The North Atlantic provides a unique opportunity for long-term downhole-measurement science through wireline re-entry. The following re-entry holes, which have not been cased to basement and which are known to have deteriorated, should be cased to basement when the drillship returns to the North Atlantic. The holes in question are 333A, 417A and 418A.

[DMP Recommendation 91/13: to PCOM]

10. Panel encourages the ODP community to prepare an add-on science proposal for the restoration of existing re-entry holes that are known to be at risk in the North Atlantic.

11. Panel wishes to see an increase in the number of re-entry holes drilled by ODP as an enhancement of the long-term scientific legacy of the Programme.

12. In view of the temperature limitations (260°C) imposed by the Vector teflon cable, the logging contractor is urged to continue to seek urgently a high-temperature memory-tool measurement capability for deployment on Leg 139.

[DMP Recommendation 91/14: to LDGO BRG]

13. Panel encourages the initiative to establish a high-temperature test hole for downhole tools on the island of Oahu.

14. In the event of Hess Deep being drilled during Leg 140, the logging programme in each logged hole should be similar to that already carried out at 504B. The (digital) dual laterolog should be run in each logged hole during Leg 140, regardless of which leg option is taken.

[DMP Recommendation 91/15: to PCOM and LDGO BRG]

15. Panel strongly supports the running of the Japanese three-component borehole magnetometer in selected basement holes during the Atolls and Guyots legs.

16. Panel reviewed five technological developments that might be appropriate fur funding through the OPCOM initiative and that would not otherwise be progressed in the short term. These were voted into the following priority order.

(1) High-temperature resistivity tool with fluid resistivity and temperature capability.

(2) Fluid sampling capability through the wireline sampler or alternative.

(3) MAXIS 500 data acquisition/analysis system (accelerated introduction to ODP).

(4) Sediment susceptibility tool.

(5) High-resolution geochemical tool.

17. The next meeting of the JOIDES Downhole Measurements Panel is scheduled to take place in Halifax, Nova Scotia, Canada during the period 15-17 October 1991. The meeting will encompass a joint one-day session with SMP to continue the drive towards the integration of core and log data. On Friday 18 October there will be a joint technical workshop for the East Canada community. Kate Moran will host.

PAUL F WORTHINGTON
12 July 1991

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Lamont-Doherty Geological Observatory
New York

4-6 June 1991

MINUTES

Present

Chairman:		P F Worthington (UK)
Members:		J Gieskes (USA)
		M Hutchinson (USA)
		D Karig (USA)
		R Morin (USA)
		R Wilkens (USA)
		M Williams (USA)
		H Crocker (Canada/Australia)
		H Draxler (Germany)
		J-P Foucher (France)
		O Stephansson (ESF)
		M Yamano (Japan)
Liaisons:		K Becker (PCOM)
		A Fisher (ODP/TAMU)
		X Golovchenko (LDGO)
		J McClain (LITHP)
	****	J Mienert (SGPP)
Guests:		R N Anderson (LDGO)
	*	C Broglia (LDGO)
	*	J Grau (Schlumberger)
		B Harding (ODP/TAMU)
		R Jarrard (LDGO)
		M Langseth (LDGO)
	**	R Madden (Madden Systems, Inc)
	*	E Pratson (LDGO)
	***	J Schweitzer (Schlumberger)
		E Scholz (LDGO)
Apologies		P Lysne (USA)
		C Sondergeld (USA)

* attendance for agenda item 8 only.
** attendance for agenda items 8-15 only.
*** attendance for agenda items 8-10 only.
**** attendance for agenda items 9-15 only

NB Agenda items 9-15 were conducted in joint session with the JOIDES Sedimentary and Geochemical Processes Panel : the minutes pertaining to these items have been agreed jointly.

1. Welcome and Introductory Remarks

The meeting was called to order at 0900 hours on Tuesday 4 June 1991. The Chairman welcomed members, liaisons and guests to the second DMP meeting of the year. Draxler was attending for the first time as the official FRG representative. A principal component of the meeting was the joint session with SGPP on 5 June 1991. Other important features were a briefing session with LDGO BRG on log data acquisition, processing and distribution, and the need to identify ahead of the OPCOM meeting on 7 June 1991 those technological developments that the Panel would like to see proposed.

Review of Agenda and Revisions

Wilkens will report on the Annual Meeting of Co-chiefs under new Agenda Item 4(v).

Agenda item 6(vi) will be expanded to include a discussion of minimum tool weights and sinker bars.

Item 6(vii) on borehole seals will be incorporated within item 11.

Item 22 will be concerned with the formulation of the Panel's input to the JOIDES OPCOM meeting on 7 June 1991.

Panel will reconvene at 0830 hours on 5 June.

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

2. Minutes of Previous DMP Meeting, College Station, Texas, 6-8 February 1991

One modification was proposed : page 18, principal paragraph, line 7 : read 2000 for 200.

With this modification the minutes were adopted as a fair record.

Matters Arising

(i) Item 4 - Oahu Test Hole

LDGO liaison reported that the long-spaced sonic tool (with digital cartridge) was run in the Oahu test hole.

(ii) Item 14 - High-temperature Logging Cable

Morin reported that the USGS high-temperature TFE logging cable cannot be made available to ODP. It had originally been suggested that ODP might purchase from USGS an appropriate length to permit high-temperature logging by splicing. This is no longer an option for offshore

use. However, the cable is currently being used on land in the Hawaii geothermal study. It could be used for testing new ODP tools in these geothermal holes, which currently range from 150-300°C and are slim holes at the upper end of this temperature range.

3. PCOM Report

Becker reported on the Spring meeting of PCOM held at the University of Rhode Island on 23-25 April 1991. Three DMP Recommendations had been put forward for discussion by PCOM.

Rec. No.	Description	PCOM Response
91/1	Specialist working group on downhole fluid sampling	Accepted
91/7	Logging of Hole 801C	Being progressed through proposal for add-on science
91/9	Future engineering leg for borehole stability studies	Not discussed

Other DMP Recommendations were made implicitly through PCOM to other parts of the ODP network.

PCOM set the direction of the drilling vessel for the next four years as follows:

1) In the remainder of FY 91, confirmed as in the current programme plan.

2) In FY 92, and beyond to January 1993, confirmed as in the programme plan approved at its November 1990 meeting in Kailua-Kona, Hawaii, through Leg 147, Engineering EPR (in the event that DCS Phase III is not ready, Hess Deep will be substituted), ending in Panama on or about 21 January 1993. The programme plan may include up to 10 days of supplemental science as moved at the November 1990 meeting.

3) Until April 1994, in the North Atlantic. Fiscal Year 1993 programme to be finalized in November 1991 at the Annual Meeting of PCOM with Panel Chairs.

4) In April 1994 through April 1995 in the general direction of highly ranked proposals in the Atlantic Ocean and adjacent seas and the Pacific.

5) PCOM's long-range commitment to engineering development in support of highly ranked thematic objectives must be considered in planning specific cruise tracks.

PCOM re-affirmed its stand that at its Spring 1992 meeting, and at subsequent meetings, it will evaluate again the state of panel recommendations, technological developments, and the overall state of the Ocean Drilling Program, and again set the general direction of the drilling vessel for the subsequent four years, with a relatively firm early track and a relatively flexible later direction.

PCOM prioritized engineering development as follows:

1) Improvement and development of the Diamond Coring System (DCS)

2) Improvement and development of the XCB Coring System

After these major priorities PCOM believes that the development should respond to the needs of scheduled legs. This implies that the next priorities are:

3) Cork/PCS/High temperature preparations, for Leg 139.

4) Orientation needs (hard rock orientation, sonic core monitor, electronic multishot), for Leg 141.

5) Vibra Percussion Corer, for scheduled 1992 SGPP objectives.

6) Motor-driven Core Barrel, for the use of GEOPROPS in the Cascadia drilling.

Each of these development activities should be re-evaluated after testing on the appropriate leg(s). Other active development efforts should continue on an as-possible basis.. If there are short-term perturbations of the schedule, PCOM assumes that the engineering development will respond to the schedule. PCOM expects reports on the development schedule in the future so that the priorities can be re-evaluated.

PCOM established an Offset Drilling Working Group to be charged with:

a) establishing and setting priorities for scientific objectives and a drilling strategy of a programme for drilling offset sections of oceanic crust and upper mantle;

b) identifying target areas where specific objectives can be addressed;

c) identifying other survey information necessary to establish the geological context of an offset drilling programme; and

d) identifying the technological requirements to implement the strategy.

DMP Consensus

Because of the coupled nature of drilling and logging programmes, the Offset Drilling Working Group should include someone with downhole measurements expertise.

PCOM recommended that the highest priority for downhole tool acquisition or development be a sensitive downhole magnetic susceptibility tool, ideally one that can be incorporated into each tool string. In the interim, or alternatively, existing susceptibility tools such as the French magnetometers should be used on Leg 141 and subsequent legs to enhance core-log correlation.

PCOM has established an Opportunity Committee (OPCOM) which is to meet for the first time on 7 June 1991 in Washington DC. The brief is to advise on how an additional $2.1 million recently made available to ODP should be spent in FY 92 and perhaps beyond. The additional funds are intended for technology that will allow the scientific goals of the ODP Long Range Plan to be achieved. (See Item 22)

4. Liaison Reports

(i) Lithosphere Panel

McClain reported on the LITHP meeting held in La Jolla on 14-16 March 1991.

LITHP endorsed DMP Recommendation 91/1 to convene a working group to address the issue of downhole fluid sampling. LITHP were especially concerned with high-temperature capabilities. The fluid sampling question was seen as extremely important.

The top four programmes ranked by LITHP in their consideration of proposals were as follows.

Rank	Programme/Theme	Area
1	Offset drilling: Layer 2/3, etc.	Hess Deep
2	Hydrothermal processes at slow spreading ridge	TAG
3	Axial crustal drilling-- EPR II	EPR, 9°30'N
4	Volcanic rifted margins	N. Atlantic

(ii) Shipboard Measurements Panel

The Chairman had attended the March meeting of SMP as liaison from DMP. The actual liaison is Sondergeld, who had been unavailable and whom SMP had requested replace for the time being the previous liaison, Gieskes, because of a shift in SMP's primary interests. The Chairman summarized the key points of the SMP meeting, mostly concerned with the computerization and interactive display of core data, and tabled a more detailed written report (Annexure I).

(iii) Sedimentary and Geochemical Processes Panel

The Chairman had attended the March meeting of SGPP to present a brief overview of the logging characteristics of gas hydrates. Gas hydrates had been the featured subject of a one-day working group meeting run as part of the SGPP meeting. This matter would be discussed more fully under Item 10 and therefore the Chairman gave only a short verbal account but tabled a more detailed written report (Annexure II).

The remainder of the SGPP meeting had principally been concerned with the ranking of proposals. Mienert tabled a list of rankings. The top four were as follows.

Rank	Theme or Area
1	Gas Hydrate
2	Mediterranean, sapropels
3	Sedimented ridges II
4	New Jersey margin

(iv) KTB

Draxler reported that the main hole of diameter 17.5 inches had reached a depth of 3002 m. Logging is being carried out over this interval after which 16-inch casing will be emplaced to total depth. The programme is behind schedule because of learning how to use the vertical drilling systems. The logging programme included both the Formation Microscanner (FMS) and the new Formation Micro-imager (FMI), a new version of the four-arm FMS with 48 electrodes per arm, 24 on the pad itself and 24 on an openable flap adjacent to the pad. There are therefore 192 electrodes in all. The electrodes are buttons of diameter 5 mm. The FMI buttons are smaller and closer together (by a few mm) than those of the FMS. Resolution is therefore sharper. The size of pads is unchanged but the FMI covers slightly more of the circumference due to electrode design differences. The focusing system is the same as for the slim FMS used by ODP. The FMI needs the MAXIS 500 data acquisition/processing system and has a slower logging speed (4-5 m per minute) than does the FMS. Schlumberger have three FMI prototypes located in Paris, Alaska and Asia. KTB acquired the tool for three logging runs.

KTB has recently organized itself into four working groups (there were previously eight). As a consequence of re-unification, a new Lithosphere Research Institute has recently been inaugurated in Potsdam. It is not yet known how this will affect KTB.

(v) Annual Co-chiefs Review

Wilkens reported on the 1991 review meeting of Co-chiefs. The meeting was very supportive of logging and made two requests, that logging data be available earlier on board ship and that more well-qualified logging scientists be actively sought for future legs. The reasons for this strong support were threefold : very little tool down-time, the answering of key scientific questions using log data, and the education of the community.

DMP Consensus

Panel congratulates the ODP Logging Contractor, the Borehole Research Group of the Lamont-Doherty Geological Observatory, on their fruitful efforts which have brought about a highly favourable recognition of the value of log data within the ODP community.

5. Reports of National Representatives

(i) United Kingdom

The Chairman reported that a one-day meeting featuring the scientific results, technological achievements and future direction of ODP had been held in London on 2 May 1991. The meeting, which had highlighted Britain's role in ODP, had been extremely successful and had contributed to a very positive climate within the community.

The Camborne School of Mines had expressed interest in supporting ODP through their geothermal logging expertise and discussions were currently in progress to see how an association might be developed.

(ii) France

Foucher reported that a French ODP day was planned for 5 June 1991. This would be similar to that recently held in the UK.

A principal technical activity was downhole sediment magnetometry. The two high-magnetic-resolution tools, NMRT and SUMT, had been run in more than 20 holes in Europe and Indonesia. The data obtained on Leg 134 are currently being interpreted. A new susceptibility tool with a much sharper vertical resolution (10-20 cm) is being proposed to ODP: the existing tool has a 1 m vertical resolution which can be processed to 50 cm. The approach would be to modify a tool that is already available in the mining industry.

Post-drilling wireline re-entry had been successfully achieved in November 1990 through the DIANAUT re-entry experiment using NAUTILE and NADIA (see Item 16). There is some concern about sealed boreholes, which cannot be re-entered. There is no conflict but the possibility exists of scientific competition. The SISMOBS downhole deployment of broad-band seismometers has been deferred until 1992.

(iii) Japan

Yamano reported on a planned diving programme using the new Japanese submersible. One dive will be dedicated to the ONDO system if weather permits. The aim is to recover data through acoustic transmission between the submersible and the ONDO system. The deployment of seismometers in the Japan Sea has been followed by one data recovery but there is no definite programme for the next data recovery. The resistivity experiments in the Japan Sea will be reported in the Part B volume for Leg 128.

(iv) ESF

Stephansson reported on an ESF science committee meeting held in Stockholm in May 1991. There is a strong interest in ODP now that the ship is returning to the Atlantic. The ESF ODP steering committee meets in mid-June to discuss involvement in Phase 2. Prospects are good. A report is now available on the deep drilling programme in Sweden.

(v) Canada/Australia

Crocker reported that the Australian ODP community awaits a ministerial decision on renewal later this year. The BMR involvement in Leg 133 and the promotional use of the Townsville port call will hopefully augur well for a positive outcome. Canada will be building promotional activity around the September port call in Victoria, BC.

The Australian ODP secretariat is moving in June 1992, possibly to Sydney. Two long-range projects are proposed for the Pacific, the subduction zone off Tasmania and the Northern Australian margin.

(vi) Germany

Draxler reported that a two-day ODP scientific meeting held in March 1991 attracted 140 attendees. At this meeting, membership of ODP Phase 2 was proposed. There were 70 presentations but only one report on logging, the results of BHTV surveys on Leg 135. There is

a perceived shortfall in general scientific knowledge about logging : a big drive is needed to raise awareness of the potential benefits.

The digital BHTV was mechanically damaged when returned for repair to DMT (WBK). Anderson commented that the damage had occurred in transit : it seems that the tool, which was transported in a PVC tube, had been damaged at either New York or Frankfurt airport. The tool was repaired and sent out for Leg 137 where it still showed problems. The tool was returned to DMT once again and is due to be delivered to the ship prior to Leg 139.

The next German ODP community meeting is scheduled for Hamburg in March 1992. A KTB/ODP meeting on high-temperature logging will take place in Hannover on 24-25 July 1991.

6. Tool Monitor Reports

(i) Geoprops Probe

Karig reported that his proposal to NSF for additional funds had been accepted and that these would allow further testing of the tool together with the preparation of a manual and the acquisition of spare parts. A bench test is scheduled for the end of June at TAM, Inc. This test should be used not merely to ascertain that the slug valve problem (believed to have been caused by a faulty 'O' ring) has been solved, but also to calibrate the permeability vs pressure decay curve. The bench test will take place in a hole the size of a Motor-driven Core Barrel (MDCB) hole. Beyond this, further land testing is unlikely to answer any further questions. A test is needed at sea. ODP will allow a technician to be trained in Geoprops operation/maintenance at TAM, Inc.

The first scientific deployment of the Geoprops Probe is scheduled for Cascadia (Leg 146). The shipboard test should be carried out at least two legs prior to Cascadia. Furthermore, this test will have to be dovetailed with deployment of the MDCB. Chile Triple Junction (Leg 141) offers a sufficiently deep hole which is unstressed and therefore suggests straightforward hole conditions.

DMP Recommendation 91/10

"Pursuant upon DMP Recommendation 91/2, the Geoprops Probe should be tested at sea at least two legs ahead of its proposed scientific deployment at Cascadia. Chile Triple Junction affords the only suitable opportunity to conduct a sea trial in an unstressed hole. Time should be made available to test the Geoprops Probe with the Motor-driven Core Barrel during Leg 141."

(ii) LAST

Crocker reported on behalf of Moran. LAST II did not go out for testing on Leg 138 because of an intermittent electrical fault detected one week before departure. The problem has now been resolved. It is proposed to test LAST II during the Chile Triple Junction leg.

(iii) BGR Borehole Magnetometer

Draxler reported that a proposal to use the German magnetometer on Leg 140 has been rejected by the German ODP secretariat because the tool is not yet completely tested and

because there was no accompanying application for membership of the scientific party. All activity is temporarily at a standstill.

(iv) French Sediment Magnetometer

Foucher reported on the interpretation of data obtained during Leg 134 (Vanuatu). The system comprises two separate tools to measure total magnetic field (NMRT) and susceptibility (SUMT). Both have shown good repeatability. Processing of NMRT data has allowed corrections for the effects of casing and of underlying volcanic basement rocks. The NMRT data are further processed, in conjunction with a surface magnetometer, to separate the present earth's field from the induced field. The SUMT data indicate the remanent magnetism. Normal magnetisation is indicated by a positive correlation of the induced-field NMRT data and the (remanent) SUMT data. Reversed magnetisation is indicated by a negative correlation. Thus the tool can be used to detect reversals. However, more examples should be investigated and these should be related to magnetostratigraphy. It is feasible to use the tool on Leg 145 (North Pacific Transect), as previously recommended by DMP.

Strong interest was expressed in the sediment magnetometer data from Indonesia. Foucher and Crocker will enquire separately about the nature of the data and the possibility of a Schlumberger representative attending the next DMP meeting to make a presentation.

[ACTION : CROCKER, FOUCHER]

(v) Japanese Borehole Magnetometer

Yamano reported that this tool was originally intended to be a high-temperature tool but that now it is targeted at Atolls and Guyots (Legs 143 and 144). Its inclusion in those legs has been accepted by the Atolls and Guyots DPG only if the tool can be run in conjunction with a Schlumberger tool string, because of time considerations. Therefore the tool is being planned as a memory tool at present. The plan is to finish the mechanical design (by August 1991), construct (December 1991), land test (January 1992) and despatch to Leg 143 (March 1992). Tool specifications are 75 mm diameter, temperature rating of 80°C, and resolution of a few nanoTesla. A Phase-2 tool to be built subsequently will have a 96 mm diameter and be rated to 260°C. This will not be a memory tool and it may need a dedicated logging run.

The Chairman pointed out that the logging contractor should verify that third party tools such as this magnetometer do conform to the published guidelines for their deployment.

(vi) Flowmeter

Morin reported that the first attempt at deployment in hole 504B, during Leg 137, had been an operational success but a scientific failure. The tool measured flow, pressure and temperature, but not under the desired conditions. The new modified go-devil worked well. However, the packer deflated during permeability measurements. This was believed to be due to low friction between the casing and the packer which suggests that the inflation pressure was inadequate. In future two packer elements inflated at c. 750 psi will be used for security. The flowmeter tool is to be deployed again during Leg 139 (Sedimented Ridges I). If successful, a test will be attempted again in 504B during Leg 140. Tool deployment is accommodated within the scientific prospectus for each of these legs.

The flowmeter tool at 55 kg had been of critical mass for downhole deployment. Fisher proposed minimum tool masses of 50 kg if free and 100 kg if the tool contains bow-spring contralizers, etc. This could be achieved by clamping sinker bars to the downhole hardware. Draxler commented that standard weights are available for this purpose but that these should be incorporated within the stiff assembly of the tool : they should not be clamped to the cable.

DMP Recommendation 91/11

"Third-party downhole tools should be designed with a mass of at least 50 kg if free and 100 kg if constrained by bow-spring centralizers or otherwise, provided that the centralizers still pass freely through the 4-inch diameter drillpipe."

DMP Consensus

Panel encourages the design and development of a universal weighting system for ODP downhole tools to allow the requirements of DMP Recommendation 91/11 to be fully met. The weighting system should be kept on board ship at all times.

7. Logging Contractor's Report

Becker, who had been a Co-chief on Leg 137, reported (on behalf of the logging contractor) on the downhole measurements carried out at 504B. The junk in the hole was cleared and the hole was deepened by 60m. Then a core barrel was lost. The need to fish for this barrel impacted on the time available for downhole measurements (of permeability and BHTV).

Temperature and fluid sampling (using both the Los Alamos and the Lawrence Berkeley tools) were carried out before milling. These produced the best set of fluids ever sampled from DSDP/ODP holes. A problem was encountered through the contraction of the fluid sample during recovery of the tool. This creates a differential pressure which the valves must be able to withstand. Some contamination did occur. These samplers will be run again on Leg 139 when hopefully this problem will have been resolved. The temperature measurements revealed that downflow is occurring.

Permeability and BHTV measurements were carried out after the engineering work. The flowmeter/permeability experiment has already been described (see Item 6(vi)). The digital German BHTV ran well in casing but only over 100 m of open hole due to an intermittent fault. The tool was subsequently returned to the factory for repair.

Anderson reported that eleven wells have been logged so far in 1991 during Legs 136-138. The FMS is becoming the most commonly used logging tool because it is being requested in holes less than 400 m depth. Of the special tools, temperature is run most often with BHTV proving popular.

Logs run in the Oahu test hole (Leg 136) showed greater SFL than ILD resistivities in the sediments at the bottom of the hole. It is not known whether this is due to fluid invasion or rock heterogeneity. The FMS was run to aid in seismometer location. This was the first ODP leg to be drilled and to have logging carried out in support of another international project (Ocean Seismographic Network). The logging therefore enjoyed a higher priority than coring on this leg.

Anderson reviewed the tool status for upcoming legs. There are problems with the acquisition of high-temperature logging cable for Leg 139, Sedimented Ridges (see Item 17). The digital dual laterolog will be run during Leg 140 at 504B or Hess Deep. All Schlumberger tools will then be digital. The high-spectral-resolution geochemical logging tool, which uses a germanium crystal, is awaiting release from ARCO. They will advise by July whether the tool can be released to Schlumberger. After this, software would have to be developed so it now seems doubtful that the deadlines (for Leg 140) can be met.

The LDGO budget status is that $ 3.95 million has been approved for FY 92 compared to the $ 4.03 million requested and $ 3.57 million for FY 91. The approved figure includes $ 140 000 for high-temperature tool development, $ 58 500 for computer equipment, and $ 1 919 500 for the Schlumberger subcontract. There are no other high technology provisions : the principal purpose of the budget increase is to allow LDGO to meet the demand for log data. In particular, there is no provision for the installation of the MAXIS 500 log data acquisition and processing facility.

Jarrard reported on the LDGO proposals to be tabled at the inaugural meeting of the JOIDES Opportunity Committee (OPCOM) in Washington DC on 7 June 1991. These were:

High-temperature resistivity tool	($ 255 000 total : already have $140 000 for FY 92 : therefore need $ 115 000)
Wireline packer	($ 250 000)
MAXIS 500	($ 150 000)
High-resolution geochemistry tool	($ 100 000)
Sediment susceptibility tool	
- 0.8 m vertical resolution	($ 200 000)
- 0.45 m vertical resolution	($ 260 000)

The sediment susceptibility tool is the highest priority of PCOM for downhole tool development.

8. Log Data Acquisition, Processing and Distribution

(i) Overview of Data Acquisition and Transfer Onboard Ship

Broglia reported that the output from the Schlumberger Cyber Service Unit (CSU) is threefold: proprietary tape (raw), customer tape (edited), and hardcopy blueprints and films. There is interim shipboard processing of the standard logs (see below for FMS). Terralog is used to change scale and plot the data from the customer tapes. An output file is created in ASCII format and this can be loaded onto a MacIntosh (for graphic display and integration with other data) and into the Appleshare on the VAX system. These data include geochemical "field logs" in the form of relative elemental yields based on a limited set of spectral standards, for initial shipboard interpretation. The sonic tool, at the top of the quad-combo, is no longer centred because other tools in the string have to be run eccentred. This can give rise to cycle skipping and noise. These effects are processed out on board ship. FMS data are processed from the proprietary tape on the Vax Station 3200. FMS processing includes a scale change (from feet below rig floor to metres below sea floor), but there is no depth shift with reference to standard

logs, and there is rarely any merging of different passes. Raster files are created for the Versatec plotter. User plots can be presented either for caliper plus images at 1:6.42 vertical and horizontal scales, which match core photographs, or for caliper plus images plus dips at 1:40 vertical scale and 1:10 horizontal scale. Other scales are sometimes used for specific purposes.

The availability of logging data to the shipboard party is affected by several time constraints. For example, logs are run last, just before the transit to a new site. Data loading on the Masscomp, editing, and transfer to a MacIntosh all take time. FMS data have to be processed.

The current situation is that logs are plotted in real time, during the recording, with a depth reference in ft brf. Standard logs are available for loading onto Masscomp as soon as the data recording is complete and during tool recovery. FMS/dipmeter digital data are available shortly after the FMS logging run. If the FMS processor is available, processing for the first pass of a 200 m hole can be completed in approximately 24 hours.

(ii) Overview of Data Processing Onshore

Broglia reported that logs are depth-shifted onshore using interactive methods. The aim is to refer all data to one reference run through manual peak-to-peak matching or an auto-correlative technique. Usually the gamma ray forms the basis for depth merging because it is recorded on each logging pass. The depth reference run is chosen on the basis of the best overall quality, the longest recorded interval, cable speed, absence of tool sticking problems, and the presence of prominent lithological markers. All log scales are referred to sea floor. Natural gamma spectral logs and sonic waveform logs are processed routinely. Neutron and density log processing is not performed routinely (beyond the automatic corrections for hole size during recording). Porosity logs, primarily density and sonic, are tied back to core to establish the best porosity distribution for input to geochemical log processing.

Pratson reported that onshore processing of the geochemical log data is required to transform the relative elemental yields into oxide weight fractions using a larger set of spectral standards. Data quality is improved by correcting the data for borehole fluids, logging speed and pipe interference. Borehole effects can account for 75% of the spectra compared to only 25% in a typical oilfield situation.

Grau pointed out potential pitfalls in GLT data reduction. Sources of error are both counting statistics and systematic errors. For the NGT, counting statistics introduce an uncertainty that is a function of total gamma counts. For example, with a total gamma response of 100 API, the uncertainties are K = ±0.2%, U = ±0.6 ppm, Th = ±1.1 ppm. An example of a systematic error is that introduced by the presence of potassium in the borehole. Barite in the drilling mud has a big effect on NGT data. For the ACT, the uncertainty is a function of weight per cent Al. For example, 10 wt% Al might be associated with a statistical precision of ±0.2% (ie 10 ± 0.2 wt% Al), and a total uncertainty including that due to environmental corrections, but excluding sticking effects, of ±1.2%. For the GST, absolute elemental concentrations can be in error if an incomplete set of spectral standards is used. For example, ignoring elements such as gadolinium, as is done in the shipboard processing, can cause drastic overestimates in the amount of silicon. Even onshore, we do ignore Ba, Mn, Na and Mg. The last three of these elements do not contribute much to the spectrum. For example, by failing to account for 2% of Na, the Ca concentration will be 1% too high. Similarly, if 13% of Mg is not accounted for, Gd will be 1.2 ppm too high. Closure errors have to be accommodated. The maximum error is

10% and this is distributed equally amongst all the capture elements. The normalisation factor, used in converting (shipboard) relative elemental yields to absolute concentrations, is strongly affected by the formation capture cross section. These effects are greatest in the presence of high porosity and high salinity.

These comments suggest that shipboard geochemical logs can be in error. A key question is whether the benefit of having these logs onboard ship outweighs the potential pitfalls.

Broglia reported on FMS processing onshore. Initially, a depth-shift of both images and dipmeter is made with reference to standard logs. There is an option to merge image data from different passes after additional manual depth shifting. There are also special procedures for contrast enhancement, eg dynamic normalisation. Raster files are created for a Benson plotter.

(iii) Data Outputs Onshore

Broglia reported that processed standard logs (excluding GLT and FMS) are routinely distributed to the shipboard party as composite logs with a metric scale 1:500 approximately 3 - 4 months after the end of a leg. Logs are also available in digital form (tape, MacIntosh/IBM floppy disc). The standard display is included in ODP Proceedings, Initial Reports.

Reprocessed GLT logs in the above formats are available approximately 18 months after the end of a leg. These data are published in ODP Proceedings, Scientific Results.

Reprocessed FMS data are available post-cruise in various formats corresponding to the evolution of ODP technology. At present, images plus caliper are available at a vertical and horizontal scale of 1:6.42, and caliper plus dips plus images are available at scales of 1:40 (vertical) and 1:10 (horizontal), as is the case onboard ship. A microfiche is included in ODP Proceedings, Initial Reports. These plots do not include the gamma ray, the inclusion of which is seen as an area of potential improvement.

(iv) Special Tools

Temperature Tool

Processing is carried out onboard ship using in-house software. Output is digital data (temperature vs time and pressure) in ASCII format.

Multichannel Sonic

Processing is not performed routinely because the tool is not run frequently: software has been developed in house. Outputs are analogue and digital data in LIS or ASCII formats.

Analogue BHTV

Processing is not performed routinely: software has been designed by Stanford University and is installed on a Masscomp. Outputs are a colour graphic display and a black-and-white hard copy.

Digital BHTV

Processing is through SIGMA 2-D software from DMT of FRG available at LDGO BRG and on the ship (from Leg 139 onwards). Software is installed on the VAX. Processing is time-consuming.

A future aim is for BHTV data to be combined with FMS data. We are a long way from that goal, partly because the BHTV is the most unreliable tool in logging. In any case, the digital BHTV software is mainly under third party control. Furthermore, commercial software packages are very expensive. The BHTV provides data that the average scientific users would be unable to handle with their hardware because of the nature and volume of the data: yet, some people do nevertheless request these data.

(v) Data Distribution

Broglia reported that the number of holes logged on ODP Legs 101 - 137 was 114. The number of tool strings run was 267. The number of ODP log data requests has increased greatly since the FMS was introduced. For example, some 170 requests were received during 1990 alone. The greatest user was the USA followed by France, Canada, Japan, UK and Germany. It is now taking two months to respond to a data request. Previously, it was 2 - 3 weeks. Hence the request for additional LDGO BRG staff in the FY 92 budget.

A survey has been undertaken of users to establish their needs. The number contacted was 78: the number of replies was 48 (62.3%). These scientists would like to see the following services improved:

- training for both ODP and JOIDES logging scientists and the shipboard party;
- use of workstations at sea;
- shipboard processing of geochemical data;
- better quality control;
- processing of FMS and BHTV data at sea;
- data transfer by computer (eg E-mail, internet);
- free log analysis software provided along with the data.

The Chairman noted that many of these requests could not be met, partly due to resources and partly because some were impractical. However, there did seem to be a growing interest in log interpretation and it may be that the LDGO logging schools, which have been very successful, should be replaced by longer interpretation schools.

(vi) Resume

The presentations were followed by a demonstration of processing facilities. The Chairman thanked LDGO BRG for providing such a comprehensive overview of the state-of-the-art of ODP log data handling. It was proposed to complement this exposition by visiting the shipboard facilities during the upcoming San Diego port call.

[ACTION:WORTHINGTON]

9. Accuracy of Geochemical Logs

The Chairman described the Geochemical Logging Tool (GLT). This includes an induced gamma spectral tool (GST) which, when run in capture mode, contributes through post-cruise processing eight of the twelve elemental concentrations that the GLT provides. These elements are of primary interest to inorganic geochemists. The GST was actually introduced at the beginning of the 'Eighties when it was run in inelastic mode with an emphasis on organic elements in the form of the infamous carbon/oxygen ratio. The aim had been to evaluate directly the hydrocarbon content of reservoir rocks. The approach did not gain credibility, partly because of the high degree of uncertainty associated with these estimates. Emphasis shifted to capture mode applications thereafter, but carbon/oxygen logs remain a potentially useful service to the oil industry, and they are now benefiting from improved technology.

Anderson reviewed the use of the GLT in ODP. Featured scientific benefits included the recognition and interpretation of the gabbro zone on the Southwest Indian Ridge (Site 735, Leg 118) and establishing the geochemical budget of the Bonin Island Arc through subduction zone studies where core recovery was poor (Site 786, Leg 125). Anderson concluded by noting that the present state-of-the-art in geochemical log applications is to be found at the KTB programme of FRG.

Draxler reported on the geochemical logging programme at the KTB site. The pilot hole (4000 m deep) produced 98% core recovery and this has provided a unique opportunity to check log responses against core. XRD and XRF have been run routinely on core. The GLT data require processing to derive mineralogy from elemental concentrations, using the ELAN package. There are two ELAN processing chains, dry model (no water) and wet model (water). Other logs can be used in conjunction with the GLT to accommodate other minerals that are not usually included in these models. The GLT uses a sodium iodide crystal, which has limited spectral resolution. KTB have also run an advanced tool, the enhanced resolution tool (ERT), with a high-spectral-resolution germanium crystal. This is a cryogenic tool: it could be run for up to 12 hours at pilot-hole temperatures (85°C at 3000 m). Stationary readings had to be taken because of the lower counting efficiency of germanium detectors. The tool was run in delayed activation (INAA) mode and capture (prompt neutron activation analysis) mode. The downhole activation time for the capture-mode readings was about 20 minutes.

Schweitzer compared GLT and ERT spectra and demonstrated the higher spectral resolution achievable with the latter. The ERT allows other minor elements to be studied. Most of these can be inferred from delayed activation mode data. For example, Na can now be measured and procedures for Mg are currently being developed. The carbon/oxygen ratio can be measured with a precision of ±2% but the extraction of carbon remains very difficult. The key question is not "Can we measure more elements?" but rather "Which elements do we need to know and in what range of concentrations?" Then the survey can be planned accordingly. There are two survey procedures that can be used for the ERT. Continuous logging runs have less risk of sticking but might require 20 passes over the same region in order to stack the counts to statistically significant levels. Stationary readings are taken with a greater risk of tool sticking but there is then a need to introduce a "fake" logging speed for processing purposes. In ODP, geochemical logs have been run only in conventional capture and (occasionally) inelastic modes, in which the neutron source and gamma-ray detector are close together. In delayed activity logging the source and detector are physically separated so that a spatial change is used to create a temporal effect.

Several points were raised through discussion. Mg is a key element for SGPP. The minimum Mg concentration required for wireline identification of specific minerals is that which is visible on the GLT log. KTB logs have revealed relatively poor statistics at very low Mg concentrations but it is believed that this situation can be improved. The key question is "Where is it really critical from a geological viewpoint to know whether Mg is present at, say, 0.5% or 1.5%?" Once this question has been answered, a logging programme can be designed.

Elements are apportioned between solids and fluids by trying to exclude elements that are unlikely to occur within the solid rock. Examples are hydrogen and chlorine. The opposite can apply, too, e.g. where Al is present in drilling muds. There is a balance to achieve and the key lies in the integrated use of core and log data.

The Enhanced Resolution Tool (ERT) will allow trace-element concentrations to be determined, e.g. antimony, arsenic, bromine, copper, europium, indium, nickel, scandium. The accuracy will be as good for trace elements as it is for aluminium. The precision is a function of element concentration.

Shipboard geochemical logging data are in the form of relative elemental yields. Oxide data are not available on board ship. The installation of the Schlumberger MAXIS 500, intended to replace eventually the CSU, will lead to absolute elemental concentrations becoming available during the course of a leg.

10. Logging and Log Interpretation in Gas Hydrates

Suess commented that there has been a reversal in ODP with regard to drilling hydrates. Previously the strategy was to avoid them; now it is to drill them. The last SGPP meeting encompassed a workshop on gas hydrates. Hydrates are present on most continental margins and on the Arctic shelf. The current interest has arisen because (i) hydrates are seen as an energy source, (ii) hydrates have an environmental impact through decomposition and thence an accentuation of the greenhouse effect, and (iii) there is scope for integration with other global programmes through an interest in methane budgets.

The SGPP requirements for gas hydrates were described as follows:

- lateral continuity;
- porosity, permeability, velocity;
- composition in terms of C, H, O;
- amount of free gas vs hydrated gas;
- thermal properties, thermal conductivity;
- growth habit, sedimentary fabric, age, direction;
- salinity structure at, above and below the gas hydrate ($CH_4.6H_20$ excludes sea salt during hydrate formation. Where does it go?)

The logging strategy for gas hydrates embraces the following points, some of which are discussed in Annexure II. Casing is usually set at 70-100 m. Most hydrates are deeper than this. The approach is therefore one of open-hole logging. Hydrates can be well characterised by logs and therefore lateral continuity between drill sites can be clearly established from the logging standpoint.

The neutron tool responds to hydrogen and can be calibrated in terms of hydrogen content. This tool will provide a measure of how much hydrate is present provided that the tool response does not "saturate" due to the very high hydrogen concentrations. Conventionally, neutron logs are presented in limestone porosity units because that is the lithology of the primary calibration pits in Houston. However, they can also be presented as count-rate ratios and it might be especially useful to compare thermal (absorption) and epithermal neutron count-rate ratios because the latter will be perturbed by carbon and oxygen due to slowing-down effects. The neutron tool is run with the density tool and they are frequently interpreted as a pair. Resistivity logs will also respond strongly to high hydrate concentrations.

Permeability cannot be measured through logging. Downhole velocity measurements are straightforward.

The geochemical logging tool, run in both inelastic and capture modes, can provide information on C, H and O concentrations. The C/O ratio can be measured more precisely at high porosities. In the hydrate case, we regard the hydrates as part of the porosity within a sedimentary fabric, with a target porosity range of 35-50%. The separate resolution of C and O will require some laboratory measurements.

Gas zones should be identifiable through the neutron-density combination provided that the tool responses are properly calibrated.

Thermal properties might be investigated indirectly using a new tool devised by KTB. This includes a temperature sensor and a heating device; the fluid is heated up and the sensor measures the dissipation of this heat into the formation. If the hydrate layer has a low thermal conductivity, a large perturbation will be observed in the temperature profile.

Logs will only partially contribute to a knowledge of the sedimentary environment in which hydrates occur. The physical characterisation of the locality is important and the key logging tool will be the FMS with its sharp spatial resolution. Again, the integration with core is essential.

Salinity structure can be investigated in several ways. One approach is to interpret the chlorine concentration log from the GLT. Another method might be to run the GST within the GLT string in thermal-decay-time (TDT) mode to obtain a chlorine log. Both of these approaches suffer from large borehole effects. An experiment was suggested to flush seawater out of the borehole, replacing it with freshwater prior to logging. Another approach might be to use the self-potential (SP) log to identify qualitatively changes in pore-fluid salinity. The SP log could be interpreted in conjunction with data from the auxiliary measurement sonde (AMS), which is always run as part of tool strings, and which provides borehole fluid resistivity and borehole temperature logs. Yet another suggestion was to run the borehole gravimeter because of its good lateral investigation characteristics.

The drilling process itself could lead to a change in the physicochemical characteristics of gas hydrates. Logs should be run as soon as possible after drilling. An option is a hole dedicated to gas hydrate studies. Another option is measurement-while-drilling (MWD) although it will be years before an ODP-compatible MWD string is available. Yet again, a push-in tool ahead of the drill bit might avoid drilling damage: this would require knowing the depth of the hydrate layer from site-survey geophysics. For example, the WSTP tool was used in hydrates on DSDP Leg 84. This tool uses a pressure differential which might cause the hydrates to decompose.

The discussion concluded with the observation that the existing logging suite should provide a good deal of useful information about hydrate occurrence and composition. Logging might provide more answers if the tools were recalibrated. DMP should finalise its views on the optimum logging suite for investigating gas hydrates. This suite could be tested during Leg 141 (Chile Triple Junction).

11. Sealed Boreholes

SGPP is interested in sealed boreholes because they prevent contact between borehole waters and the infinite water reservoir above. Unsealed boreholes may collapse more easily. Sealing does not prevent convection in the hole. Sealed holes can be used in three ways:

- free-standing mode with an unequipped head;
- installation of instruments, e.g. seismometers, physical properties, chemical properties, testing of materials, temperature;
- emplacement of tracers for hydrogeological purposes, e.g. NaBr, LiBr, LiCl.

Pressure, temperature and chemistry can be addressed through packer experiments as an alternative, but these would not provide the separation of borehole fluids from the sea. A possibility is to seal different sections of the borehole.

Becker reviewed the status of the ODP instrumented borehole seal. This takes a single sample with the tubing intake near the base of the hole, and would be difficult to modify to take multiple samples at different levels. The seals are scheduled for deployment on Leg 139, Sedimented Ridges I. The objectives are to log temperatures over a long period in order to obtain a reliable downhole temperature within this active geothermal system.

The meeting concluded that the borehole seal initiative had considerable merit and should be progressed. However, there remains the possibility of scientific competition with wireline re-entry.

12. Downhole Measurements at Accretionary Complexes

Fisher reported on downhole measurements successes and failures at the Barbados (Leg 110) and Nankai (Leg 133) accretionary complexes.

(i) Downhole Successes and Failures Leg 110: Barbados Accretionary Complex

WSTP	temperature measurement	generally successful, some failures of electronics, some incomplete deployments
	pressure measurements	some data collected, significance unclear
	water sampling	success less than 50%, possibly due to high clay content of sediments; fluid no different from squeeze-cake fluid
APC tool	temperature measurements	generally successful, occasional operator error, battery failure
logging	three main strings	80 m logs total for leg, borehole instability greatest problem, even with dedicated holes
packer tests	rotatable-packer (first use)	unsuccessful, operator error, poor hole conditions

(ii) Downhole Successes and Failures Leg 131: Nankai Accretionary Complex

WSTP	temperature measurements	generally successful, some failures of electronics, some incomplete deployments
	pressure measurements	unsuccessful, electronics failure, data significance unclear
	water sampling	success less than 20%, very lithified sediments
APC tool	temperature measurements	tool not available, of limited use in lithified sediments
logging	three main strings	160 m logs total for leg, borehole instability greatest problem, even with dedicated holes
packer tests	rotatable-packer (third use)	unsuccessful, poor hole conditions
ONDO	long-term temperature	result unknown, deployment very difficult due to current and poor hole conditions (actually deployed Leg 132)

VSP	seismic profile	largely unsuccessful, current, poor hole conditions (operator error?)
LAST I	in-situ stress	several successful deployments, failures due to operator error, battery failure
Geoprops	in-situ pressure, permeability, temperature	not available
wireline packer	fluid sampling	not used, failed during Leg 133

Jarrard commented on the chances of success of different types of downhole measurement in accretionary complexes, with a particular view towards the upcoming Cascadia leg (146). The major impediment is hole instability. During Legs 110 and 131 fewer than 20% of the downhole measurement goals were met. This figure could exceed 70% at Cascadia, provided that an aggressive logging strategy is adopted, e.g. be prepared to lose a logging tool, a BHA, or maybe more than one of each. A particularly difficult issue is the determination of permeability at Cascadia. Packer measurements have only a 30% success rate in ODP, even in stable holes. Yet, Leg 146 has both packer and flowmeter permeability experiments scheduled. A further problem is downhole fluid sampling. The wireline packer will not be available and it is not clear what the status of the pressure core sampler will be. Permeability and sampling problems are, of course, compounded by hole instability.

Karig pointed out that a primary cause of hole instability is that the material drilled in accretionary complexes is close to stress failure and that the additional stress concentrations introduced by drilling are bound to induce failure. One cannot turn a blind eye to this potential situation at Cascadia. A possibility is to use the side-entry-sub (SES) aggressively and log while pulling pipe. If there is excessive hole closure, it might be desirable to washbore a hole specifically for logging: this would improve logging prospects, but it would still be necessary to use the SES in an aggressive way. The recent DMP subgroup meeting on hole stability proposed heavy muds for formation control. This approach would prove very expensive without return circulation and would degrade the geochemical logs by invalidating the photoelectric factor (Pe) curve (from the lithodensity log) and thence the magnesium correction. There exists rationale to the effect that hole conditions might be better at Cascadia than on Leg 131 (Nankai). This view is partly based on experience with a DSDP hole at Cascadia. However, it has no bearing on a future return to Barbados, where conditions can be expected to be as bad as on Leg 110.

Suess pointed out that two Cascadia sites are dedicated to gas hydrates. It would be desirable to obtain the best possible neutron logs. This would require dividing the quad-combo into two separate tool strings so that the neutron tool can be eccentred by a bow spring. A key question is whether this practice would increase the risk to the tool string. LDGO Liaison responded that if it seems at all feasible to run an eccentred neutron tool, it will be done.

13. Specialised Logging Programmes to Meet SGPP Needs

Mienert reviewed SGPP priority goals. There are four key areas.

(a) Fluid Flow/Gas Hydrates

The environment is one of high pore-water pressure within various lithologies. A potential problem is hole instability. Key questions are permeability, pore-water pressure, fluid conductivity, thermal gradients, gas and fluid composition, salinity structure, and amounts of hydrate and free gas.

(b) Sea Level

The environment is sand and/or coral limestone. Hole instability is again a potential problem. Key issues are the amplitude and frequency of depositional and erosional events.

(c) Palaeocean Chemistry

The environment is one of biogenic material. No specific issues were identified.

(d) Sediment Architecture

The environment is primarily sand, but various lithologies are present. Hole instability is a potential problem. Key issues are physicochemical cyclicity, structure and fracture distribution, magnitude and direction of stress, composition and chemical alteration, hydrogeology, and diagenesis.

The above goals can be distilled into five activity areas, gas, pore water, solids, structure and thermal regime, all providing input to geochronology. High-resolution geochronology requires full logs and complete sampling for interhole correlation and for tying back to seismic data. The required log inputs can be classified into two groups, geochemical and geophysical. In particular, there is sometimes a need to log shallow holes and to obtain good logs in the uppermost sediments. The only logs that can be run to the surface are the nuclear logs: there is data degradation due to casing and pipe. Shear-wave and attenuation log data might assist in relating seismic interpretations to, for example, oxygen isotope stages identified from core fluids. Higher spatial resolution is sought from all logs, except the FMS. For example, should ODP use a thin-bed laterolog such as that used in the coal industry in Germany? The ability to sample sediments after a hole has been drilled would be an advantage. Sidewall wireline drilling tools have a 5-inch diameter and therefore cannot be used through ODP drillpipe. This technology would therefore have to be deployed through wireline re-entry.

In summary, SGPP needs comprehensive geochemical data from logs, e.g. to measure chemical changes in carbonates where core recovery is poor. The elemental data should include Na (to improve the wireline-derived mineralogy) and Mg, and therefore a high-spectral-resolution tool is desirable. The required geophysical logs include FMS, magnetometer, V_p, V_s, porosity and density, and fluid sampling, pore water pressure and permeability through a combination of LAST, Geoprops, etc.

14. Fluid Sampling

Several key issues have to be considered in planning a way forward. These include:

(a) do we wish to sample borehole or pore fluid?

(b) should we drill a smaller diameter dedicated hole for the Wireline Sampler Mark II?

(c) what commercial tools are available?

(d) are there alternative sampling strategies?

We need a minimum of four samples at a given station in order to establish the degree of mixing of pore and borehole fluids and thence to allow chemical extrapolation to the undisturbed pore-fluid state. Other basic requirements are temperature, pressure, fluid conductivity and a turbine flowmeter for permeability.

The principal scientific requirements are to obtain samples of formation fluids in basalt fracture zones, some at high temperatures, and in hard sediments such as cemented carbonate platforms. There is currently no information about pore-water characteristics in these zones. For soft sediments, the APC can be used with pore fluid being obtained by squeezing the sample. This works satisfactorily in all but high-permeability environments. For hard sediments and basement rock, in-situ pore fluid sampling is required.

Scholz reported on the status of the Wireline Sampler, built by TAM, Inc, and overseen by the subcontractor, Stanford University. The tool has an OD of 3.625 inches and the packers have to inflate to 12 - 13 inches. The temperature rating is 100°C and the tool is best suited for RCB holes because the bit is smaller. Although there were problems with packer deflation on Leg 133, the biggest problem is sample contamination because of the way the hydraulic circuit is designed. The tool needs to be redesigned to remove the compromises made during its long evolution. The cost of redesign and of developing two new tools is around $ 350 000. There is nothing in industry to compete with the Wireline Sampler.

Crocker commented on commercial formation testers which offer a doughnut seal with the formation and are therefore unsuitable for fractured rock. Furthermore, good samples are obtainable only where formation permeability exceeds 100 mD. The invading borehole fluids impart exchange ions to the formation and this effect has to be reversed before a pore-fluid sample can be regarded as uncontaminated. This reversal can take several days, an interval which would clearly be unacceptable for ODP purposes.

Draxler developed this theme by stating that even substantial pre-production may not guarantee an uncontaminated sample. The volume of fluid sampled is a critical issue. In the past 100 cc has been identified as desirable, but the geochemical community would now consider even 10 cc to be tolerable. Nevertheless, the large discrepancy between the pre-production volume of fluids (tens to hundreds and even thousands of litres) and the final volume of (hopefully pristine) pore-fluid sample remains a major issue to be resolved.

Possible alternative sampling tools are the Pressure Core Sampler and the OBCAT tool developed in the UK for use with the ODP drillstring packer.

Crocker noted that there is a misperception that a low-technology sample will not satisfy high-technology needs. For example, a possible approach is to use gas lift by compressed air over, say, 1000 m. This would allow sampling with time and an estimate of formation permeability. Furthermore, by sampling a significant formation interval, we would obtain a substantial sample, especially if a zone of high permeability happens to be included. A potential problem is iron contamination from the drillpipe, but this problem might be overcome by using a go-devil with sample bottles to avoid having to pass the sample up the drillpipe. This approach would also work in hot holes. A disadvantage is the depth resolution that the method implies, but sampling could be carried out at intermediate stages of drilling. A vertical resolution of 10 m would be acceptable to the geochemical community. The whole approach needs to be subject to a cost and feasibility study by a drilling engineer.

The meeting noted that many future ODP legs require high- or low-temperature pore-fluid samples. The technology must be developed to allow this to happen. Substantial engineering input is needed in a brainstorming session as a prelude to an engineering feasibility study of the best option(s). The JOIDES working group meeting on In-Situ Pore-Fluid Sampling, scheduled for 23 August 1991 in Houston, would address the first stage. It was anticipated that funds would be made available for the engineering feasibility study in early FY92. It is, of course, possible that what we are trying to do cannot be done. However, the effort should be driven by the scientific goals which remain a top ODP priority.

15. Priorities for Remedial Technology

Alt outlined SGPP technology needs.

(i) Drilling Capabilities and Core Recovery

Drilling and sampling thin sediment cover, e.g. < 50 m on upper ridge flanks.

Deep stable holes, 2.5 - 3.0 km on continental margins.

Hole stability and core recovery in alternating lithologies, sulphides, coarse rubble and loose sand.

Hot holes.

(ii) Sampling and Measurements

Recover sediments, fluids and gases at in-situ temperature and pressure (Geoprops, WSTP, Pressure Core Sampler).

Measure in-situ pore pressures, temperature, pH, dissolved constituents.

Wireline sidewall corer.

Core ahead of the bit for sampling and measurement of undisturbed material.

Sample and measure volatiles.

Borehole seals (e.g. Leg 139).

Passive tracers in sealed holes (e.g. NaBr - Leg 137).

Hot holes: upgrade tools and samplers.

Geochemical logs, leading towards enhanced resolution.

Core logs, e.g. expanded MST.

Wireline sampler.

(iii) Long-term Experiments and Monitoring

Steady-state vs episodic fluid flow (e.g. 504 B - Leg 137).

Temperature, pressure and strain gradients.

Temperature, pressure, chemistry and strain in sealed holes.

(iv) Top Priorities

Fluid sampling capability in indurated sediments and hard rock, for a wide range of in-situ temperatures.

Pressure core sampling capability, eg PCS Phase II with multiple sampling chambers, etc.

16. Wireline Re-entry

Morin reported on the French wireline re-entry operations (DIANAUT) in which logging at three DSDP sites in the North Atlantic has been successfully carried out from the submersible NAUTILE using the logging shuttle NADIA.

The logging shuttle has 1000 m of seven-conductor cable. A logging tool is fixed to the cable. Maximum tool length is 4 m. The tube for housing the tool is of 25 cm diameter so there are no restrictions on tool diameter. Nadia is lowered to the sea bed under free fall with no connection to the surface. Nautile picks up Nadia, places it over the re-entry cone and lowers it into place. Nadia is connected to Nautile which, because it contains the control electronics, becomes a subsea "logging truck". After logging, ballast is released and Nadia floats back to the surface with the tool. Logging tools cannot be changed subsea: each different logging-tool run requires a separate trip with Nadia. In the case of stuck tools, there is a weak link at the cablehead and also a facility for cutting the cable. The cost of operations is about $ 35 000 per day.

The aim was to run five logs; temperature, fluid sampler, flowmeter, BHTV and magnetometer. Each of these required one day for deployment since Nadia could not be recovered at night. Target holes were 333A, 395A and 534A. Scientific objectives were hydrogeological. All five logs were run in 395A but 333A was logged only for temperature. This hole had not been cased to basement and there had been some collapse. The consequences were lost opportunities.

DMP Recommendation 91/12

"All proposed re-entry holes should have casing programmes designed to facilitate wireline re-entry in the long term."

Gieskes pointed out that the North Atlantic contains a number of re-entry holes fairly close together. These holes potentially constitute a set of laboratories in which downhole measurements can be made using new technology in order to pursue further scientific goals, but only if the long-term stability of the holes can be secured. It is therefore worth revisiting and casing those holes which are at risk.

DMP Recommendation 91/13

"The North Atlantic provides a unique opportunity for long-term downhole-measurement science through wireline re-entry. The following re-entry holes, which have not been cased to basement and which are known to have deteriorated, should be cased to basement when the drillship returns to the North Atlantic. The holes in question are 333A, 417A and 418A."

DMP Recommendation 91/13 can only be progressed through a community proposal for add-on science.

DMP Consensus

Panel encourages the ODP community to prepare an add-on science proposal for the restoration of existing re-entry holes that are known to be at risk in the North Atlantic.

Foucher commented that ODP should take a long-term view of re-entry as a contribution to the Programme's scientific legacy. All future sites should have a re-entry capability. For example, the SGPP interest in the long-term monitoring of fluid flow can now be achieved technically provided that drilling and completion programmes are planned accordingly.

Wilkens noted that there are precedents for this type of vision. For example, the Ocean Seismographic Network includes about twenty re-entry holes that are cased to basement.

DMP Consensus

Panel wishes to see an increase in the number of re-entry holes drilled by ODP as an enhancement of the long-term scientific legacy of the Programme.

17. High Temperature Technology

(i) Tool Status for Leg 139

Jarrard reported that, in response to a JOI trawl, a French company, Plastelec, had approached ODP with a proposal to provide 350°C logging cable. LDGO had ordered 1 km of this cable for delivery by the end of June. The aim was to connect this high-temperature cable to the new standard (Vector NA) logging cable. The manufacture of the high-temperature cable was to be overseen by Gable of BRGM. LDGO have since been informed that the delivery date cannot now be met and that the high-temperature cable will not be available in time for Leg 139, Sedimented Ridges. This non-delivery impacts on the entire logging programme for Leg 139. The available Vector cable is rated to 230°C (260°C for short-term use) and yet the expected formation temperatures on Leg 139 are 350°C.

The second disappointment, which also concerns Gable of BRGM, is the non-availability of the high-temperature tool with cablehead that LDGO commissioned for the downhole measurement of temperatures up to 500°C. Unfortunately during testing at 500°C the metal/ceramic hybrid cablehead shattered because of the uneven distribution of heat due to a rapid rise in temperature. Gable had been out on Leg 137, for the deployment of a lower-temperature version of the tool in 504B, and this absence had contributed to delays in the development of the tool and its pressure casing. Further work is needed to develop a new ceramic cablehead. For this reason, the LDGO tool will be kept in France in the near term. For Leg 139, Gable is offering a version of the new tool but without a ceramic cablehead. The tool will be limited to 260°C because of the need to use a Gearhart cablehead and because of the cable limitations mentioned earlier.

The Japanese high-temperature pressure, temperature and flowmeter tool, designed to operate in 300°C environments for three hours, will be out on Leg 139 but this tool is also limited to 260°C by the cablehead and cable situations. This tool has not yet been delivered to LDGO and time is getting short.

There is now a safety consideration. PPSP have approved operations on Leg 139 only up to 350°C. Yet, there is now no way in which temperatures of this order can be measured.

Because of the cable problems, Sandia have been approached to ascertain whether a memory tool might be leased for Leg 139. This option might require having a Sandia technician on board for (part of) the cruise. Another alternative might be to commission the building of a new memory tool from Madden Systems, who built a Sandia tool and could build another within five weeks, provided that a dewared pressure casing could be secured on loan. Both of these options involve a risk to someone else's components. A strategic way forward would be to purchase a high-temperature memory tool now, to replace the Sandia tool if lost and otherwise to become an ODP tool in the long term. This would require additional funds now and LDGO is overspent for FY91. The option would only be feasible if JOI would agree to the funds now ($ 20 000 - 30 000).

The Chairman expressed concern that the limitations imposed by the cable and cablehead could compromise the scientific objectives of Leg 139. He had received a letter from Earl Davis, one of the Co-chiefs for Leg 139, sharing that concern. Panel formulated the following recommendation.

DMP Recommendation 91/14

"In view of the temperature limitations (260°C) imposed by the Vector teflon cable, the logging contractor is urged to continue to seek urgently a high-temperature memory-tool measurement capability for deployment on Leg 139."

Draxler reminded the Panel of other high-temperature cables that are commercially available. The Italians have a seven-conductor mineral-insulated cable rated to 400°C. JAPEX have a four-conductor MgO-insulated cable, made by the UK company BICC and rated to 600°C. JAPEX also have a cablehead. These cables are difficult to handle and they may have transmission limitations but they do constitute a viable alternative to the French cable.

The high-temperature digital BHTV developed by DMT (WBK) of FRG, rated to 260°C and possibly with further testing to 300°C, is tentatively due to be received by the end of June, just

nine days before the ship sails. It is a low priority tool for Leg 139. LDGO have the DMT software installed on the VAX for processing and hardcopy output with some display capability. An LDGO scientist has been trained in its use. Data will be processed at LDGO. The software will be in competition with FMS processing with respect to micro-VAX capacity.

The Chairman reminded Panel that he would be visiting the JOIDES Resolution during the San Diego port call and would be able to ascertain the tool situation for Leg 139 first hand.

(ii) Resistivity Tool

Jarrard reported on the search for a high-temperature formation resistivity tool which, along with the DCS, fluid sampling technology and temperature logging, was essential to address the (hydrogeological) objectives of EPR legs. The Camborne School of Mines (CSM) of the UK, who have a track record in geothermal energy through their Hot Dry Rock project, have submitted a proposal to build a high-temperature resistivity tool, rated to 350°C for 3-4 hours. The tool would be a focused resistivity device with the option to use it as a short normal. The design provides for five modules each of length 10 ft: fluid conductivity/thermistor assembly, electrode array, dewared electronics housing, spacer housing and cablehead. An analogue tool can be built within six months. The quote is $ 255 000 for one tool and $ 100 000 for a second. The UK Department of Energy would provide funds for the second tool if ODP committed to the first. This commitment could not be made with existing budgets. OPCOM funds need to be injected: OPCOM is meeting in Washington DC immediately after this DMP meeting. The CSM proposal will be evaluated and discussions can be expected to continue.

(iii) Fluid Sampling

Fisher reported on the testing on Leg 137 of the Los Alamos National Laboratory (LANL) and the Lawrence Berkeley Laboratory (LBL) high-temperature fluid samplers. Both tools were affected by leakage due to the contraction of samples during tool recovery. Both LANL and LBL see the removal of leakage as a development project. LANL have two tools of diameter 1.625 inches, which are not in electrical contact with the surface during deployment. One tool is made of titanium, the other of stainless steel. The latter is now fitted with a redesigned valve assembly to reduce leakage. LANL used self-machined valves rather than bought ones. The LBL tool, of diameter 2.25 inches, uses one conductor of the logging cable. It is made of stainless steel and contains a bellows assembly that accommodates the volume change on cooling and thereby reduces leakage. This tool leaked less than the LANL tools during Leg 137. LBL propose to make the bellows larger so that they will be more effective.

LANL and LBL have agreed in principle to their tools being run on Leg 139 without their technicians present. ODP technicians will be trained in the use of these tools: some training was given during Leg 137. There is a possibility of the LBL tool being required elsewhere at this time. The long-term strategy is to establish the design that works best and then to produce a tool with the appropriate mixture of technology.

(iv) High-temperature Test Facility

Wilkens reported on a geothermal hole on Oahu, Hawaii, which is 2 km deep and has a BHT of 300°C. It will cost $ 200 000 to close this down commercially. An option is to clean the hole, for a cost of $ 100 000, and have it maintained as a test or experimental facility for high-

temperature tools by the University of Hawaii. The facility is currently supported by the USGS. There is otherwise limited scope for testing high-temperature tools.

DMP Consensus

Panel encourages the initiative to establish a high-temperature test hole for downhole tools on the Island of Oahu.

18. **Shipboard Integration of Core and Log Data**

Fisher reported the progress to date under the following three headings: hardware, software and staffing.

(i) Hardware

Following completion of the WSTP upgrade for Leg 139, the next in-house project for electronics/technical staff will be the evaluation, design and construction of a natural gamma-ray detector for the MST. The prototype sonic core monitor is being replaced by a full production tool, extensively redesigned and upgraded, with new electronics, hardware, packaging, power supply and software. First sea tests are scheduled for Leg 141 (Chile Triple Junction).

(ii) Software

MST (GRAPE and susceptibility) data are now being processed in near-real time for hole-to-hole, and core-to-log correlation. On the current Leg 138, other core laboratory data are being written regularly to ASCII files and moved to the fileserver (where all MACs, PCs and VAXs can gain access) where depths are added. Through the use of a new ADJUST.DEPTH program, a set of composite log/core depths are calculated by the scientific party and added to the ASCII summary data set. Logging data are also available as ASCII files on the fileserver within a few days of logging: all have access. CORPAC experiments are underway to assist with intersite correlations.

(iii) Staffing

On leg 138, an 'extra' system manager has been sailed as Assistant Lab Officer (Bill Meyer). This is a temporary solution to the need for a second system manager, and it cannot be repeated. Leg 138 may be unusual in that many shipboard scientists are familiar with, and are qualified to make decisions concerning, core-log integration. The issue of who is ultimately responsible for the integration has not been decided.

19. **FY92 Logging Programme**

Golovchenko reported on the following three items.

(i) Leg 140: Hole 504B or Hess Deep

The main proposal is to revisit 504B with Hess Deep as an alternative. The logging programme at Hess Deep has previously been recommended by DMP to be similar to that already run at 504B. The leg prospectus does not appear to reflect this recommendation. A key question

concerns the dual laterolog which was recommended for Leg 140 and which performs better than the induction log in resistive formations. The Panel reiterated its position.

DMP Recommendation 91/15

"In the event of Hess Deep being drilled during Leg 140, the logging programme in each logged hole should be similar to that already carried out at 504B. The (digital) dual laterolog should be run in each logged hole during Leg 140, regardless of which leg option is taken."

(ii) Legs 143 and 144: Atolls and Guyots I & II

The Atolls and Guyots DPG has accepted in principle a Japanese proposal to run their borehole magnetometer during Legs 143 and 144. However, this has not previously been debated by DMP.

DMP Consensus

DMP strongly supports the running of the Japanese three-component borehole magnetometer in selected basement holes during the Atolls and Guyots legs.

(iii) Hole 801C: Old Pacific Crust

A proposal for the logging of 801C as add-on science to the FY92 programme is currently being evaluated. This exercise would be undertaken around Legs 143 and 144.

20. Panel Membership

The Chairman reported that two of the three persons identified as possible replacements for Bobb Carson had indicated that they would accept an invitation to join DMP. Their names and resumes would now be forwarded to PCOM Chairman.

[ACTION: WORTHINGTON]

21. Next DMP Meetings

The next meeting of the JOIDES Downhole Measurements Panel is scheduled to take place in Halifax, Nova Scotia, Canada during the period 15-17 October 1991. The meeting will encompass a joint one-day session with SMP to continue the drive towards the integration of core and log data. On Friday 18 October there will be a joint technical workshop for the East Canada community. Kate Moran will host.

The following DMP meeting will take place in Hawaii during the second half of January 1992. Roy Wilkens will host.

The subsequent DMP meeting is tentatively scheduled for Windischeschenbach, FRG, in May or June 1992. This meeting would allow a joint session with KTB.

22. **Recommendations for the JOIDES Opportunity Committee**

The Panel reviewed five technological developments that might be appropriate for funding through the OPCOM initiative and that would not otherwise be progressed in the short term. These were voted into the following priority order.

(1) High-temperature resistivity tool with fluid resistivity and temperature capability.

(2) Fluid sampling capability through the wireline sampler or alternative.

(3) MAXIS 500 data acquisition/analysis system (accelerated introduction to ODP).

(4) Sediment susceptibility tool.

(5) High-resolution geochemical tool.

The Chairman undertook to convey the highest priorities to OPCOM.

[ACTION: WORTHINGTON]

23. **Close of Meeting**

The Chairman thanked Panel Members, Liaisons and Guests for their contribution to the meeting, the Directorate of the Lamont-Doherty Geological Observatory for the provision of meeting facilities, the LDGO Borehole Research Group for their kind hospitality, and Rich Jarrard for his gracious hosting. On behalf of the Panel, the Chairman wished Jarrard everything of the best for his new appointment at the University of Utah. The meeting closed at 1425 hours on Thursday 6 June 1991.,

PAUL F WORTHINGTON
30 June 1991

MEETING OF JOIDES SHIPBOARD MEASUREMENTS PANEL

Texas A & M University

College Station

19-21 March 1991

1. Preamble

This meeting was attended in the capacity of Liaison from the JOIDES Downhole Measurements Panel (DMP) to the JOIDES Shipboard Measurements Panel (SMP). The SMP meeting included a joint session with the JOIDES Information Handling Panel (IHP). These notes relate specifically to those aspects of the meeting that have implications for the ODP downhole measurements programme.

2. Integration of Core and Log Data - Strategy

The joint session of SMP and IHP addressed the shipboard integration of core and log data. The goal is a fully integrated, user friendly computer database that is interactive and widely accessible. This would allow shipboard scientists to take data from beyond their immediate disciplines. The requirements are a common reference depth, standard compatible ASCII formats, integration software, shipboard data availability, and post-cruise data storage and access. Key questions are how to handle increasingly larger datasets and how the data can be accessed by the community in the future. It was considered especially important to have some readily extractable quality indicators associated with the data.

Work on shipboard data integration began during Leg 134 with a drive to integrate all the core data. The second stage will be to integrate the merged core data with log data. Looking further ahead, an ultimate goal would be to integrate the merged core-log data with geophysical data.

Several problems were identified during Leg 134. These included time constraints on the Shipboard System Manager who is also responsible for routine system maintenance and cannot handle both this and the data itegration initiative. Similar comments apply to the shipboard scientists who also have their routine assignments. There is a need for data processing software tools. Finally, a key issue is the adoption of a reference depth.

IHP and SMP agreed that the currrent shipboard data acquisition and data processing system should be modified to allow for the implementation of core-log data integration. The most important addition to the current process is the ability to manipulate and edit ASCII data files, which comprise the integrated database and which receive input from the S1032 automated raw database, from other shipboard measurements, and from the Terralog data manipulation package. The ASCII files should be made available one year post-cruise as a database for user access.

Specific tasks must be performed to implement core-log data integration. Therefore, IHP and SMP recommended addition of the following: a second sea-going computer system manager and one person-year to develop software tools for data processing. IHP also supported the earlier SMP/DMP recommendation that a core-log data correlation specialist be identified as part of the scientific party for each leg.

It is noteworthy that the joint IHP/SMP panel meeting was conducted without a PCOM liaison present. This absence placed the meeting at a disadvantage.

3. Integration of Core and Log Data - Implementation

The following requirements were identified.

(a) Hardware

Core natural gamma sensor
Magnetic susceptibility log (for more meaningful reference depths)
Sonic core monitor (Leg 141 et seq)
Electrical resistivity core imager
Automation of physical properties laboratory (including software)
Core-log data integration work station
Macintosh PC for physical properties and palaeomagnetics.

(b) Software

Core data interpolation/integration software
Common shipboard spreadsheet
Barrel-sheet computerisation (Leg 138 et seq)
Depth-conversion software for sonic core monitor (SCM).

The following procedure for merging to a reference-depth scale was provisionally identified. The data sets were presumed to be SCM, core and log data, and marker horizons.

Step 1 Nominal core depth is corrected using software for SCM data.

Step 2 Core/log data correlation
Specialist user software (eg Corepac) to determine reference depth.
Correlation parameters are: natural gamma, magnetic susceptibility, density, and P-wave velocity.

A realistic time schedule for implementing the above is being formulated by ODP/TAMU staff. The data correlation specialist should receive two days' basic training at ODP/TAMU prior to sailing.

4. Sonic Core Monitor

The SCM is designed for use with the RCB/XCB. The concept is now proven. This allows the positioning and orientation of hard rock when core recovery is incomplete. The existing tool is a memory device. A Mark-II version is being developed with improved electronics and a (MWD) capability to transmit the data in real time, with an ASCII format output. The new tool is scheduled for deployment during Leg 141.

5. Pressure Core Sampler

This is a version of the XCB: it has a one-metre core capacity. The core chamber is sealed by a ball valve preserving borehole hydrostatic pressure, not in-situ pore pressure. Thus far the PCS has been run five times of which two were successful. A disadvantage is that one cannot access the solid core under pressure: it is necessary to depressurise. Further, core cannot be shipped under pressure.

6. Motor Driven Core Barrel

This is a wireline-deployable miniature core barrel within the drillstring. It is designed to core up to 4.5m ahead of the main bit. The MDCB failed its test on Leg 135 and further deployment has been deferred until Leg 141. This means that the Geoprops Probe, which is designed to operate within a MDCB hole, cannot be tested on Leg 139 as a prelude to scientific deployment on Leg 141. Instead Geoprops will be deployed at sea for the first time on Leg 141.

7. Core Handling Study

This study was undertaken during Leg 134. The core/liners bend when transferring from the rig floor to he core walk. Other sources of core disturbance certainly exist. Physical properties are affected. As a result of this study, recommended practices for improved core handling have been formulated.

8. Physical Properties Equipment

(a) Natural Gamma Sensor

It has been recommended that this be purchased. The Core Laboratories equipment is to be evaluated for prospective purchase.

(b) Resistivity Imaging Equipment

This is on the shelf at TAMU. SMP strongly supported its recommissioning and/or upgrading.

(c) Multisensor Track

Alternative technologies are to be evaluated with a view to upgrading the MST. In particular, GRAPE needs to be calibrated.

9. Units

A prerequisite for data integration is a common system of units. It was proposed that both shipboard and downhole measurements should be reported in SI units. This should be an across-the-board implementation unless there is good reason to do otherwise.

10. Leg 139 - Sedimented Ridges I

The safety panel require that drilling terminate at 350°C. This is unfortunate because the aim is to drill into a hydrothermal reservoir with an estimated temperature of 370°C. Subsea vents have temperatures up to 350°C, so the safety panel embargo might become effective at comparatively shallow depths and thereby prevent the scientific goals from being attained. At present, the effectiveness of hole cooling by circulation is being examined.

11. Legs 143/144 - Atolls and Guyots

Previous drilling in similar environments has resulted in low core recovery. Chemical characterisation is likely to rely on the geochemical logs. These should be calibrated via XRF and XRD. Carbon is measured routinely in the geochemistry laboratory. The geochemical log, run in C/O mode, might provide an additional diagnostic capability for carbonates, where core recovery is sparse.

12. Next Meetings

The next SMP meeting had been proposed to take place in Victoria, BC from 11-13 September 1991, during the ship port-call. This meeting had been planned to encompass a joint session with DMP. However, SMP Chair is no longer available on those dates. The next SMP meeting has therefore been rescheduled for 15-18 October 1991 in Halifax, Nova Scotia. In view of the strong PCOM encouragement for DMP and SMP to retain especially close liaison during the data-integration phase, DMP will also try to meet in Halifax at the same time, provided that this new arrangement does not impact on any plans already made. Topics for discussion at the joint DMP/SMP meeting would include:-

(i) Innovation in collecting core and log data: i.e. log first, core later.

(ii) Strategy for problem holes, i.e. poor core recovery, incomplete logs.

The subsequent SMP meeting is provisionally scheduled for Honolulu, Hawaii, in March 1992, to coincide with a ship port-call. It is proposed that this meeting be followed by a working group session on Physical Properties.

Paul F Worthington
25 March 1991

ANNEXURE II

REPORT ON MEETING OF JOIDES SEDIMENTARY AND GEOCHEMICAL PROCESSES PANEL

TEXAS A & M UNIVERSITY

COLLEGE STATION

5 - 6 JUNE 1991

1. I attended SGPP in my capacity as Chairman of the JOIDES Downhole Measurements Panel. Input from DMP had been requested by SGPP Chairman specifically for a workshop on "Gas Hydrates and Ocean Drilling" held as part of the SGPP meeting. These notes relate to the downhole measurements aspects of the meeting.

2. Hydrates are hydrogen-bonded water lattices that physically entrap other molecules. In natural gas hydrates the "guest" molecules can be any common constituent of natural gas. Methane is the most prolific. There are two types of crystal structure for natural gas hydrates, conventionally known as Type 1 and Type 2, which have different physical properties. Type 1 is the more common. Hydrates can be disseminated in pore spaces, or occur in nodular (2 mm to 2 cm), layered (15 cm) or massive (several metres) form. They can occur within all types of sediments.

3. $1m^3$ of methane hydrate produces 0.81 m^3 water plus 170 m^3 methane. The global resource of hydrate is estimated as 10^4 Gt (1 Gt = 10^{15} g methane carbon). Approximately 2 to 4 Mt/year of methane are being released to the atmosphere, mostly from Arctic offshore permafrost which has experienced a temperature rise due to seawater coverage and is allowing the hydrate to decompose. The decomposition is giving rise to a new sea-floor topography through subsidence. The ratio of gas-hydrate methane to atmospheric methane is 10 000:1 so that a small change in the former could have a big effect on the latter. Thus, there are implications for global climatic and environmental change.

4. Essentially there are two geophysical models that seek to describe the occurrence and manifestation of gas (methane) hydrates. Key aspects are the relationship of hydrate occurrence to the bottom-simulating reflector (BSR) and whether or not a free gas is present below the hydrate stability zone. Clear seismic reflections are seen only from the base of the hydrate layer, not from the top. We need to design experiments to test the geophysical model.

5. Downhole measurements are capable of distinguishing between different pore-filling substances. They have been used for this purpose in the oil industry for over 60 years. Used

qualitatively, single logs can be informative. For quantitative application, logs are affected (like all geophysical measurements) by the principle of equivalence, ie non-uniqueness of interpretation. Equivalence can be resolved through the conjunctive use of several different logging tools.

6. Borehole logs are depth records of physical measurements presented in terms of physico-chemical parameters. The parametric values are averages over the zones of investigation of the various tools. If this average does not change with depth, the log(s) will show constancy. Logs can be constant even if there is a change in the proportion or distribution of constituents, through the principle of equivalence.

7. In order to assess the potential of logs to distinguish between solid hydrates, water and gas, we need to know the responses of standard logging tools to each of these constituents. These are listed below, together with sandstone and limestone matrix values for comparison.

TOOL	HYDRATE TYPE 1	WATER	GAS	SANDSTONE (SiO_2)	LIMESTONE ($CaCO_3$)
Sonic (km/s)	3.73	1.6	0.3*	5.5	6.29
Density (g/cc)	0.90	1.0	0.2*	2.65	2.71
Neutron (lst ϕ)	1.07	1.0	0.0015*	0.04	0
Resistivity (Ω m)	Inf	0.04-10.0	Inf	Inf	Inf
Gamma (API)	0	0	0	15-30	10-20

*Nominal values: function of compression. Inf = infinity.

Thus, we see that the sonic log responds distinctly to hydrate, the density and neutron logs to gas, and the resistivity log to water. The natural gammma ray log allows us to classify formations as clean (< 30 API units) or clay-mineral-bearing (30-200 API units). Interpretation procedures are different for these two cases.

8. Where hydrate is present within the pore spaces of a clean formation, it can be recognised by high sonic velocities and formation resistivities, relative to values recorded in a water zone. Gas can be recognised by relatively low sonic velocities,

low density and neutron responses, and high resistivities. These statements presuppose that there are no lithological changes between the hydrate or gas zones and the reference water zone, and they do not necessarily apply in clay-mineral-bearing formations.

9. For quantitative interpretation, the density and neutron logs, drawn to compatible limestone scales, can be used to provide a quick-look porosity estimate in clean formations. This allows a formation factor F to be calculated using Archie's first law (in reverse). A value of water resistivity Rw is needed from a nearby water zone, from a recovered sample, or from log analysis. The value so derived might not be the same as that of the brine in hydrate zones. If a value of formation resistivity Rt is known from electric logs, the water saturation (the fraction of pore space filled with water) can be evaluated by inputting F, Rw and Rt to Archie's second law. We determine 1-Sw to give the fraction of pore space filled with hydrate or gas. Note that isolated pockets of brine, surrounded by hydrate, will not be seen by resistivity logs which respond to continuous conducting paths.

10. To distinguish between hydrate, water and gas, we can use crossplots of neutron vs density responses to diagnose free gas and density vs sonic velocity to estimate the amount of hydrate. Unlike standard oil industry crossplots, which specify a fluid type and diagnose lithology, we need to specify a lithology with constant matrix properties and then diagnose fluid type. Quantatitive evaluations are achievable. The procedures become much more complex if the formations contain clay minerals.

11. Paragraphs 5 to 10 refer to standard borehole logs. Alternative approaches might be required in order to circumnavigate the need for a representative value of Rw. A possibility is to run the Geochemical Logging Tool (GLT) in inelastic mode to determine a ratio of carbon-to-oxygen elemental concentrations. In this mode, the tool will respond both to hydrate and to free methane gas. It should be possible to distinguish between the two occurrences.

12. Hydrates will be encountered during Legs 141 (Chile Triple Junction) and 146 (Cascadia). In both cases we need to know the amount of hydrate, the amount of free gas, gas composition, the porosity-velocity calibration for the geophysical model(s), the permeability of the hydrate layer (inferred from the quantities of methane above and below) and the source of the methane. Neither of these legs is a hydrates leg. It is therefore especially important to know the details of the hydrate-targeted logging programme when the cruise is being designed. The pre-cruise meeting for leg 141 is scheduled for May 1991. A logging scheme will be needed before then.

PAUL F WORTHINGTON
7th March 1991

Univ... of Sou... ...ment of ...logy
Highfield
Southampt...
UNITED KINGDOM
...M Nesbitt
...f Department

000121

Fax (0703) 593052 – Geology
(0703) 593939 – University
Telex 47661 SOTONU G
Switchboard (0703) 595000
Direct line (0703)

FACSIMILE FRONT COVER SHEET

FOR THE ATTENTION OF: CRAIG S. FULTHORPE

ORGANISATION: JOIDES OFFICE, UNIV. TEXAS

CITY: AUSTIN, TX

COUNTRY: USA

FACSIMILE NUMBER: 010-1-512 471 0999

FROM: DR D STOW

NUMBER OF PAGES: 7 (including front cover) DATE: 3/8/91

CONFIRMATION COPY: To be forwarded by post YES ~~NO~~* (*Please delete)

NOTES/MESSAGES:

ATTN: Craig Fulthorpe

RE: SGPP MINUTES

In the absence of fully readable minutes from DMP and with only fax copy of part from Judith McKenzie, this is the best I can do.

I leave today for a further 3 weeks in the field (Chile)

Regards,

Will also mail by Courier

IF YOU DO NOT RECEIVE ALL THE PAGES PLEASE TELEPHONE IMMEDIATELY:
(0703) 592031/502011

Minutes of SGPP Meeting

DATE: 4-6 June 1991
PLACE: Lamont Doherty Geological Observatory, NY
HOST: R. Jarrard, Borehole Group

List of Attendees

SGPP members

Jeffrey Alt
Nicholas Christie-Blick
Rodger Flood
Richard Hiscott
Judith McKenzie
Frederick Prahl
Erwin Suess, SGPP chair
Jacques Boulegue
Shirley J. Dreiss
William W. Hay
Makoto Ito
Jürgen Mienert
Dorrik A.V. Stow
Peter Swart

Apologies from Henry Elderfield

Liaisons & guests

R. Zierenberg LITHP
M. Langseth PCOM
A. Fisher ODP
M. Coffin

1. WELCOMING AND INTRODUCTIONS

SGPP Chair Erwin Suess opened the meeting and welcomed the attendees. The morning session of the first day of the meeting began with a few individuals missing who arrived later during the session. The minutes of the preceding meeting and the current agenda were discussed and accepted. Reports from liaisons were the first items considered on the agenda.

2. REPORTS

Report from LITHP liaison to SGPP - Robert Zierenberg reported on the last LITHP meeting held in La Jolla, CA on 14-16 March 1991 (see appendix 1 for report from R.Zierenberg). ODP engineer Mike Storms briefed the panel on drilling plans for upcoming Legs 137, 139 and 142 and the status of the Diamond Coring System (DCS). Storms remains optimistic about DCS. Standard rotary coring techniques will be used during Leg 139 (sedimented ridges) and sulfide recovery may be poor. The lack of and/or deficiencies with the wireline packer were likewise discussed with Storms.
LITHP, based on Leg 135 (Lau Basin) results, recommended that a second XRF-technician be staffed on JOIDES Resolution for future hard-rock legs, recommended that NARM-DPG should concentrated more on basement objectives for upcoming legs, strongly endorsed off-set drilling and proposed to reinvestigate possibilities for Red Sea drilling.
LITHP made a global ranking of all active proposals that address high priority objectives of the panel (see appendix 1 for complete ranking). The top four ranked proposals were:
(1) Offset drilling layer 2/3, Hess Deep (#375-rev.), (2) Slow ridge hydrothermal processes, TAG (#361A), (3) Axial crustal drilling, EPR II 9°30' (EPRDPG) and (4) Volcanic rifted margins, N. Atlantic (#392-396).

SGPP Discussion

SGPP discussed the possibility of ODP obtaining permission for the JOIDES Resolution to drill in the Red Sea. SGPP requests that PCOM investigate this possibility in light of the changing political situation in the Middle East region.

Report from SGPP liaison to TECP - Shirley Dreiss reported on the last TECP meeting held in Davis, CA on 21-23 March 1991 (see appendix 2 for executive summary). During the meeting three strong concerns of the panel were registered: (1) reduction of Leg 141 (CTJ) to 39 days of drilling time, (2) problems concerning the Hess Deep proposed drilling, particularly the lack of site survey information, and (3) anticipated poor recovery of shallow-water carbonate sediments during Legs 143/144 (A & G). The majority of the meeting was spent making the panels global ranking with the following top three ranking: (1) N. Atlantic (#392-396), (2) Mediterranean Collision Zone (323A, 330A, 379A, 383A) and (3) Chile Triple Junction Leg II.

Report from PCOM liaison to SGPP - Due to the absence of a delegated PCOM liaison to SGPP, Peter Swart, who had attended the last PCOM meeting as K. Becker's replacement in Narragansett, RI on 23-25 April 1991, agreed to make a report but apologized for not being properly prepared with reference notes. The ship track of the JOIDES Resolution was confirmed for FY 1992 and beyond to January 1993 with the ship moving into the North Atlantic and adjacent seas at that time for approximately 18 months. The preliminary mandate of the new Opportunity Committee (OPCOM) was discussed. OPCOM was established to evaluate ways to use an additional $2.1 M of "extra" NSF funds in new and imaginative ways to advance scientific ocean drilling. POCOM proposed the following possible uses: (1) DCS development and testing, (2) Deep drilling, (3) Alternate platforms, (4) High-latitude support vessels (FY 93 and beyond) and (5) Staff costs for the above. Other items of SGPP interest covered during the meeting included the establishment of an Offset Drilling WG and the disbanding of the Atolls & Guyots WG.

SGPP Discussion

Co-chief staffing of upcoming legs was discussed. The selections of co-chiefs for Leg 143 and 144 (A & G) have been announced, K. Konishi (J) & E. Winterer (USA) and L. Premoli-Silva (ESF) & J. Haggerty (USA), respectively. SGPP expressed concern about the selection of co-chiefs for Leg 146 (Cascadia). **PCOM expressed a clear preference in favor of proponents serving as co-chief, whereas SGPP had specifically requested a non-proponent as a co-chief for Leg 146 (i.e. M. Goldhaber).**

Report from ODP liaison to SGPP - A. Fisher reported on the PPSP safety review for Leg 141 (CTJ). Collision zone sites have been given broad approval with a landward drilling plan beginning first with SC3 followed by SC2 and SC1 to check for problems with gas. Post-collision sites (SC8) were not approved, but gas hydrate sites and gas hydrate drilling have been approved. G. Claypool, B. Katz and M. von Breymann are preparing a shipboard report for gas hydrate monitoring and safety procedures.

Fisher also reported on the Leg 137 (Site 504B) results. The hole was successfully cleaned and further coring operations were completed before drilling was halted due to lose of part of the drill-string in the hole. Leg 140 will again reoccupy Site 504B, and, at that time, a fishing operation will be required to remove the lost equipment prior to continuing to deepen the hole. Fluids were sampled using the

Los Alamos and Lawrence Livermore Berkeley sampling devises. These high temperature fluid samplers are still in a development stage. Each has its problems with contamination. They will be tested further on Leg 139 (Sedimented Ridges). J. Alt, Leg 137 shipboard scientist, reported that fluids sampled at the bottom of the hole at 160°C were apparently of bore-hole origin and not contaminated by surface sea water. The sulfate concentrations were zero and anhydrite apparently precipitates in the hole. With increasing temperature and depth, calcium increases and magnesium decreases. An underpressured zone was noted with renewed downward flow of water.

Currently, Leg 138 (Eastern Equatorial Pacific) is averaging 100% recovery and excellent logging conditions are producing real time data.

3. GAS HYDRATE WORKSHOP

Gas Hydrate Workshop Report - In its present form, the Gas Hydrate Workshop Report prepared by K. Kvenvolden is more an extended minutes from the meeting rather than an extensive scientific report. SGPP thinks that the report should be expanded, requiring input and feed-back from the various contributors at the workshop. The report should address more strongly and adequately the safety issue in drilling gas hydrates. The amplified workshop report will be published in JOIDES Journal, with an additional article submitted to EOS. The final document will be prepared by K. Kvenvolden, E. Suess and J. McKenzie.

Dedicated Gas Hydrate Leg - SGPP has gas hydrates as a highly ranked theme but lacks an appropriate drilling proposal. This deficiency necessitates the formulation of a dedicated gas hydrate drilling proposal, possibly by a sub-committee composed of SGPP members. Possible sites for a gas hydrate proposal in the Atlantic were discussed. C. Paull has an active gas hydrate program off North Carolina, USA. R. Flood noted that the Argentine Basin contains gas hydrates and there is a USGS project to study gas hydrates off the Blake Outer Ridge. The USGS sponsored a meeting on gas hydrates in mid-April, 1991. Gas hydrates have been recognized in the southern area of the Barbados Accretionary Prism.

SGPP Action

SGGP proposes that a note be published in the JOIDES Journal, as well as in other scientific publications such as EOS, requesting proposals for dedicated gas hydrate legs, preferably in the Atlantic considering the proposed ship's track in the upcoming years. R. Hiscott will formulate the notice before the end of the current meeting.

Joint Session with DMP - SGPP requests that the following items related to the study of physical and chemical properties of gas hydrates be included under Point 2 (What are the logging characteristics and log interpretations of gas hydrates?) on the joint session agenda.
Gas hydrates properties that should be determined or investigated with drilling are lateral continuity, porosity, permeability, pore pressure, composition, amount of free gas, amount of hydrate, temperature structure, associated diagenetic products, salinity structure (freshwater hydrate), sediment fabric, growth habit (i.e. displacive, replacive disseminated), and age structure. Can these types of information be obtained from logs? Can logging be done while drilling or ahead of drilling? Are downhole seismic experiments, thermal conductivity and FMS studies possible?

REVIEW OF NEW PROPOSALS AND GLOBAL RANKING.

Bearing in mind the proposed ship track from Feb 93 to Sept 94 in the Atlantic, ending in N Atlantic, and from Oct 94 to December 95 in the Atlantic and adjacent seas, six new proposals were considered and then a new ranking drawn up.

Proposal 397. Primarily of interest to LITHP. Review could add comment on sediments and synrifting tectonics. RH to prepare response. **RANK 1**

Proposal 398. Main interest to SGPP is the influence of bottom currents, the glacial input of sediments and glacial/current plumes on seamounts. JM to prepare response. **RANK 3**

Proposal 346 - add. This is simply additional information for earlier proposal. Proponents to be thanked for information. **NO ACTION**

Proposal 363 - add. Same as 363 but with amplification of paleoceanographic objectives and mention of mid-Cretaceous black shale event. **NO ACTION**

Proposal 361 - rev. Very high interest for SGPP, but with some problems of site survey requirements, fluid sampling techniques and representativeness of area. SGPP must emphasise the technical problem of fluid sampling that needs to be addressed. **RANK 5**

Much discussion of ways and means of voting/ranking proposals, taking into account scientific themes, practical logistics and the ship's general track. So decided to draw up revised ranking by eliminating non-Atlantic proposals, eliminating to Gas Hydrate "non-proposal" and adding in new Atlantic/adjacent seas proposals.

Voting procedure (generally agreed as good workable method). Each member ranks each of 17 proposals from 17 (high) to 1 (low), or from 16 to 1 (etc) if he/she is proponent on one proposal. Proposal scores summed and averaged as appropriate, highest average is first rank et seq. No discussion of proposals during voting, no members need leave the room.

Final agreed ranking

			(average scores)
1	348	New Jersey Margin	13.36
2	391	Mediterranean Sapropels	12.86
3	378	Barbados accretion	12.29
4	330	Mediterranean Ridge	11.60
5	380	VICAP	11.53
6	361	TAG hydrothermatism	10.60
7)	354/339	Benguela current	10.47
8)	388	Ceara Rise	10.47
9	59	Madeira Abyssal Plain	9.53
10	323	Atlantic/Mediterranean Gateway	8.71
11	372	N Atlantic Water Masses	7.53
12	345	W Florida margin	7.47
13	332	Florida escarpment	7.33
14	379	Mediterranean Drilling	6.80
15	313	Equatorial Atlantic pathway	4.27
16	327	Argentine Rise	3.87
17	341	Global Climatic Change	2.93

5 **JOINT SESSION WITH DMP**

See Paul Worthington's minutes from DMP (Sections 9-15)

6 **STATUS OF GEOCHEMICAL OBJECTIVES OF THE BARBADOS DRILLING PROPOSAL**

Item not discussed further.

7 **STRATEGY, OBJECTIVES AND DESIGN FOR VERY DEEP DRILLING**

(a) Somali Basin. Mike Coffin made presentation of earlier proposal for deep drilling in the Somali Basin that had been considered by SOHP.

Proposal 79 - N Somali Basin, minimum 1500 m sediments through Tethyan section.

Proposal 61 - W Somali Basin, minimum 1500 m sediments in 4500 m water depth through Tethyan section.

Reviewed tectonic and paleoenvironmental objectives.

(b) Subduction zone drilling from land. Rob Zierenberg made presentation of proposals to drill from Middleton Island in the Aleutians, approx. 10 km down to subduction zone.

Reviewed metamorphic, diagenetic and fluid evolution objectives.

SGPP concensus, after discussion of deep drilling, is that for moderately deep drilling the Somali Basin sites are typical of the sort of drilling we could support although they would not necessarily be high priorities. For still deep drilling (ie 4-8 km holes), the panel is unlikely to lend any support at present.

8 **OPCOM BUDGET PRIORITIES**

Priority 1: Develop capability for fluid sampling and measurement of in-situ fluid properties:

(a) for free-flowing water in hot rock (testing system)
(b) for pore water sampling/measurement (Pressure Core Sampler - phase II)

Priority 2: Develop capability for recovering unconsolidated sand/rubble without extensive loss or damage to cores.

And, of the TAMU list:

Priority 3: Use of alternative platforms for Sea level/Sediment Architecture objectives (eg. New Jersey transect, Coral Islands, Global Change Programs, etc).
Priority 4: Deep-Drilling for SGPP objectives (eg. Somali Basin)
Priority 5: Diamond Coring System
Priority 6: High-latitude support
Priority 7: Staffing costs

9 MISCELLANEOUS ITEMS

(a) Liaisons:

NARM-DPG (Aug 11-12)	Nick Christie-Blick	
OHP (Oct 1-3)	Dorrik Stow/Makoto Ito	
TEDCOM (Sept 11-13)	Jeff Alt	
FLUID SAMPLING WG (Aug)	Peter Swart	
(suggestions)	Phil Froelich	
	Harry Elderfield	
	Shirly Dreiss	
	Mirian Kastner	
	J Kharaka	

(b) Further report back from PCOM (Mark Langseth)

Strong competition for Cascadia co-chief, including SGPP proposal for M Goldhaber. Review to be carried out of ODP operations by panels. Further extension of ODP by NSF looks promising. PCOM priorities for engineering developments given.

(c) Next Meeting

November 8 - 9, 1991 ZURICH (Judith McKenzie)
provisionally Feb/Mar, 1992 MIAMI (3 days) (Peter Swart)
September, 1992 ?2-3 days/?Kiel

(d) Membership

USSR member - SGPP suggestion of GALIMOV
USA rotation (replacements for Shirly Dreiss and Fred Prahl)
- Judy McK will sound out our suggestions before formally proposing.

(e) International Conference on Paleoceanography (IV) in Kiel in September 1992. Could have joint meeting with OHP in Kiel then - idea received favourably.

Meeting closed at 1255

000129

GEOMAR

RECEIVED
AUG 0 5 1991
Ans'd.....

Wischhofstrasse 1-3
2300 Kiel 14
Federal Republic of Germany

Telefax Transmittal Cover Sheet

Telephone: (49) 431 720 2233 / 2232
Telefax Number: (49) 431 720 2293
If you experience difficulty receiving this, or you do not receive all of the pages, please call and speak with the Switchboard Operator at 49 431 720 2 (0).
This document is being sent from a Sharp FO-200, Level 3 Telecopier

From: Erwin Suess
GEOMAR

Date: 8-4-91

Transmit to: **Fax 001 512 471 0999**
Dr. Craig S. Fulthorpe
Institute for Geophysics
The University of Texas at Austin

Re: More on the SGPP minutes

Dear Craig:

Am glad to hear that you have received the minutes from Dorrik; inexplicably, I have not received anything from Dorrik as of now. It worries me that he says he does not have the complete DMP minutes, he should have had them. In case he does not: Please include copies of the following ten pages with the SGPP minutes covering the 2nd day activities.

In any event, if you find a chance to fax me what you plan on putting into the briefing book, I would appreciate it.

I will mail a disk with the Gas Hydrate Report and the executive summary on Tuesday after receiving a copy of the Executive summary from either you or Dorrik. It will be a Mac disk and the text is typed with MS-word.

Regards, Erwin.

Erwin

PLEASE SEE AGENDA BOOK WHITE PAGES 97 - 106 FOR RELEVANT SECTION OF JUNE 4-6 DMP MINUTES (ITEMS 9-15)

Copy: D. Stow
Pages (Including Cover Sheet): eleven

000131

RECEIVED
AUG 0 5 1991
Ans'd.....

GEOMAR

Wischhofstrasse 1-3
2300 Kiel 14
Federal Republic of Germany

Telefax Transmittal Cover Sheet

Telephone: (49) 431 720 2233 / 2232
Telefax Number: (49) 431 720 2293
If you experience difficulty receiving this, or you do not receive all of the pages, please call and speak with the Switchboard Operator at 49 431 720 2 (0).
This document is being sent from a Sharp FO-200, Level 3 Telecopier

From: Erwin Suess
GEOMAR

Date: 8-5-91

Transmit to: **Fax 001 512 471 0999**
Dr. Craig S. Fulthorpe
JOIDES Office
Institute for Geophysics
The University of Texas at Austin

Re: More worries about the SGPP minutes

Dear Craig:

After realizing that Dorrik apparently did not include the portion of the session with DMP in his version of the minutes, I am further worried that he also might not have planned to include the Gas Hydrate Report as an Appendix. Therefore, and just incase it is needed, I am sending the Gas Hydrate Report attached to this note and hope that you will be able to include this one as well in the briefing book.

In addition, I will mail a disk with the report and the executive summary as promised yesterday.

Regards,
Erwin

Pages (Including Cover Sheet): seven

"Gas Hydrates and Ocean Drilling"

Organized and chaired by Keith Kvenvolden and Erwin Suess

INTRODUCTION

This workshop "Gas Hydrates and Ocean Drilling" was held in conjunction with the meeting of the Sedimentary and Geochemical Processes Panel (SGPP) at College Station, Texas, on March 5 - 6, 1991. In attendance were panel members and invited participants (Appendix A), totaling about 35 individuals. The purpose of the workshop was to review the geological, physical-chemical, and geophysical aspects of gas hydrates in oceanic sediments in order to provide guidance to ODP for drilling, coring, and testing the gas hydrates that will be encountered on future ODP legs.

DISCUSSION TOPICS

The discussion centered around six main topics with selected speakers addressing each of the topics and goals as follows:

1. **Gas hydrates and the global methane budget.**
Purpose: discuss the role of gas hydrates in global change and define the place of ODP in the Global Change program.
Focus: stability and reservoir size of gas hydrates in sediments of the Arctic shelf and of outer continental margins.

2. **Physical-chemical characteristics of gas hydrates.**
Purpose: examine the fundamental properties of gas hydrates and consider the conditions leading to hydrogen sulfide hydrates occurring separately or syngenetically with methane hydrates in continental margins and/or sedimented ridge crests.
Focus: physical chemistry of gas hydrates; evidence for hydrogen sulfide gas hydrates on the Cascadia margin: safety measures needed by ODP to cope with hydrogen sulfide hydrates.

3. **Geophysical characteristics of gas hydrates.**
Purpose: consider the arguments of free gas vs. no free gas at the base of the gas hydrate zone and examine the assumptions for the system: sediment-water-free gas-gas hydrate in seismic models of bottom simulating reflectors.
Focus: percentage of pore space filled with gas hydrate; gas hydrate formation from "undersaturated" methane solutions; ODP safety standards with regard to drilling of gas hydrates.

4. **ODP Pressure Core Sampler.**
Purpose: examine the status of the PCS and particularly of the development for phase II to achieve scientific goals formulated by SGPP.
Focus: discuss capabilities for recovering sediment at *in situ* temperatures and pressures for analysis of gas hydrates, pore fluids and gases, and microbial activity; for preserving sediment structures, through-wall imaging of internal structures, fabric analyses, and physical properties measurements; for transfer of gases, fluids, and solids through pressure ports; and for calibration of well logs.

5. **Safety procedures for ocean drilling.**
Purpose: revise safety procedures for drilling gas hydrates
Focus: formulate recommendations for PPSP.

6. Gas hydrate objectives of ODP for FY 1992.
Purpose: re-examine objectives and sites of Leg 141 (Chile Triple Junction) and Leg 146 (Cascadia Margin) to emphasize gas hydrate objectives after elimination by PCOM of proposed gas hydrate leg offshore Peru.
Focus: discuss thermogenic vs. biogenic sources of methane and the role of fluid movement in active margin settings; consider other possible gas hydrate objectives for future drilling legs.

AGENDA AND SUMMARY OF PRESENTATIONS

March 5

8:30-9:00	Introductions (Suess, Kvenvolden)
9:00-10:00	Gas hydrates, carbon cycle (Kvenvolden, Brooks, Paul)
10:00-10:15	Break
10:15-12:15	Chemistry and physics of gas hydrates (Miller, Sloan, Boulegue, Claypool)
12:15-13:00	Lunch (ODP)
13:00-15:00	Geophysics, gas/no gas (von Huene, Hyndman)
15:00-15:15	Break
15:15-16:15	Pressure Core Sampler (Kvenvolden, Pettigrew, Dunlap)
16:15-17:30	Safety Considerations (Ball, Claypool, Katz)
17:30-20:00	Dinner
20:00-22:00	Informal discussions, Manor House Inn

March 6

8:30-10:30	Gas hyrate objectives of ODP (von Breymann, Lewis)
10:30-10:45	Break
10:45-12:30	Conclusions and Recommendations

A brief summary of each of the remarks follows:

Kvenvolden set the stage for considerations of the global importance of gas hydrates by pointing out that a lack of knowledge leads to the wide ranging speculation concerning the role of gas hydrates and the size of the methane hydrate reservoir. Decomposing gas hydrates may currently contribute 2 - 4 Mt/yr of methane carbon to the atmosphere. This contribution is minor compared to other known sources of atmospheric methane. However, increasing temperatures may increase the flux of methane from gas hydrates.

Brooks described gas hydrate which occur at subbottom depths of less than 6 m at water depths ranging from 400 to 2,400 m in the Gulf of Mexico. The methane in these gas hydrates was either from biogenic or thermogenic sources based on molecular and isotopic compositions. Seismic wipe-out zones, hummocky, and pockmarked surfaces are associated with the gas hydrate occurrences. Shallow biogenic gas hydrates were also observed in the Eel River Basin offshore northern California.

Paull discussed the methane record in ice cores for the past 20,000 years during which atmospheric methane concentrations changed from 320 ppbv to 600 ppbv at about 18,000 years ago. He suggested that this change might be related to gas hydrate decomposition caused by sea level lowering of 100 m at that time. The gas hydrates would destabilized from the bottom up with an estimated release of 1.8×10^{-4} Gt/km^2. Thus 1 Gt of methane would be released by each 5,600 km^2. Because the gas hydrate reservoir is so large, this released methane (a greenhouse gas) could affect global climate; the methane release could also cause sediment instability and submarine slumps.

Sloan presented an historical review of gas hydrates which were first discovered in the laboratory in the early 1800s. In gas hydrates, water molecules form a structural framework of cages that contain gas molecules. The size of the cages is fixed and can include only gas of specific molecular diameters. Two crystalline structures are possible. In Structure I the vertices of the cages are joined whereas in Structure II the faces of the cages are joined. Methane hydrates are Structure I, but with about 1% propane the geometry of the cages will shift to Structure II. Eight heuristics of gas hydrates led to nine applications: (1) Biogenic methane, carbon dioxide, and hydrogen sulfide form Structure I, but with propane form Structure II; (2) Structure II has greater stability field than Structure I; (3) Hydrogen sulfide hydrates are uniquely stable; (4) 1 m^3 hydrate contains 160-180 m^3 gas; (5) Thermogenic gas hydrates should have similar heat transfer properties; (6) Gas hydrates can exist with only one other phase; (7) In deep water drilling, hydrates can occur when water-based drilling fluids are used; (8) Hydrate crystal morphology dictates strength of structure; and (9) Metastability will exist only over short time scales (days).

Boulegue considered hydrogen sulfide and its role in the formation of hydrate. He had observed hydrogen sulfide on platinum and noticed that the ratio was similar to that found in fully saturated hydrogen sulfide hydrates. There was a concern that hydrogen sulfide hydrates would pose a problem for ODP. Discussion led to the conclusion that hydrogen sulfide hydrate formation or decomposition should not be a major problem but that hydrogen sulfide should be monitored during the drilling operation.

Claypool posed five questions of importance to gas hydrate drilling: (1) What are pressure-temperature conditions that control methane hydrate stability; (2) How much methane is necessary to stabilize the hydrates; (3) Is free gas present; (4) Can gas hydrate act as a seal to high pressure gas; and (5) What procedure should be used to estimates the drilling depth to the base of zone of gas hydrate stability. To answer these questions he proposed that a new equation ($P = \exp [46.74 - 10{,}748/T]$, where P is in kPa, and T is in K) be used to define the methane-water-hydrate system and that hydrostatic, not lithostatic, pressure be used. He concluded that gas hydrate formation requires 80 - 150 mM methane and that free gas at the base of gas hydrate cannot be at high pressure, i. e., cannot exceed hydrostatic pressure if water is present.

von Huene reviewed the geophysical results of gas hydrate occurrences observed on DSDP Leg 76 and 84 and on ODP Leg 112. He noted that a BSR is not always observed where gas hydrates are present. Reprocessing seismic records shows that what may first appear as a continuous seismic reflector may in fact be patchy in occurrence. Low amplitude BSRs may indicate absence of free gas. An increase of gas hydrates with depth will give rise to stronger reflections. Some gas is needed to get reflectivity. Synthetic seismograms showed 60% porosity and 10% gas hydrates. A three hole experiment, proposed for offshore Peru and rejected by PCOM, was suggested for offshore Chile in order to evaluate the relationship between the BSR and the occurrence of gas hydrate.

Hyndman discussed a model for gas hydrate formation in subduction zones where accreting sediments are expelling fluids upward. Upward fluid flow also occurs where there is rapid sediment loading. In this model the BSR represents a layer of gas hydrate formed through the sweeping upward of biogenic methane. The hydrate builds upward in the stability field, and the BSR occurs where fluid expulsion is high. This model contrasts with the conventional view of in situ gas hydrate formation. Both models have problems which were discussed. The new model was applied to the Cascadia Margin. Analyses of seismic data suggest that the gas hydrate occupies about 1/3 of the pore space and that the gas hydrate base is 5 to 50 m thick. There is little gas below the BSR. Conclusions reached were (1) no increase in BSR reflector strength over structural highs; (2) no flat spots at base of hydrate; (3) no reflections at base of gas layer; (4) no attenuation of underlying reflectors by gas; (5) velocity-depth shows increase through BSR; (6) AVO best fit indicates no free gas; and (7) gas hydrate permeability more like snow than ice.

Worthington reviewed the logging characteristics of gas hydrates. Logs used conjunctively can yield quantitative assessment of gas hydrates. A comparison was presented between various logging devices and the theoretical and measured responses to gas hydrates and gas and water. Results were shown for gas hydrates recovered from the NW Eileen State No. 2 well in Alaska and DSDP Site 570 offshore Guatemala. Information about gas hydrates from cross plots was demonstrated: (1) Density vs. Neutron porosity, (2) Sonic velocity vs. Neutron porosity; and (3) Density vs. Sonic velocity. A recommended logging program included the following: Temperature and pressure, Density and neutron activation; Sonic wave form, Gamma ray, Dual lateralog, Carbon and oxygen (geochemical log), Caliper log, and Spherically focussed log.

Pettigrew After an historical review of the Pressure Core Barrel by Kvenvolden and a review of guidelines for the Pressure Core Sampler, Pettigrew described the current status of the Pressure Core Sampler, which is 42 ft. long, has a 6 ft. pressurized section, and 2 fluid sampling ports. The core is recovered at near *In situ* pressure and bottom hole pressure is trapped. the Pressure Core Sampler has been tested five times, three times on Leg 124 and twice on Leg 131 with various degrees of success. Questions were raised concerning temperature control, fluid transfer, and contamination by drilling fluid. A calculation was made showing that the maximum pressure that could result from a trapped gas hydrate would be about 3,000 psi which is well within the 5,000 psi design range of the tool.

Dunlap described the Texas A & M pressure sampling system that was designed and used several years ago. This device was deployed in shallow water and was opened in a hyperbaric chamber where engineering properties of the sediment were measured, and samples were taken for gas analyses. There is a concern about gas hydrates affecting the foundations for oil-well platforms in deep water. A system is being designed to push a probe ahead of the drill to measure properties related to gas hydrates, such as shear strength, pore pressure, resisitivity, thermal conductivity, sediment density, and temperature. A core penetrometer is being considered to determine type of sediment and pore-water pressure. A device is also being constructed to make gas hydrates in the laboratory to measure physical properties.

Ball reiterated the concerns of the PPSP and indicated that this panel would consider proposals, on a site by site basis, that request to drill through the BSR. Guidance from this workshop will be useful.

von Broymann reviewed ODP objectives in gas hydrate drilling. The next ODP legs with gas hydrates are 141 (Chile Triple Junction) and 146 (Cascadia Margin). It is important to look at question of gas hydrates when designing a leg proposal. Legs may be readjusted to answer gas hydrate questions. The possibility of thermogenic hydrocarbons must be considered. Phase I development of Pressure Core Sampler requires an operational tool that at a minimum can recover gases and liquids. A gas manifold needs a lead person to interface with ODP. Logging of gas hydrate occurrences is essential Model testing of gas hydrates needs at least shorebased interest. The following measurements are important for gas hydrate research: (1) composition and quantity of gas, (2) presence and absence of free gas, (3) porosity/velocity calibrations, (4) amount of gas hydrate as percent of porosity, (5) permeability of gas hydrate layer, (6) concentration of methane above and below BSR, and (7) source of methane and other gases - local source vs. migration.

Lewis discussed the scientific rational and objectives of ODP Leg 141 (offshore Chile). This leg involves a ridge crest environment with a complex migrating triple junction and ridge crest subduction. Of interest in gas hydrate research is Line 745 where three holes will be drilled. Along this line the BSR is quasi-continuous and two holes will penetrate the BSR if approved. In addition, one hole will be drilled near the toe of the slope on Line 750, and one hole will penetrate the region of the triple junction on Line 751.

Hyndman review briefly the Cascadia Margin drilling for Leg 146 to define fluid expulsion and physical properties. Sites will be drilled offshore Vancouver to test diffuse fluid flow and offshore Oregon to test focused fluid flow. One fourth of the leg will be devoted to gas hydrates. The gas hydrate objectives are: (1) calibration of BSR pressure-temperature conditions; (2) measurement of velocity, porosity, permeability and estimates of heat flow; (3) calibrate seismic data interpretation; (4) test gas hydrate formation model; and (5) evaluate diagenetic associations of gas hydrates.

RECOMMENDATIONS

From the above presentations and the accompanying discussion, the following conclusions and recommendations were made. There was a general consensus that gas hydrates are an important research topic in ocean drilling. Even though more than 20 years has passed since gas hydrates were first recognized as naturally occurring substance, much remains to be learned about these intriguing materials. ODP provides an important platform for the study of gas hydrates occurring in oceanic sediments. Current drilling practices of ODP are capable of recovering partially decomposed samples of gas hydrate. To make the study of gas hydrates quantitative, there is an immediate need for use of a functional Pressure Core Sampler which is capable of recovering gas and liquids at *in situ* pressures. Such a device will provide not only information about gas hydrates but also about the composition and concentration of fluids within and below the zone of gas hydrate stability. In order to gain new knowledge about gas hydrates, the following specific recommendations are made by SGPP:

Predictive equation for depth of gas hydrate stability field.
The temperature and pressure regime below the seafloor determines the stability field of pure methane and mixed gas hydrates. The SGPP concurs with the recommendations by the workshop participants that an analytical equation be tested and substituted for the graphic method, used unchanged since the days of DSDP, and that a software package, allowing numerical solutions for any environment of gas hydrate stabilities, be developed for use aboard the JODES Resolution to improve safety measures.

Pressure Core Sampler:

1. **Manifold for extracting free and hydrated gases**

A gas sampling manifold is required to obtain the contents and composition of free and hydrate gases. The existing manifold assembly of the PCS tool appears to be inadequate, due to large internal dead volumes, to conduct the necessary experiments with gas hydrate contained inside the pressure chamber. The SGPP concurs with the recommendation of the workshop participants that a previous successful gas sampling manifold (Kvenvolden, USGS Menlo Park) and a new but untested design (Whelan, Woods Hole Oceanographic Institution) be perfected by ODP with input from both of these scientists as well as future shipboard geochemists.

2. **"Harpoon" for extracting pore waters.**

For shipboard analyses of the pressurized samples obtained by the PCS system, the "harpoon" is presently the most suitable attachment for subsampling fluids. It utilizes the internal pressure of the sample chamber to self-squeeze pore waters from the center of the core thereby eliminating possible contamination by drilling fluid. SGPP concurs with the recommendations of the workshop participants that design, construction, and operation of the harpoon be completed with input from the shipboard geochemists of Legs 141 and 146.

3. **Exchangeable pressure chamber.**

The pressure core sampler under development by ODP is a coring system capable of retrieving samples at bottom hole pressure, and hence is the key tool for pursuing several major objectives of SGPP, notably the behavior of fluids, gases, and gas hydrates in accretionary prisms. The SGPP considers that successful completion of these objectives requires three exchangeable pressure core subassemblies and recommends that these be available for the upcoming Legs 141 and 146. These assemblies should be used on a rotating basis with one chamber attached to the PCS system during sampling, while the contents of the second one are subsampled and analyzed aboard ship and the third one is being readied for a new deployment. This approach allows a complete downhole profile, as opposed to a single measurement per hole. It provides adequate turn-around time for close sample spacing downhole, eliminates the costly construction of an as-yet unavailable transfer chamber, and ensures back-up in case of damage. If trace metal concentrations are of high priority, the multiple subassemblies should be made of titanium; if gases, dissolved metabolites, or major sea water ions are to be measured, the less costly stainless steel version is adequate.

Gas hydrate leg.

Understanding the interaction of natural gas hydrates with the thermal and fluid regime of continental margins and in particular accretionary complexes, is the highest scientific priority of the SGPP. Likewise, the presence of gas hydrates has uniquely influenced safety deliberations by the PPSP in drilling deep margin holes. Hence, the participants of this workshop recommend that a dedicated gas hydrate leg be planned and drilled similar to the one previously proposed for the Peru Margin (ODP 112A). The SGPP and the PPSP, outside proponents and investigators should design such a leg with drilling opportunities in the Atlantic or the Pacific Oceans.

Indian Ocean Synthesis Conference
University of Wales, Cardiff, UK
July 16-18, 1991

SEA-GOING SCIENTISTS SEQUESTERED IN SILURIA

Fifty-two scientists from ten countries met in Cardiff in July of 1991 to draw together individual results of the 9-leg ODP campaign in the Indian Ocean (1987-1988) into ocean-wide syntheses. The conference was convened by Robert Duncan (Oregon State University), David Rea (University of Michigan), Jeffrey Weissel (Lamont-Doherty Geological Observatory), Ulrich von Rad (BGR, Hannover) and Robert Kidd (University of Wales, College of Cardiff) who acted as host. Support was provided by JOI/USSAC, NERC and the UWCC Department of Geology.

The meeting was divided into a one-day plenary session open to all comers (sponsored by the Geological Society of London) and two days of joining together in small working groups to compare individual results and prepare outlines of synthesis papers. The plenary session was opened with a welcome by Michael Brooks, Head of Department. Keynote presentations were designed to reacquaint conferees with the goals and achievements of the nine-leg Indian Ocean program. Results were summarized by: Roland Schlich on "Objectives of the ODP Indian Ocean drilling program"; Jean-Yves Royer on "Paleogeographic reconstructions of the Indian Ocean"; Warren Prell on "Development of the Arabian Monsoons"; Robert Duncan on "Life cycle of Indian Ocean hotspots"; Sherwood Wise on "Antarctic to sub-Antarctic Paleoceanography"; Ulrich Von Rad and Felix Gradstein on "Ocean evolution: from Tethys to Indian Ocean"; Jeffrey Weissel on "Intra-plate deformation in the central Indian Ocean"; Henry Dick on "Oceanic lithosphere layer 3: Indian Ocean Site 735"; and Robert Kidd on "Progress of the PALIOS project: DSDP to ODP synthesis". In the afternoon of the first day conferees attended a poster session illustrating the results of approximately 20 research efforts by various conference delegates on Indian Ocean ODP topics.

On the morning of the second day the workshop subdivided into thematic groups and discussed what the most important results of the Indian Ocean drilling were in the three general categories of Lithosphere, Tectonics, and Sediments and Ocean History. Here we list those results which have

significance to a broad range of earth scientists, not merely to marine geoscientists:

1. History, onset, oceanography and atmospheric circulation of the Arabian Sea: development of the monsoons in response to Himalayan uplift.

2. Documentation of significant ice sheets on East Antarctica by the early Oligocene, of Eocene/Oligocene glacial activity, and of late Miocene enhancement of ice/glacial activity.

3. Early rift evolution of passive margins and important constraints on the timing of the breakup of east Gondwana in the late Jurassic and Early Cretaceous.

4. Four K/T boundaries, three with iridium anomalies, and one complete Cenomanian/Turonian boundary.

5. Flood basalt initiation, lifespan and compositional variability of hotspots; reference frame for plate motions and plate reconstructions.

6. Penetration and high recovery of Oceanic layer 3 gabbros, demonstrating composition, structure; deformation and alteration history of slowly-spreading crust.

7. Documentation of the response of oceanic lithosphere to both compressional and extensional forces.

8. Origin, structure, rifting and subsidence of vast oceanic plateaus.

For most of the second and all of the third day workshop members gathered in small groups to begin working on synthesis manuscripts. Twenty-seven multi-authored papers were proposed. The American Geophysical Union has agreed to combine reviewed papers into a Geophysical Monograph on the topic of "Scientific Drilling in the Indian Ocean" which should appear in late 1992.

Indian Ocean Synthesis Volume
American Geophysical Union

Authors and Titles

Pospichal and Huber: The Cretaceous/Tertiary Boundary in the Indian Ocean

Prell et al.: Evolution of the Indian Ocean Monsoon and Paleoclimates of the Northern Indian Ocean

Royer et al.: Indian Ocean Plate Motions and Paleogeographic Reconstructions

Schlich and Duncan: Indian Ocean Drilling Program

Schlich et al.: Kerguelen Plateau Structure, Stratigraphy and Tectonics: A Summary

Thurow et al.: The Cenomanian/Turonian Boundary Event (CTBE) in the Indian Ocean - a Key to Understanding the Global Picture

von Herzen et al.: Synthesis and Comparison of Physical Properties, Borehole Logging, and Downhole Experiments in Lower Ocean Crust (Site 735B)

von Rad et al.: Mesozioc Evolution of the Rifted Margin of Northwest Australia

Watkins et al.: Paleoceanography of the Cretaceous Indian Ocean from Litho- and Biostratigraphy

Weis et al.: Mantle Evolution During the Opening of the Indian Ocean Basin

Weissel et al.: Extensional and Compressional Deformation of the Lithosphere in the Indian Ocean in the Light of ODP Drilling

Weissel-Prell: Indian Ocean Sedimentary Response to Himalayan Uplift

Zachos et al.: Paleoceanography of the Indian Ocean: Inferences from Stable Isotope Data

Tectonics Subgroup

Comparison of Tectonic Objectives and Achievements for each leg

Leg 115: Objective was to determine an absolute plate motion reference frame from drilling on the Chagos-Laccadive Ridge and the Mascarene Plateau; objective was met.

Leg 116: Objective was to determine the history of the intraplate deformation in the central Indian Ocean; objective was met. However, the relationship between the deformation and Himalayan uplift history remains poorly known.

Leg 117: Objective was to determine the uplift history of Owen Ridge; objective was met.

Leg 118: No clear tectonic objectives.

Leg 119, 120: Objective was to determine the origin, rifting and subsidence history of Kerguelen Plateau; objectives were mainly met, but merging the Kerguelen and Broken Ridge drilling results and geophysics data will take time, and needs to be done.

Leg 121: Objective at Broken Ridge was to determine the rifting and history; objectives were met. Objective at the Ninetyeast Ridge was to determine the absolute plate motion reference frame through basement ages, and this objective was met.

Leg 122/123: Objective was to determine the rifting history of the NW Australian continental margin; objectives probably met.

Objectives not met:

The drilling objective was not met at Prydz Bay, which was to determine the early rifting history of India and East Antarctica.

Future Drilling Opportunities

1) Kerguelen/Broken Ridge basement and Cretaceous environments (see also LIPS report).
2) Red Sea Drilling: some aspects could be revived.
3) Somali deep hole would be useful for dating the breakup of East and West Gondwana in the Jurassic.
4) Breakup between Australia and Antarctica: drilling in the Diamantina Fracture Zone, and the Labuan Basin, adjacent to the eastern margin of the Kerguelen plateau.

Summary of Indian Ocean Accomplishments, Discoveries, Failures and Future Drilling - Lithosphere Objectives

Accomplishments and Discoveries:

1. Hotspot volcanism
   a. Timescale, starting conditions (flood basalts)
   b. Temporal variations in flux and composition
   c. Reference frame for plate motions and reconstructions

2. Penetration and high recovery of Oceanic layer 3 rocks
   a. Slow spreading ridge end-member of magma supply, structure
   b. Deformation, alteration history
   c. Logging - core comparison, physical properties
   d. Viable offset drilling strategy for deep crustal sampling

3. Oldest Indian Ocean crust, Argo Abyssal Basin
   a. Comparison with Red Sea and Jurassic crust elsewhere
   b. Geochemical reference site

4. Ash stratigraphy
   a. Tephro-chronology
   b. Volcanic histories - physical and chemical processes

Future Opportunities for ODP Drilling:

1. Red Sea: Early ocean basin formation and metallogenesis.

2. Return to Site 735B: Completing the crustal section.

3. Australian-Antarctic Discordant Zone: Mantle downwelling? and development of this spreading ridge anomaly during ocean basin opening.

4. Southeast Indian Ocean Transect: Tracking MORB variablity through time.

5. Northern Kerguelen Plateau basement: Age and composition

SEDIMENTS AND OCEAN HISTORY:

Major accomplishments of Indian Ocean ODP drilling:

1. History, onset, oceanography and atmospheric circulation of the Arabian Sea: response to monsoons.

2. Documentation of significant ice sheets on East Antarctica by the early Oligocene, of Eocene/Oligocene glacial activity, and of late Miocene enhancement of ice/glacial activity.

3. Important constraints on the timing of the breakup of east Gondwana

4. Establishment of a high-latitude data base for biostratigraphy, magnetostratigraphy, lithostratigraphy, glaciomarine sequences.

5. Important constraints on the origin of Kerguelen-Broken Ridge Plateau in the Early Cretaceous

6. Late Triassic nannofossil and palynomorph stratigraphy, first discovery of a Rhaetian carbonate platform on the northwest Australian Tethyan margin; enhanced petroleum prospectivity of northwest Australia.

7. Juvenile hemipelagic ocean sequence of Early Cretaceous age on the northwest Australian margin.

8. Neogene and later Paleogene history of carbonate deposition, dissolution and the CCD.

9. High resolution, low-latitude Neogene sections, including detailed magnetostratigraphy back to the middle Miocene.

10. Latitudinal transects for biostratigraphy for Campanian through Pleistocene; diachroneity of biostratigraphic markers.

11. Latitudinal transects for oxygen and carbon isotopic stratigraphy, especially useful for Paleogene questions and best of all oceans for mid- to high-latitude paleoceanography.

Serendipitous Results/Discoveries.

1. Four essentially complete K/T boundaries with iridium anomalies.

2. An excellent Cenomanian/Turonian boundary.

3. Expanded and nearly complete whole Cenozoic section at 762; expanded Paleocene with all fossil groups and magnetostratigraphy at 752.

4. Tectonic activity, Plio-Pleistocene uplift of the Oman margin.

5. Forty million year record of volcanic activity on Broken Ridge; extensive post-breakup volcanism on the northwest Australian margin; detailed tephrochronology of the Indonesian arc.

6. Non-marine sediments on Kerguelen Plateau

Objectives not achieved:

1. Poor records of the lower to middle Eocene

2. Jurassic missing in Leg 122 sites.

3. No improvement to the Jurassic and early Cretaceous biostratigraphy

Remaining Important Problems:

1. The undrilled legs: Somali deep stratigraphic test site; Red Sea; Makran accretionary prism

2. The unsampled latitudinal gap at about 30° to 50°S inhibits mid- to high-latitude biostratigraphic correlations.

3. Definition of the two largest deep sea fans in the world, Bengal and Indus, and the fine-scale resolution of Himalayan uplift from clastic fluxes.

4. High resolution Neogene stratigraphy at mid and high latitudes.

5. Initiation of ice cover on Antarctica; evidence for major *de*glaciations on Antarctica.

6. Basement of Australian marginal plateaus, of west Kerguelen.

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Department of Geology
919-966-4516

CB# 3315, Mitchell Hall
The University of North Carolina at Chapel Hill
Chapel Hill, N.C. 27599-3315

RECEIVED
JUL 3 0 1991
Ans'd.....

July 26th, 1991

To: PCOM
From: T.J. Bralower, Liason ODP-GSGP TJB
Re: Update of GSGP-CRER activities, 1990-1991

The Global Sedimentary Geology Program project on Cretaceous Rhythms, Events and Resources (CRER) was the centerpiece of a workshop sponsored by JOI/USSAC held in Denver in August 1991. A summary of this workshop was published in the JOI/USSAC Newsletter.

In the last year several independent efforts have been made to begin drilling Cretaceous sections on land. Two separate land-based drilling projects have been devised: "Albicore" which is coordinated by A. Fischer (USC) intends to investigate the middle-late Albian "greenhouse maximum" and "Apticore" coordinated by R. Larson (URI) aims to study the effects on paleoceanography of a possible early Aptian superplume. As a part of project "Albicore", a German group coordinated by J. Thurow (Bochum) will drill a hole through the Albian in the northwest part of Germany in Fall 1991. A proposal has been submitted to JOI/USSAC to hold a workshop in Italy in 1992 to formalize plans for project "Apticore". Another result of the CRER workshop was a significant revision of the ODP proposal (253) coordinated by W. Sliter (USGS) to drill a transect of holes on Shatsky Rise and other Pacific plateaus in order to elucidate black shale deposition and its relationship with depth, volcanism and latitude. Finally, a US group, funded by DOE and led by M. Arthur (Penn State) and W. Dean (USGS) will drill a transect of holes through the middle-upper Cretaceous in S.W. Colorado. The cored Cretaceous record from land areas will be a profound addition to the DSDP/ODP record from the ocean basins.

Workshop Report

Cretaceous Resources, Events and Rhythms

Contributed by M. A. Arthur, T. J. Bralower and W. E. Dean

One-hundred and three earth scientists interested in Cretaceous earth processes and global change attended the August 20-24, 1990 SEPM research conference on CRER (Cretaceous Resources, Events and Rhythms) sponsored by the Society of Economic Paleontologists and Mineralogists (SEPM) and the Global Sedimentary Geology Program (GSGP). Generous funding from JOI/USSAC supported attendance of 12 graduate students and provided partial support for a number of key speakers. In addition to a program of oral and poster presentations of ongoing investigations of Cretaceous paleoenvironments, biota and sedimentation; a day-long field trip to view Cretaceous strata deposited in or on the margins of an epicontinental sea; and two core workshops illustrating principles of interpretations of cycles, black shales and sequence stratigraphy in Cretaceous marine strata; several sessions were held to discuss potential scientific objectives which could be met by ODP and other drilling, a synopsis of which appears below.

Our major objectives can be addressed with ODP drilling and tied together in the theme, "Record of the Earth System in an Alternate Mode." The Cretaceous earth contrasted greatly with that of the late Neogene and Quaternary. It has been asserted that Cretaceous climate was generally warmer and more equable and ice volume was a fraction of the present. It has also been suggested that deep ocean convection was sluggish in comparison because of reduced thermal contrast. These interpretations remain controversial. Extremely active mid-plate and plate margin volcanism also characterized the Cretaceous, accompanied by perhaps the highest sea level and most extensive continental flooding of the Phanerozoic. As a result of these factors, the chemistry of the atmosphere and oceans may have differed somewhat from Neogene and modern oceans. Oceanic oxygen-carrying capacities were reduced and dysaerobic/anoxic conditions in mid- to deep-water masses were common. Dramatic biotic evolutionary radiations and extinctions resulted from constantly changing environmental conditions.

There is an order of magnitude less known about this alternate state than there is about the Neogene climate/oceanic mode, which has been and will be studied in great detail in recent and planned ODP legs. At the CRER meeting we identified the following specific scientific goals:

a) Studies of peak high-stand intervals. These probably correspond to peak "greenhouse" intervals as well and we need to better understand the climate-ocean system at these times.

b) Tests of global eustatic models and of current sea level chronostratigraphies. Application of recent higher resolution integrated biostratigraphies to drilling of various continental margins may resolve tectonic and eustatic forcing of relative sea-level change and shed light on rates of change.

c) Isotopic, assemblage and evolutionary studies on well-preserved Cretaceous microfossil assemblages will constrain latitudinal and basin-margin temperature and salinity gradients. Adequately preserved assemblages are available only through ocean drilling in most cases.

d) Investigations of critical gateways in oceanic circulation. Little is known about the exact timing of shallow and deep-water communication between various Cretaceous ocean basins in particular.

e) Studies of Cretaceous anoxia and its spatial and temporal extent. Carefully planned drilling needs to be carried out in particular locations and along depth transects to test depositional models and correspondence of "black shale" deposition with sea level and climatic changes.

f) Interaction of drilling objectives with results of climate modelling (GCM) studies. We need to use climate models as predictive scenarios and test their sensitivity and predictions rigorously with global data sets derived, in part, from ocean drilling.

g) Coordination with CRER Project "Albicore." The objective of this project is to examine a brief but well-constrained mid-Cretaceous (late Albian) time "slab" on a global scale in order to understand short-term (orbital) variability in a greenhouse world.

CONVENE
A
WORKSHOP
Contact the JOI Office for details.

Mike Arthur, currently at the University of Rhode Island, focuses on aspects of the strange Cretaceous earth environment abusing stable isotopes, among other things, in his research.

Timothy Bralower of the University of North Carolina utilizes miniscule but ubiquitous calcareous fossils in his biostratigraphic and paleoceanographic work.

Walter Dean is Chief of the Sedimentary Processes Branch at the U.S. Geological Survey, and pummels sediments and sedimentary rocks into submission for geochemical studies of paleoenvironmental problems.

Few well-recovered sections, targeting specific Cretaceous objectives, exist to test these hypotheses. The assembled workers support advances in technology which will boost recovery of interbedded chalk-chert and sand deposits and allow adequate recovery during deeper drilling. We stress that most drilling programs can be designed to meet several goals, as follows:

1. Recovery of continuous, highest latitude Cretaceous strata.

2. Drilling in epicontinental seaways and adjacent to gateways to test models of sources of deep water and origin of epicontinental sea hypoxia.

3. Continental margin depth transects to test sequence stratigraphic concepts, and examine patterns of biogenous sediment accumulation, carbonate preservation and organic matter preservation with depth and distance offshore.

4. Latitudinal transects to examine climatic gradients and changes in surface water biota, as well as to test models of the forcing of Cretaceous climates by orbital variations.

5. Drilling of Cretaceous platform and pelagic carbonate sediments under shallow burial conditions to obtain the best preserved faunal components, with additional objectives to test models of widespread events in drowning of Cretaceous rudist reef platforms.

A detailed report on the CRER Conference and specific recommendations for further research and drill sites relevant to ocean drilling will be available from JOI in mid-December 1990.

Dalhousie University
Department of Oceanography
Halifax, N.S.
B3H 4J1
(902) 494-2503

TO: DR. JAMES AUSTIN -- FAMOUS PCOM CHAIRMAN
FROM: LARRY MAYER

Jamie -- Needless to say you haven't caught me at the best time but -- for the good of the cause --- unfortunately the most recent info re: NAD will be generated at the meeting in Tromso today and tomorrow -- I have no idea what will be accomplished and it would be nice if you could get a call into someone for an update (I enclose a list of all participants with the hope that you may find someone) -- I am enclosing several documents that may give you an idea of whats going on -- these include:

1- circular of 21 May -- describing Tromso meeting objectives

2- Agenda for Tromso meeting

3- Cover page and abstract from the NAD Science Plan (the document is about 200 pages thick)

4- The section on linkages to other programs

5- A brief history of NAD and the science plan

6- list of participants

The bottom line is that this has been rather ad hoc though there are a lot of big players involved and they have the ear of many established organizations. The present focus is the Science plan which should be finalized this week and then published in the JOurnal of the Society of Polar Research. With this document and the work of the Technical Committee (looking at logistical considerations), the Site Survey subgroup (exploring means for site surveys) and the Data Bank subgroup (assessing existing Arctic databases) the program hopes to gain legitimacy and come into its own. Interaction and cooperation with ODP is essential -- if everyone's card's are played right both groups could greatly benefit (ODP by expanding its capabilities and addressing a key scientific issue that it could not before) and NAD by gaining the experience and credibility of ODP. Look through this stuff and give me a call if you have questions -- sorry I couldnt be there -- I'll miss the fun of bragging about Leg 138 -- and even miss seeing you.

Larry

Larry

000254

Circular

To: NAD Science Committee
From: Jörn Thiede

Subject: Next meeting of the NAD Science Committee
Place: Polarmuseet, Tromsö, northern Norway
Time: July 31, 1991, 10:00 a.m. to 3:00 p.m.

1. Most of you will have heard that POLAR STAR, ODIN and POLARSTERN will depart Tromsö on August 1 for a major Arctic expedition. Since a number of the members of the NAD organization are participating in this expedition the chairman of the NAD Executive Committee has invited to a general meeting of NAD matters in Tromsö the day before departing. The proposed agenda is enclosed.

2. I will be spending the last week of May in Washington, D.C. together with Leonard Johnson to finalize the NAD Science Report. Comments have been provided by a wide audience in the meantime and we feel that it is important and urgent to finalize the science plan. The final version of the science plan will be circulated for approval before the July meeting in Tromsö.

3. I am asking the chairmen of the two subgroups of the NAD Science Committee to prepare short statements on their state of affairs. This applies to Yngve Kristoffersen with respect to the Site Survey Panel and to Gary Brass with respect to the Arctic Data Bank.

4. I have not yet communicated with Keith Manchester on the topic of the report from the NAD Technology Committee. Whenever I have presented NAD plans and discussions the question of technical feasability has come up. I feel that a specific report addressing the technological requirements and problems to carry out Arctic deep-sea drilling is provided more or less simultaneously to the Science Report. Through a copy of this memo I am requesting Keith to communicate to us his thoughts on this item.

Hope to see you in Tromsö. The letter of Tore Vorren/Leonard Johnson also suggests that we lodge at a hotel in Tromsö (address, price, phone and fax numbers enclosed).

Jörn Thiede
May 21, 1991

ARCTIC CRYOSPHERE EVOLUTION AND VARIABILITY: SCIENTIFIC PRIORITIES AND GEOLOGICAL FRAMEWORK

Science Plan

prepared by the

NAD Science Committee

1991

Figure of title page has been taken from cover of Jackson, 1987

000156

Abstract:

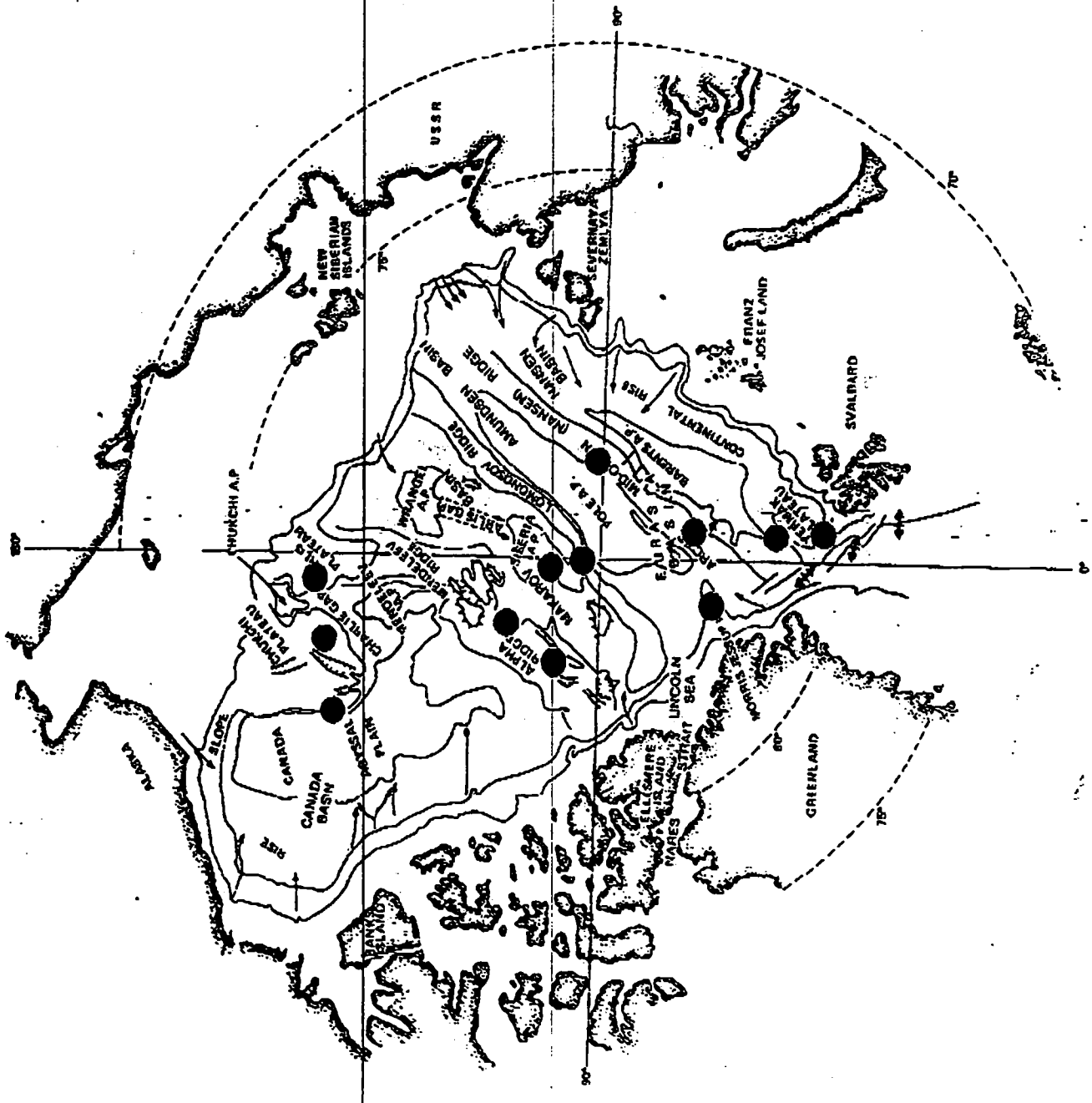
Arctic Cryosphere Evolution and Variability

1. The Nansen Arctic Drilling Program (NAD) prepares for investigations in the ice covered Arctic Ocean to resolve its Late Mesozoic and Cenozoic paleoceanographic and -climatic as well as tectonic history. It is the time for the international scientific community to join forces in expeditions to the Arctic. It is our ultimate objective, to explore the natural properties and history of some of the least known, most hostile ocean basins of our globe through deep-sea drilling techniques.

2. The Arctic ice cover is an expression of the extreme modern climatic scenario which has only developed during the Late Cenozoic cooling of both poles. Sea ice covered areas and their marginal zones have experienced the most extreme and most rapid climatic changes during the most recent geological past. It is here where the ocean surface water masses cool to below 0°C and where cold oxygen-rich and dense surface waters sink to the sea floor to contribute to the renewal of the bottom water masses of the global ocean. To understand the short- and long-term changes of the Arctic Ocean environment is therefore critical for resolving GLOBAL CHANGE. The Arctic Ocean with its important contribution to deep water formation and its clear association with ice sheet history will be of importance in predicting the future behavior of the global ocean climate system.

3. Continental margins and sedimentary basins of polar and subpolar areas have been understood to contain large quantities of natural resources. The geological history of the northern hemisphere and the framework for the formation of such resources cannot be reconstructed properly if the nature and evolution of the basement of the Arctic Ocean is not determined by means of obtaining undistributed samples from basement rocks. Large tectonic features, such as Lomonosov Ridge, the Alpha Mendeleev Ridge, Makarov Basin, the Canadian Basin and a number of continental margin features are virtually unknown. Reconstructions of the paleogeography of the northern hemisphere prior to Cenozoic times are hypothetical at best and can only be solved by deciphering the plate tectonic puzzle of the Mesozoic Arctic.

4. Drill sites have been proposed to sample most major basement units of the Arctic Ocean and to for describe the Late Mesozoic and Cenozoic depositional environment selecting both high and low sedimentation rate areas. We are on the brink of technical feasibility of Arctic deep-sea drilling. NAD proposes an approach over several years to combine heavy coring, light and heavy drilling to obtain an undisturbed sampled record of the properties of basement rocks and of the history of the Arctic Ocean depositional environment.



Locations of proposed drill sites for the Nansen Arctic Drilling program.

2. LINKAGES TO OTHER PROGRAMS AND ORGANIZATIONS

The perspectives of NAD have been discussed intensively in national and international funding organizations, agencies of all Arctic rim countries and a number of other interested nations. The scientific background for NAD has been prepared by the SCOR Working Group 82 "Polar Deep-Sea Paleoenvironments" and several workshops and meetings of the IUGS Commission for Marine Geology (CMG) as well as the ICL Subcommittee on the Arctic (Blasco et al., 1987).

Arctic deep-sea drilling has been emphasized during the COSOD conferences (Conference on Scientific Ocean Drilling); it achieved a high priority rating in the Working Group on "Changes in the Global Environment" of COSOD II, in Strasbourg, July 1987 (COSOD, 1987). As a consequence of these discussions and of the applicability of many techniques developed by ODP (Ocean Drilling Program) NAD has also established a formal liaison of JOIDES.

2.1 Ocean Drilling Program

Some of the paleoenvironmental perspectives of this science plan can be and have been pursued in the subarctic deep sea basin and during DSDP leg 10 in the Bering Sea, DSDP Leg 38 and ODP Leg 105 in the Labrador Sea Basin Bay area. New proposals which are presently being discussed in a newly established DPG of ODP will hopefully lead to renewed efforts in northern high latitude deep sea drilling efforts (though clearly outside the permanently ice covered Arctic regions), with the following scientific aims.

A comparison of the available data from the northern and the southern hemisphere reveals that the history of the circum-antarctic deep-sea regions has been studied in considerably more detail and with more success, than the records on the northern hemisphere. Presently it appears that the glacial history of the southern hemisphere began some 20 to 30 Ma before that of the northern hemisphere. However, we believe that at least part of this asymmetry is due to an artefact of available samples and regional coverage of drill points, because we have been unable to sample the Arctic Ocean proper and the western parts of the Norwegian-Greenland Sea. In addition, sediments in the northern Labrador Sea and in particular in Baffin Bay have produced enormous stratigraphic difficulties in dating. In this proposal we are focusing on the Norwegian-Greenland Sea to complete the information on the northern hemisphere which has been collected during ODP Leg 104 and Leg 105. The Norwegian-Greenland Sea is a particularly interesting area to study, because the East Greenland Current is carrying the history of the glacial ice cover of the Arctic Ocean. The Norwegian Current in the east is reflecting the warm-water transport from the main North Atlantic to the Arctic. ODP Leg 104 succeeded in unraveling the history of the Norwegian Current and determined the onset of northern hemisphere glacial paleoclimates.

Until now the Norwegian-Greenland Sea has been visited by DSDP Leg 38 and ODP Leg 104. The drilling campaigns covered the eastern and southern parts of this deep-sea basin including the Greenland-Scotland Ridge. Due to the poor recovery on DSDP Leg 38 we lack high resolution stratigraphic records, and thus important knowledge on paleoenvironmental changes in the southern part of the Norwegian-Greenland Sea basins. In contrast, the results of ODP Leg 104 (Eldholm, Thiede et al., 1989) provide us with detailed information about the eastern part of the basin, in particular:

- the development of paleoenvironments in the Norwegian Sea, especially of the (warm) Norwegian current system, and
- the variability of Cenozoic paleoclimate on the northern hemisphere.

The results open important perspectives for future deep-sea drilling activities in th northern, western, and southern areas of the Nordic Seas that have not yet been drilled in detail. The new drilling program as proposed here is addressed to

- the paleoceanographic evolution of the Norwegian-Greenland Sea (cold East Greenland-Current versus warm Norwegian Current)
- the opening of Nordic Sea gateways and the development of northern hemisphere Cenozoic paleoclimate.

The target areas proposed for drilling are arranged in terms of two transects: One transect extends from the Fram Strait along the East Greenland continental margin to the Denmark Strait following the eastern boundary of the East Greenland Current. The other transect reaches from the northern Iceland Plateau to the south of the Iceland-Faroe Ridge, an important barrier for water masses between the Norwegian-Greenland Sea and the North Atlantic.

2.2 Continental Margin and Shelf Sea Drilling

The environmental history of the Canada Basin is being addressed by a cooperative effort between the US Geological Survey and the Geological Survey of Canada. The GSC/USGS effort has two main components. The first component involves field documentation and land-based drilling of the upper Cenozoic terrestrial sequence for the Yukon Basin and the adjacent Old Crow Basin. Outcrop and geophysical evidence suggest several kilometers of sediments are preserved in these basins. Outcrop samples show that the Yukon and Old Crow Basin sections extend well back into the Miocene and contain various types of microfossils and tephra beds that will be useful for dating. Thus these sequences are likely to contain a good record of the late Cenozoic evolution of terrestrial environments adjacent to the Arctic Ocean.

The second component involves marine geophysical studies and piston coring on the Beaufort Shelf and the Northwind Ridge. Multichannel seismic data and reconnaissance coring indicate a relatively thick Mesozoic to Holocene record is preserved in the Northwind Ridge section. Only the upper and basal units of the Northwind Ridge section have been sampled. Preliminary analysis of cores indicates that upper Quaternary interglacial intervals are represented by foraminifer-rich beds and all interglacials of the Brunhes Epoch appear to be present. In addition, Cretaceous sediments recovered from the base of the section contain foraminifers. Thus the unsampled section between the Upper Quaternary and Cretaceous has high potential for yielding useful information for understanding the open marine paleoenvironmental evolution of the Canada Basin. Multichannel seismic records from the Beaufort Shelf have revealed structures that bring deep units near the surface. Reconnaissance coring sampled a few of these structures and sediments in the base of these cores which appear to represent preglacial conditions. Although very preliminary, the results from the Beaufort Shelf suggest additional coring in this area can obtain marginal marine to shelfal late Cenozoic record that will form an important tie between the mainly terrestrial record from the Yukon and Old Crow Basins and the more open marine Northwind Ridge sequence.

Similar efforts are underway in the Barents sea organized by Norwegian institutions (IKU in Trondheim) as the leading institution. It has to be assumed that comparable programs are carried out by Soviet institutions in the E European and Siberian shelf.

2.3 Other National/International Efforts

The perspectives of NAD have been presented to AOSB (Arcti Ocean Sciences Board) and will be to IASC (International Arctic Science Committee), which is entertaining the foundation of a marine geology and geophysics working group. Program objectives are closely related to and will be part of NCAP, the Nansen Centennial Arctic Research Program proposed by the Norwegian Academy of Sciences. The Arctic System Science Workshop (US-NSF) too recommended an intensified program of research in Arctic Ocean Paleoceanography to determine paleoclimatic conditions (Moritz, 1990).

PAGES (Past Global Changes) sponsored by the International Geosphere Biosphere Program (IGBP) has a formal liaison with NAD and joint coordinated efforts are in the planning stage.

NAD activities must also be considered in relation to PONAM, ECOPS, ARCTIC 91 and NEREIS, all of these projects or activities are being carried out by international organizations, ESF (European Science Foundation) or national agencies.

NAD will also extend the temporal and regional of the ice coring presently carried out on the Greenland ice shield. However, NAD

will also benefit from scientific success of the ice drilling because of the different nature of the sample material, the different time scales being addressed and the supporting information to be drawn from the ocean basin adjacent to the Greenland ice shield.

Appendix B

History and Scope of the NAD Science Plan

This proposal focuses on the scientific perspectives and priorities of deep-sea drilling in the permanently ice covered Arctic Ocean, based upon the input of an international group of scientists. Many of the technical aspects of site surveying and deep-sea drilling in ice covered waters will be dealt with in a similar report of the NAD Technology Committee. Topics were defined at the first NAD meeting in Washington D.C. during the International Geological Congress in 1989. Further discussions were held at the NAD meeting on October 11, 1990 in Stockholm/Sweden after the preparation of the cruise plans for ARCTIC 91 (TRAPOLEX Transpolar Expedition, summer 1991). The discussions in Stockholm also led to the consideration that a specific Site Survey Committee should be formed. Yngve Kristoffersen, member of the NAD Science Committee, will carry the initiative for this activity. Options to establish an Arctic data bank are presently being evaluated (spearheaded by Garry Brass, member of the NAD Science Committee).

Preparation for Arctic deep-sea drilling will necessitate extensive operations for site surveying in major parts of the Arctic Ocean, whereas drill sites will be confined to a few well chosen localities over some of the most prominent basement structures in the central Arctic. For both operations extensive logistic support will be established, which could also be used by many other polar science disciplines. This science plan for Arctic deep-sea drilling should therefore lead to a general increase in the Arctic research effort involving not only geosciences but other polar research disciplines as well. This plan will serve as the scientific base for Arctic deep-sea drilling and thus move forwards realisation of the goal in the mid-nineties.

Appendix C

NAD Organization and Membership

The Nansen Arctic Drilling project was founded on the occasion of the International Geological Congress in Washington, 1989. It presently consists of an Associative Committee with science and technology committees. Membership is from interested countries. NAD maintains a formal liaison office (funded by participating countries) with JOI Inc. (Washington, D.C).

The Science Committee has established a subcommittee on "site surveying" and an "Arctic Data Bank".

Executive Committee

Kurt Boström
Department of Geology
University of Stockholm
S-106 91 Stockholm
SWEDEN

Dieter Fütterer
Alfred-Wegener-Institut für Polarforschung
Columbus Center
D-2850 Bremerhaven
GERMANY

Leonard Johnson
Geophysical Sciences
Office of Naval Research
Arlington, VA 22217-5000
U.S.A.

Katsutada Kaminuma
National Institute of Polar Research
9-10, 1-chome, Itabashi-ku
Tokyo 173
JAPAN

Anthony E.S. Mayer
Secretary of the Polar Science Comm.
National Environment Research Council
Polaris House, North Star Avenue
Swindon Sn2 1EU
U.K.

David I. Ross
Atlantic Geoscience Centre
P.O. Box 1006, Dartmouth, N.S.
CANADA B2Y 4A2

Jean-Claude Sibuet
IFREMER

Centre de Brest
F-29273 Brest
FRANCE

H. Sörensen
Institute for Petrology
University of Copenhagen
Öster Voldgade 10
DK-1350 Copenhagen K.
DENMARK

Jan H. Stel
Netherlands Marine Research Foundation
Koningin Sophiestraat 124
NL-2595 TM The Haque,
THE NETHERLANDS

Tore O. Vorren
Department of Geology, IBG
University of Tromsö
P.O. Box 3085
N-9001 Tromsö
NORWAY

CHAIR

Vyacheslav S. Yastrebov
P.P. Shirshov Institute of Oceanology
USSR Academy of Sciences
23, Krasikova
Moscow 117218
USSR

Science Committee

Jan Backman
Stockholm University
Geologiska Institutionen
Kungstensgatan 45
S-106 91 Stockholm
SWEDEN

Garret Brass
Rostenstiel School of Marine & Atmospheric Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149
U.S.A.

Yngve Kristoffersen
Seismological Observatory

University of Bergen
N-5000 Bergen
NORWAY

Yves Lancelot
Dept. de Géologie Dynamique
Univ. Pierre et Marie Curie
4 place Jussieu
F-75252 Paris Cedex 05
FRANCE

Birger Larsen
Danmarks Geologiske Undersögelse
Thoravej 8
DK-2400 Köbenhavn NV.
DENMARK

Alexander P. Lisitzin
P.P. Shirshov Institute of Oceanology
USSR Academy of Sciences
23, Krasikova
Moscow 117218
USSR

Larry Mayer
Department of Oceanography
Dalhousie University
Halifax, N.S.
CANADA B3H 4H1

Nicholas Shackleton
Quaternary Research
University of Cambridge
Free School Lane
Cambridge CB2 3RS
U.K.

Jörn Thiede
GEOMAR Research Center for
Marine Geosciences
Wischhofstrasse 1-3
D-2300 Kiel 14
GERMANY

CHAIR

J.E. van Hinte
Instituut voor Aardwetenschappen
Vrije Universiteit
Amsterdam
THE NETHERLANDS

Technology Committee

000166

Mikhail Ya. Gelfgat
All-Union Drilling Technique Research Institute, VNIIBT
Oil and Gas Ministry
6, Leninsky Prospect
Moscow 117049
USSR

Keith Manchester
Program Support Subdivision
Atlantic Geoscience Centre
P.O. Box 1006 Dartmouth, N.S.
CANADA B2Y 4A2

CHAIR

Claus Marx
Institut für Tiefbohrtechnik
Erdgas und Erdölgewinnung
Technical University Clausthal
Agricolastrasse 10
D-3392 Clausthal-Zellerfeld
GERMANY

Alistair Skinner
British Geological Survey
Murchison House
West Mains Road
Edinburgh EH9 3LA
U.K.

Ove Stephansson
Division of Rock Mechanics
University of Lulea
S-951 87 Lulea
SWEDEN

Mike Storms
Ocean Drilling Program
Texas A&M University
College Station TX 77840
U.S.A.

Harald Strand
c/o Aker drilling a.s.
P.O.Box 65
N-4056 Tananger
NORWAY

Jyoji Takagi
Jamstec
2-15 Natsushima-cho
Yokosuka, Kanagawa 273
JAPAN

NANSEN ARCTIC DRILLING PROGRAM
MEETING IN TROMSØ, NORWAY

TIME: 31 JULY. 1991 , 10:00 AM - 3:00 PM
PLACE: POLARMUSEET

AGENDA

1 ***Secretariat at JOI.*** In 1992, should NAD establish a more formal secretariat at JOI providing normal secretariat + financial services? Leonard Johnson will have a cost estimate.

2 ***Interaction with ODP.*** How may we interact better with ODP?

3 ***Financing of site surveys and shallow drillings.*** Should NAD start raising money for site surveys and shallow margin drilling in 1992 or leave it to the individual scientists?

4 ***Science Plan.*** Report from the Science Committee on the Science plan.

5 ***NAD Site Survey sub-committee.*** Appointment of a NAD Site Survey sub-committee comprising A. Grantz (USA), S. Blascoe (Canada), H. Miller (Germany) and Y. Kristoffersen (Norway).

6 ***Data bank for site survey data.*** Report from the Science Committee on establishment of a data bank for site survey data.

7 ***Inventory of known technologies and platforms for both site surveys and drilling.*** Report from the Technology Committee of inventory of known technologies and platforms for both site surveys and drilling, and how to establish a data bank for these data.

8 ***Active sediment corer.*** Y. Kristoffersen wil give an overview of the active sediment corer.

9 ***Gattling gun drill.*** L. Johnson will provide information about the state of the gattling gun drill equipment.

10 ***ODP-drilling in the Norwegian -Greenland Sea.*** T.Vorren will give an overview of the work of the The North Atlantic-Arctic Gateways Detailed Planning Group of ODP.

The University of Rhode Island Graduate School of Oceanography
Narragansett Bay Campus, Narragansett, RI 02882-1197
Office of the Associate Dean
(401) 792-6268, Fax (401) 792-6160, M.LEINEN/OMNET

July 29, 1991

James Austin
JOIDES Planning Office
Texas A & M University
College Station, TX 77843-3113
FAX: (512) 471-0999

Dear Jamie,

Enclosed is a short status report on the activities of both the U.S. JGOFS Program and the International JGOFS Program (the steering committees for both of which I attend). Because you have not had a JGOFS update previously, I have included very general information in the report as well as some specifics on present activity.

Sincerely,

Margaret Leinen

Margaret Leinen

000170

JGOFS Program Update
to JOIDES/PCOM
August, 1991

Margaret Leinen
University of Rhode Island
Graduate School of Oceanography
Narragansett, RI 02882-1197

General Information on JGOFS Program

JGOFS, the Joint Global Ocean Flux Study, is a core project of the International Geosphere Bioshphere Program. JGOFS has completed the science plan for their study, which is available from the JGOFS Secretariat. This plan outlines the general scientific problem and the goals of JGOFS. The JGOFS goals are: (1) to determine and understand, on a global scale, the processes controlling the time varying fluxes of carbon and associated biogenic elements in the ocean, and to evaluate the related exchanges with atmosphere, seafloor, and continental boundaries, and (2) to develop a capability to predict, on a global scale, the response of ocean biogeochemical processes to anthropogenic perturbations, in particular, those related to climate change. The program will rely on three types of studies in order to reach these goals. The first are Process Studies, which will inventory the key fluxes of biogenic components, define the control mechanisms regulating those fluxes, calibrate models, and evaluate parameters which influence the fluxes and describe their relationship to important oceanographic events. The North Atlantic Bloom Experiment (NABE), which was held during 1989 in the North Atlantic, served as a pilot study for such process studies. The first major process study has begun in the equatorial Pacific.

Field experiments in the equatorial Pacific have been carried out since the beginning of 1990 and will continue through the end of 1993. A particularly concentrated period of time will be 1992, when the U.S., Noumea, and Japan will all have several cruises in this region. The second major component of the JGOFS program are large space/time scale surveys. JGOFS will cooperate the World Ocean Circulation Experiment (WOCE) in order to complete a global survey which will provide an agreed upon suite of well-defined, intercalibrated, biogeochemical core measurements throughout the water column at a regular spacing along a worldwide series of transects. Such a suite will include pigments, nutrients, biomass components, gases, dissolved organic species, particulate organic carbon and nitrogen, and radionuclides. It is the intention of the program to also deploy a global array of sediment traps to estimate the vertical particle flux and make a global set of benthic measurements to constrain benthic fluxes. Long time series observations will be carried out at time series stations, such as the U.S. Time

Series Stations at Bermuda and Hawaii. These long time series stations will build on observations that have been made over the years at fixed locations, such as Ocean Weather Station Papa and India. The JGOFS strategy is to build on the mechanistic process oriented understanding of biogeochemical fluxes obtained through the process studies in order to understand the results of the large space/time scale surveys.

A third important component of the JGOFS program is modelling. Models are being developed for both local and regional marine ecosystems. These ecosystem models are being incorporated into dynamical models for ocean circulation in order to develop hypotheses and predictions concerning biogeochemical fluxes. The ultimate aim of the JGOFS modelling program is to develop global primitive equation models of the biogeochemical fluxes in the ocean that can predict the time evolution of these fluxes from given starting conditions. This is obviously an ambitious goal, but is also obviously the logical one for a program of this magnitude.

An important component of the JGOFS strategy is the use of remote sensing satellite data for ocean color, sea surface temperature, and other parameters of importance for global fluxes. JGOFS itself will not be responsible for deploying or collecting the data from such satellites, however, the program has close links with the international and national agencies responsible for such satellite data, and these data will clearly be an important parameter of the large time/space scale surveys.

Paleoceanographers have been particularly interested in the relationship of JGOFS to benthic processes and the sedimentary record. Benthic process play a crucial role in the cycling of carbon and associated biogenic elements within the ocean, and understanding them will be critical to meeting the JGOFS goals. In addition, as paleoceanographers know, extrapolating present-day understanding of ocean response to climate forcing would not necessarily give up predictive capability. Thus, an appreciation for the ways in which the ocean has responded to past climate change is clearly within the purview of JGOFS. However, the JGOFS program itself has restricted its interest to quaternary paleoceanography and the relationship of ocean circulation, paleoproductivity, and CO_2 content of the atmosphere.

Details of the science plan and a copy of the science plan are available from the JGOFS Executive Secretary, Ms. E. Tidmarsh, SCOR Secretariate, Department of Oceanography, Dalhousie University, Halifax, NS, B3H 4J1, Canada.

U.S. JGOFS

The activities of the U.S. JGOFS program are of particular interest to ODP now because U.S. JGOFS plans a very large field experiment during 1992 in the equatorial Pacific. This will be the largest on-going JGOFS activity for

the next two or three years. The U.S. JGOFS EqPac program will include cruises supported by the National Science Foundation (NSF), the Office of Naval Research (ONR), and the National Oceanic and Atmospheric Administration (NOAA). These cruises will occupy stations along the transect from 12°N to 12°S at about 140°W. Some cruises will concentrate of surveys of 18 stations along this transect to provide a detailed view of the ecosystems in this complex zonal current system. Other cruises will occupy three stations along the transect for up to a week at a time in order to examine the temporal changes of the upper water column to dynamic forcing. A cruise emphasizing benthic flux and burial fluxes will also be included in the field season. Sediment traps will be deployed at about 9 stations along the transect. Cruises will take place in both spring and fall, the major times of primary productivity at this longitude. During both spring and fall, NOAA ships will occupy transects to the east and west of the U.S. JGOFS NSF-sponsored cruises, in order to study advection of nutrients and to put the transect in a spatial context. ONR cruises focusing on the provocative new hypothesis that iron limits phytoplankton growth will also be taking place at the same time.

The science plan for the U.S. JGOFS program is available from the U.S. JGOFS Planning Office, Woods Hole Oceanographic Institution, Woods Hole, MA, 02543. Details about the U.S. JGOFS EqPac program are available from Margaret Leinen, University of Rhode Island, Graduate School of Oceanography, Narragansett, RI, 02882-1197.

JGOFS/ODP Interactions

Several scientists who are involved in OPD are also active JGOFS participants. They have emphasized to JGOFS the importance of a paleoceanographic perspective and have emphasized to ODP the valuable contributions that JGOFS will make to our understanding of the sedimentation processes that generate our geological record. An example of this interaction came out of the recent Leg 138 equatorial Pacific ocean drilling. When Leg 138 scientists found that they had extra time available to invest in another site, they made the decision to place that site very close to their planned equatorial site along the same 110°W transect because JGOFS scientists had highlighted the extreme gradient in biological processes in the upper water column in this region. The Leg 138 scientists were in agreement after their leg that the addition of this extra site, very close to the Equator, provided them with a unique opportunity to observe the gradient with time. Interactions of this sort have resulted from the close collaboration of ODP scientists with JGOFS scientists among us and at our institutions.

JOIDES OPPORTUNITY COMMITTEE
7 June, 1991
Joint Oceanographic Institutions, Inc.
Washington, D.C.

REVISED DRAFT MINUTES
(August 2, 1991)

Opportunity Committee (OPCOM):

J. Austin, Chairperson - University of Texas at Austin, Institute for Geophysics (PCOM)
G. Brass - University of Miami, Rosenstiel School of Marine and Atmospheric Science (Nansen Arctic Drilling Program)
M. Delaney - University of California, Santa Cruz (OHP)
S. Humphris - Woods Hole Oceanographic Institution (LITHP)
J. Malpas - Memorial University (Canada-Australia Consortium) (PCOM)
J. McKenzie - ETH, Zürich (SGPP)
K. Millheim - AMOCO Production Co., Tulsa (TEDCOM)
E. Moores - University of California, Davis (TECP)
J. Watkins - Texas A&M University, College of Geosciences (PCOM)
P. Worthington - BP Research Centre, Sunbury-on-Thames (DMP)

Liaisons:

T. Francis - Science Operator (ODP-TAMU)
R. Jarrard - Wireline Logging Services (ODP-LDGO)
B. Malfait - National Science Foundation
T. Pyle - Joint Oceanographic Institutions, Inc.

Guests and Observers:

J. Baker - Joint Oceanographic Institutions, Inc.
P. Dauphin - National Science Foundation
E. Kappel - Joint Oceanographic Institutions, Inc.

JOIDES Office:

C. Fulthorpe - Science Coordinator

SELECTED ACRONYMS AND ABBREVIATIONS

ARC	Australian Research Council
BGR	Bundesanstalt fur Geowissenschaften und Rohstoffe
BGS	British Geological Survey
BHTV	Borehole Televiewer
BIRPS	British Institutions Reflection Profiling Syndicate
BMR	Bureau of Mineral Resources
BRGM	Bureau de Recherches Géologiques et Minières
CSDP	Continental Scientific Drilling Program
CSG	Computer Services Group (ODP)
DCS	Diamond Coring System
DFG	Deutsche Forschungsgemeinschaft
DP	Dynamic Positioning
DPG	Detailed Planning Group
ECOD	European (ESF) Consortium for the Ocean Drilling Program
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
ETH	Eidgenossiches Technische Hochschule
FMS	Formation Microscanner
FSDN	Federation of Digital Seismic Networks
FY	Fiscal Year
GSGP	Global Sedimentary Geology Program
IDAS	Isothermal Decompression Analysis System
IFREMER	Institut Francais de Recherche pour l'Exploitation de la Mer
IGBP(/PAGES)	International Geosphere/Biosphere Program (/Past Global Changes)
ILP	International Lithosphere Program
IOC	Intergovernmental Oceanographic Commission
IPR	Intellectual Property Rights
IRIS	Incorporated Research Institutions for Seismology
JAMSTEC	Japan Marine Science and Technology Center
JAPEX	Japan Petroleum Exploration Company
JGOFS	Joint Global Ocean Flux Studies
KTB	Kontinentales Tiefbohrprogramm der Bundesrepublik Deutschland
LBL	Lawrence Berkeley Laboratory
LANL	Los Alamos National Laboratory
LRP	Long Range Plan
MCS	Multi-Channel Seismic
MDCB	Motor-Driven Core Barrel
MOU	Memorandum of Understanding
MRC	Micropaleontological Reference Center
NADP	Nansen Arctic Drilling Program
NAS	National Academy of Science
NERC	Natural Environment Research Council
NSERC	National Scientific and Engineering Research Council
ONR	Office of Naval Research
OSN	Ocean Seismic Network
PCS	Pressure Core Sampler
PDC	Poly-crystalline Diamond Compact (drilling bit)
PEC	Performance Evaluation Committee
PPI	Producer Price Index
RFP	Request for Proposals
RIDGE, InterRIDGE	Ridge Inter-Disciplinary Global Experiments (US and international)
SCM	Sonic Core Monitor
SNL	Sandia National Laboratory
SOE	Special Operating Expense
STA	Science and Technology Agency (of Japan)
USSAC	US Scientific Advisory Committee
USSSP	US Science Support Program
VPC	Vibro-Percussive Corer
WCRP	World Climate Research Program
WG	Working Group
WOCE	World Ocean Circulation Experiment

FY92 Programs:

A&G	Atolls and Guyots
CA	Cascadia margin
CTJ	Chile Triple Junction
EPR	East Pacific Rise
HD	Hess Deep
NPT	North Pacific Transect
504B	(Deepening) Hole 504B

DPGs and WGs:

A&G-DPG	Atolls and Guyots DPG
NAAG-DPG	North Atlantic-Arctic Gateways DPG
NARM-DPG	North Atlantic Rifted Margins DPG
OD-WG	Offset Drilling WG
SL-WG	Sea-Level WG

JOIDES OPPORTUNITY COMMITTEE
7 June, 1991
Joint Oceanographic Institutions, Inc.
Washington, D.C.

EXECUTIVE SUMMARY

1. OPCOM concludes that the most important priority for the "incremental" NSF funding for FY92 (and projected for FY93) is accelerating the development and testing of the DIAMOND CORING SYSTEM. The bottom line for the future scientific success of ODP is that the DCS must work in the range of environments discussed in the LRP. The development should include due attention to the individual components (e.g., development of appropriate bits and core catchers for the relevant lithologies) and the cultivation of necessary expertise (a systems engineering approach to understanding heave compensation approaches, choice of drilling fluids, operator expertise). Testing should include both land and sea tests, with an explicit focus on environments of scientific importance to ODP (e.g., basalts including highly fractured ones, shallow water carbonates, and alternating hard and soft lithologies such as cherts and chalks, including deep water environments). The testing at sea will involve engineering legs on the *JOIDES Resolution* as necessary.

   We anticipate funding these efforts for a total of $1.9M, allocated as $1.675M in FY92 and $0.225M in FY93. This may need to be modified on receipt of results from DCS Phase III Design Studies anticipated in August.

2. Our second priority is logging and fluid sampling development. We recommend the purchase of a logging resistivity tool (FY92) and community input and design feasibility studies on new, more effective approaches to *in situ* fluid sampling.

   We anticipate funding purchase of the resistivity tool for $0.15M in FY92 and funding development of fluid sampling for $0.175M in each of FY92 and FY93.

3. Recognizing the growing importance and potential scientific benefits of the use of alternate platforms, we recommend that JOI, Inc. use the most effective route to commission a feasibility study on alternate platforms for FY92 (or sooner if funds can be rearranged).

   We anticipate funding of $0.1M in FY92 for this item.

4. Of an anticipated $4.2M for FY92 and FY93, this leaves $1.7M unencumbered in FY93. Our first priority for these funds would be allocating resources for the use of alternate platforms, with a priority to augmentation/supplementation of scheduled FY92 and anticipated FY93 programs (explicitly, the Atolls and Guyots Legs and New Jersey Sea Level). We recognize the key importance of support vessels for high-latitude North Atlantic drilling (anticipated $1.3M) and the possibility that this may not be found in SOE or may displace other vital parts of development. These possibilities will need reassessment after hearing ODP/TAMU's priorities for FY93 SOE funds.

5. We also recognize the importance of careful consideration of staffing implications for the above priorities as further development occurs.

JOIDES OPCOM
Friday, 7 June 1991

WELCOME AND INTRODUCTION

OPCOM Chairperson Austin called the meeting to order. He introduced the first meeting of OPCOM (which may meet again). OPCOM will consider strategies for the use of an additional $2.1M to be provided by NSF during FY92, and additional increments possible in subsequent years. The mandate for OPCOM had been formulated at the April PCOM meeting. Austin expected that discussion would be far-ranging. Austin then called for introductions.

BACKGROUND AND LONG-RANGE PERSPECTIVE (NSF)

Malfait noted that on January 1, 1991, the original target budget for ocean drilling in FY92 had been $41.4M, depending on fuel costs and assuming 6 international partners. Since then, fuel prices had decreased, the USSR had joined ODP, and congressional reaction to the overall NSF budget had been favorable, with a 16 - 17% increase likely for FY92. Malfait stated that, based on these developments, NSF will consider an increment of $2.1M to bring the new ODP target figure to $43.5M for FY92.

The ODP budget has been viewed as "steady state"; major budget increases have been difficult to justify. Within the budget are SOEs for, e.g., ice support ships, etc. SOEs are mandated at 4%, but have recently exceeded that amount. The overall budget is now lagging the budget projections of the LRP. With some caveats, listed below, Malfait was fairly confident that the budget could now be kept close to LRP projections through FY95.

The caveats are: 1) renewal, post-FY93, 2) number of international partners, 3) any increase in international contributions, and 4) US inflation rate. If OPCOM initiates activities that may run into FY94, these factors must be kept in mind.

Discussion

Baker asked about consequences if the overall NSF budget is lower than expected. Malfait replied that NSF's estimates are conservative. Baker went on to ask whether the effect of an additional partner would be to add money, or reduce the NSF contribution. Malfait responded that this had not yet been decided. Malpas observed that, since the $2.1M begins in October, it could be considered to represent the USSR contribution, though somewhat less than the actual $2.75M contribution. Malfait commented that if fuel prices had stayed high, the $2.1M would not be available. Brass pointed out that the US is currently paying about 60% of ODP's budget, but is only required to pay 51%. Therefore, a budget increase should not be expected to accompany the addition of new partners.

Francis felt that ODP cannot go on adding international partners because there is a limit to the size of shipboard scientific parties. Malfait replied that it was always possible to add 2 more scientists to the shipboard party, there being no need to match with an equal number of US scientists. (NSF had informed ODP-TAMU that the absolute number of US scientists is to remain constant.)

Responding to a question from Jarrard, Malfait confirmed that the increment to ODP's budget would be for more than one year. Brass asked whether this would mean annual OPCOM meetings, but Malfait replied that that would depend on what was decided at this meeting. If OPCOM takes a long-term view, future meetings may not be necessary.

Malfait went on to outline constraints under which NSF and JOIDES would be required to handle extra funds: 1) ODP conducts ocean drilling, not continental drilling; 2) ODP must operate within the framework of the MOUs (some activities use comingled funds, others are the responsibility of international partners; JOIDES plans science); 3) NSF will continue to deal through JOI, Inc. as prime contractor; 4) the long-term must be considered, keeping in mind post-1993 uncertainties. NSF would entertain incorporation of additional activities, funded by the extra money, as an amendment to the FY92 Program Plan. EXCOM and BCOM will both require input.

Baker observed that ODP is the only program of which he is aware in which the community gets what it wants. ODP has been lucky so far, but there may be future budget reductions. Austin encouraged OPCOM to promote operations that will yield quick returns, since that might help NSF renew the increment in subsequent years.

INDIVIDUAL PERSPECTIVES

LITHP

Humphris noted that LITHP's long-term objectives require technology developments for drilling and logging. In the short term, technological problems had prevented drilling of Sedimented Ridges II, while the longer-term objectives, including deep drilling, will require improvements in: 1) drilling in highly-fractured volcanics in the upper oceanic crust, 2) penetration rate and bit life, and 3) recovery rate. Offset drilling can be used to achieve some deep objectives in the short term, but improved recovery is still essential.

DCS III will not be operational for about 3 years. Funds are required so that the DCS can be tested as required, by use of an alternate platform. LITHP favors spending on the DCS and slimhole logging tools. DCS development also impacts other panels' LRP objectives, e.g., atoll and continental margin drilling, and riser drilling. Use of the extra funds for DCS III and associated logging would benefit a large part of the ocean drilling community and also affect the long-term success of ODP and achievement of LRP objectives.

Discussion

Brass commented that the DCS was also relevant to paleoceanographic objectives, in particular for the recovery of Paleogene and Mesozoic sediments. Austin recalled that a meeting on the DCS in December 1990 had concluded that $1.6M was needed for DCS II and 3 years and $3M for DCS III. He asked why NSF rejected this spending option at that time. Malfait replied that, at that time, fuel costs were uncertain and also NSF felt that such a plan should have been in the FY91 Program Plan to begin with if it had been considered important. Furthermore, NSF considered the DCS cost estimates questionable.

OHP

Delaney stated that OHP regards the DCS as crucial for the following reasons: 1) it was a COSOD II technology priority, 2) it impacts recent and planned drilling legs (Shatsky and A&G legs would have been more highly ranked if the DCS had been available), and 3) it is essential for recovering chert/chalk and shallow-water carbonates. However, Delaney stressed that chert/chalk may be unique to the deep ocean and, therefore, the DCS should be tested there and not on land or on shallow-water carbonates.

Other OHP ideas for the extra funds were alternate platforms for continental margin drilling, though this was not supported by the whole of OHP, and APC coring in young

sediments. Support was widest for the DCS. Quoting I. Premoli-Silva, Delaney added that it "is better to finish things than start new ones".

Discussion

Worthington expressed two concerns: 1) supporting the DCS would be placing all of ODP's eggs in one basket, since it is risky and might not work, and 2) the DCS is a long-term project and will not provide short-term benefits relevant to renewal. Austin commented that, in addition, the extra funding increment might not be long term.

SGPP

McKenzie reported that SGPP had discussed options for use of the extra funds at its recent meeting in conjunction with DMP. She listed SGPP's themes: 1) fluid flux, 2) sea level, 3) metallogenesis, 4) paleocean chemistry, and 5) sedimentary architecture and mass balance. SGPP's interests are, therefore, directed toward processes. Therefore,the DCS came low on SGPP's list of priorities.

SGPP requires fluid sampling capability and *in situ* physical properties measurements instead. In free-flowing fluid environments, recovery of fluids has not been possible. For sampling in pore-water environments, the PCS should be brought to Phase II.

Secondary problems of interest to SGPP are improved recovery of sands and rubbles, and alternate platforms, which are particularly important for the shallow-water section off New Jersey.

Discussion

In response to a question from Malfait, McKenzie said that SGPP's view of the fluids problem involves both the *JOIDES Resolution* and returning to holes later with other vessels. The wireline packer has failed, but a working tool is required. On-site drilling time is the first priority and later monitoring can then be considered. McKenzie added that it had not been possible to recover free-flowing fluid on Leg 133.

Brass observed that an alternate platform is the only idea not already in the system. McKenzie said that drilling in water depths less than 100 m will be required, but Austin noted that the New Jersey sea level program is not a FY92 program and is not even on the schedule. Francis stated that the working minimum water depth for drilling by the *JOIDES Resolution* is 60 m. Millheim and Watkins both supported the alternate platform approach as being innovative and leading to rapid returns. McKenzie pointed out that even projects now in the system are not proceeding continuously. Jarrard agreed, noting that the wireline packer is the subject of a two year moratorium. Worthington added that no further work will be carried out on the packer for two years unless action is taken.

Austin showed the April, 1991, PCOM motion on engineering priorities. Francis recalled that the Gas Hydrates Workshop had recommended shelving PCS II, but McKenzie responded that SGPP had changed its priorities. Francis said that a major redesign, taking at least a year, is required and added that ODP-TAMU was not currently working on the PCS. Brass explained that IDAS is being constructed. It can be taken to sea and will be tested at SIO in June. The system cannot sample at ambient pressure. If it works, he will cooperate with ODP-TAMU to build a core transfer system. Francis pointed out that the VPC is on PCOM's list of engineering priorities, but that the PCS is not. McKenzie agreed, but noted that OPCOM represents a new opportunity. Austin stated that the PCOM motion would have to be modified if OPCOM recommends a particular system. Brass and

Francis cautioned that it might be necessary to hire a new engineer, and Austin agreed that there are staffing implications to every OPCOM decision.

TECP

Moores explained that TECP members had been polled by fax on the issue of additional funds. There was support for maximizing present capabilities, involving 1) deep drilling (many Atlantic objectives), and 2) *in situ* temperature and pressure measurements of fluids (important for studies of accretionary prisms). TECP also supported the DCS, noting that compatible downhole measurements are also needed, including a slimhole televiewer for stress measurements. There was minority support for a hollow, downhole motor drill, and also interest in getting ODP involved in the shallow-water global change program, requiring an alternate platform and numerous holes.

Discussion

Jarrard informed OPCOM that ODP-LDGO had recently acquired a slimhole BHTV. Austin commented that ODP-TAMU engineers believe that deep drilling will require a change in the way the *JOIDES Resolution* is run: being prepared for slower drilling, with casing of holes. The ship is capable of drilling deep holes, but it must be allowed to sit on the sites for long periods. So far, there has been no enthusiasm in the community for this approach, but it will have to be considered for Atlantic drilling.

DMP

Worthington explained DMP's priorities, discussed at its recent meeting. First was development of tools to measure formation resistivity, fluid resistivity and temperature, and high-temperature tools, including slimhole tools. Development could be fast , but much of this is DCS-linked. Second priority was fluid sampling. The wireline packer was a first attempt, but an upcoming meeting in Houston will gather industrial input to consider the best approach. This will require action soon to yield medium-term benefits. Third priority was the MAXIS 500 shipboard data acquisition and processing system, which will accelerate data use, but with a low external profile. Other interests of DMP are downhole susceptibility (not highly-ranked, though it was PCOM's first priority) and the enhanced geochemistry tool.

Worthington added that other tools are in the pipeline and will be coming. DMP has emphasized tools that are not already scheduled and need a push.

HIGH-LATITUDE DRILLING

Brass presented an overview of the geology of the Arctic Ocean, together with the many questions remaining and the problems of drilling and coring in the Arctic environment. An international expedition (*Arctic '91*) is planned to explore the East Arctic Basin. Brass proposed a 40- to 60-day expedition to Alpha Rise and the West Arctic Basin using an icebreaker (US or USSR) and either a French or Canadian long corer. He suggested the possibility of ODP involvement in planning, staffing and curation of cores.

Millheim noted the high cost of industry drilling operations in the Arctic. The use of the ice as a drilling platform was rejected, as the ice is moving too fast. Brass said that only *Arctic '91* will occur unless ODP becomes involved.

PCOM

Malpas discussed the philisophical approach to dealing with the extra funds. He noted that NSF would like the money to be used for implementation of the LRP, but the option of influencing renewal has also been raised and should be discussed. He added that the latter might not be a good idea. Malpas went on to express concern that ODP often appears to be "reacting to brush fires". The LRP exists and goals have been set. Malpas cautioned against frequent changes of plan and underfunding projects. He then raised the issue of how ODP's success should be judged. The general science population looks for global breakthroughs (e.g., DSDP's confirmation of seafloor spreading). ODP will require technology development and *time* to do this: ODP must get into the mode of spending several legs on one problem. In order to avoid alienating the rest of the community, this approach will require alternate platforms. The extra funds might buy some of the required time.

Regarding technology, the LRP provides the plan and Malpas questioned whether further discussion was necessary. In implementing the LRP, underfunding must be avoided: something must be finished. The DCS has been underfunded, but $2.1M may not be enough to make it work. Furthermore, the VPC might not work even if it is funded. Each phase of the LRP is based on the preceding phases, therefore OPCOM should stick to the LRP implementation plan. Phase I is DCS, deep drilling and high-temperature drilling, while phase II involves alternating soft and hard sediments and oriented core samples.

Lastly, Malpas asked whether ODP should serve itself or the general community. To ensure that the best use is made of the data collected, extra personnel may be required, in addition to time and technology.

Watkins presented the case of alternate platforms for sea-level studies. There are two means of attacking the sea-level problem: A&G and continental margin drilling. ODP's record of recovery in shallow-water carbonates has been poor (~5%). R. Ginsburg achieved ~80% recovery in that lithology using a jack-up rig and diamond coring. The continental margin approach requires a transect, involving shallow-water sites, as does drilling in lagoons. This emphasizes the need for alternate platforms. Watkins noted the presence of a French rig in the Pacific (at Moorea) which might be suitable for atoll drilling. The returns would be rapid. He concluded that alternate platforms should be OPCOM's first priority, with the DCS second.

Discussion

After a brief discussion, follow-up studies to maximize use of existing data were felt to be the responsibilities of individual investigators.

Brass stated that, though an alternate platform would allow testing of the DCS, only a test on the *JOIDES Resolution* would test the heave compensator, which is critical for maintaining weight on bit and producing high recovery. Millheim disagreed, noting that other aspects of the DCS could be usefully tested on an alternate platform, e.g., bit development, core catchers, drilling fluids and operator experience. Motion compensation could be simulated or tested without the drillship. The importance of improved core catchers to enhance recovery, and the SCM to monitor core recovery during drilling, were emphasized.

ODP-TAMU

Francis presented projected costs for various ODP-TAMU projects (Appendix 1). The $780,000 presently allotted to the DCS III in FY92 is insufficient. Studies are being carried out to decide which of two alternative designs to adopt. An additional $1.9M is required for FY92 if DCS III is to have a chance of being ready for Leg 147, though even then, that cannot be guaranteed. Planning for deep drilling will require an additional engineer. ODP-TAMU engineers do not feel that an alternative platform will be very effective for DCS testing, though it might be useful for the VPC. *Bucentaur*, a Norwegian vessel (Appendix 1), costs $30,000/day. An ice support vessel will be needed for a number of NAAG sites, and funds for this cannot be an SOE if deep drilling and DCS costs are also made SOEs. Core lab modifications could await the next dry-docking in FY94.

SMP has noted that the load on the technical staff has increased and recommended an additional 8 technical support positions. The group already suffers from a high turnover rate. A second computer systems manager is essential. Francis also presented costs for an additional development engineer and two marine technicians. Core-log integration has been strongly advocated by SMP and DMP and endorsed by PCOM. It will involve costs for workshops, personnel (2), and hardware and take 3 years.

Discussion

Austin asked what ODP-TAMU's preference would be for spending the additional NSF funds. Francis replied that the priorities would be: 1) to increase DCS III spending in FY92, and 2) to hire a second computer systems manager. Millheim recommended beginning immediately to gain deep drilling experience, but Austin doubted that the community was ready to leave the ship in one place long enough for a really deep hole.

ODP-LDGO

Jarrard distributed a handout (Appendix 2) listing tools that will not be produced without additional funds. The next generation geochemistry tool offers 3 times the number of sensing elements of the present tool. Sediment susceptibility will be an important component of core-log integration, but higher resolution than the present 1.5m is needed. The MAXIS 500 data acquisition/analysis system is not a new tool and is low-profile. It will enable immediate distribution of data to shipboard scientists.

Regarding fluid sampling, problems with the wireline packer are known and can be remedied. However, a 2-year moratorium has begun and some legs will lose out. In related discussion, Francis said that LANL and LBL tools will be taken on Leg 139, but these are still being developed. The Cann-Becker straddle packer system will require ~$30,000 to modify for ODP use, but DMP still has reservations about it.

Jarrard went on to discuss the high-temperature resistivity tool, DMP's highest priority. It is essential for EPR drilling for porosity/permeability measurements (core measurements are not representative in fractured rocks). The aim is to achieve a tool functional up to 350°C. Camborne School of Mines and the BGS are prepared to produce an analog tool by December, though a digital tool would take longer.

No work is being carried out on high-temperature slimhole tools. Cold DCS holes can, however, be logged using ARCO tools.

JOI, INC.

Pyle distributed a handout on alternate platforms.

GENERAL DISCUSSION

Austin explained that OPCOM must generate recommendations for PCOM, who will then pass them on to JOI, Inc. and NSF. He noted that there are high- and low- budget elements in each of the 5 items of the OPCOM mandate. He felt that OPCOM should recommend something visible and referred to the global proposal prioritization map, adding that OPCOM should feed into FY92 and FY93 planning. This is Phase I of the LRP. Alternate platforms might be for science (leading to questions about how to relate them to ODP, e.g., staffing, publications, etc.), for testing systems, or both. Paleoceanography is being done well, but deep drilling will require changes in the way the *JOIDES Resolution* is run. An alternate platform would assist in this, implying an alternate science platform.

Austin agreed with Malpas that OPCOM must be true to LRP Phase I implementation, at least initially. He felt that OPCOM must reiterate PCOM's stand that the DCS is critical to ODP's success. If all of the extra funds are allocated to the DCS, it will put great pressure on ODP-TAMU to produce a working system. Regarding deep drilling, the capabilities of the *JOIDES Resolution* must first be maximized, necessitating long periods at single sites, with casing, liners and mud. He felt that it would be beneficial to provide the extra $150,000 for the high-temperature resistivity tool. Worthington cautioned against ignoring the large community interested in fluid sampling, which is not represented in the LRP.

Austin informed OPCOM that ONR is interested in contributing money to an alternate platform off New Jersey in 1993. New Jersey sea level is very likely to be on the FY93 schedule, and this would be a good opportunity to bring in another funding agency. He suggested developing plans for 2 cases: 1) $2.1M increment lasts only one year, and 2) the increment lasts for multiple years.

Malpas suggested assuming that the $2.1M increase would last at least 2 years. This is a significant period for DCS development and a significant proportion of the $4.2M should go to DCS III. Use of an alternate platform for science could be considered during periods when the DCS is being tested on the *JOIDES Resolution*. Furthermore, assuming a 2-year increment puts pressure on NSF to ensure that the increment does indeed last 2 years.

Responding to questioning, Francis said that no ship time will be required for DCS III during FY92. Leg 147 would be the earliest possible test of DCS III, and that would require an additional $1.9M to be even a possibility. PCOM would have to consider where to test DCS III if it is not done on Leg 147. Austin noted that PCOM wants the engineering test carried out in an environment of scientific interest.

Austin agreed that OPCOM should present a single plan to PCOM. OPCOM reached the following consensus.

OPCOM Consensus

OPCOM regards the "extra" funds provided to the Ocean Drilling Program as a step increase that is likely to be available for more than one (1992) fiscal year, and that planning for its expenditure be carried out accordingly. In the first instance, PCOM should consider planning for fiscal years 1992 and 1993.

During discussion of the DCS and its testing, Malpas and Brass felt that the *JOIDES Resolution* was the most appropriate test bed, though Millheim pointed out that associated systems (e.g., core catchers, etc.) could be tested separately on an alternate platform.

Francis said that the $1.9M required for the DCS in FY92 is in addition to the $780,000 already budgeted for DCS work. The combined amount is an estimate of the cost of design and construction of DCS III and does not include land testing. He added that testing on the *JOIDES Resolution* will take a leg and some dockyard time. Malpas suggested testing the DCS over 2 years, and that an alternate platform might be used either for science or testing of DCS components before the full DCS test at the end of the 2-year period.

Jarrard noted that $500,000 would enable development of the high-temperature resistivity and fluid sampling tools. There followed discussion of the costs of alternate platforms and whether there would be sufficient funds remaining for such a platform when the DCS and logging tools had been funded. Francis added the $1.3M cost of an ice-support vessel for FY93's NAAG program to the equation. This should have been a SOE, but SOE money had been necessarily spent on underfunded engineering projects. Malfait said that OPCOM should firm up the budget allocations for FY92, while bearing in mind the needs for FY93. It was recognized that the only FY92 program for which an alternate platform might be desirable is A&G, where mobilization/demobilization costs will be high. Watkins and Brass highlighted the need for additional financial support from outside groups, e.g., the French for a Pacific alternate platform, or ONR for one off New Jersey (but only in FY93). Malpas felt that ODP-TAMU should consider cutting engineering projects so that it could focus on the DCS and suggested that Francis bring to the August PCOM meeting a list of potential cuts.

Humphris proposed dropping plans for an alternate platform in FY92 to allow concentration on the DCS. An alternate platform could be considered for FY93. There was support for the idea that an alternate platform is a long-term issue, involving notification of the community, RFPs, the relationship to ODP-TAMU (publications, staffing, etc.) and EXCOM action to be considered.

Malfait pointed out that the real sum under discussion for the 2-year period (FY92 - 93) is the $4.1M NSF increment plus $3.6M in SOEs, yielding a total of $7.8M. There was agreement and Austin added that FY92 SOEs have been set, but FY93 SOE items will have to compete for funds with the ice support vessel. If some or all of the ice support vessel funds come from the SOE, it will leave a more realistic sum for an alternate platform. Malpas and Francis felt that it would be best to decide on FY92 as much as possible, leaving most of the uncertainty to the FY93 budget.

OPCOM felt that more information on alternate platforms was required. Moores and Malpas suggested using A&G and New Jersey programs as case studies. Francis said that a new ODP-TAMU engineer could be hired to perform such a costing study and to work on deep drilling. Millheim suggested using a consultant, H. Zaremba of Durango, Colorado, who had advised R. Ginsburg on his Bahamas drilling project. Moores stated that some of the FY92 increment could be spent on the alternate platform study. There was general agreement that an engineering feasibility study for alternate platforms was necessary.

Francis felt that an additional ODP-TAMU engineer might be required to define the job and interact with the consultant. Millheim, however, said that the consultant would only require basic information. Austin said that money for the study would be required in FY91. Pyle responded that there was none available. Millheim, however, said that the timing was negotiable. Austin said that a report from the consultant will be required at the PCOM Annual Meeting. Millheim said that he would contact the consultant.

Brass suggested that alternate platforms be used as extensions to existing programs. Austin, however, responded that planning will have to be more open. RFPs should be

issued in the fall so that panels can rank proposals in the spring. He added that this should be discussed by PCOM at its August meeting.

Delaney prepared a summary of OPCOM's conclusions for approval by OPCOM as a consensus. Austin raised the issue of staffing, asking whether it should be discussed at this meeting, or following the report of the alternate platform study. Francis said that some of the $1.9M could go to staffing, instead of subcontractors. Design reports on the two versions of DCS III under consideration should be available in August. Austin directed Delaney to include a note on staffing in her consensus, adding that the meeting on fluids sampling should also consider staffing.

Austin outlined the following sequence of events:

June	OPCOM I
August	DCS III studies (if available)
	Fluid sampling expert meeting
	PCOM
Before October 1	Initiation of alternate platform feasibility study.

OPCOM might meet again after the reports are completed to place alternate platforms and downhole measurements into a form that could be incorporated into FY93 planning. A second meeting would be held some time between October 1 and the PCOM Annual Meeting, perhaps the day before the PANCHM meeting. OPCOM approved the following consensus.

OPCOM Consensus

1. **OPCOM concludes that the most important priority for the "incremental" NSF funding for FY92 (and projected for FY93) is accelerating the development and testing of the DIAMOND CORING SYSTEM. The bottom line for the future scientific success of ODP is that the DCS must work in the range of environments discussed in the LRP. The development should include due attention to the individual components (e.g., development of appropriate bits and core catchers for the relevant lithologies) and the cultivation of necessary expertise (a systems engineering approach to understanding heave compensation approaches, choice of drilling fluids, operator expertise). Testing should include both land and sea tests, with an explicit focus on environments of scientific importance to ODP (e.g., basalts including highly fractured ones, shallow water carbonates, and alternating hard and soft lithologies such as cherts and chalks, including deep water environments). The testing at sea will involve engineering legs on the *JOIDES Resolution* as necessary.**

   We anticipate funding these efforts for a total of $1.9M, allocated as $1.675M in FY92 and $0.225M in FY93. This may need to be modified on receipt of results from DCS Phase III Design Studies anticipated in August.

2. **Our second priority is logging and fluid sampling development. We recommend the purchase of a logging resistivity tool (FY92) and community input and design feasibility studies on new, more effective approaches to *in situ* fluid sampling.**

We anticipate funding purchase of the resistivity tool for $0.15M in FY92 and funding development of fluid sampling for $0.175M in each of FY92 and FY93.

3. **Recognizing the growing importance and potential scientific benefits of the use of alternate platforms, we recommend that JOI, Inc. use the most effective route to commission a feasibility study on alternate platforms for FY92 (or sooner if funds can be rearranged).**

   We anticipate funding of $0.1M in FY92 for this item.

4. **Of an anticipated $4.2M for FY92 and FY93, this leaves $1.7M unencumbered in FY93. Our first priority for these funds would be allocating resources for the use of alternate platforms, with a priority to augmentation/supplementation of scheduled FY92 and anticipated FY93 programs (explicitly, the Atolls and Guyots Legs and New Jersey Sea Level). We recognize the key importance of support vessels for high-latitude North Atlantic drilling (anticipated $1.3M) and the possibility that this may not be found in SOE or may displace other vital parts of development. These possibilities will need reassessment after hearing ODP/TAMU's priorities for FY93 SOE funds.**

5. **We also recognize the importance of careful consideration of staffing implications for the above priorities as further development occurs.**

ADJOURNMENT

The meeting was adjourned at 4:40 PM.

APPENDICES ATTACHED TO THE 7 JUNE, 1991 OPCOM MEETING

1. Science Operator report, supplemental information
2. Wireline Logging report, supplemental information

HANDOUTS DISTRIBUTED AT THE 7 JUNE OPCOM MEETING

1. JOI, Inc. memo on alternate platform options

EXECUTIVE SUMMARY: STRATEGY COMMITTEE

ad hoc subcommittee of JOIDES PLANNING COMMITTEE
Joint Oceanographic Institutions, Inc.
Washington, D.C.
29 May 1990

As decided upon by PCOM during its Paris meeting, the purpose of the inaugural meeting of the STRATCOM subcommittee was two-fold:

1.) To facilitate renewal of ODP:

- by examining and implementing ways to showcase and enhance the program's effectiveness, both within the U.S. and among the international partners.
- by presenting such strategies to PCOM at its August, 1990 meeting.
- by reporting on STRATCOM existence and its initial deliberations to EXCOM during its joint meeting with the ODP COUNCIL in June, 1990, with a view to enlisting its active support in the renewal effort.

2.) To examine various means of showcasing ODP's accomplishments to a growing number of detractors, as evidenced by recent correspondence to the JOIDES Office (see PCOM Agenda Book, Paris Meeting, 4/90).

STRATCOM was also to recommend to PCOM at its August meeting whether or not a continuing mandate for its existence was warranted.

Identification of Themes to Serve a Focused Drilling Program

Discussion culminated in a recommendation to PCOM for consideration of the following themes for a focused approach to ocean drilling (no priority order):

- **HIGH-RESOLUTION NEOGENE PALEOCEANOGRAPHY TRANSECTS**
- **SEA-LEVEL STUDIES**
- **DEEP-DRILLING TO UNDERSTAND THE STRUCTURE AND FLUID DYNAMICS OF ACCRETIONARY PRISMS**
- **PASSIVE MARGIN EVOLUTION**
- **EVOLUTION OF SEDIMENTED AND UNSEDIMENTED RIDGE CRESTS**
- **OFFSET DRILLING FOR DEEP LITHOSPHERE OBJECTIVES**

Publicity/"Dog and Pony Shows"

Discussion resulted in a recommendation to JOI, Inc. to hold a presentation similar to its well-received National Science Board program (perhaps in modified form) before the combined EXCOM/ODP COUNCIL at its 20-21 June meeting in Washington, D.C., with a view to soliciting EXCOM response concerning subsequent scheduling and formatting of such events in member countries.

Maximizing Impact of the Long Range Plan

Given ODP's existing liaisons with FDSN and GSGP, and probable future liaisons with InterRIDGE, Nansen Arctic Drilling Program, IGBP and

JGOFS, STRATCOM will formulate a series of one-page summaries of ODP's existing and newly evolving relationships with a number of important global initiatives in the earth sciences.

Those initiatives are listed, along with suggested authors (no priority order):

- GLOBAL CHANGE (B. Ruddiman/N. Pisias)
- TECHNOLOGY DEVELOPMENT (C. Sparks/B. Harding)
- GLOBAL SEDIMENTARY PROCESSES (M. Arthur)
- RIDGE CREST PROCESSES (J. Malpas/B. Detrick)
- HIGH-LATITUDE DRILLING (G. Brass/L. Johnson)
- CONTINENTAL DRILLING (T. Pyle)

The written summaries will be included with the JOI, Inc. brochure, intended as a popular summary to accompany publication of the LRP.

Other Recommendations

For PCOM

In light of the themes listed above (while stressing that they are a flexible framework, into which modified/new themes could be incorporated), STRATCOM suggests to PCOM that it charge the thematic panels to go beyond existing, unsolicited proposals and Detailed Planning Group drilling plans to synthesize a prospectus involving a finite number of long-term focuses of ODP, each perhaps consisting of 4-6 drilling legs. The following questions must be addressed:

- **How will such programs be tackled effectively?**
- **Who will the proponents of these programs be?**
- **Do the proposals exist to tackle these programs effectively? If not, how will these proposals be generated?**

STRATCOM felt that such a strategy could perhaps be in place for the advisory structure before November 1991.

STRATCOM considers that its *ad hoc* status as an executive subcommittee of PCOM is appropriate and should be retained.

For JOI, Inc.

Consider augmenting the number of LRP/brochure packets to be published (currently ~2,500) to include more mailings to international partners (now set at ~200 each) and perhaps to more/other U.S. organizations.

For National Science Foundation

Approach the Ocean Studies Board of the National Academy of Sciences (and perhaps other, similar review bodies as deemed appropriate) for a formal review of the LRP.

STRATCOM felt that such an initiative would blunt unofficial criticism of ODP, while encouraging official, and perhaps constructive, suggestions for program improvement over the long term.

EXECUTIVE SUMMARY: STRATEGY COMMITTEE II (STRATCOM II)

ad hoc subcommittee of JOIDES PLANNING COMMITTEE

at Joint Oceanographic Institutions, Inc.

Washington, D.C.

25 September 1990

As decided upon by PCOM during its August meeting at Scripps Institution of Oceanography, the purpose of the second meeting of STRATCOM was two-fold:

1.) **To facilitate renewal of ODP.**
   - by examining and implementing ways to enhance the program's effectiveness, both within the U.S. and among the international partners
   - by presenting such strategies to PCOM at its November, 1990 meeting

2.) **To examine various means of showcasing ODP's accomplishments.**

****

STRATCOM emphasized short-term (i.e., pre-1993) strategies with a series of recommendations (no priority order):

I. Members of STRATCOM (Austin, Beiersdorf, Leinen, Malpas, Moberly) and other members of PCOM as appropriate or desirable should make themselves available for oral presentations on ODP in aid of renewal.
(**Note:** EXCOM input on timelines for renewal necessary and desirable for such activity.)

II. Members of PCOM will be asked to submit summary slides (or art which can be converted to slide copy, perhaps by JOI, Inc.) for such [renewal] presentations, and to showcase themes summarized by the LRP.

III. Members of PCOM, perhaps in consultation with outside parties (e.g., members of some of ODP's formal liaison groups) will be asked to prepare short, popular articles based upon the 1-page inserts in the LRP brochure. These inserts emphasize ODP's relationships with other, ongoing initiatives in the earth sciences.

IV. PCOM will be asked to endorse a JOIDES-sponsored meeting showcasing the thematic impact of ODP on the international earth sciences community.

   - similar to COSOD's in form and size.
   - will emphasize ODP's accomplishments, but not be limited to them.
   - probable date: spring, 1992 (would require BCOM action 3/91).
   - several mega-themes discussed, to be discussed further at 11/90 PCOM meeting.
   - potential convenors and members of both scientific and general organizing committees discussed, to be modified based upon further discussion at 11/90 PCOM meeting.

UNIVERSITY OF CALIFORNIA, SAN DIEGO

000191 UCSD

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

SCRIPPS INSTITUTION OF OCEANOGRAPHY
GEOLOGICAL RESEARCH DIVISION

9500 GILMAN DRIVE
LA JOLLA, CALIFORNIA 92093

July 26, 1991

Dr. James A. Austin, Chairman
JOIDES Planning Committee
Institute for Geophysics
University of Texas at Austin
8701 Mopac Boulevard
Austin, TX 78759-8345

Dear Jamie:

As one vitally concerned with the success and scientific integrity of the Guyots Drilling Legs, I am naturally upset by the proposal to devote time from one of the legs to logging the bottom part of Hole 801C, drilled on Leg 129. I have written a brief position memo, herewith enclosed, setting forth my reasons for opposing this proposal. There does not seem to be a panel to whom to send this on such short notice (I understand you may be considering this matter at the forthcoming meeting of PCOM), so I send it straight to you.

It was nice to see you, even if only fleetingly, at the meetings here a couple of weeks ago.

Best regards.

Sincerely yours,

Edward L. Winterer

Encl.

Logging at Site 801

According to the Operations section of the Site 801 Chapter in the Leg 129 Initial Reports Volume:

During Leg 29, Hole 801B (a single-bit hole) was logged from a depth of 54 mbsf down to 470 mbsf (8 m below the sediment/basalt contact).

Hole 801C (a reentry hole) was drilled to a depth of 571 mbsf (109 meters into basalt) with the first bit. When the bit was retrieved, cones were missing, indicating there was junk in the bottom of the hole.

With only 4 days of operational time left on the site, the decision was made to attempt to fish the junk from the hole and core ahead, rather than to log the additional 100 m of basalt now open below the base of the existing set of logs. The fishing was successful, leaving the hole free and clear for future deepening. Now only 2 days of operational time remained.

Again, for the second time, a decision was made not to log, but rather to make up a new BHA and core ahead. This was done and coring proceeded an additional 25 m before time ran out and the site had to be abandoned.

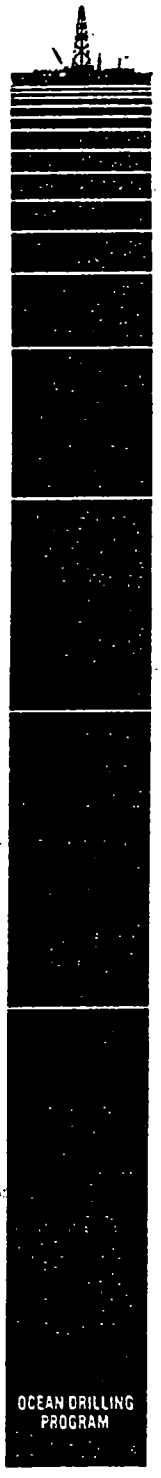
Each Scientific Party faces comparable decisions on how to spend their time, and the decision of whether to log or to core ahead is a particularly common choice confronting Co-Chiefs. It is <u>not</u> one of their options to core now and ask that some future leg do the logging they decided not to do. Leg 129 scientists decided to core at a time they had ample time left to log. They now want another scientific party with a heavy schedule of difficult drilling on their own set of high-priority drilling and logging objectives, to sacrifice time to do a task that the Leg 129 scientists freely chose not to do when they had their chance.

Jerry Winterer

JOIDES Office
The University of Texas at Austin
Institute for Geophysics
8701 Mopac Boulevard
Austin, Texas 78759-8345

000193

Tel: (512) 471-0471 or 471-6156
Fax: (512) 471-0999
Telemail: JOIDES.UTIG
Telex: 7408994 JOID UC
Email: joides@utig.ig.utexas.edu



25 June 1991

Mr. Herbert Zaremba
209 Highland Hills Drive
Durango, CO 81301

Dear Mr. Zaremba:

I write to you as chairman of the JOIDES (Joint Oceanographic Institutions for Deep Earth Sampling) Planning Committee of the Ocean Drilling Program. Your name was put forward to us recently by Keith Millheim of AMOCO Production Company as an expert in the field of offshore drilling platforms of various kinds. I believe that he has already talked to you a bit about ODP, but let me try to acquaint you with our needs as well, as a means of justifying a request for your services.

ODP is an internationally supported program to conduct scientific ocean drilling around the world. ODP began in 1984, and has just completed its first global circumnavigation. Our intent is to carry out basic research, not to exploit the marine environment for hydrocarbons or other resources. The U.S. National Science Foundation puts up about half the money for ODP (total budget ~$42M in fiscal year 1992), and science planning is conducted by an advisory structure of several hundred experts in the fields of tectonics, sedimentology, geochemistry, paleoceanography, igneous petrology, logging and engineering.

ODP's drilling platform is the SEDCO BP-471 (aka *JOIDES Resolution*), a dynamically-positioned drillship with an effective string limit of ~7.3 km. The ship has shown itself to be capable of drilling and continuously coring in virtually any weather condition, and has thus far operated successfully in all of the major oceans, from the fringes of the Arctic to the shores of the Antarctic. Nonetheless, current scientific planning (see enclosed article) suggests that over the next 2-3 years, ODP will need to operate in some geologic environments (e.g., very shallow water on inner continental shelves, lagoons of Pacific atolls) that may preclude use of the *Resolution* as a primary platform.

With that in mind, the scientific advisory structure of ODP, with the support of NSF, is beginning to investigate alternatives for some kinds of drilling activities. Unfortunately, we find ourselves with a pronounced need for external advice, and it was in that context that your name was mentioned. ODP is interested in obtaining your services as a paid consultant to produce a report on the availability, capabilities, and costs of alternate drilling platforms for use in the marine geologic environments of interest to us.

Please let me know at your convenience how this request strikes you, and provide me with any details on rates of remuneration and so on that I can pass on to our business people. The advisory structure wants to get started on this report as soon as possible, but I have been advised that we cannot commit any funds to you before 1 October, the beginning of our next fiscal year. In the meantime, I would still like to know whether or not you would be willing to undertake this work for us when a suitable contract can be executed. If so, I would arrange to brief you in more detail on our specific needs and future plans.

Thank you in advance for your attention to this matter. I look forward to hearing from you, either by letter at the above address or by phone at (512) 471-0450.

Sincerely,

James A. Austin, Jr.

James A. Austin, Jr.
Senior Research Scientist
Chair, JOIDES Planning Committee

JAA/km

cc: A. Maxwell
OPCOM members

000195

AZ WELL SERVICES INC.

RECEIVED
AUG 0 5 1991
Ans'd.....

209 HIGHLAND HILL DRIVE
DURANGO, COLORADO 81301
TEL. (303) 385-7408

August 1st, 1991

JOIDES Office
The University of Texas at Austin
Institute for Geophysics
8701 Mopac Boulevard
Austin, Texas 78759-8345

Dear Sirs:

Att. James A. Austin Jr.
Chair, JOIDES Planning Committee
Re: Report on Special Drilling Platforms for Coring Operations in Shallow Waters.

This is in response to your letter of 25 June, 1991, and various telecons between ourselves regarding my services to produce the subject report. I am willing to undertake this assignment on a first priority basis; *i.e.* JOIDES has first call on my availability and I will devote whatever time is required to meet your time schedule. However, I wish to reserve the option to perform other consultant services for other clients concurrently with your project provided this additional work does not delay completion of your report.

I have described to you the contact from a management consultant firm who are attempting to negotiate a contract with the Government of Kuwait. They contacted me prior to your 25 June letter and are interested in hiring me to participate in the oil phase of Kuwait's reconstruction. Thus, I felt an obligation to them provided they could firm - up a specific assignment for me. To date, they have not been able to do this. Furthermore, the scope and intensity of my participation has decreased somewhat from the original concept. They have been advised of my intent to perform your work and concur that a part - time participation, if any, might better fill their requirements.

So, the above is the current and accurate description of my consultant status. I feel it is important for all concerned to understand this situation.

Regarding your project, I wish to thank you for your interest in my services and add that it appears to be a very stimulating and challenging assignment. I would like to commence preliminary work even though I understand that a formal contract and compensation cannot be implemented prior to 1st October, 1991.

In our last telecon (7/26/91) you referred to certain specifications and data related to the FY92 program now being prepared. As soon as this information is available, I would appreciate receiving a copy. In any case, I will need as a minimum (but not necessarily in the listed order) the following information:

1. A detailed description of the DCS coring machine that will be supported by the shallow water platform. This should show static and dynamic loading patterns while coring and while the device is in transit between locations. Also, a breakdown of the machine's major components as to size and weight is important for alternate logistics options.

2. Generalized drilling / coring programs for the entire shallow water FY 92 effort. This should indicate consumable well drilling materials for the entire program as well as for the deepest single core hole. These data will guide me as to storage and loading requirements on the platform as well as a perception of the logistics involved.

3. Physical data on each prospective shallow water core hole site. These to include:
   .1 Geographic location.
   .2 Water depth.
   .3 Tidal data.
   .4 Prevailing ocean currents.
   .5 100 yr. weather / storm forecasts including wave periods, heights, wind velocity / direction, seasonal variation, etc.
   .6 Description of ocean bottoms soil type, bearing capacity, etc. at each core site. Shallow soil cores and analysis may be required if such data are not available.
   .7 Forecast of sequence of coring and seasonal time period involved in the entire shallow water program.

4. Is More than one DCS machine available? This is important if the Resolution will be operating simultaneously with the shallow water program. It occurs to me that a much simpler version of the DCS machine is required for a fixed , bottom - supported platform vs. a dynamically positioned drillship. In fact, what's wrong with an off - the - shelf mineral coring rig modified as necessary for platform installation? A company such as Tonto Drilling Services, Longyear or the Amoco SHADS rig could fill this requirement in a cost - effective manner. This route would obviate the need to coordinate the shallow water program with the Resolution program if the one DCS machine is tied up on the Resolution.

5. A directory of names, titles, affiliations, addresses / phone numbers of all key people involved in the program.

I am sure to think of other items. We can review this in detail at the Sept. 11th - 12th conference in British Columbia. I have just today received your invitation to me to attend that meeting along with the JOIDES Journals and the ODP Brochure. Thank you very much. I shall await Ms. Burns advice on travel arrangements. If you don't mind, I may have my wife accompany me (at my expense) and would want to coordinate her travel plans with Ms. Burns.

After I have reviewed the material just received, some of my questions may be answered. For example, I note the June 91 Journal contains a complete list of ODP people.

Regarding my fee for producing the report, I believe I would prefer a lump - sum consultant fee plus reimbursable expenses for reasonable out-of-pocket costs for travel, etc. I anticipate I will need certain third party technical services such as site - specific weather and sea - state data, soil data as well as computerized structural analyses of the platform design, for example. We need to define who will provide and pay for these services. Obviously, I cannot give you a firm fixed fee amount for my services until I see the scope and details of the shallow water program. However, I am confident that my fee and expenses will fit into your FY92 Budget for this study. You will note this letter is on an AZ Well Services Inc., letterhead. AZ is a company owned and operated by myself and my son Anthony B. Zaremba of Farmington, NM. For personal tax reasons, I will bill JOIDES for my services through AZ Well Services Inc. if you and your business people have no objection. Incidentally, I am enclosing my professional resume' for your records and information.

In closing, I again express my appreciation for your confidence in me to produce this report. If JOIDES accept my recommendations, I perceive an ongoing need for my services (and AZ Well Services Inc.) to implement acquisition / modification / or construction of the platform. In addition, deployment of the shallow water coring system to diverse international locations will involve complex logistics and this is also within the scope of AZ Well Services expertise.

Please call or write if you have any questions / comments on this matter.

Sincerely,

H.B. Zaremba

CC: K.K. Millheim - Amoco Tulsa Research Center - Tulsa

H. B. (HERB) ZAREMBA

209 HIGHLAND HILL DRIVE
DURANGO, CO. 81301
TEL - (303) 385-7408

OBJECTIVES: Actively participate as a consultant, manager or equity owner in any challenging venture in the energy industry to utilize 42 years of experience and accumulated expertise.

EXPERIENCE: AMOCO PRODUCTION COMPANY-P.O.Box 3092, Houston, TX. 77253.

An integrated major oil company, wholly owned subsidiary of Amoco Corporation.

4/81 to 6/89

(Retired)

OPERATIONS MANAGER - Amoco Production Company Houston General Office, Drilling Department.

Supervised and implemented new - venture exploration drilling operations in remote, logistically difficult locations (Papua New Guinea, Madagascar, Algeria, Colombia, East Africa, Bering Sea - Alaska, etc.). In 1985, managed Amoco's Navarin Basin, Bering Sea, Alaska, exploration program. This was the furthest offshore and most environmentally complex drilling project in the history of the industry. Conceived and successfully completed the program on-budget and on schedule utilizing innovative marine support systems and a sophisticated satellite - linked communications, data monitoring and operational control facility.

8/76 to 3/81

REGIONAL DRILLING MANAGER - Amoco Europe, London, England.

Responsible for drilling operations in the European Region through operating subsidiaries in the United Kingdom, Norway, Netherlands, Ireland,Spain, Germany and Italy. Directed drilling programs involving up to ten offshore and onshore rigs and budgets apprcaching $200 million annually. Provided liaison with higher management on all drilling matters and served as the authority on all technical, operational and economic facets of the drilling programs.

8/67 to 8/76

OPERATIONS MANAGER - Amoco International - Chicago Headquarters and Mauritania, Trinidad, Ecuador, Peru and Philippines.

Responsible for operational, engineering and logistical functions related to exploration drilling programs in new - venture areas. Participated in a major research and development project involving a deep water drilling and production tension - leg platform. During latter assignments, conceived innovative equipment, methods and systems vital to the installation procedure of the platform. Five invention disclosures were patented in the U. S. A. and several foreign countries.

8/64 to 7/67 **AN-SON CORPORATION** - 3814 N. Santa Fe, Oklahoma.

An Oklahoma based oil and gas operator and drilling contractor with contract drilling operating in Colombia, Venezuela and Peru.

VICE PRESIDENT AND DIRECTOR

Supervised foreign operations of Contract Drilling Division with 18 rigs operating in Colombia, Venezuela and Peru.

1948 to 1953
1956 to 1964 **ESSO INTER - AMERICA, INC.** Formerly
INTERNATIONAL PETROLEUM CO. LTD.,
396 Alhambra Circle, Coral Gables, Florida

An integrated oil company, wholly- owned subsidiary of Exxon Corp.,operating in Latin America and the Caribbean.

1961 to 1964 **PRODUCTION MANAGER - Intercol. - Bogota, Colombia**

Responsible for all producing and drilling operations and the related planning, engineering, economic and capital budget preparation and justification concerning these operations. Represented Company in six joint- interest farmouts.

1948 to 1953
1956 to 1962 **PETROLEUM ENGINEER** - IP Company
Venezuela, Peru and Coral Gables, Florida.

Various technical assignments in the petroleum engineering function rising to Chief Petroleum Engineer.

1954 to 1955 **BLACK, SIVALLS AND BRYSON, INC.** - Oklahoma City, Oklahoma.

A major oilfield equipment manufacturing company.

CHIEF PROCESS ENGINEER- Gasoline Plants

Responsible for design, sale and construction of small-sized, packaged gasoline plants utilizing the refrigeration recovery process.

H. B. ZAREMBA

MILITARY:

1943 to 1945 Service - U.S. Army Air Force in European Theater of Operations 1st. Lt. Pilot 35 Combat Missions
12th Tactical Air Force - Italy - **World War II**
5 Air Medals, 5 Battle citations, 1 Unit Citation

EDUCATION AND TRAINING:

School Northwestern University, Technological Institute Evanston, Illinois

Degree Bachelor of Science - Chemical Engineering 1948

Class Rank 111/245

Activities Secretary Student AICHE; Freshman Football

Languages Spanish (Read, write, speak)

Post Graduate Professional Training:

School of Production technology - API - University of Texas, Kilgore, Texas, Fall - 1957.

Reservoir Engineering School, - Jersey Production Research Co., Tulsa, Oklahoma, Spring - 1961.

Well Logging School, - Jersey Production Research Co., Tulsa, Oklahoma, Spring 1961

School of Offshore Technology, API - University of Texas, Houston, Texas, April - 1968

Well Control School & Well Planning School, USL Lafayette, LA., summer - 1976.

MMS Certified Well Control Certificate, NL Baroid Houston, Texas, April - 1985

PERSONAL INTERESTS

- Fishing, boating, golf, Alpine skiing.

REFERENCES

- Available on request.

WOODS HOLE OCEANOGRAPHIC INSTITUTION
Woods Hole, Massachusetts 02543
Phone: (508) 548-1400
FAX: (508) 548-1400, Ext. 6013
Telex: 951679

Department of Geology and Geophysics

July 31, 1991

Dr. James Austin, Chairman
Planning Committee, ODP
Institute for Geophysics
University of Texas, Austin
Austin, TX

Dear Jamie,

This letter is to provide you and the planning committee with an update on preparations for backup drill sites for Leg 140 at the Hess Deep. I went to Paris in Late June and visited with Dr. Jean Francheteau at the Universite de Paris Institute du Physique du Globe. He and his laboratory group were extremely cooperative and helpful, and I had a very enjoyable visit. During my stay, I reviewed the key Nautile dive films from the Hess Deep collected during the French diving expedition there. Most critical were the dives extending from the Hess Deep up the south side of the intra-rift high and a dive extending up the north wall of the intra-rift high from the flanking deep to the north . Considerable time was spent reviewing each film, and I made detailed notes for each. In addition, I had a preprint from Roger Hekinian detailing the petrography of every rock sample collected by the Nautile, as well as the sound track of the divers comments and their hand written logs. Dr. Francheteau reviewed many of the key segments of the dives with me, and additional details based on the divers personal observations. The quality of the videotape was high, much better than that from the TV system on the JOIDES Resolution, and it was possible to identify even very small scale features such as fault gauge on rock faces.

The coverage of the basin is very good, and includes all the major structural elements of the zone of rifting. Overall, the published paper and cross-sections of Francheteau et al. (1991) appear to cover the range of likely tectonic scenarios for the basin, based on what is known from the films and the extensive German and American Seabeam coverage.

The crucial question was the availability of good bare rock drill sites on gabbro outcrop. In reviewing the films, it was evident that there was a considerable amount of debris of somewhat indeterminate origin and a light dusting of sediment over much of the floor of the

Hess Deep. The gentle slopes, and lack of a source for many rubble strew hillsides, leads one to the conclusion that much of the basin is floored by disrupted and extended outcrop - literally pulled apart on joint surfaces during the amagmatic opening of the rift basin. The long gentle slope from the Hess Deep upward to the intra-rift high to the north may well have originally been a detachment fault surface as proposed as one alternative by Francheteau et al. (1990, EPSL), but it clearly has undergone considerable disruption, extension and hydrothermal alteration. The long gentle slope traversed by Dives 17, 18, 1 and 2 is extensively coated by sediment and hydrothermal crusts. Periodically it is broken by steep scarps which generally expose a mixture of coarse rubble, mud and hydrothermal sediment. Locally, however, the rubble becomes semi-coherent, and in numerous instances the divers were convinced that they were looking at outcrop. It is possible that the long gentle smooth slopes between the scarps are underlain by a detachment fault surface, but only drilling will tell. This is the area of proposed drill sites HD-1 and HD-2, and I believe that they are worth test drilling. I rate the probability of success at about 50-50.

The critical dives for the proposed Hess Deep drilling, however, turn out to be **Nautile dive 5** (NZ5 on accompanying figure) which extended from the end of dive 2 up the steepening slope of the intra-rift high to its crest, and **Nautile dive 10** which extends up the opposite, north facing, wall of the intra-rift high to its crest. On both these dives, the overall slopes were much steeper, and massive outcrops were abundant. Dive 5 found a series of flat to gently sloping benches interspersed by steep scarps exposing near continuous massive gabbro outcrop. The Nautile recovered an extensive suite of gabbros from the base and walls of these scarps (samples 3-6) and along the crest of the intra-rift high (samples 7-9) on dive 5. Each bench, and the crest of the high, appeared to be a lightly sedimented flat surface, which was locally fissured, exposing massive gabbro, where joint surfaces had evidently been pulled open by extension. Between fissured areas, and near the lips of the benches, there are extensive unfissured areas which appear to be lightly sedimented outcrop. I believe that these benches present numerous opportunities to drill with a high probability of success (75%). This is the area proposed for site HD3 in the Hess Deep drilling proposal. Specific locations for drilling are shown on the enclosed Dive 5 bathymetric profile on the crest of the high and on, or near, the lips of the upper two benches.

The opposite wall of the intra-rift high, covered by dive 10, also exposes considerable outcrop, particularly high on the wall, and a large

suite of gabbros was also recovered (samples 9-17). The character of the outcrop was quite different than that seen on the south wall, however, with a much more finely and irregularly jointed appearance, and a lack of large smooth fault surfaces (common on the face of many of the outcrops on the south side). This led me to conclude that the two walls might have a different origin, with the south wall possibly a back-tilted detachment fault surface, and the north wall a later shallow high-angle fault surface. This is of course speculative, but what is evident from the extensive exposure of massive gabbros on both walls of the intra-rift high is that this high is some form of coherent keystone structure in the basin, and is apparently a large, relatively intact block of layer 3 gabbros.

Many of the samples from dives 5 and 10 are metamorphosed, mylonitized and contain quite a bit of amphibole according to the rock descriptions. This alteration and deformation may have occurred during the opening of the rift basin during propagation of the Cocos-Nazca Ridge, and may be unrelated to structures and alteration formed beneath the EPR. Given the E-W strike of the Cocos-Nazca Ridge, and the N-S strike of the EPR it is likely that structures and alteration related to the initial formation of the crustal section beneath the EPR and those related to the opening of the Hess Deep can be successfully differentiated by the use of the formation microscanner, which has been very successful to date in determining the orientation of structures down-hole.

One of the realities of using tectonically exposed sections of the lower ocean crust is that nowhere is it likely that we can totally escape the effects of the tectonism and hydrothermalism related to their exposure. At slow spreading ridges, where our best opportunities appear to be at the large transverse ridges which are formed at Ridge-transform intersections, this is not a major problem. The structures involved in transverse ridge formation are directly related to those occurring elsewhere along the rift valley. At fast spreading ridges, however, there is a lack of large transverse ridges exposing deep sections of the crust, and we are going to have to explore other types of structures exposing the lower ocean crust. In other words, the Hess Deep appears to be the best game in town for directly drilling into lower crustal sections in the Pacific, and it is the opportunity we have to exploit.

There is a possibility that the first leg of Hess Deep drilling might penetrate a reasonable Moho section (defined as a gabbro section >500 m overlying mantle peridotite in a magmatic or tectonic contact formed beneath an ocean ridge). It is more likely that we will have a

deep hole in gabbro at the end of the leg, which can be subsequently continued down to the Moho. It is important to realize that the longer the section above the Moho we obtain, the more valuable the hole will be (*the mo' hole the better!*). However, we should be very careful not to bill the forth coming Hess Deep drilling as *the Moho leg,* because it would likely set the program up for a fall.

In this light, I want to point out to the P-Comm. that the first leg of Hess Deep drilling is exploratory. It has two reasonable goals: 1) to test the drillability of the propagating rift environment in fast spread ocean crust - a complete unknown at this time - it is a very different tectonic environment than Site 735, and 2) to obtain a long continuous core (500 m+) of layer 3 crust formed beneath the East Pacific Rise for comparison to that drilled in Hole 735B. If we are successful, then we will be able to directly test the very different models for the formation of the lower ocean crust at fast and slow spreading ridges for the first time by comparing the internal stratigraphy of the two sections. This would be a dramatic achievement, scientifically of greater importance perhaps than drilling the Moho.

I am leaving for Scripps August 5th to spend 2 days reviewing the Hess Deep Alvin dives with Peter Lonsdale and Jim Natland. This dive program concentrated on the north wall of the rift where there are extensive exposures of sheeted dikes and, locally, the layer 2-3 boundary. The purpose of my visit will be to see if we can locate suitable drilling targets on the north wall of the rift basin where the JOIDES Resolution can spud directly into the plutonic section on the rift basin wall, outside the principle zone of extension along the rift valley floor, and hence avoid as much as possible the secondary effects of tectonism and alteration related to the opening of the rift basin.

While it is true that there is never enough site survey, the available dive coverage of the Hess Deep has proved adequate for locating specific drilling targets as anticipated, and I believe that we now have an excellent chance of a succesful drilling leg with a very high scientific return.

Sincerely,

Henry Dick

Dr. Henry Dick
Senior Scientist

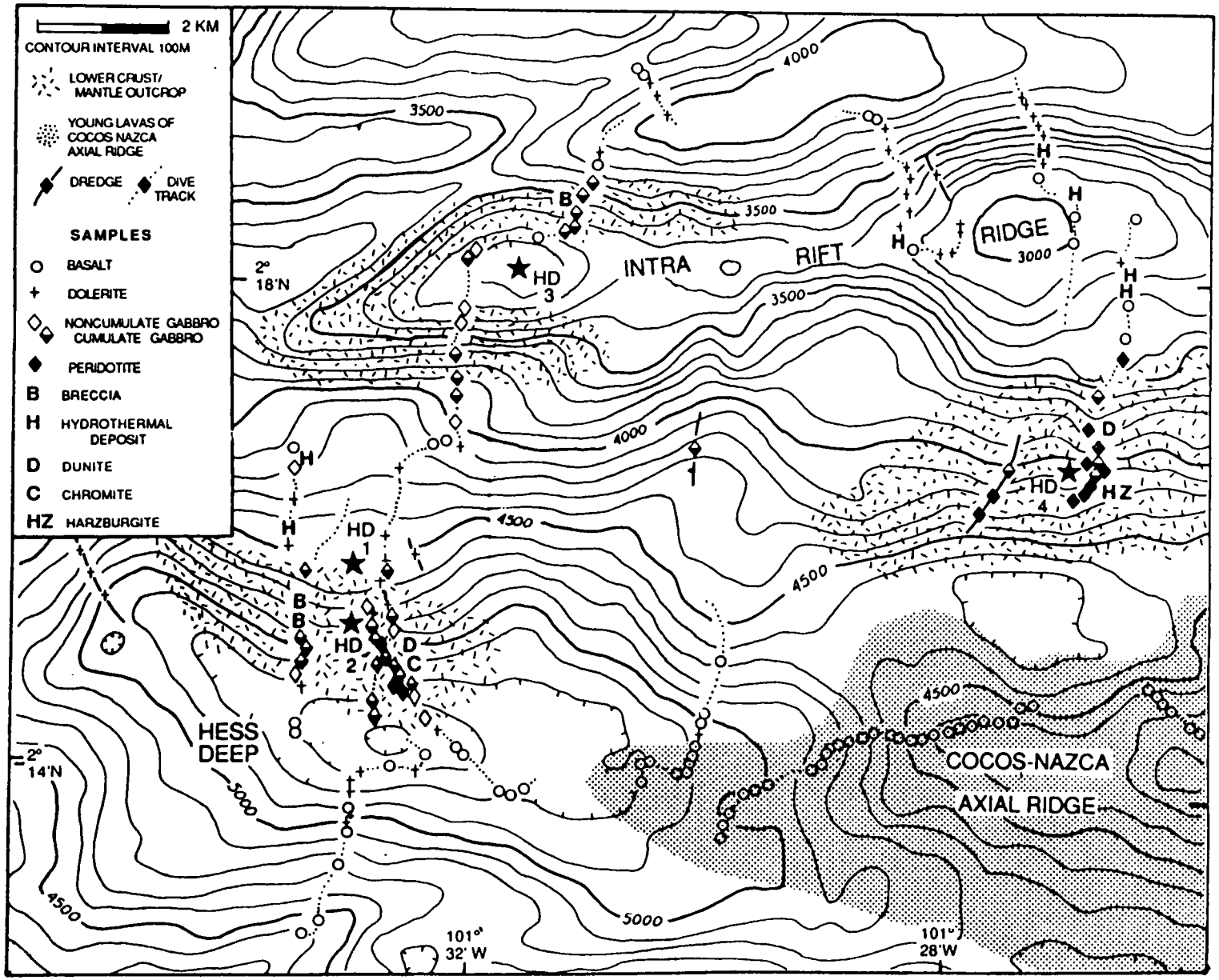
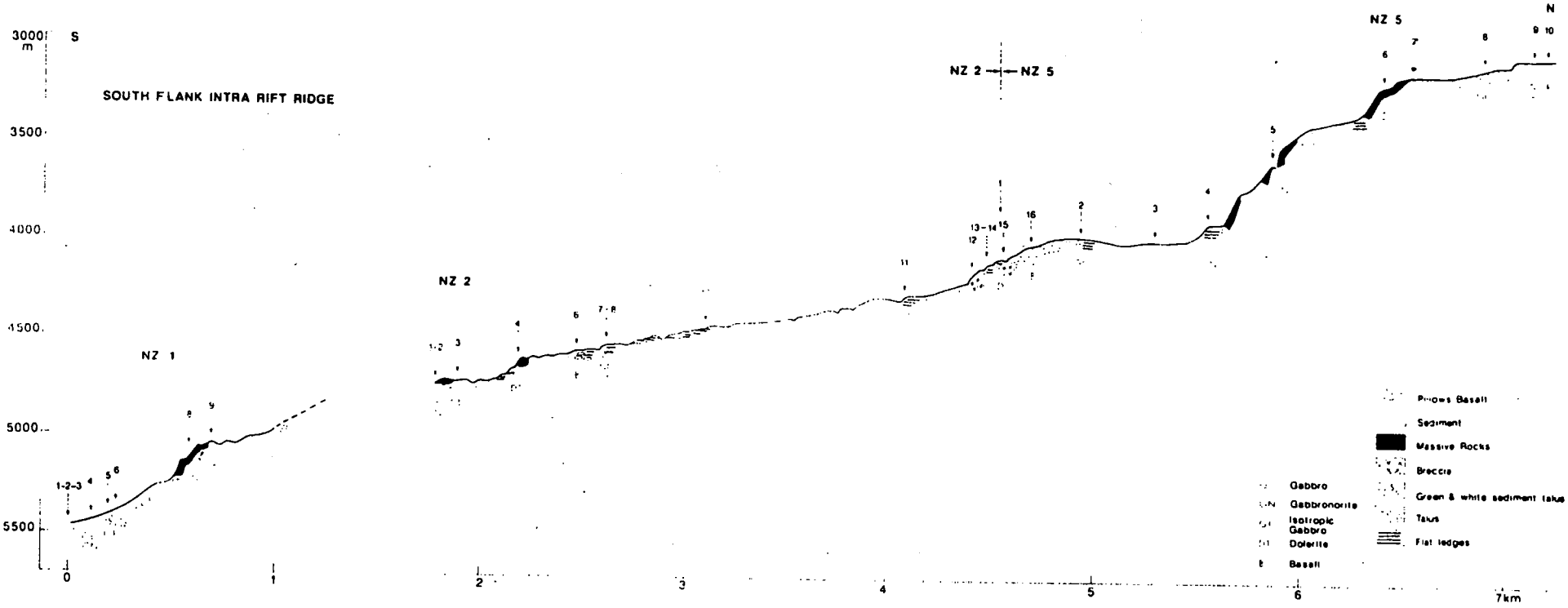
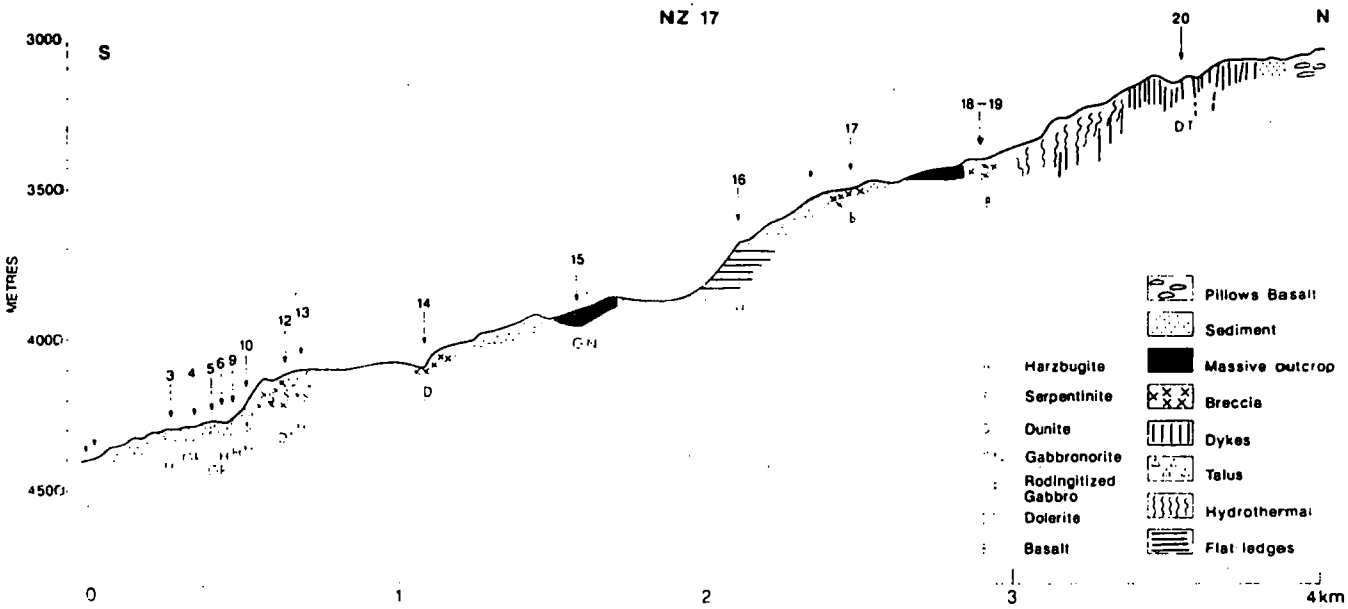
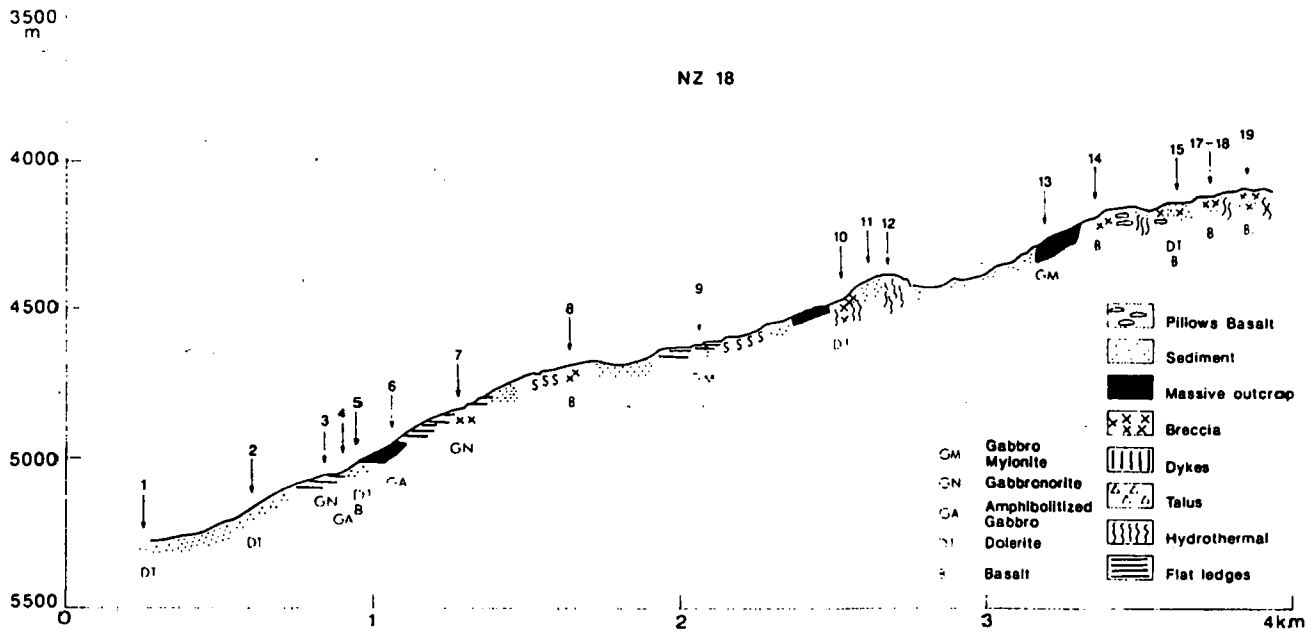


Figure 4. Geologic and bathymetric map of the Hess Deep rift valley. Geology is based upon the Nautlie dive series and dredge results from the F/S Sonne and Atlantis II (modified from Francheteau et al., in press). The stars indicate the location of the four proposed drilling sites (*Hess Deep 1, 2, 3,* and *4*).


SOUTH FLANK INTRA RIFT RIDGE
3000 m
S
N
3500
4000
4500
5000
5500
NZ 1
NZ 2
NZ 2 — NZ 5
NZ 5
1-2-3
4
5
6
7-8
9
10
11
12
13-14
15
16
Gabbro
Gabbronorite
Isotropic Gabbro
Dolerite
Basalt
Pillows Basalt
Sediment
Massive Rocks
Breccia
Green & white sediment talus
Talus
Flat ledges
0
1
2
3
4
5
6
7km


NZ 17
S
N
3000
3500
4000
4500
METRES
0
1
2
3
4km
Harzbugite
Serpentinite
Dunite
Gabbronorite
Rodingitized Gabbro
Dolerite
Basalt
Pillows Basalt
Sediment
Massive outcrop
Breccia
Dykes
Talus
Hydrothermal
Flat ledges

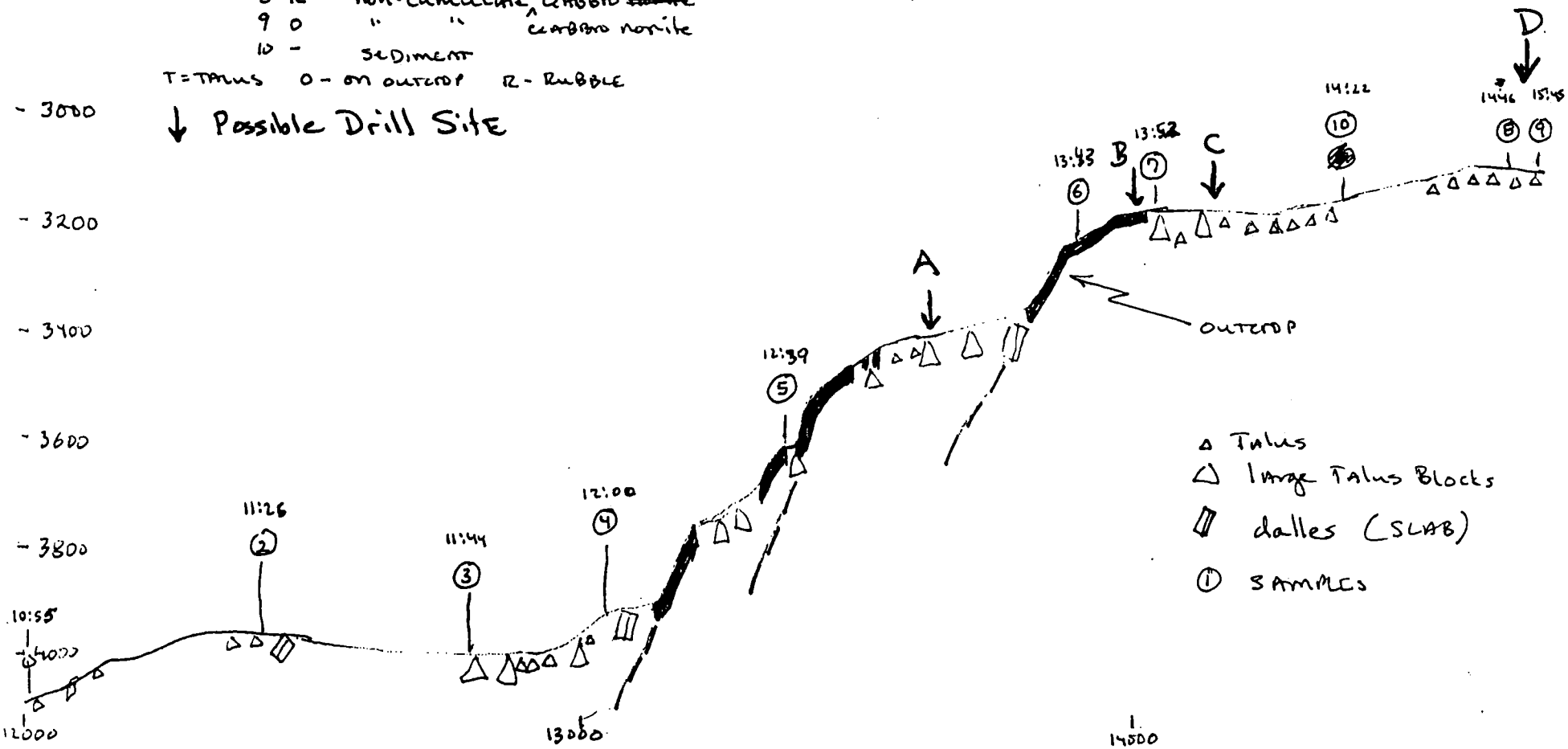

NZ 18
3500
m
4000
4500
5000
5500
0
1
2
3
4km
GM Gabbro Mylonite
GN Gabbronorite
GA Amphibolitized Gabbro
D Dolerite
B Basalt
Pillows Basalt
Sediment
Massive outcrop
Breccia
Dykes
Talus
Hydrothermal
Flat ledges

MANTLE
DIVE 5

SAMPLE		
1	T	METADOLERITE
2	T	NON-CUMULATE GABBRO
3	T	NON-CUMULATE OLIVINE GABBRO
4	O	CUMULATE METAGABBRO NORITE
5	O	CUMULATE METAGABBRO NORITE
6	O	METAGABBRO
7	O	MYLONITIC GABBRO ←
8	R	NON-CUMULATE metaGABBRO ~~NORITE~~
9	O	" " GABBRO NORITE
10	-	SEDIMENT

T = TALUS O - ON OUTCROP R - RUBBLE

↓ Possible Drill Site



"MEMORANDUM"

July 17, 1991

To: Jerry Winterer, Leg 143 Co-Chief Scientist
Will Sager, Leg 143 Co-Chief Scientist
Janet Haggerty, Leg 144 Co-Chief Scientist
Isabella Premoli-Silva, Leg 144 Co-Chief Scientist

From: Tim Francis Tim

Subject: Very Shallow Water Drilling

1. As you are probably aware, there is considerable interest in drilling a number of sites in very shallow water over the next few years. These might be either on inner continental shelves or in the lagoons of Pacific atolls. Just as there is a maximum water depth beyond which the *JOIDES Resolution* cannot operate, there is a shallow water limit to operations. The ship has not yet been pushed close to either limit. The shallowest depth in which she has operated to date is 150 m at Site 681 on the Peru margin (Leg 112). APC/XCB coring was successfully carried out at that site.

2. After discussions between SEDCO and our own engineers, I advised PCOM in April that the shallowest water in which *JOIDES Resolution* could operate, given favorable weather and negligible swell, is about 60 m. Following the OPCOM meeting last month, JOIDES is about to commission a study on the cost and availability of alternate drilling platforms -- barges, jack-ups, etc. -- which might fill the gap between this limit and the shoreline. We have recently been advised by SEDCO that they have conducted a successful DP test, using taut wire for positional reference, with the 472 (sister ship of our vessel) in 57 ft. (17 m) of water near Lisbon. Thus drilling in shallower water than 60 m seems feasible.

3. It is important, therefore, to attempt a very shallow water site in the near future, primarily as an engineering feasibility trial to guide the scheduling of future operations. The lagoon of a Pacific atoll would be the ideal place in which to conduct it. The purpose of this memo is to enquire whether you would be willing to allow such a trial to take place on either Legs 143 or 144. A successful outcome could hasten atoll drilling in the future (post Leg 144), hopefully with the Diamond Coring System.

Ocean Drilling Program
Office of the Director
Texas A&M University Research Park
1000 Discovery Drive
llege Station, Texas 77845-9547 USA
9) 845-8480
Telex Number: 62760290
FAX Number: (409) 845-4857

4. The time required for the trial would be about 30 hours, during which we would attempt to core to, say, 250 mbsf. A water depth in the range 20–30 m would be appropriate. Only rotary drilling would be possible and a modified BHA would be necessary. The cost of failure, i.e. not being able to hold position well enough, would be small -- just a short length of lost/bent pipe. An essential pre-requisite to the trial would be adequate seismic reflection coverage to satisfy PPSP. Is there an atoll accessible to the *JOIDES Resolution* which has such coverage?

5. We would appreciate your comments and suggestions. If the geophysical coverage for such a trial exists on/close to the Leg 143/144 track and you are willing to allow time for this, we should define the site and assemble the necessary data in time for the 24-25 October PPSP meeting in San Diego. Meanwhile, I will alert PCOM to the possibility at the August meeting.

cc: Dr. James Austin, PCOM Chairman
Mr. Barry Harding, ODP
Dr. Audrey Meyer, ODP
Mr. Mike Storms, ODP
Dr. John Firth, ODP Staff Scientist Leg 143
Dr. Amanda Palmer-Julson, ODP Staff Scientist Leg 144

July 3, 1991

Dr. Daniel E. Karig
Department of Geological Sciences
Cornell University
Snee Hall
Ithaca, NY 14853

Dear Dan:

GEOPROPS Probe

Following the bench test of the GEOPROPS Probe at TAM in Houston on 26 June 1991, we have had internal discussions here at ODP-TAMU on the status of the tool. Our judgment is that it will need further bench tests, drop tests and downhole tests on land, with appropriate modifications and adjustments, before it can be regarded as ready for deployment from the drillship. We understand that there are neither plans nor money for such tests. In accordance with the Guidelines for Third Party Tool Development (JOIDES Journal, XVII, 1, 56-57), therefore, we are unable to accept GEOPROPS for deployment on Leg 141.

Having said this, however, we are not saying that the GEOPROPS development should be stopped. We are aware of the strong scientific interest in getting the tool fully operational for Leg 146 (Cascadia). Our engineers believe that the tool is a clever design, has significant promise, and ultimately can be made to work. We have discussed ways in which the development might be brought to a successful conclusion, resulting in a "Mature ODP Tool." There seem to be three options for you to consider:

1. Hire a consulting engineer experienced in downhole tool development to do the work. We can suggest suitable names.

2. Have a further contract with TAM. On the basis of the track record so far, we do not recommend this approach.

3. Hand over the development to ODP-TAMU. Because of the heavy demands on our engineering manpower, this is not at present a possibility. At its April 1991 meeting, PCOM prioritized the projects on which our engineering development effort should be spent. The 6th and bottom priority was development of the "MDCB, in preparation for the use of GEOPROPS in the Cascadia drilling."

If the MDCB tests progress exceptionally well, it might be possible, with PCOM's approval, for GEOPROPS to be substituted into this bottom slot. But this could not be before December 1991. It might then be possible to run MDCB and GEOPROPS on Leg 143 or 144, giving us a fighting chance of meeting the Cascadia (Leg 146) deadline.

Ocean Drilling Program
Office of the Director
Texas A&M University Research Park
1000 Discovery Drive
College Station, Texas 77845-9547 USA
(409) 845-8430
Telex Number: 62760290
FAX Number: (409) 845-4857

Whichever of the above three options is followed, we estimate another $25K will be required to prepare GEOPROPS for its baptism of fire on the *JOIDES Resolution.* Finding this money will require further effort and commitment on your part. However, as you may have heard, there may be $2.1M extra money in ODP in FY92 and subsequent years. On 7 June 1991 the JOIDES Opportunity Committee (OPCOM) met to discuss how this money might be spent and provisionally allocated $175K in FY92 and FY93 for "studies on new, more effective approaches to in situ fluid sampling." It might be possible for you to tap some funds from this source.

I wish you the best of luck in what I hope is the final lap of a marathon event. But cheer up, people are offering refreshments along the way and the tape is in sight.

Yours sincerely,

Tim Francis

Timothy J.G. Francis
Deputy Director

TJGF:hk

cc: Dr. James Austin, PCOM
Dr. Paul Worthington, DMP
Dr. Bruce Malfait, NSF
Dr. Tom Pyle, JOI
Mr. Barry Harding, ODP
Dr. Audrey Meyer, ODP
Mr. Mike Storms, ODP
Mr. Dave Huey, ODP
Dr. Andy Fisher, ODP

000213

DEPARTMENT OF GEOLOGICAL SCIENCES
CORNELL UNIVERSITY
SNEE HALL
ITHACA, NEW YORK 14853-1501

Office of Chairman
Daniel E. Karig

(607) 255-3679 or 5352
Fax: (607) 254-4780

July 12, 1991

Dr. Timothy J.G. Francis
Deputy Director
Ocean Drilling Program
Texas A & M University Research Park
1000 Discovery Drive
College Station, TX 77845-9547

Dear Tim:

I should wait until I get a reply from Dave Huey concerning the test results report I sent him but I'd like to make a few points concerning the Geoprops Probe clear.

This tool was designed for use on the Nankai leg, where I would have been one of the scientific beneficiaries. At this point, I have no personal scientific objectives for the tool and have been seeing it through largely out of "honor" and altruism. I certainly never had nor plan to have any intentions of involvement in the Cascadian margin leg.

Moreover, I have more than enough commitments into the foreseeable future, which leaves very little (no) time to go through yet another proposal writing episode. It is perfectly clear to me that if the proponents of the tool for Cascadia wish to see it ready, one of them had better quickly step forward and do something more than expect someone to drop a finished tool on their laps. I'm willing to consult, advise, etc., but not to drop more pressing projects for the probe.

Sincerely yours,

Daniel E. Karig
Professor & Chair

meg

000214

NATIONAL SCIENCE FOUNDATION
1800 G STREET, N.W.
WASHINGTON, D.C. 20550

DIVISION OF OCEAN SCIENCES

July 31, 1991

Dr. Arthur Maxwell
Chairman, JOIDES Executive Committee
Institute for Geophysics
University of Texas at Austin
8701 Mopac Boulevard
Austin, TX 78759-8345

Dear Art:

Several item of interest to EXCOM, plus a requested report for the next EXCOM meeting, were discussed at the ODP council session on July 11, 1991.

First, all member countries reiterated their strong support for a continuation of the program with the JOIDES Long Range Plan providing the guiding scientific directions. A ten year program with the JOIDES Resolution as the primary ship in the initial phase was agreed upon. The timing and mechanism for considering potential new facilities was debated. The EXCOM ad hoc committee on Long Term Organization and Management of ODP is scheduled to report in January 1992. The Council plans to use the report, and additional EXCOM comments, as input to future discussions.

Second, there was consensus that co-chief scientist representation on drilling legs as described in the MOUs does not need to be done strictly on a yearly basis. The intent of the MOU should be interpreted on a longer time frame as appropriate for the addition of a seventh international partner. This is consistent with the sense of the EXCOM discussion earlier in the week. NSF will work with Texas A&M management to ensure appropriate guide- lines for implementation of the MOUs are followed.

The Council also discussed the on-going management of the ODP and international interactions. A number of Council representatives commented that the process for international competition in engineering development activities and purchase of standard supplies often allows little time for the partners to react. NSF will revisit this issue with JOI and its contractors to improve the notification and bidding system.

The Council also requests that a status report on international staffing at the major contractors (Texas A&M and Lamont) be presented at the next EXCOM meeting. General questions include numbers and trends for international technicians and staff scientists, procedures for job vacancy advertisements, and future projections.

The impression is that the level of international staffing has decreased with time. The Council did not request any specific actions beyond the EXCOM report to determine facts versus impressions.

I believe the San Diego meetings went well and will see you in Germany in January.

Sincerely

Donald F. Heinrichs
Chairman, ODP Council

cc: JOIDES Office
T. Pyle, JOI,Inc.

bcc: ODP Files

Explanatory Notes to Proposal Lists

During the past months the JOIDES Office has written an updated ODP proposal catalog as a *4th Dimension* ® database for Macintosh. The purpose of this effort was to evaluate the status of processing of all ODP proposals for JOIDES Office use, and for presentation to PCOM, thematic panels and PEC III. At this stage, draft versions are presented to PCOM. **PCOM should decide whether and how to phase "old" proposals out of the review/ranking process in order to give thematic panels a directive as to which proposals are "active".**

The catalog

Conceptually, the catalog differs from earlier proposal lists by uniquely identifying each proposal document submitted to the JOIDES Office, be it a new proposal, a revised version replacing an earlier proposal, or an addendum to an earlier proposal. Master lists created in such a way allow assessment of the history of each proposal and the status of the latest, i.e. most updated version.

Technically the proposal catalog includes the following possibilities: 1) to search for complete as well as partial value of any of the more than 40 input fields of the proposal file to create any desired selection of records and to produce accurate statistics, 2) to sort any of the fields, 3) to link the proposal file with other files, such as proposal review and personnel files, 4) to create an unlimited number of custom layouts (outputs) from desired fields, 5) to create custom applications for multiple database users (e.g., other JOIDES Office personnel), and 6) to improve database structure while the database is growing.

Master Lists

Master lists show all proposals. Two types of master lists (List A and List B) are presented here. In addition to being composed of different sets of data fields, List A is sorted chronologically, whereas List B is sorted by proposal number.

List A here serves as a means to assess the age of proposals thematic panels were considering at their most recent (spring 1991) global ranking. Proposal status information is concentrated into one column in order to leave space for other types of information, such as title and contact proponent.

List B allows tracking of a proposal's history. Proposal status information is organized in several columns for better visualization. Some data fields are explained in more detail in the following sections.

Proposal categories

Proposals generally fall into one of three categories, which is indicated in the reference number (first field of any proposal list):

999---- New (initial) proposal; four dashes following the three digit number are identifiers for new proposals.

999-Rev Revised proposals, always replace previous versions; note that a third version, 999-Rev2, replaces the second version, 999-Rev.

999-Add Addenda; they can consist of additional sites, site survey or other scientific data, or objectives. Note that 999-Add2 stands for a second addendum, which may or may not replace the first one.

A fourth category, supplemental science proposals (S-n), was introduced by PCOM this year to distinguish such documents for their special requirements and processing. Detailed Planning Group reports also replace original proposals on which they are based, and thus enter the proposal catalog as programs (e.g., "NAAG" for the NAAG-DPG Report).

Proposal status

Proposal status has been assessed within a scheme shown on p. 3 at the end of these notes ("Status" box on input layout), by checking one or more of eight proposal status types.

Active proposals	
In Review	Proposals now in the process of initial thematic panel review, i.e., between submission and initial global ranking.
Ranked	Proposals which have gone through at least one global ranking and have been ranked by at least one thematic panel; rank may be as low as 25th.
Not Ranked	Proposals not appearing on global ranking lists of thematic panels **and** submitted/updated not earlier than within the last three calendar years before the present year (older proposals are checked as "not drilled", see below). This is the cut-off suggested by the JOIDES Office to define "active proposals", to be decided upon by PCOM.
Inactive proposals	
Replaced (by)	Proposals replaced by a revised version. Generally, the replacing version (revised proposal) has the same three digit number as the replaced version; in cases where this rule has been violated and a new number has been given to the revised version, the new number is given here to link the documents (see also "ghost of").
To DPG	Proposals forwarded to a DPG. If some of these proposals are not included into the drilling program of that DPG, they may later be "reactivated" by thematic panel ranking.
Drilled/scheduled	Proposals contributing to planning of a particular leg; whether or not specific proposed sites were drilled is less relevant than their general scientific contribution to a leg; FY92 programs scheduled at the 1990 annual PCOM meeting but not drilled yet are also checked here.
Not Drilled	Proposals which did not evolve into drilling programs for various reasons **and** were not updated within the JOIDES Office cut-off period (see also "not ranked").
Ghost (of)	These are statistical placeholders for those instances where a revised proposal has been assigned a three digit number different from that of the previous version by the JOIDES Office; they link the new number to original one(s) (see also "replaced by").

Recommendation

As the proposal list grows and thematic panel memberships change, the JOIDES Office finds that new panel chairs are often not very sure what to do with proposals scheduled for global ranking at spring meetings. Approaches are certainly not consistent among the thematic panels. Consequently, the JOIDES structure, as a responsibility toward proponents, faces the task of formalizing ranking procedures more clearly.

From Master List A, it is apparent that thematic panels have ranked proposals with submission dates mostly younger than early 1988. For example, only five ranked proposals were submitted during 1986/87 (Ross Sea, Juan de Fuca Ridge, Woodlark Basin, Loihi Seamount, Shatsky Rise). An update for Shatsky Rise was received in June 1991 and is in review now, which reduces the number to four. Woodlark Basin, TECP's rank 7 (April, 1991), is a "very immature" proposal that needs to see a major update before TECP could recommend it for drilling. Ross Sea is OHP's (April 1991) rank 11, Loihi is LITHP's (April 1991) rank 15, and Juan de Fuca is LITHP's (April 1991) rank 16. Since ranks below ~ 5, and certainly below ~ 10, probably do not have any impact on near- and middle-term drilling schedules, all currently "highly" ranked ODP proposals have in effect been submitted since the beginning of 1988.

Therefore, the effect of a "natural" phasing out of proposals older than ~ 3-4 years by a formal statute of limitations would have only a mild impact in terms of "killing" proposals (or asking proponents to update their proposals), and would clarify the issue of the meaning of "active" proposals for the JOIDES advisory structure. The JOIDES Office proposes the following wording, which could form the basis of a PCOM motion on this subject:

PCOM recommends that proposals which have not been updated for three full calendar years before the present calendar year (i.e., January 1, 1988 for 1991 activities, to roll to January 1, 1989 on January, 1992) be declared formally "inactive". Thematic panels will be given the directive by the JOIDES Office not to review inactive proposals formally, but rather to initiate submission of proposal updates from proponents if there is sufficient panel interest. The community will be informed about this change in policy through the JOIDES Journal.

JOIDES Office, August 5, 1991

Proposal Logging

Proposal No 015---- Old No 15/A Date rec 1/10/84

Category ☒ New ☐ Revised ☐ Addendum ☐ S-Prop.

Status ○ Active Proposal ◉ Not active Proposal

- ☐ In Review
- ☐ Ranked
- ☐ Not ranked
- ☒ Replaced ("by:", if new no.): 329-Rev
- ☐ To DPG (eg, NARM-DPG): _____
- ☐ Drilled on/scheduled for Leg: _____
- ☐ Not Drilled ☐ Ghost of: _____

Title Paleocommuncation Between the North and South Atlantic Seas During the Cretaceous: Formation of the Atlantic Ocean

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
001----	12/16/82	Pre-middle Cret. history of deep SE Gulf of Mexico	Buffler, R.T.	Not drilled
002----	12/16/82	Middle America Trench and Costa Rica conv. margin	Buffler, R.T.	Not drilled
003----	06/27/83	Vicinity of the Hawaiian Islands	Watts, A.B.	R
004----	07/01/83	Tuamotu Archipelago	Okal, E.A.	Not drilled
005----	07/13/83	Development of carbonate platforms, N Bahamas	Schlager, W.	**Leg 101**
006----	08/01/83	Ocean crust and high lat. paleo., Labrador Sea	Gradstein, F.M.	R
007----	08/01/83	Gulf of Mexico area	Buffler, R.T.	Not drilled
008----	08/01/83	Chile Triple Junction	Cande, S.C.	R (318-Rev)
009----	01/05/84	Pre-Messinian ocean history of the Mediterranean	Hsü, K.	Not drilled
010----	01/05/84	Cenozoic events, oceanic and atm. circ., off NW Africa	Sarnthein, M.	R
011----	01/05/84	Porto and Vigo seamounts, Iberian continental margin	Kidd, R.B.	Not drilled
012----	01/05/84	Transect across the Tyrrhenian back-arc basin	Cita-Sironi, M.B.	**Leg 107**
013----	01/05/84	Time-series studies of oceanic ecosystems	Wiebe, P.H.	Not drilled
014----	01/10/84	Zero age drilling: EPR 13°N	Bougault, H.	**Leg 147**
015----	01/10/84	Formation of the Atlantic Ocean	Herbin, J.P.	R (329-Rev)
016----	01/10/84	Atlantic-Mediterranean relationships since the Miocene	Faugeres, J.C.	Not drilled
017----	01/10/84	Deep crust and upper mantle, Gorringe Bank	Mevel, C.	R
018----	01/10/84	Galicia Bank	Mauffret, A.	R
019----	01/10/84	Eleuthera Fan	Ravenne, C.	**Leg 101**
020----	01/10/84	Subduction-collision, outer Hellenic Arc	Mascle, J.	Not drilled
021----	01/10/84	Rifting, stretching, accretion, Tyrrhenian marginal basin	Rehault, J.P.	R
022----	01/10/84	Rhone deep-sea fan	Bellaiche, G.	Not drilled
023----	01/10/84	Caribbean basins	Mascle, A.	Not drilled
024----	01/10/84	Barbados transects	Mascle, A.	**Leg 110**
025----	01/10/84	New Hebrides Island Arc	Pelletier, B.	**Leg 125**
026----	01/10/84	Tonga Kermadec arc	Pelletier, B.	R
027----	01/10/84	Sulu Sea marginal basin and Sulu-Negros troughs	Rangin, C.	R
028----	01/10/84	Tectonic evolution, South China Sea	Letouzey, J.	Not drilled
029----	01/10/84	Ryukyu island arc and Okinawa backarc basin transect	Letouzey, J.	Not drilled
030----	01/10/84	Indian Ocean	Clocchiatti, M.	R
031----	01/10/84	Paleoenvironmental history of the Red Sea	Guennoc, P.	Not drilled
032----	01/26/84	Caribbean Sea primary drilling sites	Rosencrantz, E.	Not drilled
033----	01/26/84	Ghost of 009---- (double)		G
034----	01/26/84	Targets in the North Pacific - Bering latitudes	Scholl, D.C.	Not drilled
035----	02/01/84	Additional sites for Barbados accretionary complex	Westbrook, G.K.	**Leg 110**
036----	02/07/84	Drilling in the Norwegian Sea	Hinz, K.	R
037----	02/15/84	Costa Rica	Shipley, T.H.	R
038----	02/15/84	Northeast Gulf of Mexico	Kennett, J.P.	Not drilled
039----	02/27/84	Cape Verde area	Hill, I.A.	Not drilled
040----	02/27/84	Reentry for logging of Site 534, Blake-Bahama Basin	Sheridan, R.	Not drilled
041----	03/05/84	Structural and hydrological processes, Barbados forearc	Moore, J.C.	**Leg 110**
042----	03/05/84	Sunda Straits area	Huchon, P.	Not drilled
043----	03/05/84	Southwest Pacific	Falvey, D.A.	Not drilled
044----	03/05/84	Evolution of the Andaman Sea	Peltzer, G.	Not drilled
045----	03/05/84	Paleoenvironment, equatorial Atlantic	Ruddiman, W.F.	**Leg 108**
046----	03/05/84	South China Sea Basin	Hayes, D.E.	R
047----	03/05/84	Manila Trench subduction zone, South China Sea	Hayes, D.E.	Not drilled
048----	03/05/84	South China Sea Basin	Hinz, K.	R
049----	03/05/84	Eastern Banda Arc/Arafura Sea	Schluter, H.U.	Not drilled

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
050----	03/05/84	Nankai Trough	Taira, A.	R
051----	03/05/84	Sea of Japan	Kagami, H.	R
052----	03/12/84	Solomon Sea	Milsom, J.	Not drilled
032-Add	03/19/84	Heat flow and seismic refraction, Yucatan Basin	Rosencrantz, E.	Not drilled
053----	03/19/84	Vertical seismic profiling	Phillips, J.D.	**Leg 102**
024-Add	03/20/84	Structural and hydrological processes, Barbados	Mascle, A.	**Leg 110**
054----	03/20/84	Southern Ocean drilling (South Atlantic sector)	Kennett, J.P.	**Legs 113/114**
055----	03/21/84	Makran forearc, Pakistan	Leggett, J.K.	Not drilled
056----	03/21/84	Deformation and fluid flow, central Indian Ocean	Weissel, J.K.	**Leg 116**
057----	03/21/84	Formation of the African-Arabian margin	Stein, C.A.	Not drilled
058----	03/21/84	West Baffin Bay	Grant, A.C.	**Leg 105**
059----	03/27/84	Cont. margin sed. instability, drilling adjacent turbidites	Weaver, P.P.E.	R
060----	04/20/84	Newfoundland Basin, eastern Canadian margin	Masson, D.G.	Not drilled
006-Rev	05/14/84	Labrador Sea and Baffin Bay - high lat. paleoceanography	Gradstein, F.M.	**Leg 105**
017-Rev	05/21/84	Deep crust and upper mantle, Gorringe Bank	Mevel, C.	Not drilled
061----	06/18/84	Madagascar/East African margin and W Somali Basin	Coffin, M.F.	Not drilled
062----	06/18/84	Davie Fracture Zone	Coffin, M.F.	R
063----	06/18/84	Madeira Abyssal Plain	Schuttenhelm, R.	Not drilled
064----	06/25/84	Site NJ-6	Poag, C.W.	Not drilled
010-Rev	07/01/84	Cenozoic events, oceanic and atm. circ., off NW Africa	Sarnthein, M.	R
036-Rev	07/05/84	Norwegian Sea	Hinz, K.	**Leg 104**
065----	07/05/84	Magnetic Quiet Zone, south Australia margin	Mutter, J.C.	Not drilled
066----	07/05/84	Principal horizontal stresses in ocean crust	Whitmarsh, R.B.	R
067----	07/06/84	Tonga - Lord Howe Rise transect	Falvey, D.A.	Not drilled
068----	07/06/84	Deep basins of the Mediterranean	Montadert, L.	Not drilled
008-Rev	07/20/84	Southern Chile Triple Junction	Cande, S.C.	R
069----	07/23/84	Rock stress measurements, Norwegian Sea	Stephansson, O.	Not drilled
070----	07/23/84	Borehole seismic experiments, DSDP Sites 417 and 603	Stephen, R.A.	**Leg 102**
071----	07/30/84	Ghost (Letter of Intent)		G
072----	07/30/84	Lesser Antilles forearc	Speed, R.C.	**Leg 110**
073----	08/01/84	Adelie margin, E Antarctica	Wannesson, J.	R (110-Rev)
018-Rev	08/02/84	Galicia Bank	Mauffret, A.	**Leg 103**
074----	08/02/84	Continental margin of Morocco, NW Africa	Winterer, E.L.	Not drilled
037-Rev	08/06/84	Test of duplex thrust model, Costa Rica margin	Shipley, T.H.	Not drilled
075----	08/13/84	Gulf of California	Mammerickx, J.	Not drilled
076----	08/17/84	Axial drilling on the EPR at 13°N	Francheteau, J.	R
059-Rev	08/20/84	Cont. margin sed. instability, drilling adjacent turbidites	Weaver, P.P.E.	R
077----	08/20/84	Seychelles Bank and the Amirante Trough	Mart, Y.	Not drilled
078----	08/23/84	Indus Fan	Kolla, V.	Not drilled
079----	08/28/84	Tethyan stratigraphy and oceanic crust, Indian Ocean	Coffin, M.F.	Not drilled
080----	08/30/84	Convergent margin processes, Sunda and Banda arcs	Moore, G.F.	Not drilled
021-Rev	09/01/84	Tyrrhenian transect	Rehault, J.P.	R
081----	09/04/84	Ionian Sea transect	Hieke, W.	Not drilled
082----	09/04/84	Sulu Sea	Thunell, R.	**Leg 124**
083----	09/05/84	Izu-Ogasawara (Bonin) arc transect	Okada, H.	R
084----	09/10/84	Peru margin	Kulm, L.	**Leg 112**
085----	09/20/84	Continental margin of Morocco, NW Africa	Hayes, D.E.	Not drilled
086----	10/12/84	Red Sea	Bonatti, E.	R
087----	10/12/84	Basalt drilling objectives in the Arabian Sea	Natland, J.	Not drilled

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
088----	10/12/84	Mascarene Plateau-Chagos-Laccadive volcanic lineament	Duncan, R.A.	R
089----	10/12/84	Mantle drilling at the SW Indian Ridge	Dick, H.J.B.	R
090----	10/12/84	Southeast Indian Ocean Ridge transect	Duncan, R.	Not drilled
091----	10/12/84	Southeast Indian Ridge crustal transects	Langmuir, C.	Not drilled
092----	10/12/84	Bore hole seismic observatory	Butler, R.	R
093----	10/12/84	Anoxic sediments, western Arabian Sea	Prell, W.L.	Leg 117
094----	10/12/84	Upwelling and evolution of the Indian Ocean Monsoon	Prell, W.L.	Leg 117
095----	10/12/84	Salinity, runoff, and evolution of Indean Ocean Monsoon	Cullen, J.L.	Leg 117
096----	10/12/84	Bengal Fan	Curray, J.R.	Leg 116
097----	10/12/84	Equatorial Indian Ocean transect	Peterson, L.C.	R
098----	10/12/84	Atmosph. circ. and climatic evol., Australian desert	Rea, D.K.	Not drilled
099----	10/12/84	Paleo., climate dynamics, stratigraphy, S Indian Ocean	Coulbourn, W.	Not drilled
100----	10/12/84	Southeast Indian Ocean Ridge transect	Duncan, R.M.	Not drilled
101----	10/12/84	Geologic history of ridgecrest hydrothermal activity	Owen, R.M.	Not drilled
102----	10/12/84	Somali Basin	Matthias, P.	Not drilled
103----	10/12/84	Northwest Indian Ocean	Heirtzler, J.	Not drilled
104----	10/12/84	Ninetyeast Ridge	Curray, J.	Leg 121
105----	10/12/84	Arc-continent collision, Timor	Karig, D.E.	Not drilled
106----	10/12/84	Broken Ridge, Indian Ocean	Curray, J.	Leg 121
107----	10/12/84	State of Stress in Oceanic Lithosphere	Forsyth, D.	Not drilled
108----	10/12/84	East Antarctic continental margin	Kennett, J.P.	R
109----	10/12/84	Kerguelen-Heard Plateau	Kennett, J.P.	Legs 119/120
110----	10/12/84	Ghost of 073----		G
110-Rev	10/12/84	Wilkesland-Adelie continental margin	Kennett, J.P.	R (073-Rev2)
111----	10/12/84	Southeast Indian Ocean Ridge transect	Kennett, J.P.	Not drilled
112----	10/12/84	Lithosphere targets	Kennett, J.P.	Leg 118
113----	10/12/84	Agulhas Plateau		Not drilled
114----	10/12/84	Crozet Plateau	Kennett, J.P.	Not drilled
115----	10/12/84	Agulhas Plateau and adjacient basins, off South Africa	Herb, R.	R
116----	10/12/84	Paleoceanography of the Indian Ocean, Ninetyeast Ridge	Oberhansli, H.	Leg 121
117----	10/12/84	Northern Red Sea	Cochran, J.R.	Not drilled
118----	11/02/84	Cenozoic history off E Africa (and Hominid evolution)	Kennett, J.P.	Leg 117
062-Rev	12/03/84	Davie Fracture Zone: reactivating zone of weakness?	Coffin, M.F.	Not drilled
119----	12/03/84	History of the early opening of the Gulf of Aden	Stein, C.A.	Not drilled
120----	12/10/84	Atlantis II Deep, Red Sea	Zierenberg, R.A.	Not drilled
121----	12/10/84	Exmouth and Wallaby plateaus and Argo Abyssal Plain	Exon, N.F.	R
122----	12/28/84	Basement drilling at the Kane Fracture Zone	Karson, J.A.	Legs 106/109
123----	12/28/84	Studies at IPOD Site 501/504 (Costa Rica Rift)	Mottl, M.J.	Leg 111
124----	01/02/85	Deepen Hole 504B	Becker, K.	Leg 111
125----	01/14/85	Bare Rock drilling, Mid-Atlantic Ridge at 22°53'N	Bryan, W.B.	Legs 106/109
126----	01/14/85	Australasian region	Crook, K.A.W.	Not drilled
127----	01/18/85	E Sunda Arc and NW Australia collision	Silver, E.A.	Not drilled
128----	01/21/85	Phys. properties, mech. state, struct. fabric in acc. prisms	Karig, D.E.	R
129----	01/21/85	Bounty Trough	Davey, B.	R
130----	01/21/85	Evolution of SW Pacific, area N of New Zealand	Eade, J.V.	Leg 135
073-Add	02/20/85	Adelie margin, East Antarctica	Wannesson, J.	Not drilled
089-Rev	03/01/85	Mantle heterogeneity, SW Indian Ridge fracture zones	Dick, H.J.B.	R
131----	03/09/85	Trapped oc. crust and displaced cont. borderl., Banda Sea	Silver, E.A.	Not drilled
132----	03/11/85	TTT-Type Triple Junction area off central Japan	Ogawa, Y.	R

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
097-Rev	03/21/85	Equatorial Indian Ocean transect	Peterson, L.C.	R
133----	03/21/85	In-situ fluid samplers for use in the ODP	McDuff, R.E.	Legs Eng.
030-Rev	03/25/85	Davie Ridge and Malagasy margin	Segoufin, J.	R
134----	03/25/85	Gulf of Aden	Girdler, R.W.	R
135----	03/25/85	Thermo-mechanical models for rifting, Broken Ridge	Weissel, J.K.	Leg 121
136----	03/25/85	Kerguelen-Heard Plateau (Indian Ocean)	Schlich, R.	R
137----	03/25/85	Fossil Ridges in the Indian Ocean	Schlich, R.	R
138----	03/25/85	Rodriguez Triple Junction (Indian Ocean)	Schlich, R.	R
139----	03/25/85	Agulhas Plateau, southwest Indian Ocean	Jacquart, G.	R
140----	04/01/85	Central and northern Red Sea axial areas	Pautot, G.	R
141----	04/02/85	Deep sea fan de l'Indus	Jacquart, G.	R
142----	04/02/85	Equatorial Pacific depth transect, Ontong Java Plateau	Mayer, L.A.	R
115-Rev	04/08/85	Agulhas Plateau and adjacent basins, off South Africa	Herb, R.	Not drilled
116-Add	04/08/85	Ninetyeast/Chagos Laccadive Ridges evaluation for paleo.	Oberhansli, H.	Leg 121
143----	04/09/85	In-situ magnetic susc. measurements with well log probe	Krammer, K.	R
010-Rev2	04/26/85	Cenozoic paleo., off NW Africa and equatorial Atlantic	Sarnthein, M.	Leg 108
084-Add	05/12/85	Peru margin	Kulm, L.	Leg 112
144----	05/28/85	Arc-arc collision, Kuril forearc	Seno, T.	R
145----	05/29/85	Left-lateral dislocation of the Ryukyu arc system	Ujiie, H.	R
146----	05/30/85	Toyama submarine fan, eastern Japan Sea	deVries Klein, G.	R
088-Rev	05/31/85	Chagos-Laccadive-Mascarene volcanic lineament	Duncan, R.A.	Leg 115
147----	06/05/85	South China Sea	Xia, Z.	Not drilled
148----	06/05/85	Oblique subduction in Sagami Trough, off central Japan	Ogawa, Y.	Not drilled
132-Rev	06/11/85	TTT-Type Triple Junction area off central Japan	Ogawa, Y.	Not drilled
097-Rev2	06/19/85	Equatorial Indian Ocean transect	Peterson, L.C.	Leg 115
146-Rev	06/20/85	Toyama submarine fan, eastern Japan Sea	deVries Klein, G.	Not drilled
149----	06/20/85	Active spreading center of the Sea of Japan	Kimura, M.	R
150----	06/20/85	Hard rock drilling, Ninetyeast and Kerguelen-G. ridges	Frey, F.A.	Legs 120/121
151----	06/20/85	Opening of the Japan Sea - mantle plume origin	Wakita, H.	Legs 127/128
152----	06/20/85	Borehole seismic experiments - ODP Leg 107	Avedik, F.	Leg 107
153----	06/20/85	Southeast Pacific	Hayes, J.D.	Not drilled
154----	06/20/85	Entrapment of Banda-Celebes-Sulu-Sea Basin	Hilde, T.W.C.	Leg 124
021-Rev2	07/01/85	Tyrrhenian transect	Rehault, J.P.	Leg 107
136-Rev	07/01/85	Kerguelen-Heard Plateau (Indian Ocean)	Schlich, R.	Legs 119/120
155----	07/05/85	Downhole measurements, Japan Sea	Suyehiro, K.	R
156----	07/05/85	Massive sulfide in Kita-Yamato Trough, Japan Sea	Urabe, T.	Legs 127/128
157----	07/10/85	Paleo. and marine climatic history, Japan Sea	Koizumi, I.	Legs 127/128
083-Rev	07/15/85	Izu-Ogasawara (Bonin) Arc transect	Okada, H.	R
158----	07/15/85	Geochem. and sedimentology, Japan Trench/Japan Sea	Matsumoto, R.	Legs 127/128
159----	07/15/85	Long-term downhole ex., Izu-Mariana-Sagami-Suruga	Kinoshita, H.	Not drilled
160----	07/15/85	Geophysics of topmost part of lithosphere, Weddell Sea	Kinoshita, H.	Not drilled
161----	07/15/85	Measurements at high T in hydro. circulation, MAR	Kinoshita, H.	Not drilled
051-Rev	07/17/85	Tectonics of the Japan Sea	Kagami, H.	Legs 127/128
162----	07/17/85	Vertical seismic profiles, SW Indian Ridge fracture zones	Stephen, R.A.	Leg 118
027-Rev	07/18/85	Sulu Sea marginal basin	Rangin, C.	Leg 124
163----	07/18/85	Zenisu Ridge (Nankai Trench), Japan	Rangin, C.	R
164----	07/18/85	Japan Trench and Japan-Kuril trenches junction	Cadet, J-P.	Not drilled
165----	07/18/85	Shikoku Basin oceanic crust	Le Pichon, X.	Not drilled
166----	07/22/85	Evolution of mantle wedge, opening of Japan Sea	Tatsumi, Y.	Legs 127/128

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
167----	07/22/85	Okinawa Trough back-arc rifting and Ryukyu Trench	Uyeda, S.	Not drilled
168----	07/22/85	Sedimentology of siliceous sediments, Japan Sea	Iijima, A.	Legs 127/128
169----	07/29/85	South Tasman Rise	Hinz, K.	Not drilled
170----	07/29/85	Back-arc spreading center, Valu Fa Ridge, Lau Basin	Morton, J.L.	Not drilled
030-Rev2	08/05/85	Davie Ridge and Malagasy margin	Segoufin, J.	Not drilled
073-Rev	08/05/85	Ghost of 110-Rev		G
073-Rev2	08/05/85	Adelie margin, East Antarctica	Wannesson, J.	Not drilled
137-Rev	08/05/85	Fossil ridges in the Indian Ocean	Schlich, R.	Not drilled
138-Rev	08/05/85	Rodriguez Triple Junction (Indian Ocean)	Schlich, R.	Not drilled
139-Rev	08/05/85	Agulhas Plateau, southwest Indian Ocean	Jacquart, G.	Not drilled
140-Rev	08/05/85	Central and northern Red Sea axial areas	Pautot, G.	Not drilled
141-Rev	08/05/85	Indus Cone (Western Indian Margin)	Jacquart, G.	Not drilled
171----	08/13/85	Intra-oceanic arc-trench development, Bonin region	Taylor, B.	Leg 126
050-Rev	08/19/85	Nankai Trough and Shikoku forearc	Taira, A.	Leg 131
172----	08/19/85	Mariana forearc, arc, and backarc basin	Fryer, P.	Leg 175
173----	08/19/85	Seychelles-Mascarene Plateau, NW Indian Ocean	Patriat, P.	Leg 115
174----	08/19/85	Fore-arc tectonics, Japan Trench	Otsuki, K.	Not drilled
175----	08/19/85	Japan Trench strike-slip assoc. with Japan Sea opening	Niitsuma, N.	Not drilled
176----	08/19/85	Southernmost Japan Trench and migration of triple jct.	Niitsuma, N.	Not drilled
177----	08/19/85	Intra-oceanic plate shortening, Zenisu Ridge	Taira, A.	Not drilled
178----	08/19/85	Forearc igneous activity and collision, Nankai forearc	Shiki, T.	Not drilled
179----	08/19/85	Daito Ridges region, NW Philippine Sea	Tokuyama, H.	Not drilled
180----	08/19/85	Kita-Amami Basin and Amami Plateau, N Philippine Sea	Shiki, T.	Not drilled
181----	08/19/85	Petrology and tectonics, Izu-Ogasawara-Mariana forearc	Ishii, T.	Legs 125/126
182----	08/19/85	Kula Plate stratigraphy, Sounder Ridge, Bering Sea	Taira, A.	Not drilled
183----	08/20/85	Periplatform ooze in the Indian Ocean	Droxler, A.	R
184----	08/21/85	Papua New Guinea/Bismarck Sea region	Exon, N.	Not drilled
185----	08/23/85	Origin, evolution and paleo. of the Kerguelen Plateau	Coffin, M.F.	Legs 119/120
092-Rev	08/26/85	Seismic observatory in the Crozet Basin	Butler, R.	Not drilled
184-Add	08/28/85	Papua New Guinea/Bismarck Sea region	Exon, N.F.	Not drilled
186----	08/28/85	SW Indian Ocean fracture zone hydrology and heat flow	Von Herzen, R.P.	Leg 118
187----	09/13/85	New Hebrides Arc region, Southwest Pacific	Taylor, F.W.	Leg 134
188----	09/18/85	Leg 109 - 395A/418A borehole geophysics/drilling	Salisbury, M.H.	Not drilled
086-Rev	09/25/85	Red Sea	Bonatti, E.	Not drilled
183-Rev	09/25/85	Periplatform ooze in the Indian Ocean	Droxler, A.	R
189----	10/07/85	Tonga Ridge - Lau Ridge region	Stevenson, A.J.	Leg 135
190----	10/07/85	Arc-ridge collision, central New Hebrides arc (Vanuatu)	Fisher, M.A.	Leg 134
191----	10/07/85	Arc-plateau collision and intra-arc basin, Solomon Isl.	Vedder, J.G.	Not drilled
003-Rev	11/13/85	Drilling flexural moats flanking the Hawaiian Islands	Watts, A.B.	R
192----	11/13/85	Baranof Fan, SE Gulf of Alaska	Stevenson, A.J.	Not drilled
193----	11/13/85	Upper ocean particulate fluxes, Weddell Sea	Biggs, D.C.	Leg 113
194----	11/18/85	South China Sea	Donsheng, L.	R
048-Rev	12/04/85	Sulu Sea and South China Sea	Hinz, K.	Leg 124
195----	12/05/85	Paleoenvironment and paleoclimate, Bering Sea	Sancetta, C.	Not drilled
196----	12/09/85	Northward motion of Ninetyeast Ridge	Peirce, J.W.	Leg 121
197----	12/13/85	Otway Basin/West Tasmania region	Willcox, J.B.	Not drilled
198----	12/13/85	Neogene tectonics and sed., Ulleung (Tsushima) Basin	Chough, S.K.	Not drilled
121-Rev	12/16/85	Argo Abyssal Plain-Exmouth Plateau transect	Exon, N.F.	R
199----	12/24/85	Pelagic sediments of subarctic gyre region, N Pacific	Sancetta, C.	Leg 145

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
200----	12/24/85	3-axis borehole magnetometer logging, MARK	Beiersdorf, H.	Leg 109
201----	12/24/85	High-resolution temperature borehole logging	Beiersdorf, H.	Leg 109
143-Rev	12/30/85	In-situ magnetic susc. measurements with well log probe	Krammer, K.	Leg 109
202----	12/30/85	Geological evolution, Northern Marshall Islands	Schlanger, S.O.	R
203----	12/30/85	Drilling of guyots, Central Pacific	Winterer, E.L.	R
204----	12/30/85	Florida Escarpment transect	Paull, C.	R
205----	12/30/85	Carbonate fans, escarpments, banks, Bahamas	Schlager, W.	Not drilled
206----	12/30/85	Slope sedimentation, Great Barrier Reef	Davies, P.J.	R
207----	01/03/86	Tectonic evolution, Bering Sea Basin and Aleutian Ridge	Rubenstone, J.	Not drilled
208----	01/10/86	Petr. discontinuities at ancestral triple jct., Indian Ocean	Natland, J.	Not drilled
209----	01/10/86	Eltanin Fracture Zone	Dunn, D.A.	Not drilled
210----	01/13/86	Yakutat margin, NE Gulf of Alaska	Lagoe, M.B.	Not drilled
211----	01/17/86	Deep stratigraphic tests (SOH Panel)	Arthur, M.	Leg 123
212----	01/27/86	Northern/Central California ODP Sites	Greene, H.G.	Not drilled
213----	01/27/86	Accretion in the central Aleutian subduction complex	McCarthy, J.	Not drilled
214----	01/31/86	Trench-slope break, central Aleutian forearc	Ryan, H.F.	Not drilled
215----	02/10/86	Plio.-Holocene sedimentary and paleo. history, Red Sea	Richardson, M.	Not drilled
216----	02/13/86	Axis of South China Sea basin	Rangin, C.	Not drilled
217----	02/13/86	Northern Lord Howe Rise	Mauffret, A.	Not drilled
218----	02/14/86	Manila Trench and Taiwan collision zone, S China Sea	Lewis, S.D.	Not drilled
046-Rev	02/24/86	Evolution of passive margins, South China Sea	Hayes, D.E.	R
134-Rev	02/27/86	Gulf of Aden	Girdler, R.W.	Not drilled
219----	03/03/86	Gulf of Aden	Simpson, P.R.K.	Not drilled
206-Rev	03/10/86	Great Barrier Reef, Queensland Trough and Plateau	Davies, P.J.	R
220----	03/20/86	Three sites in the Lau Basin	Hawkins, J.W.	Leg 135
221----	03/24/86	Late Cenozoic paleoenvironment, equatorial Pacific	Pisias, N.G.	Leg 138
222----	03/28/86	Origin, sed. history, and tectonics, Ontong Java Plateau	Kroenke, L.W.	R
223----	04/14/86	Fracture zone of the central Indian Ridge	Natland, J.	Not drilled
171-Add	04/21/86	Summary of two-leg Bonin-Mariana drilling program	Taylor, B.	Legs 125/126
083-Rev2	04/23/86	Izu-Ogasawara (Bonin) Arc transect	Okada, H.	Legs 125/126
224----	04/23/86	Escanaba Trough, sed. filled axial valley of Gorda Ridge	Fisk, M.	R
225----	04/30/86	Aleutian Basin, Bering Sea	Cooper, A.K.	Not drilled
226----	05/01/86	Carbonate systems and circulation, eq. Indian Ocean	Prell, W.L.	R
227----	05/02/86	Deformation of W Aleutian R., formation of Pennant B.	Vallier, T.L.	Not drilled
228----	05/05/86	Weddell Sea	Hinz, K.	Leg 113
229----	05/07/86	Beringian continental slope and rise, Bering Sea	Cooper, A.K.	Not drilled
230----	05/08/86	Wilkes Land margin, Antarctica	Eittreim, S.	Not drilled
231----	05/08/86	North-Pacific Magnetic Quiet Zone	Mammerickx, J.	Not drilled
055-Add	05/12/86	Summary for Makran forearc program	Leggett, J.K.	Not drilled
089-Rev2	05/12/86	Fracture zone drilling on the SW Indian Ridge	Dick, H.J.B.	Leg 118
108-Rev	05/12/86	Prydz Bay-Amery margin	Kennett, J.P.	R
232----	05/16/86	Zero-age crust on northern Juan de Fuca Ridge	Davis, E.E.	Leg 139
129-Rev	05/19/86	Bounty Trough	Davey, B.	Not drilled
233----	05/21/86	Fluids and structure of accr. complex, central Oregon	Kulm, L.D.	R
121-Rev2	05/23/86	Argo Abyssal Plain-Exmouth Plateau transect	Exon, N.F.	Legs 122/123
234----	05/27/86	Kinematics of plate convergence along E Aleutian Trench	Von Huene, R.	Not drilled
235----	05/28/86	Arc-trench development rel. to collision, Solomon Sea	Honza, E.	Not drilled
236----	05/28/86	Northern Gulf of Alaska	Bruns, T.R.	Not drilled
026-Rev	05/30/86	Oblique arc-ridge convergent zone, Tonga Trench slope	Pelletier, B.	Leg 135

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
145-Rev	06/02/86	Left-lateral dislocation of the Ryukyu arc system	Ujiie, H.	Not drilled
237----	06/04/86	Decollement zone at convergent margin, Vancouver	Brandon, M.T.	R (317-Rev)
144-Rev	06/06/86	Arc-arc collision, Kuril forearc	Seno, T.	Not drilled
238----	06/09/86	Pore pressures, Makran subduction zone	Wang, C-Y	Not drilled
239----	06/09/86	Two sites in the Lau Basin	Cronan, D.S.	**Leg 135**
240----	06/10/86	Argo Abyssal Plain	Gradstein, F.M.	R
051-Add	06/12/86	Supplement for Japan Sea proposals	Kagami, H.	**Legs 127/128**
149-Rev	06/12/86	Age of Yamato Basin spreading center, Japan Sea	Kimura, M.	**Legs 127/128**
155-Add	06/12/86	Tectonic and lithospheric aspects of the Japan Sea	Suyehiro, K.	**Legs 127/128**
241----	06/13/86	Yakutat block, G. of Alaska, and Zodiak Fan, Aleutian B.	Heller, P.L.	Not drilled
242----	06/16/86	Backthrusting and backarc thrusting, E Sunda Arc	Silver, E.A.	R
243----	06/20/86	Subduction , accretion, volcanic history, Tonga forearc	Bloomer, S.H.	**Leg 135**
198-Add	06/27/86	Neogene tectonics and sed., Ulleung (Tsushima) Basin	Chough, S.K.	Not drilled
244----	07/07/86	Western Ross Sea	Cooper, A.K.	R
245----	07/07/86	Transform margin of California	Howell, D.G.	Not drilled
246----	07/07/86	Mesozoic paleo., S Arabian margin	Jansa, L.F.	**Leg 117**
247----	07/07/86	Oceanogr., climatic and volcanic evolution, NE-Pacific	Bornhold, B.D.	R
240-Rev	07/24/86	Argo Abyssal Plain	Gradstein, F.M.	**Leg 123**
226-Rev	08/07/86	Carbonate systems and circulation, eq. Indian Ocean	Prell, W.L.	**Leg 115**
248----	08/08/86	Ontong-Java Plateau	Ben-Avraham, Z.	**Leg 130**
249----	08/08/86	Sedimentation in the Aleutian Trench	Underwood, M.B.	Not drilled
250----	08/14/86	Lithofacies and depositional cyclicity, Navy deep-sea fan	Underwood, M.B.	Not drilled
251----	08/14/86	Seychelles - Mascarene - Saya de Malha Region	Khanna, S.N.	**Leg 115**
252----	08/14/86	Loihi Seamount	Staudigel, H.	R
244-Rev	08/15/86	Western Ross Sea	Cooper, A.K.	R (296-Rev2)
253----	08/28/86	Black shales in ancestral Pacific, Shatsky Rise	Sliter, W.V.	R
254----	08/28/86	Black shale deposition in the pelagic realm	Parrish, J.T.	Not drilled
255----	08/28/86	Gulf of Guinea	Herbin, J.P.	Not drilled
037-Add	09/08/86	Update on Costa Rica accretionary wedge hole	Shipley, T.H.	Not drilled
256----	09/15/86	Queen Charlotte transform fault and oblique convergence	Hyndman, R.D.	Not drilled
252-Rev	09/17/86	Loihi Seamount	Staudigel, H.	**Ranked 1991**
257----	09/23/86	Farallon Basin (Sites J1-J5), Gulf of California	Lawver, L.A.	Not drilled
258----	10/01/86	Stockwork zone on the Galapagos Ridge	Embley, R.	Not drilled
027-Add	10/14/86	Additional site to Sulu-Negros Trough (prop. 27/48)	Rangin, C.	**Leg 124**
259----	10/14/86	Meiji sediment drift, NW Pacific	Keigwin, L.D.	R
260----	10/14/86	Ogasawara Plateau region near the Bonin arc, NW Pacific	Saito, T.	**Legs 125/126**
261----	10/15/86	History of the Mesozoic Pacific Ocean	Larson, R.L.	**Leg 129**
204-Rev	10/17/86	Florida Escarpment transect	Paull, C.K.	R (332-Rev2)
262----	11/12/86	Mid Indus Fan	Haq, B.U.	Not drilled
263----	11/24/86	Southern Explorer Ridge, NE Pacific	Chase, R.L.	Not drilled
264----	12/02/86	Montagnais impact structure and ejecta, Scotian shelf	Grieve, R.A.F.	R
265----	12/04/86	Western Woodlark Basin	Scott, S.D.	**Ranked 1991**
206-Rev2	12/12/86	Evolution of carbonate platforms (Great Barrier Reef)	Davies, P.J.	**Leg 133**
264-Rev	12/16/86	Meteorite impact and mass extinction, Nova Scotian shelf	Jansa, L.F.	Not drilled
266----	12/23/86	Sumary of Lau Basin drilling program	Gill, J.	**Leg 135**
267----	12/29/86	Old ocean crust, Argo Abyssal Plain and West Pacific	Langmuir, C.H.	**Leg 123**
268----	12/29/86	Hydro. processes and ore dep., Queensland Pl./Trough	Jansa, L.F.	R
269----	12/29/86	Aleutian subaerial pyroclastic flows into marine env.	Stix, J.	Not drilled
270----	01/12/87	Tomographic imaging of hydrothermal circulation cell	Nobes, D.C.	Not drilled

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
048-Add	01/25/87	Sulu Sea transect	Hinz, K.	Leg 124
128-Rev	02/16/87	Phys. properties and mech. state in accretionary prisms	Karig, D.E.	Not drilled
271----	02/20/87	Paleoceanographic transect of the California Current	Barron, J.A.	R
272----	02/20/87	Long-term downhole measurements in seas around Japan	Kinoshita, H.	Legs 127/128
273----	03/02/87	Southern Kerguelen Plateau	Schlich, R.	Legs 119/120
274----	03/02/87	South China Sea	Zhao, Y.	Not drilled
183-Rev2	03/03/87	Periplatform ooze in the Indian Ocean	Droxler, A.	Not drilled
259-Rev	03/06/87	Meiji Tongue and Detroit Seamount	Keigwin, L.D.	Leg 145
232-Add	03/23/87	Sed. under hydrothermal influence, Middle Valley	Blaise, B.	Leg 139
275----	03/27/87	Gulf of California	Simoneit, B.R.T.	R
276----	04/02/87	Drilling on equatorial Atlantic transform margins	Mascle, J.	R (346-Rev)
277----	04/10/87	Tilt/strain borehole monitoring, Cascadia margin	Brandon, M.T.	Leg 146
194-Rev	04/23/87	South China Sea	Donsheng, L.	R
278----	05/01/87	Hydro. alteration, layer 3, and crustal ext., Blanco TF	Hart, R.	Not drilled
268-Rev	05/12/87	Lead-zinc deposits in carbonate rocks, Queensland Pl./Tr.	Jansa, L.F.	R
279----	05/20/87	Anatomy of Seamount 6 near East Pacific Rise	Batiza, R.	Not drilled
108-Rev2	05/31/87	East Antarctic continental margin - Prydz Bay	Kennett, J.P.	Leg 119
280----	06/04/87	Cretaceous-aged Geisha Seamounts and Guyots, W Pac.	Vogt, P.R.	Not drilled
281----	06/09/87	Melanges in acc. prisms, Kuril/Japan trenches, Nankai Tr.	Okamura, Y.	Not drilled
282----	06/22/87	Tracing the Hawaiian Hotspot	Niitsuma, N.	Not drilled
283----	06/28/87	Kuroshio ext. and plate motion from NW Pac sed. drifts	Jacobi, R.D.	Not drilled
284----	07/06/87	Drilling in Escanaba Trough, S Gorda Ridge	Morton, J.L.	SR-DPG
222-Add	07/10/87	Basement origin and ocean history, Ontong Java Plateau	Mahoney, J.	Leg 130
285----	07/14/87	Jurassic Quiet Zone, Western Pacific	Vogt, P.R.	Leg 129
286----	07/20/87	Core and log layer 2/3 transition, Hole 504B	Becker, K.	R
287----	08/01/87	Drilling in the M-Series, Western Pacific	Vogt, P.R.	Leg 129
288----	08/01/87	Repositioning Site EP2 to EP12, Exmouth Plateau	Mutter, J.C.	Leg 122
268-Rev2	08/18/87	Lead-zinc deposits in carbonate rocks, Queensland Pl./Tr.	Sangster, D.F.	Not drilled
289----	08/28/87	Subduction zone mass budget in the Japan Arc	Sacks, S.	Not drilled
242-Rev	09/02/87	Eastern Sunda arc-continent collision zone	Silver, E.A.	Not drilled
224-Rev	09/08/87	Escanaba Trough, sed. filled axial valley of Gorda Ridge	Fisk, M.	Leg 139
155-Rev	09/09/87	Island arc to back arc basin transition	Suyehiro, K.	R
290----	09/11/87	Deep drilling on axial seamount, Juan de Fuca Ridge	Johnson, H.P.	Ranked 1991
066-Rev	09/21/87	Principal horizontal stresses in ocean crust	Whitmarsh, R.B.	Not drilled
291----	09/21/87	Volcanic moat, apron and pedestral, Marquesas Isl. Chain	Natland, J.H.	Not drilled
292----	09/21/87	SE Sulu Sea	Hinz, K.	Leg 124
293----	09/21/87	Celebes Sea	Hinz, K.	Leg 124
177-Rev	09/25/87	Intra-oceanic plate shortening, Zenisu Ridge	Taira, A.	Not drilled
076-Rev	09/28/87	Axial/off-axial drilling of hydrothermal systems, EPR	Hékinian, R.	R (357-Rev2)
273-Add	10/08/87	Southern Kerguelen Plateau	Schlich, R.	Legs 119/120
294----	10/28/87	Petrology and geochemistry of Aoba intra-arc basin	Shervais, J.W.	Leg 134
046-Rev2	11/16/87	Continental rifting and sedimentation, South China Sea	Hayes, D.E.	Not drilled
295----	12/07/87	Hydrogeology and structural evol., Nankai acc. complex	Gieskes, J.M.	Leg 131
296----	12/07/87	Ghost of 244----		G
296-Rev	12/07/87	Ghost of 244-Rev		G
296-Rev2	12/07/87	Ross Sea	Cooper, A.K.	Ranked 1991
297----	12/29/87	Antarctic peninsula, Pacific margin	Barker, P.F.	R (353-Rev)
247-Rev	01/19/88	Oceanogr., climatic and vulcanic evolution, NE Pacific	Bornhold, B.D.	Leg 145
298----	01/21/88	Acquiring vertical seismic profiles in Nankai Trough	Moore, G.F.	Leg 131

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
299----	02/08/88	Deformational behaviour from self-boring pressuremeter	Moran, K.	Leg 146
300----	02/18/88	Deep crustal drilling, Site 735B, SW Indian Ridge	Dick, H.J.B.	Ranked 1991
292-Add	03/07/88	Addendum to southeast Sulu Sea	Hinz, K.	Leg 124
301----	03/07/88	Integrated proposal for Nankai forearc	Karig, D.E.	Leg 131
302----	03/24/88	Electrical conductivity structure, E Japan Sea	Kinoshita, H.	Legs 127/128
163-Rev	04/04/88	Zenisu Ridge (Nankai Trough) Japan	Lallemant, S.	Not drilled
194-Rev2	04/28/88	South China Sea	Donsheng, L.	Not drilled
303----	04/30/88	Fracturing of seafloor and volcanism, Hawaiian Swell	Keating, B.	Not drilled
190-Add	05/09/88	New position for site DEZ-2, New Hebrides Island Arc	Fisher, M.A.	Leg 134
304----	06/01/88	Nankai downhole observatory	Taira, A.	R
221-Add	06/20/88	Late Cenozoic paleoenvironment, equatorial Pacific	Pisias, N.G.	Leg 138
305----	06/20/88	Arctic ocean drilling	Mudie, P.J.	NAAG-DPG
306----	06/24/88	Old Pacific history	Larson, R.L.	Leg 129
247-Add	07/07/88	Primary sediment results, Patton-Murray Seamount Gr	Bornhold, B.D.	Leg 145
307----	07/07/88	Structure, timing, uplift, Cross Seamnt., Hawaiian Swell	Keating, B.	Not drilled
222-Rev	07/11/88	Basement origin and ocean history, Ontong Java Plateau	Mahoney, J.	Leg 130
233-Rev	07/11/88	Fluids and structure of acc. complex, central Oregon	Kulm, L.D.	R
308----	07/14/88	Volcanically reactivated seamounts, Line Islands Chain	Keating, B.	Not drilled
003-Add	07/15/88	Flexural moats flanking the Hawaiian Islands	Detrick, R.S.	Not drilled
304-Rev	08/16/88	Nankai downhole observatory	Taira, A.	Leg 131
155-Rev2	08/22/88	Arc/back arc, downhole seismometer empl. and stress	Suyehiro, K.	Legs 127/128
059-Rev2	09/21/88	Cont. margin sed. instability, drilling adjacent turbidites	Weaver, P.P.E.	Ranked 1991
309----	09/21/88	VSP program at scheduled sites Bon-2 and Bon-1	Cooper, P.	Leg 125
310----	09/21/88	Geochemical sampling of dipping reflector sequences	Morton, A.C.	NARM-DPG
311----	09/21/88	Sedimentary equivalent of dipping reflector sequences	Masson, D.G.	NARM-DPG
312----	09/21/88	Drilling on the Reykjanes Ridge	Powell, C.M.R.	Not ranked 1991
313----	09/21/88	Major oceanographic pathway, equatorial Atlantic	Jones, E.J.W.	Ranked 1991
314----	09/21/88	Fluid flow and mech. response across acc. prism, Nankai	Karig, D.E.	Leg 131
315----	09/26/88	Ocean Seismic Network test site, N of Oahu	Purdy, G.M.	Leg 136
316----	09/26/88	Gas-hydrate hole during upcoming W Pac drilling	Hesse, R.	Not drilled
275-Rev	10/13/88	Drilling the Gulf of California	Simoneit, B.R.T.	Ranked 1991
225-Add	10/14/88	Augm. rpt. conc. plate reconstr., proposals 182 and 225	Scholl, D.W.	Not drilled
231-Add	10/14/88	Augm. rpt. conc. plate reconstr., as outlined in prop. 231	Scholl, D.W.	Not drilled
003-Rev2	10/19/88	Flexural moats flanking the Hawaiian Islands	Watts, A.B.	Not drilled
271-Rev	10/20/88	Neogene upwelling and evol. of California Current	Barron, J.A.	R
195-Add	10/21/88	Augmentation report for Bering Sea paleo.	Scholl, D.W.	Not drilled
199-Add	10/21/88	Paleoceanography, North Pacific	Scholl, D.W.	Leg 145
317----	12/28/88	Ghost of 237----		G
317-Rev	12/28/88	Accretionary wedge and fluid expulsion, Vancouver Is.	Hyndman, R.D.	Leg 146
318----	01/20/89	Ghost of 008----		G
318-Rev	01/20/89	Chile margin triple junction, southern Chile Trench	Cande, S.C.	R (362-Rev2)
319----	02/21/89	Extinct hydroth. system, E Galpagos Rift/Inca transform	Jonasson, I.R.	Not drilled
320----	03/03/89	Paleoceanography and paleoclimatology, Nordic Seas	Eystein, J.	NAAG-DPG
321----	03/23/89	Fast-spreading mid-ocean ridge crest: EPR at 9°40'N	Fornari, D.J.	Leg 147
322----	03/28/89	Ontong Java Plateau kimberlites	Nixon, P.H.	Not drilled
323----	04/03/89	Neogene overthrust./extension & gateway, Alboran Sea	Comas, M.C.	R
142-Rev	04/05/89	Ontong Java Plateau	Mayer, L.	Leg 130
324----	04/20/89	Mediterranean tectonic evolution	Cita-Sironi, M.B.	Not ranked 1991
325----	05/09/89	High-T hydrothermal site, Endeavour Ridge	Johnson, H.P.	Ranked 1991

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
326----	05/11/89	Continental margin drilling, Morocco/Northwest Africa	Hinz, K.	Not ranked 1991
327----	05/24/89	Argentine continental rise	Hinz, K.	**Ranked 1991**
203-Rev	05/26/89	Cretaceous Guyots, northwest Pacific	Winterer, E.L.	**Legs 143/144**
328----	06/06/89	Drilling on the continental margin, east Greenland	Hinz, K.	NARM-DPG
329----	07/14/89	Ghost of 015----		G
329-Rev	07/14/89	Formation of the Atlantic Ocean	Herbin, J.P.	Not ranked 1991
330----	07/17/89	Accretionary prism and collision, Mediterranean Ridge	Cita-Sironi, M.B.	**Ranked 1991**
331----	07/25/89	Extinct spreading axis, Aegir Ridge, Norwegian Sea	Whitmarsh, R.B.	Not ranked 1991
332----	07/25/89	Ghost of 204----		G
332-Rev	07/25/89	Ghost of 204-Rev		G
332-Rev2	07/25/89	Drilling transect, Florida Escarpment	Paull, C.K.	Not ranked 1991
333----	07/27/89	Evolution of pull-apart basin, Cayman Trough	Mann, P.	**Ranked 1991**
334----	07/28/89	Detachm. faults and crust-mantle bound., Galicia margin	Boillot, G.	R
202-Rev	07/31/89	Drowned atolls, Marshall Islands	Schlanger, S.O.	**Legs 143/144**
335----	07/31/89	Ghost of 202-Rev (renumbered)		G
336----	07/31/89	Arctic to North Atlantic gateways	Thiede, J.	NAAG-DPG
337----	07/31/89	Tests of Exxon sea-level curve, New Zealand	Carter, R.M.	**Ranked 1991**
338----	08/03/89	Sea-level fluct., Marion carbonate plateau, NE Australia	Pigram, C.J.	**Leg 133**
339----	08/07/89	Paleoceanographic transects, Benguela Current	Meyers, P.A.	**Ranked 1991**
340----	08/07/89	Tectonic, climatic, oceano. change, N Australian margin	Symonds, P.	**Ranked 1991**
341----	08/08/89	Late Wisconsinian climatic changes, off E Canada	Syvitski, J.P.M.	Not ranked 1991
342----	08/08/89	Growth and fluid evolution, Barbados acc. prism	Speed, R.C.	R (378-Rev)
343----	08/08/89	Window of Cret. volcanic formation, Caribbean Zone	Mauffret, A.	**Ranked 1991**
344----	08/08/89	Jurassic Magnetic Quiet Zone, W North Atlantic	Sheridan, R.E.	Not ranked 1991
345----	08/11/89	Sea level and paleoclimate, W Florida margin	Joyce, J.E.	**Ranked 1991**
346----	08/14/89	Ghost of 276----		G
346-Rev	08/14/89	Equatorial Atlantic transform margin	Mascle, J.	**Ranked 1991**
347----	08/15/89	L. Cenozoic paleoceanography, south-equatorial Atlantic	Wefer, G.	**Ranked 1991**
348----	08/16/89	Paleogene/Neogene stratigraphy, U.S. Atlanic margin	Miller, K.G.	**Ranked 1991**
349----	08/22/89	VICAP, Gran Canaria	Schmincke, H.U.	**Ranked 1991**
350----	09/01/89	Sedimentation and plate deformation, Gorda def. zone	Lyle, M.	R (386-Rev)
351----	09/06/89	Bransfield Strait	Storey, B.C.	Not ranked 1991
352----	09/13/89	Layer 3 of East Pacific crust, Mathematician Ridge	Stakes, D.S.	Not ranked 1991
353----	09/13/89	Ghost of 297----		G
353-Rev	09/13/89	Antarctic Peninsula, Pacific margin	Barker, P.F.	Not ranked 1991
354----	09/18/89	Late Cenozoic upwelling system, Angola/Namibia	Wefer, G.	**Ranked 1991**
355----	09/18/89	Formation of a gas hydrate	Von Huene, R.	R
233-Rev2	09/20/89	Fluids and structure of acc. complex, central Oregon	Kulm, L.D.	R
271-Rev2	09/22/89	Limited APC coring on seamounts off California Coast	Barron, J.A.	Not drilled
356----	09/29/89	Denmark Straits, Greenl. Scotland and Jan Mayen Ridge	Smolka, P.P.	R
355-Rev	10/04/89	Formation of a gas hydrate	Von Huene, R.	R
357----	10/25/89	Ghost of 076----		G
357-Rev	10/25/89	Ghost of 076-Rev		G
357-Rev2	10/25/89	Axial and off-axial drilling on EPR near 12°50'N	Hékinian, R.	**Leg 147**
286-Add	10/30/89	Update for "Layer 2/3 transition at 504B"	Becker, K.	R
SR	10/30/89	Sedimented Ridges DPG Report	Detrick, R.S.	**Leg 139**
221-Add2	11/03/89	Data supplement to eastern equatorial Pacific Neogene	Pisias, N.G.	**Leg 138**
317-Add	11/07/89	Addendum to Vancouver Island Margin Proposal 317	Hyndman, R.D.	**Leg 146**
358----	11/13/89	Volcanic rifted passive margins, Vøring margin	Eldholm, O.	NARM-DPG

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
359----	11/20/89	Ghost (Letter of Intent)		G
360----	12/06/89	Hydrothermal activity and metallogenesis, Valu Fa Ridge	Von Stackelberg,	Ranked 1991
361----	01/03/90	Active hydroth. system, slow-spread ridge, MAR 26° N	Thompson, G.	Ranked 1991
362----	01/09/90	Ghost of 318----		G
362-Rev	01/09/90	Ghost of 318-Rev		G
362-Rev2	01/09/90	Triple junction, southern Chile Trench	Cande, S.C.	R
363----	01/18/90	Plume volcanism and rift/drift, Grand Banks-Iberia	Tucholke, B.E.	Ranked 1991
330-Add	01/22/90	Accretionary prism in collisional context, Med. Ridge	Cita-Sironi, M.B.	Ranked 1991
364----	01/22/90	Thrust units of cont. basement, Sardinian-African Strait	Torelli, L.	Not ranked 1991
365----	01/29/90	Conjugate passive margin, North Atlantic	Srivastava, S.P.	R
366----	01/29/90	Ghost (Letter of Intent)		G
367----	02/07/90	Cool water carbonate margin, southern Australia	James, N.P.	Ranked 1991
368----	02/12/90	Jurassic Pacific crust: A return to Hole 801C	Larson, R.L.	Ranked 1991
369----	02/20/90	Deep mantle section, Mark area	Mevel, C.	Ranked 1991
370----	02/22/90	Magmatic processes and natural tracers, MAR	Dick, H.J.B.	Not ranked 1991
371----	02/26/90	Ghost (Letter of Intent)		G
372----	02/26/90	Cenozoic circulation and chem. gradients, N Atlantic	Zahn, R.	Not ranked 1991
373----	03/01/90	Stress, hydrol. circ. and heat flow, Site 505 revisited	Zoback, M.D.	Ranked 1991
374----	03/06/90	Mantle heterogeneity, Oceanographer FZ	Dick, H.J.B.	Ranked 1991
375----	03/06/90	Deep drilling of fast-spreading crust, Hess Deep	Dick, H.J.B.	R (387-Rev)
376----	03/07/90	Layer 2/3 (and crust/mantle) boundary, Vema FZ	Auzende, J.M.	Ranked 1991
377----	03/07/90	Ghost of 315----		G
377-Rev	03/07/90	Hole for global seismometer network, NE of Oahu	Purdy, G.M.	Leg 136
378----	03/12/90	Ghost of 342----		G
378-Rev	03/12/90	Growth and fluids evol., Barbados accretionary wedge	Westbrook, G.K.	Ranked 1991
379----	03/12/90	Scientific drilling in the Mediterranean Sea	Mascle, J.	Ranked 1991
381----	03/19/90	Drilling on continental shelf and slope, Argentina	Huber, B.T.	Not ranked 1991
380----	05/01/90	Ghost of 349----		G
380-Rev	05/01/90	VICAP, Gran Canaria	Schmincke, H.U.	Ranked 1991
382----	05/03/90	Upper mantle - lower crustal uplifted section, Vema FZ	Bonatti, E.	Ranked 1991
383----	05/22/90	Extension and continent-continent collision, Aegean Sea	Kastens, K.A.	Not ranked 1991
265-Add	06/04/90	Addendum to Woodlark Basin proposal	Scott, S.D.	Ranked 1991
317-Add2	06/05/90	Formation of methane hydrate, Cascadia subduction zone	Hyndman, R.D.	Leg 146
384----	07/18/90	Ghost of 343----		G
384-Rev	07/18/90	Pacific-Atlantic connection, Venezuela basin, Aruba Gap	Mauffret, A.	Not ranked 1991
385----	08/07/90	Coring of seismometer hole, south of Hawaii	Keating, B.	Leg 136
385-Add	08/09/90	Coring of seismometer hole, north of Hawaii	Helsley, C.E.	Leg 136
386----	08/10/90	Ghost of 350----		G
386-Rev	08/10/90	Paleoceanography and deformation, California margin	Lyle, M.	Ranked 1991
233-Rev3	08/14/90	Fluids and structure of acc. complex, central Oregon	Moore, J.C.	Leg 146
Cascadia	08/14/90	Cascadia margin DPG Report	Cathles, L.M.	Leg 146
355-Rev2	08/30/90	Formation of a gas hydrate	Von Huene, R.	Ranked 1991
387----	09/04/90	Ghost of 375----		G
387-Rev	09/04/90	Deep drilling of fast-spread crust, Hess Deep	Gillis, K.	Leg 147
Bering	09/07/90	Bering Sea history (Pacific Prospectus)	CEPAC	Ranked 1991
247-Add2	09/17/90	Water mass conversion, glacial subarctic Pacific	Pedersen, T.F.	Leg 145
286-Add2	09/21/90	Second addendum to "Layer 2/3 Transition, Hole 504B"	Becker, K.	Legs 137/140
388----	10/01/90	Neogene deep water circ. and chemistry, Ceara Rise	Curry, W.B.	Ranked 1991
345-Add	10/05/90	Addenda to West Florida margin sea level and paleo.	Joyce, J.E.	Ranked 1991

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List A (Sorted by "Date Received at the JOIDES Office")

Ref.No	Received	Abbreviated Title	Contact	Status
389----	10/29/90	Cretaceous traverse, Western South Atlantic	Malmgren, B.A.	Not ranked 1991
362-Rev3	11/08/90	Triple junction, southern Chile Trench	Cande, S.C.	**Leg 141**
390----	11/12/90	Drilling in the Shirshov ridge region	Milanovsky, V.E.	**Ranked 1991**
S-1	11/21/90	Lithofacies and cyclicity, Navy Fan	Piper, D.J.W.	In Review
334-Rev	12/27/90	S reflector and ultramafic basement, Galicia margin	Boillot, G.	**Ranked 1991**
391----	01/02/91	Formation of sapropels, eastern Mediterranean	Zahn, R.	**Ranked 1991**
EPR	01/09/91	East Pacific Rise DPG Report	Davis, E.E.	**Legs 142/147**
059-Add	01/15/91	Cont. margin sed. instability, drilling adjacent turbidites	Weaver, P.P.E.	**Ranked 1991**
392----	01/29/91	Mantle plume origin, North Atlantic volcanic margins	Larsen, H.C.	NARM-DPG
393----	01/29/91	Continent-ocean transition, Greenland volcanic margin	Larsen, H.C.	NARM-DPG
365-Rev	02/04/91	Conjugate passive margins, North Atlantic	Srivastava, S.P.	NARM-DPG
394----	02/04/91	Pre/syn-volcanic extensinal basins on passive margins	Kiørboe, L.V.	NARM-DPG
323-Rev	02/11/91	Alboran basin and Atlantic-Mediterranean gateway	Comas, M.C.	**Ranked 1991**
395----	02/11/91	Compressional tectonics on a passive volcanic margin	Boldreel, L.O.	NARM-DPG
396----	02/11/91	Testing hot-spot model for volcanic passive margins	Andersen, M.S.	NARM-DPG
363-Add	02/18/91	Paleoceanographic record at sites NR1, NR2, and NR3	Tucholke, B.E.	**Ranked 1991**
397----	02/20/91	Mantle plume and multiple rifting, North Atlantic	Gudlaugsson, S.T	In Review
398----	02/22/91	Quat. paleoceanography, Grand Banks, Newfoundland	Piper, D.J.W.	In Review
361-Rev	03/01/91	Hydroth. system, slow-spread. ridge, MAR 26°N (TAG)	Thompson, G.	In Review
A&G	03/08/91	Atolls and Guyots DPG Report	Rea, D.K.	**Legs 143/144**
S-2	03/20/91	Downhole measurements, Jurassic crust, Hole 801C	Larson, R.L.	In Review
346-Add	03/25/91	Data status, equatorial Atlantic transform margin	Mascle, J.	**Ranked 1991**
NARM	03/27/91	North Atlantic Rifted Margins DPG Preliminary Report	Larsen, H.C.	**Ranked 1991**
NAAG	04/11/91	North Atlantic - Arctic gateways DPG Report	Ruddiman, W.F.	**Ranked 1991**
356-Rev	05/01/91	Oceanogr./climatic changes, North Greenland Sea	Smolka, P.P.	In Review
365-Add	05/28/91	Geothermal measurements, Newfoundland/Iberia transects	Louden, K.E.	In Review
S-3	05/31/91	Cased re-entry hole for deployment of OSN observatory	Dziewonski, A.	In Review
253-Rev	06/19/91	Deposition of organic carbon-rich strata, ancestral Pacific	Sliter, W.V.	**Ranked 1991**

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

Ref.No	Received	Key	Inactive Proposals: Replaced, to DPG, Ghost	Inactive Proposals: Not Drilled	Inactive Proposals: Drilled or Scheduled	Active Proposals: In Review	Active Proposals: Not Ranked	Active Proposals: Ranked
001----	12/16/82	SE Gulf of Mexico		•				
002----	12/16/82	Middle America		•				
003----	06/27/83	Hawaiian flex. moats	R					
003-Add	07/15/88	Hawaiian flex. moats		•				
003-Rev	11/13/85	Hawaiian flex. moats	R					
003-Rev2	10/19/88	Hawaiian flex. moats		•				
004----	07/01/83	Tuamotu Archipelago		•				
005----	07/13/83	Bahamas			Leg 101			
006----	08/01/83	Labrador Sea	R					
006-Rev	05/14/84	Labrador Sea			Leg 105			
007----	08/01/83	Gulf of Mexico		•				
008----	08/01/83	Chile Triple Junction	R (318-Rev)					
008-Rev	07/20/84	Chile Triple Junction	R					
009----	01/05/84	Pre-Messinian Med		•				
010----	01/05/84	NW Africa margin	R					
010-Rev	07/01/84	NW Africa margin	R					
010-Rev2	04/26/85	NW Africa - eq. Atl			Leg 108			
011----	01/05/84	Iberian margin		•				
012----	01/05/84	Tyrrhenian back-arc			Leg 107			
013----	01/05/84	Oceanic ecosystems		•				
014----	01/10/84	EPR 13°N zero age	EPR		Leg 147			
015----	01/10/84	Formation of Atlantic	R (329-Rev)					
016----	01/10/84	Atl.-Med. relationships		•				
017----	01/10/84	Gorringe crust/mantle	R					
017-Rev	05/21/84	Gorringe crust/mantle		•				
018----	01/10/84	Galicia Bank	R					
018-Rev	08/02/84	Galicia Bank			Leg 103			
019----	01/10/84	Eleuthera Fan			Leg 101			
020----	01/10/84	Outer Hellenic Arc		•				
021----	01/10/84	Tyrrhenian transect	R					
021-Rev	09/01/84	Tyrrhenian transect	R					
021-Rev2	07/01/85	Tyrrhenian transect			Leg 107			
022----	01/10/84	Rhone Fan		•				
023----	01/10/84	Caribbean basins		•				
024----	01/10/84	Barbados			Leg 110			
024-Add	03/20/84	Barbados			Leg 110			
025----	01/10/84	New Hebrides			Leg 125			
026----	01/10/84	Tonga Kermadec Arc	R					
026-Rev	05/30/86	Tonga Kermadec arc			Leg 135			
027----	01/10/84	Sulu Sea	R					
027-Add	10/14/86	Sulu Sea			Leg 124			
027-Rev	07/18/85	Sulu Sea			Leg 124			
028----	01/10/84	South China Sea		•				
029----	01/10/84	Ryukyu - Okinawa		•				
030----	01/10/84	Indian Ocean	R					
030-Rev	03/25/85	Davie R., Malagasy m.	R					
030-Rev2	08/05/85	Davie R., Malagasy m.		•				
031----	01/10/84	Red Sea		•				

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
032----	01/26/84	Yucatan Basin		•				
032-Add	03/19/84	Yucatan Basin		•				
033----	01/26/84	Ghost of 009----	G					
034----	01/26/84	N Pacific - Bering		•				
035----	02/01/84	Barbados acc. wedge			Leg 110			
036----	02/07/84	Norwegian Sea	R					
036-Rev	07/05/84	Norwegian Sea			Leg 104			
037----	02/15/84	Costa Rica	R					
037-Add	09/08/86	Costa Rica		•				
037-Rev	08/06/84	Costa Rica		•				
038----	02/15/84	NE Gulf of Mexico		•				
039----	02/27/84	Cape Verde		•				
040----	02/27/84	Site 534 logging		•				
041----	03/05/84	Barbados forearc			Leg 110			
042----	03/05/84	Sunda Straits		•				
043----	03/05/84	SW Pacific		•				
044----	03/05/84	Andaman Sea		•				
045----	03/05/84	Equatorial Atl.			Leg 108			
046----	03/05/84	South China Sea	R					
046-Rev	02/24/86	South China Sea	R					
046-Rev2	11/16/87	South China Sea		•				
047----	03/05/84	Manila Trench		•				
048----	03/05/84	South China Sea	R					
048-Add	01/25/87	Sulu Sea			Leg 124			
048-Rev	12/04/85	Sulu and S. China seas			Leg 124			
049----	03/05/84	Banda Arc/Arafura Sea		•				
050----	03/05/84	Nankai Trough	R					
050-Rev	08/19/85	Nankai Trough			Leg 131			
051----	03/05/84	Japan Sea	R					
051-Add	06/12/86	Japan Sea			Legs 127/128			
051-Rev	07/17/85	Japan Sea			Legs 127/128			
052----	03/12/84	Solomon Sea		•				
053----	03/19/84	VSP/WSP			Leg 102			
054----	03/20/84	S Ocean (Atl.sector)			Legs 113/114			
055----	03/21/84	Makran forearc		•				
055-Add	05/12/86	Makran forearc		•				
056----	03/21/84	Indian O. faults/fluids			Leg 116			
057----	03/21/84	Afr.-Arabian margin		•				
058----	03/21/84	West Baffin Bay			Leg 105			
059----	03/27/84	Sediment instability	R					
059-Add	01/15/91	Sediment instability						1991
059-Rev	08/20/84	Sediment instability	R					
059-Rev2	09/21/88	Sediment instability						1991
060----	04/20/84	Newfoundland Basin		•				
061----	06/18/84	Somali Basin		•				
062----	06/18/84	Davie Fracture Zone	R					
062-Rev	12/03/84	Davie Fracture Zone		•				
063----	06/18/84	Madeira Abyssal Plain		•				

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

Ref.No	Received	Key	Inactive Proposals: Replaced, to DPG, Ghost	Inactive Proposals: Not Drilled	Inactive Proposals: Drilled or Scheduled	Active Proposals: In Review	Active Proposals: Not Ranked	Active Proposals: Ranked
064----	06/25/84	Site NJ-6		•				
065----	07/05/84	S Australia MQZ		•				
066----	07/05/84	Horizontal stress	R					
066-Rev	09/21/87	Horizontal stress		•				
067----	07/06/84	Tonga-Lord Howe Rise		•				
068----	07/06/84	Deep Med.		•				
069----	07/23/84	Norwegian Sea stress		•				
070----	07/23/84	Sites 417 and 603			Leg 102			
071----	07/30/84	Ghost (Letter of Intent)	G					
072----	07/30/84	Lesser Antilles			Leg 110			
073----	08/01/84	Adelie margin	R (110-Rev)					
073-Add	02/20/85	Adelie margin		•				
073-Rev	08/05/85	Ghost of 110-Rev	G					
073-Rev2	08/05/85	Adelie margin		•				
074----	08/02/84	Morocco margin		•				
075----	08/13/84	Gulf of California		•				
076----	08/17/84	EPR at 13°N	R					
076-Rev	09/28/87	EPR at 12°50'N	R (357-Rev2)					
077----	08/20/84	Seychelles		•				
078----	08/23/84	Indus Fan		•				
079----	08/28/84	Indian Ocean strat.		•				
080----	08/30/84	Sunda and Banda arcs		•				
081----	09/04/84	Ionian Sea transect		•				
082----	09/04/84	Sulu Sea			Leg 124			
083----	09/05/84	Izu-Ogasawara arc	R					
083-Rev	07/15/85	Izu-Ogasawara arc	R					
083-Rev2	04/23/86	Izu-Ogasawara arc			Legs 125/126			
084----	09/10/84	Peru margin			Leg 112			
084-Add	05/12/85	Peru margin			Leg 112			
085----	09/20/84	Morocco margin		•				
086----	10/12/84	Red Sea	R					
086-Rev	09/25/85	Red Sea		•				
087----	10/12/84	Arabian Sea		•				
088----	10/12/84	W Indian Ocean volc.	R					
088-Rev	05/31/85	W Indian Ocean volc.			Leg 115			
089----	10/12/84	SW Indian Ridge	R					
089-Rev	03/01/85	SW Indian Ridge	R					
089-Rev2	05/12/86	SW Indian Ridge			Leg 118			
090----	10/12/84	SE Indian Ridge		•				
091----	10/12/84	SE Indian Ridge		•				
092----	10/12/84	Crozet seismic observ.	R					
092-Rev	08/26/85	Crozet seismic observ.		•				
093----	10/12/84	Arabian Sea anoxic sed.			Leg 117			
094----	10/12/84	Indian Ocean Monsoon			Leg 117			
095----	10/12/84	Indean Ocean monsoon			Leg 117			
096----	10/12/84	Bengal Fan			Leg 116			
097----	10/12/84	Eq. Indian Ocean	R					
097-Rev	03/21/85	Eq. Indian Ocean	R					

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
097-Rev2	06/19/85	Eq. Indian Ocean			Leg 115			
098----	10/12/84	Australian desert		•				
099----	10/12/84	S Indian Ocean paleo		•				
100----	10/12/84	SE Indian O. Ridge		•				
101----	10/12/84	Ridgecrest hydro.		•				
102----	10/12/84	Somali Basin		•				
103----	10/12/84	NW Indian Ocean		•				
104----	10/12/84	Ninetyeast Ridge			Leg 121			
105----	10/12/84	Timor collision		•				
106----	10/12/84	Broken Ridge			Leg 121			
107----	10/12/84	Oceanic lithosp. stress		•				
108----	10/12/84	E Antarctic margin	R					
108-Rev	05/12/86	E Antarctic margin	R					
108-Rev2	05/31/87	E Antarctic margin			Leg 119			
109----	10/12/84	Kerguelen-Heard Pl.			Legs 119/120			
110----	10/12/84	Ghost of 073----	G					
110-Rev	10/12/84	Wilkesland-Adelie	R (073-Rev2)					
111----	10/12/84	SE Indian Ridge		•				
112----	10/12/84	Lithosphere targets			Leg 118			
113----	10/12/84	Agulhas Plateau		•				
114----	10/12/84	Crozet Plateau		•				
115----	10/12/84	Agulhas Plateau	R					
115-Rev	04/08/85	Agulhas Plateau		•				
116----	10/12/84	Ninetyeast Ridge			Leg 121			
116-Add	04/08/85	Ninetyeast Ridge			Leg 121			
117----	10/12/84	N Red Sea		•				
118----	11/02/84	Cenozoic off E Africa			Leg 117			
119----	12/03/84	Gulf of Aden		•				
120----	12/10/84	Red Sea		•				
121----	12/10/84	E Indian Ocean	R					
121-Rev	12/16/85	E Indian Ocean	R					
121-Rev2	05/23/86	E Indian Ocean			Legs 122/123			
122----	12/28/84	Kane FZ, MAR			Legs 106/109			
123----	12/28/84	Sites 501/504			Leg 111			
124----	01/02/85	Deepen Hole 504B			Leg 111			
125----	01/14/85	MAR at 22°53'N			Legs 106/109			
126----	01/14/85	Australasian region		•				
127----	01/18/85	Sunda Arc/NW Austr.		•				
128----	01/21/85	Acc. prisms properties	R					
128-Rev	02/16/87	Acc. prisms properties		•				
129----	01/21/85	Bounty Trough	R					
129-Rev	05/19/86	Bounty Trough		•				
130----	01/21/85	N of New Zealand			Leg 135			
131----	03/09/85	Banda Sea		•				
132----	03/11/85	Japan TTT-Triple Jct.	R					
132-Rev	06/11/85	Japan TTT-Triple Jct.		•				
133----	03/21/85	In-situ fluid samplers			Eng.			
134----	03/25/85	Gulf of Aden	R					

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
134-Rev	02/27/86	Gulf of Aden		•				
135----	03/25/85	Broken Ridge			Leg 121			
136----	03/25/85	Kerguelen-Heard P.	R					
136-Rev	07/01/85	Kerguelen-Heard P.			Legs 119/120			
137----	03/25/85	Indian O. fossil ridges	R					
137-Rev	08/05/85	Indian O. fossil ridges		•				
138----	03/25/85	Rodriguez Triple Jct.	R					
138-Rev	08/05/85	Rodriguez Triple Jct.		•				
139----	03/25/85	Agulhas Plateau	R					
139-Rev	08/05/85	Agulhas Plateau		•				
140----	04/01/85	Red Sea	R					
140-Rev	08/05/85	Red Sea		•				
141----	04/02/85	Indus Fan	R					
141-Rev	08/05/85	Indus Fan		•				
142----	04/02/85	Ontong Java Plateau	R					
142-Rev	04/05/89	Ontong Java Plateau			Leg 130			1991
143----	04/09/85	Magnetic susceptibility	R					
143-Rev	12/30/85	Magnetic susceptibility			Leg 109			
144----	05/28/85	Kuril forearc collision	R					
144-Rev	06/06/86	Kuril forearc collision		•				
145----	05/29/85	Ryukyu arc	R					
145-Rev	06/02/86	Ryukyu arc		•				
146----	05/30/85	Toyama submarine fan	R					
146-Rev	06/20/85	Toyama submarine fan		•				
147----	06/05/85	South China Sea		•				
148----	06/05/85	Sagami Trough		•				
149----	06/20/85	Japan Sea spreading	R					
149-Rev	06/12/86	Japan Sea spreading			Legs 127/128			
150----	06/20/85	Indian Ocean			Legs 120/121			
151----	06/20/85	Japan Sea plume			Legs 127/128			
152----	06/20/85	Seismic Exp., Leg 107			Leg 107			
153----	06/20/85	Southeast Pacific		•				
154----	06/20/85	Banda-Cel.-Sulu-Sea			Leg 124			
155----	07/05/85	Downhole meas., Japan	R					
155-Add	06/12/86	Japan Sea			Legs 127/128			
155-Rev	09/09/87	Arc/back arc (Japan S.)	R					
155-Rev2	08/22/88	Arc/back arc (Japan S.)			Legs 127/128			
156----	07/05/85	Japan Sea sulfide			Legs 127/128			
157----	07/10/85	Japan Sea paleo.			Legs 127/128			
158----	07/15/85	Japan Trench/Japan Sea			Legs 127/128			
159----	07/15/85	Long-term ex.		•				
160----	07/15/85	Weddell Sea		•				
161----	07/15/85	High T meas., MAR		•				
162----	07/17/85	SW Indian R. VSP			Leg 118			
163----	07/18/85	Zenisu Ridge	R					
163-Rev	04/04/88	Zenisu Ridge		•				
164----	07/18/85	Japan/Kuril trench jct.		•				
165----	07/18/85	Shikoku Basin o. crust		•				

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
166----	07/22/85	Japan Sea opening			Legs 127/128			
167----	07/22/85	Okinawa T./Ryukyu T.		•				
168----	07/22/85	Japan Sea siliceous sed.			Legs 127/128			
169----	07/29/85	South Tasman Rise		•				
170----	07/29/85	Valu Fa R., Lau Basin		•				
171----	08/13/85	Bonin arc-trench			Leg 126			
171-Add	04/21/86	Bonin-Mariana summ.			Legs 125/126			
172----	08/19/85	Mariana arc			Leg 175			
173----	08/19/85	Seychelles-Mascarene			Leg 115			
174----	08/19/85	Japan Trench/forearc		•				
175----	08/19/85	Japan Trench		•				
176----	08/19/85	Japan Trench/triple jct.		•				
177----	08/19/85	Zenisu Ridge		•				
177-Rev	09/25/87	Zenisu Ridge		•				
178----	08/19/85	Nankai forearc		•				
179----	08/19/85	Daito Ridges		•				
180----	08/19/85	N Philippine Sea		•				
181----	08/19/85	Izu-O.-Mariana forearc			Legs 125/126			
182----	08/19/85	Sounder R. plate strat.		•				
183----	08/20/85	Indian O. peripl. ooze	R					
183-Rev	09/25/85	Indian O. peripl. ooze	R					
183-Rev2	03/03/87	Indian O. peripl. ooze		•				
184----	08/21/85	Papua New Guinea		•				
184-Add	08/28/85	Papua New Guinea		•				
185----	08/23/85	Kerguelen Plateau			Legs 119/120			
186----	08/28/85	SW Indian O. hydro.			Leg 118			
187----	09/13/85	New Hebrides Arc			Leg 134			
188----	09/18/85	395A/418A geophysics		•				
189----	10/07/85	Tonga R./Lau Ridge			Leg 135			
190----	10/07/85	New Hebrides, Vanuatu			Leg 134			
190-Add	05/09/88	New Hebrides, Vanuatu			Leg 134			
191----	10/07/85	Solomon Isl.		•				
192----	11/13/85	Baranof Fan, G/Alaska		•				
193----	11/13/85	Weddell Sea			Leg 113			
194----	11/18/85	South China Sea	R					
194-Rev	04/23/87	South China Sea	R					
194-Rev2	04/28/88	South China Sea		•				
195----	12/05/85	Bering Sea paleo.		•				
195-Add	10/21/88	Bering Sea paleo.		•				
196----	12/09/85	Ninetyeast Ridge			Leg 121			
197----	12/13/85	Otway B./W Tasmania		•				
198----	12/13/85	Ulleung (Tsushima) B.		•				
198-Add	06/27/86	Ulleung (Tsushima) B.		•				
199----	12/24/85	NPT paleo.			Leg 145			
199-Add	10/21/88	NPT paleo.			Leg 145			
200----	12/24/85	Magnetom. log, MARK			Leg 109			
201----	12/24/85	MARK high-res. temp.			Leg 109			
202----	12/30/85	N Marshall Is. evol.	R					

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
202-Rev	07/31/89	Marshall Is. atolls	A&G-DPG		Legs 143/144			
203----	12/30/85	Central Pacific guyots	R					
203-Rev	05/26/89	Central Pacific guyots	A&G-DPG		Legs 143/144			
204----	12/30/85	Florida Escarpment	R					
204-Rev	10/17/86	Florida Escarpment	R (332-Rev2)					
205----	12/30/85	Bahamas		•				
206----	12/30/85	Great Barrier Reef	R					
206-Rev	03/10/86	Great Barrier Reef	R					
206-Rev2	12/12/86	Great Barrier Reef			Leg 133			
207----	01/03/86	Bering Sea/Aleutian R.		•				
208----	01/10/86	Indian anc. triple jct.		•				
209----	01/10/86	Eltanin Fracture Zone		•				
210----	01/13/86	Yakutat margin, Alaska		•				
211----	01/17/86	Deep stratigraphic tests			Leg 123			
212----	01/27/86	N/Central California		•				
213----	01/27/86	Aleutian subduction		•				
214----	01/31/86	Aleutian forearc		•				
215----	02/10/86	Red Sea sed./paleo.		•				
216----	02/13/86	South China Sea axis		•				
217----	02/13/86	N Lord Howe Rise		•				
218----	02/14/86	South China Sea		•				
219----	03/03/86	Gulf of Aden		•				
220----	03/20/86	Lau Basin			Leg 135			
221----	03/24/86	E eq. Pac. paleo.			Leg 138			
221-Add	06/20/88	E eq. Pac. paleo.			Leg 138			
221-Add2	11/03/89	E eq. Pac. paleo.			Leg 138			
222----	03/28/86	Ontong Java Plateau	R					
222-Add	07/10/87	Ontong Java Plateau			Leg 130			
222-Rev	07/11/88	Ontong Java Plateau			Leg 130			
223----	04/14/86	Central Indian Ridge		•				
224----	04/23/86	Escanaba Trough	R					
224-Rev	09/08/87	Escanaba Trough	SR-DPG		Leg 139			
225----	04/30/86	Aleutian Basin		•				
225-Add	10/14/88	Plate reconstruction		•				
226----	05/01/86	Eq. Indian Ocean	R					
226-Rev	08/07/86	Eq. Indian Ocean			Leg 115			
227----	05/02/86	Aleutian arc		•				
228----	05/05/86	Weddell Sea			Leg 113			
229----	05/07/86	Bering Sea		•				
230----	05/08/86	Wilkes Land margin		•				
231----	05/08/86	N Pac. MQZ		•				
231-Add	10/14/88	Plate reconstruction		•				
232----	05/16/86	Juan de Fuca Ridge	SR-DPG		Leg 139			1991
232-Add	03/23/87	Middle Valley hydro.	SR-DPG		Leg 139			1991
233----	05/21/86	Oregon acc. complex	R					
233-Rev	07/11/88	Oregon acc. complex	R					
233-Rev2	09/20/89	Oregon acc. complex	R					
233-Rev3	08/14/90	Oregon acc. complex	Cascadia-DPG		Leg 146			1991

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
234----	05/27/86	E Aleutian Trench		•				
235----	05/28/86	Solomon Sea		•				
236----	05/28/86	N Gulf of Alaska		•				
237----	06/04/86	Vancouver acc. wedge	R (317-Rev)					
238----	06/09/86	Makran pore pressures		•				
239----	06/09/86	Lau Basin			Leg 135			
240----	06/10/86	Argo Abyssal Plain	R					
240-Rev	07/24/86	Argo Abyssal Plain			Leg 123			
241----	06/13/86	Yakutat b., Zodiak Fan		•				
242----	06/16/86	E Sunda Arc	R					
242-Rev	09/02/87	E Sunda Arc		•				
243----	06/20/86	Tonga forearc			Leg 135			
244----	07/07/86	W Ross Sea	R					
244-Rev	08/15/86	W Ross Sea	R (296-Rev2)					
245----	07/07/86	California transform		•				
246----	07/07/86	Arabian margin paleo.			Leg 117			
247----	07/07/86	NE Pac. evolution	R					
247-Add	07/07/88	NE Pac. evolution			Leg 145			
247-Add2	09/17/90	NE Pac. evolution			Leg 145			
247-Rev	01/19/88	NE Pac. evolution			Leg 145			
248----	08/08/86	Ontong-Java Plateau			Leg 130			
249----	08/08/86	Aleutian Trench sed.		•				
250----	08/14/86	Navy Fan		•				
251----	08/14/86	Seychelles - Mascarene			Leg 115			
252----	08/14/86	Loihi Seamount	R					
252-Rev	09/17/86	Loihi Seamount						1991
253----	08/28/86	Pac. black shales	R					
253-Rev	06/19/91	Pac. black shales						1991
254----	08/28/86	N Atl. black shales		•				
255----	08/28/86	Gulf of Guinea		•				
256----	09/15/86	Queen Charlotte TF		•				
257----	09/23/86	Farallon Basin		•				
258----	10/01/86	Galapagos R. stockw.		•				
259----	10/14/86	NPT paleo.	R					
259-Rev	03/06/87	NPT paleo.			Leg 145			
260----	10/14/86	Ogasawara Plateau			Legs 125/126			
261----	10/15/86	Mesozoic Pacific			Leg 129			
262----	11/12/86	Mid Indus Fan		•				
263----	11/24/86	S Explorer Ridge		•				
264----	12/02/86	Montagnais impact	R					
264-Rev	12/16/86	Montagnais impact		•				
265----	12/04/86	Woodlark Basin						1991
265-Add	06/04/90	Woodlark Basin						1991
266----	12/23/86	Lau Basin summary			Leg 135			
267----	12/29/86	Argo Abyssal P./W Pac			Leg 123			
268----	12/29/86	Queensland Pl./Trough	R					
268-Rev	05/12/87	Queensland Pl./Trough	R					
268-Rev2	08/18/87	Queensland Pl./Trough		•				

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
269----	12/29/86	Aleutian pyrocl. flows		•				
270----	01/12/87	Hydro. circ. tomogr.		•				
271----	02/20/87	California Current	R					
271-Rev	10/20/88	California Current	R					
271-Rev2	09/22/89	California Current		•				
272----	02/20/87	Long-term measurem.			Legs 127/128			
273----	03/02/87	S Kerguelen Plateau			Legs 119/120			
273-Add	10/08/87	S Kerguelen Plateau			Legs 119/120			
274----	03/02/87	South China Sea		•				
275----	03/27/87	Gulf of California	R					
275-Rev	10/13/88	Gulf of California						1991
276----	04/02/87	Eq. Atl. transform	R (346-Rev)					
277----	04/10/87	Cascadia tilt/strain	Cascadia		Leg 146			
278----	05/01/87	Blanco transform fault		•				
279----	05/20/87	Seamont 6 near EPR		•				
280----	06/04/87	Pac. seamounts./guyots		•				
281----	06/09/87	Japan melanges		•				
282----	06/22/87	Hawaiian Hotspot		•				
283----	06/28/87	NW Pac sed. drifts		•				
284----	07/06/87	Escanaba Trough	SR-DPG					1991
285----	07/14/87	W Pac JQZ			Leg 129			
286----	07/20/87	504B: layer 2/3 trans.	R					
286-Add	10/30/89	504B: layer 2/3 trans.	R					
286-Add2	09/21/90	504B: layer 2/3 trans.			Legs 137/140			
287----	08/01/87	W Pac M-series			Leg 129			
288----	08/01/87	Exmouth Plateau			Leg 122			
289----	08/28/87	Mass budget Japan arc		•				
290----	09/11/87	Juan de Fuca axial smt.						1991
291----	09/21/87	Marquesas Island Chain		•				
292----	09/21/87	SE Sulu Sea			Leg 124			
292-Add	03/07/88	SE Sulu Sea			Leg 124			
293----	09/21/87	Celebes Sea			Leg 124			
294----	10/28/87	Aoba intra-arc basin			Leg 134			
295----	12/07/87	Nankai hydro/structure			Leg 131			
296----	12/07/87	Ghost of 244----	G					
296-Rev	12/07/87	Ghost of 244-Rev	G					
296-Rev2	12/07/87	Ross Sea						1991
297----	12/29/87	Antarctic peninsula	R (353-Rev)					
298----	01/21/88	Nankai VSP			Leg 131			
299----	02/08/88	Self-boring p-meter	Cascadia		Leg 146			
300----	02/18/88	735B: layer 3/mantle						1991
301----	03/07/88	Nankai integrated			Leg 131			
302----	03/24/88	Japan Sea electr. cond.			Legs 127/128			
303----	04/30/88	Hawaiian Swell		•				
304----	06/01/88	Nankai observatory	R					
304-Rev	08/16/88	Nankai observatory			Leg 131			
305----	06/20/88	Arctic drilling	NAAG-DPG					
306----	06/24/88	Old Pacific history			Leg 129			

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
307----	07/07/88	Cross Seamount		•				
308----	07/14/88	Line Islands Chain		•				
309----	09/21/88	VSP at Bon-2/Bon-1			Leg 125			
310----	09/21/88	DRS/geochemistry	NARM-DPG					
311----	09/21/88	DRS/sed. equivalent	NARM-DPG					
312----	09/21/88	Reykjanes Ridge					•	
313----	09/21/88	Eq. Atl pathways						1991
314----	09/21/88	Nankai fluid & mech			Leg 131			
315----	09/26/88	OSN test site, Oahu			Leg 136			
316----	09/26/88	W Pac gas hydrate		•				
317----	12/28/88	Ghost of 237----	G					
317-Add	11/07/89	Vancouver acc. wedge	Cascadia-DPG		Leg 146			
317-Add2	06/05/90	Gas hydrate Cascadia	Cascadia-DPG		Leg 146			
317-Rev	12/28/88	Vancouver acc. wedge	Cascadia-DPG		Leg 146			
318----	01/20/89	Ghost of 008----	G					
318-Rev	01/20/89	Chile Triple Junction	R (362-Rev2)					
319----	02/21/89	Extinct hydroth.		•				
320----	03/03/89	Nordic Seas	NAAG-DPG					
321----	03/23/89	EPR at 9°40'N	EPR-DPG		Leg 147			
322----	03/28/89	Ontong Java Kimberl.		•				
323----	04/03/89	Alboran Sea/gateway	R					
323-Rev	02/11/91	Alboran Sea/gateway						1991
324----	04/20/89	Med tectonic evol.					•	
325----	05/09/89	Endeavour Ridge						1991
326----	05/11/89	NW Africa margin					•	
327----	05/24/89	Argentine cont. rise						1991
328----	06/06/89	E Greenland margin	NARM-DPG					
329----	07/14/89	Ghost of 015----	G					
329-Rev	07/14/89	Formation of Atlantic					•	
330----	07/17/89	Med. Ridge						1991
330-Add	01/22/90	Med. Ridge						1991
331----	07/25/89	Aegir Ridge					•	
332----	07/25/89	Ghost of 204----	G					
332-Rev	07/25/89	Ghost of 204-Rev	G					
332-Rev2	07/25/89	Florida Escarpment					•	
333----	07/27/89	Cayman Trough						1991
334----	07/28/89	Galicia margin	R					
334-Rev	12/27/90	Galicia margin						1991
335----	07/31/89	Ghost of 202-Rev	G					
336----	07/31/89	Arctic/N Atl. gateways	NAAG-DPG					
337----	07/31/89	New Zealand sea level						1991
338----	08/03/89	Marion Plateau s.l.			Leg 133			
339----	08/07/89	Benguela Current						1991
340----	08/07/89	N Australian margin						1991
341----	08/08/89	E Canada Wisc. climate					•	
342----	08/08/89	Barbados acc. prism	R (378-Rev)					
343----	08/08/89	Caribbean crust						1991
344----	08/08/89	NW Atl JMQZ					•	

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
345----	08/11/89	W Florida sea level						1991
345-Add	10/05/90	W Florida sea level						1991
346----	08/14/89	Ghost of 276----	G					
346-Add	03/25/91	Eq. Atl. transform						1991
346-Rev	08/14/89	Eq. Atl. transform						1991
347----	08/15/89	South-eq. Atl. paleo.						1991
348----	08/16/89	New Jersey sea level						1991
349----	08/22/89	VICAP, Gran Canaria						1991
350----	09/01/89	Gorda deformation	R (386-Rev)					
351----	09/06/89	Bransfield Strait					•	
352----	09/13/89	Mathematician Ridge					•	
353----	09/13/89	Ghost of 297----	G					
353-Rev	09/13/89	Antarctic Peninsula					•	
354----	09/18/89	SE Atl. upwelling						1991
355----	09/18/89	Gas hydrate	R					
355-Rev	10/04/89	Gas hydrate	R					
355-Rev2	08/30/90	Gas hydrate						1991
356----	09/29/89	NGS Paleo.	R					
356-Rev	05/01/91	NGS Paleo.				•		
357----	10/25/89	Ghost of 076----	G					
357-Rev	10/25/89	Ghost of 076-Rev	G					
357-Rev2	10/25/89	EPR near 2°50'N	EPR-DPG		Leg 147			
358----	11/13/89	Vøring margin	NARM-DPG					
359----	11/20/89	Ghost (Letter of Intent)	G					
360----	12/06/89	Valu Fa hydro.						1991
361----	01/03/90	TAG hydro.						1991
361-Rev	03/01/91	TAG hydro.				•		
362----	01/09/90	Ghost of 318----	G					
362-Rev	01/09/90	Ghost of 318-Rev	G					
362-Rev2	01/09/90	Chile Triple Junction	R					
362-Rev3	11/08/90	Chile Triple Junction			Leg 141			1991
363----	01/18/90	GB-Iberia plume volc.						1991
363-Add	02/18/91	Grand Banks paleo.						1991
364----	01/22/90	Sardinian-African Str.					•	
365----	01/29/90	N Atl. conj. margins	R					
365-Add	05/28/91	N Atl. geothermal	NARM-DPG			•		
365-Rev	02/04/91	N Atl. conj. margins	NARM-DPG					
366----	01/29/90	Ghost (Letter of Intent)	G					
367----	02/07/90	S Australia margin						1991
368----	02/12/90	Hole 801C Return						1991
369----	02/20/90	MARK deep mantle						1991
370----	02/22/90	MAR magmatism					•	
371----	02/26/90	Ghost (Letter of Intent)	G					
372----	02/26/90	N Atl. paleo.					•	
373----	03/01/90	Site 505 Return						1991
374----	03/06/90	Oceanographer FZ						1991
375----	03/06/90	Hess Deep	R (387-Rev)					
376----	03/07/90	Vema FZ: layer 2/3						1991

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Master List B (Sorted by "Ref. No")

			Inactive Proposals			Active Proposals		
Ref.No	Received	Key	Replaced, to DPG, Ghost	Not Drilled	Drilled or Scheduled	In Review	Not Ranked	Ranked
377----	03/07/90	Ghost of 315----	G					
377-Rev	03/07/90	OSN test site, Oahu			Leg 136			
378----	03/12/90	Ghost of 342----	G					
378-Rev	03/12/90	Barbados acc. prism						1991
379----	03/12/90	Med. drilling						1991
380----	05/01/90	Ghost of 349----	G					
380-Rev	05/01/90	VICAP, Gran Canaria						1991
381----	03/19/90	Argentina shelf/slope					•	
382----	05/03/90	Vema FZ: deep crust						1991
383----	05/22/90	Aegean Sea					•	
384----	07/18/90	Ghost of 343----	G					
384-Rev	07/18/90	Caribbean crust					•	
385----	08/07/90	OSN coring: Oahu			Leg 136			
385-Add	08/09/90	OSN coring: Oahu			Leg 136			
386----	08/10/90	Ghost of 350----	G					
386-Rev	08/10/90	California margin						1991
387----	09/04/90	Ghost of 375----	G					
387-Rev	09/04/90	Hess Deep			Leg 147			1991
388----	10/01/90	Ceara Rise						1991
389----	10/29/90	SW Atl. traverse					•	
390----	11/12/90	Shirshov Ridge						1991
391----	01/02/91	Med. sapropels						1991
392----	01/29/91	Labrador Sea volc.	NARM-DPG					1991
393----	01/29/91	Greenland volc. margin	NARM-DPG					1991
394----	02/04/91	N Atl. volc. margins	NARM-DPG					1991
395----	02/11/91	Volc. passive m. comp.	NARM-DPG					1991
396----	02/11/91	N Atl. volc. margins	NARM-DPG					1991
397----	02/20/91	N Atl. multiple rifting				•		
398----	02/22/91	Grand Banks paleo.				•		
A&G	03/08/91	Atolls and Guyots			Legs 143/144			
Bering	09/07/90	Bering Sea history						1991
Cascadia	08/14/90	Cascadia margin			Leg 146			1991
EPR	01/09/91	East Pacific Rise			Legs 142/147			1991
NAAG	04/11/91	N Atl./Arctic gateways						1991
NARM	03/27/91	N Atl. rifted margins						1991
S-1	11/21/90	Navy Fan				•		
S-2	03/20/91	801C logging				•		
S-3	05/31/91	NW Pac OSN hole				•		
SR	10/30/89	Sedimented Ridges			Leg 139			1991

R = Replaced by revised proposal; ref. number is given if revised proposal has different number than replaced proposal
G = Ghost; links revised proposals to replaced version if ref. number is different

ODP Proposal Log Sheet **356-Rev** Proposal received: May 1, 1991

☐ *New proposal* ☒ **Revised proposal** ☐ *Addendum to proposal* ☐ *"Supplemental Science" Proposal*

Oceanographic and Climatic Changes Caused by Subsidence of Large Crustal Areas in the Denmark Straits, Jan Mayen Ridge and Iceland Faeroe Ridge area

P.P. Smolka and F. Strauch

Abbrev. Title: Oceanogr./climatic changes, North Greenland Sea	Key: NGS Paleo.	Area: N Atl

Contact:

Dr. P.P. Smolka
Geologisch Paläontologisches Institut
Westfälische Wilhelms Universität
Corrensstrasse 24
D-4400 Münster
Germany

Tel: 49 (251) 83-3951, -3989
FAX: 49 (251) 83-3968, -2090

Objectives:

LRP

1. Paleoceanography of Norwegian Greenland Sea (NGS) and North Atlantic Gateways (NAG) — 13
   - History of NGS (watermasses, East Greenland current, polarfront, shift of circulation pattern)
   - History of NAG (Denmark Straits, Iceland Faeroe Ridge) impact of NGS waters on global climate
   - Nature of sediments on N flank of Denmark straits (up to 8 km) and around Faeroes (up to 2 km)
   - Preglacial marine and potentially nonmarine sedimentary environment below unconformity
2. Subsidence of aseismic ridges in a hot spot environment (Greenland Scotland Ridge) — 7
3. Provide data for nature of horiz. stress field changes and their impact on crustal subsidence — 5

General area: North Atlantic

Specific area: Denmark Straits, Jan Mayen Ridge and Iceland Faeroe Ridge

Proposed Sites:

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives
DST-1	66°N/029°W	250	380		380	History of overflow; differential subs. Denmark Straits.
DST-2	66.2°N/027.8°W	500	380		380	Denmark Str. overflow; GSR differential subsidence.
DST-3	65.2N/34.3W	250	250		250	Denmark Str. overflow; prograding sed.; glacial onset.
DST-4	67.4N/27.4W	320	450		450	Paleoecol.; paleoclimate; polarfront; water/sed exchange.
DST-5	68°N/025°W	1250	400		400	Deep watermasses; deflection of overflow of EG current.
JMR-1	69°53.4'N/008°41.1'W	732	250		250	Subsidence; preglacial sed; timescale of envir. change.
JMR-2	68°30.2'N/012°27.7'W	1763	526	4	530	History of E Iceland current, overflow effects; subsidence.
IFR-1	63°21.1'N/007°47.3'W	830	463	27	490	Subsidence; paleo.; dating overflows; S NGS currents.
IFR-2	61.4°N/010.2°W	1100				Subsidence; overflow separation and mixing; paleo.

Proposal acknowledged by JOIDES Office:	May 17, 1991	to:	Smolka, P.P.
Proposal forwarded for review:	Jun 3, 1991	to:	LITHP, OHP, SGPP, TECP
Proposal copies:	Jun 3, 1991	to:	JOI, SO, SSDB
Proposal forwarded to DPG:	00/00/00	to:	

Proposal Reference No.: 356-Rev

Title: "Oceanographic and Climatic Changes Caused by Subsidence of Large Crustal Areas in the Denmark Straits, Jan Mayen Ridge and Iceland Faeroe Ridge Area — Proposal for Subarctic Drilling of Multiple Purpose Holes"

Proponent(s): P.P. Smolka and F. Strauch

Summary*

"....The northern North Atlantic is a key area for the study of the behavior of the Geosystem and some of its components - Lithosphere, Ocean, Atmosphere interacting with each other

Thus with the assistance of the preliminary data of Leg 38 and the supplementary data of Leg 104, the drilling of the sites proposed here, will provide the necessary information for quantitative models of both lithosphere and ocean dynamics.

Furthermore the Norwegian Greenland Sea (NGS) is a major or better one of the master factors governing important subsystems of the European/North American Geosystem. This applies to the formation and subsequent exchange of deep water with the North Atlantic as well, as to the role and influence of near-surface ocean currents on both American (East Greenland Current/Labrador Current) and European (Norwegian Current) climates as present as well as in the Neogene past.

In addition the seafloor of the Norwegian Greenland Sea is divided into many distinct areas (ridges, microcontinents, etc.) with a complex and individual history both with respect to their origin and their subsidence.

Major changes of these oceanographic boundary conditions that might well had global importance, occurred in the NGS in Neogene times. Therefore the detailed quantitative study of selected key areas in the NGS both with respect to paleoceanographic items and lithosphere dynamics will give valuable insight into the care that is necessary, when judging the potential importance of impacts to the geosystem - natural ones in the past as well as man-made in the present...."

"....Some of the key questions have been addressed as early as during Leg 38 stage. The answers have been partially hidden by large coring gaps and the lack of HPC. In addition important key areas such as the Denmark Straits have not been sampled.

Consequently the proposed sites follow the strategy of two paleoenvironmental and tectonic transects along the East Greenland margin through the Denmark Straits gateway and through the Iceland Faeroe Ridge gateway.

In addition these subarctic sites backbone other high latitude arctic sites in case of unexpected technological or geological problems.

More important is, that the value of high arctic sites is limited by knowledge on Neogene global change potentially triggered by the passage of parameters through the mid-arctic gateways of the Denmark Straits and across the Iceland Faeroe Ridge into the Neogene North Atlantic.

By drilling multiple objectives, the sites of the Denmark Straits, the Jan Mayen Ridge and Iceland Faeroe Ridge use the resources available in the most effective manner possible...."

*In cases proponents do not submit an abstract or summary, the JOIDES Office extracts part(s) of the proposal for this purpose (indicated as ".... ....").

000247

ODP Proposal Log Sheet 399----

Proposal received: May 3, 1991

☒ New proposal ☐ *Revised proposal* ☐ *Addendum to proposal* ☐ *"Supplemental Science" Proposal*

Tectonic Evolution of the Alboran Sea

A.B. Watts, J.P. Platt and B.C. Schreiber

Abbrev. Title: Tectonic evolution of the Alboran Sea	Key: Alboran Sea evolution	Area: Med

Contact:

Dr. A.B. Watts
Department of Earth Sciences
University of Oxford
Parks Road
Oxford, OX1 3PR
UNITED KINGDOM

Tel: 44 (0865) 272-032
FAX: 44 (0865) 272072

Objectives:

LRP 7/8

Tectonic processes responsible for Neogene extensional basins underlying the Mediterranean

- Beginning and duration of extensional episode
- Subsidence history and its match to subsidence curves for extensional or other basin types
- Nature of deformation during basin formation: orthogonal, oblique, varying? Amount, duration of ext.?
- Crust before formation of the present basin: deformed and metam., Tethyan oceanic, streched cont. crust?
- Thermal and magmatic effects associated with extension: age and chemistry of volcanism

General area: Mediterranean Sea
Specific area: Alboran Sea
Proposed Sites:

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives
A-1	35.988°N/004.92°W	645	1250		1250	Unconformities; Messinian channel structure; normal fault
A-2	35.722°N/003.365°W	795	1000	200	1200	Stratigraphy, nature of bsmt. on S flank of Alboran Ridge
A-3	35.545°N/003.308°W	1101	1000	200	1200	Stratigraphy, nature of bsmt. on Moroccan margin
A-4	36.193°N/002.017°W	1900				Stratigraphy, incl. possible syn-rift sediments
A-5	35.890°N/001.937°W	2290	900	300	1200	Timing of fault motion along young strike-slip fault

Proposal acknowledged by JOIDES Office:	May 17, 1991	to:	Watts, A.B.
Proposal forwarded for review:	Jun 3, 1991	to:	LITHP, OHP, SGPP, TECP
Proposal copies:	Jun 3, 1991	to:	JOI, SO, SSDB
Proposal forwarded to DPG:	00/00/00	to:	

Proposal Reference No.: 399----

Title: "Tectonic Evolution of the Alboran Sea - A Proposal for ODP Drilling"

Proponent(s): A.B. Watts, J.P. Platt and B.C. Schreiber

Summary*

"....The Neogene extensional basins that underlie much of the Mediterranean region pose a geotectonic problem of global significance. These basins, which are typically a few hundred km across, are mostly located on the sites of Late Cretaceous to Palaeogene mountain chains, and they are surrounded by highly arcuate thrust belts that were active during extension in the basin. They are in many ways analogous to the marginal basins of the western Pacific and western Atlantic oceans, which form by extension behind island arc/trench systems, but differ in several important respects. They are smaller, the basins are largely floored by extended continental crust, and in several cases The Aegean and southern Tyrrhenian Basins are most closely comparable to the marginal basins in that they lie above clearly defined subduction zones with attendant island arcs (the Aeolian and Hellenic arcs), and the Tyrrhenian Basin may be locally floored by quasi-oceanic crust (Kastens et al., 1988). In the case of the northern Tyrrhenian Sea, the Pannonian Basin, or the Alboran Sea, however, there is not clear geophysical evidence to support subduction of oceanic lithosphere during the period of extension in the basin. The directions of extension in these basins, and of relative convergence in the surrounding arcs, vary markedly, and show no direct relationship to the overall relative motion of the African and Eurasian plates that bound these systems. They therefore represent a tectonic process that operates to some extent independently of plate tectonics, and which is transitional in character between the tectonics of the major ocean basins and that of the continents. Improved understanding of the nature and causes of this process is therefore vital to the development of a truly global tectonic theory...."

*In cases proponents do not submit an abstract or summary, the JOIDES Office extracts part(s) of the proposal for this purpose (indicated as ".... ....").

000243

ODP Proposal Log Sheet **365-Add** Proposal received: May 28, 1991

☐ *New proposal* ☐ *Revised proposal* ☒ **Addendum to proposal** ☐ *"Supplemental Science" Proposal*

Geothermal Measurements Along the Newfoundland and Iberia Conjugate Passive Margin Transects

K.E. Louden, J.C. Mareschal and J.P. Foucher

Abbrev. Title: Geothermal measurements, Newfoundland/Iberia transects	Key: NARM Geothermal	Area: N Atl

Contact:

Dr. Keith E. Louden
Department of Oceanography
Dalhousie University
Halifax, Nova Scotia B3H 4J1
CANADA

Tel: 1 (902) 424-3557
FAX: 1 (902) 424-3877
Tmail: Dalhousie.Ocean
Email: louden@ac.dal.ca

Objectives:

LRP: 7

Subsidence history, rifting process, and crustal composition through geothermal measurements.

- Direct measurement of crustal radiogenic heat production from basement samples at each site.
- Additional drilling in order to measure temperature gradients down hole at approx. 5-10 positions.
- Site survey measurements of surface heat flow along each transect.

General area: North Atlantic

Specific area: Newfoundland and Iberia margins

Proposed Sites: Sites determined by NARM-DPG according to program strategy

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives

Proposal acknowledged by JOIDES Office:	Jun 3, 1991	to:	Louden, K.E.
Proposal forwarded for review:	Jun 3, 1991	to:	LITHP, OHP, SGPP, TECP
Proposal copies:	Jun 3, 1991	to:	JOI, SO, SSDB
Proposal forwarded to DPG:	00/00/00	to:	NARM-DPG (North Atlantic Rifted Margins)

Proposal Reference No.: **365-Add**

Title: **"Geothermal Measurements Along the Newfoundland and Iberia Conjugate Passive Margin Transects"**

Proponents: K.E. Louden, J.-C. Mareschal, J.-P. Foucher and J.-C. Sibuet

Summary

In this Addendum to ODP Proposal 365 Rev, we present a rationale for placing a high priority on the measurement of heat flow and crustal radiogenic heat production at the proposed drill sites along the conjugate margin transects across the Newfoundland and Iberia basins. We expect that these data will add significantly to the interpretation of the subsidence history, in helping to define the nature of the rifting process. They will also help interpret the nature of the crustal composition within the disputed region of the continent-to-ocean transition. The critical information that only drilling can offer comes from basement sampling which will allow the measurement of crustal radiogenic heat production. Using recent surface heat flow data across Goban Spur and Galicia Bank, we show why constraints on crustal heat production are necessary in order to limit possible models of the heat flow variation across old passive margins. Well-constrained downhole measurements of temperature and thermal conductivity should also be made on all boreholes in order to benchmark more numerous surface measurements across the margins. These surface heat flow data do not presently exist and should be given high priority for surveys to be conducted in these regions in the near future.

*In cases proponents do not submit an abstract or summary, the JOIDES Office extracts part(s) of the proposal for this purpose (indicated as ".... ....").

000251

ODP Proposal Log Sheet **S-3** Proposal received: May 31, 1991

☐ *New proposal* ☐ *Revised proposal* ☐ *Addendum to proposal* ☒ **"Supplemental Science" Proposal**

Proposal for a Cased Hole with Re-entry Cone for Deployment of OSN Observatory

A. Dziewonski, M. Purdy and K. Suyehiro

Abbrev. Title: Cased re-entry hole for deployment of OSN observatory	Key: NW Pac OSN hole	Area: NW Pac

Contact:
Dr. Adam Dziewonski
Department of Earth and Planetary Sciences
Harvard University
Cambridge, MA 02138
Tel: 1 (617) 495-2351
FAX: 1 (617) 495-8839

Objectives:

LRP

Case hole with re-entry cone for deployment of OSN observatory

Other

General area: Northwest Pacific
Specific area: South of Detroit Seamount
Proposed Sites: 10-20 m away from planned site NW-1A

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives
NW-1B	47.6°N/161.8°E	5330	300	15	315	Case re-entry hole for OSN observatory

Proposal acknowledged by JOIDES Office:	Jun 3, 1991	to:	Dziewonski, A.
Proposal forwarded for review:	Jun 3, 1991	to:	LITHP, OHP, SGPP, TECP
Proposal copies:	Jun 3, 1991	to:	JOI, SO, SSDB, R. Kidd (chair SSP)
Proposal forwarded to DPG:	00/00/00	to:	

Proposal Reference No.: S-3

Title: "Letter Proposal for Supplemental Science in Connection with the Drilling During Leg 145"

Proponents: A.M. Dziewonski, M. Purdy, K. Suyehiro, Prof. Shimamura and Prof. Kanazawa

Summary*

"....This is a letter proposal for "supplemental science" in connection with the drilling during Leg 145. I, together with Mike Purdy and our colleagues in Japan: Drs. Kanazawa, Shimamura and Suyehiro, propose that in addition to Hole A on site NW-1 (46.6°N, 161.8°E) there also be drilling Hole B, with casing and re-entry cone for the future deployment of a station of the Ocean Seismographic Network (OSN-2). In the remainder of this letter I will concentrate on the scientific background and the scientific objectives of the OSN and site OSN-2, in particular...."

*In cases proponents do not submit an abstract or summary, the JOIDES Office extracts part(s) of the proposal for this purpose (indicated as ".... ....").

ODP Proposal Log Sheet **253-Rev** Proposal received: Jun 19, 1991

☐ *New proposal* ☒ **Revised proposal** ☐ *Addendum to proposal* ☐ *"Supplemental Science" Proposal*

Paleoceanographic Controls on the Deposition of Organic Carbon-Rich Strata in the Ancestral Pacific

W.V. Sliter, G.R. Brown, M.A. Arthur, R. Larson and G.W. Brass

Abbrev. Title: Deposition of organic carbon-rich strata, ancestral Pacific	Key: Ancestral Pacific paleo.	Area: W-C Pac

Contact:

Dr. W.V. Sliter
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

Objectives:

LRP 13/15

Paleoceanographic controls on deposition of mid-Cret. organic carbon-rich strata in ancestral Pacific

- Depositional paleodepth of C(org)-rich strata by drilling depth transects at high and low paleolatitudes
  - to establish upper and lower boundaries of Cret. oxygen-deficient water masses
  - to determine the degree of oxygen deficiency that prevailed during deposition
- Determine the width and intensity of the paleoequatorial divergence
  - impact on vertical stratification of upper water column
  - impact on deposition of organic carbon during anoxic episodes 1 and 2
- Obtain sufficient core material deposited beneath inferred high-marine vs. low-marine productivity areas
  - to determine the source of carbon
  - relative importance of productivity vs. dissolved oxygen and/or sedimentation rate factors
  - geochemistry of associated sediments
- Effects of instability in water col. above seamounts due to topogr. upwell. and semistat. mesoscale eddies
- Effects of mid-Cret. volcanic pulse on deposition of org. C, and timing of anoxic events
- Onset of "Cret. Greenhouse" as analogy to onset of "Modern-Day G." (paleo-T, p(CO2), geochem.fluxes)
- Basement age of Shatsky Rise to confirm triple-junction plume origin; consequences on biosphere

General area: West-central Pacific
Specific area: Shatsky Rise, Magellan Rise and Manhiki Plateau
Proposed Sites:

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives
SHAT-1	32°36'N/158°22'E	2475	748		748	High-productivity, shallow site.
SHAT-2	31°55'N/157°33'E	3225	563	050	613	High-prod., mid-depth site; paleoeq. S site; bsmt age, M21.
SHAT-3	32°25'N/157°05'E	3700	375		375	High-productivity, deep site.
SHAT-4	37°45'N/163°05'E	3250	625	050	675	Paleoeqatorial N site; basement age, M13.
SHAT-5	34°02'N/159°10'E	3262	730	050	780	Paleoeqatorial mid-lat. site; basement age, M18.
SHAT-5A	34°20'N/159°10'E	3375	340	050	390	As SHAT-5.
MAG-1	07°10'N/176°52'W	3185	1025		1025	Low-productivity, mid-latitude, shallow site.
MAG-2	07°45'N/177°05'W	3600	350		350	Low-productivity, mid-latitude, mid-depth site.
MAG-3	06°35'N/176°35'W	4350	450		450	Low-productivity, mid-latitude, deep site.
MAN-1	12°00'S/162°25'W	2400	750		750	Low-productivity, high-latitude, shallow site.
MAN-2	11°09'S/161°29'W	3080	310	015	325	Low-productivity, high-latitude, mid-depth site; bsmt age.

Site Name	Position	Water depth	Penetration Sed	Bsmt	Total	Brief site-specific objectives
MAN-3	11°55'S/163°15'W	3300	350		350	Low-productivity, high-latitude, deep site.

Proposal acknowledged by JOIDES Office:	Jun 25, 1991	to:	Sliter, W.V.
Proposal forwarded for review:	Aug 1, 1991	to:	LITHP, OHP, SGPP, TECP
Proposal copies:	Aug 1, 1991	to:	JOI, SO, SSDB
Proposal forwarded to DPG:	00/00/00	to:	

Proposal Reference No.: **253-Rev**

Title: **"Paleoceanographic Controls on the Deposition of Organic Carbon-Rich Strata in the Ancestral Pacific"**

Proponent(s): W. V. Sliter, G.R. Brown, M.A. Arthur, R. Larson and G.W. Brass

Summary*

"....We herein propose a horizontal and vertical array of eleven drill sites on three topographic highs (Shatsky Rise, Magellan Rise, and Manihiki Plateau) that expands and amplifies the objectives of the original proposal. Our main thrust continues to be aimed at better understanding the paleoceanography of the Mesozoic Superocean during the middle Cretaceous thermal maximum that was characterized by the episodic deposition of C_{org}-rich strata. Equally important, the stratigraphically extensive pelagic caps of the target seamounts allows us to assess the impact of the massive middle Cretaceous pulse in ocean crustal production on the chemistry of the ocean and the timing of biotic extinction and evolutionary events. Thus, the revised proposal, while continuing to address Objective 7 of COSOD-I "Sedimentation in oxygen-deficient oceans", and the recommendations of the USSAC Workshop on Cretaceous Black Shales (1986), now also targets the evolutionary objectives of COSOD-II (Working Group 5), as well as the recommendations of GSGP-CRER Working Group 2 (Arthur et al., 1990), and several recommendations of the USSAC Workshop of Large Igneous Provinces (1990)...."

*In cases proponents do not submit an abstract or summary, the JOIDES Office extracts part(s) of the proposal for this purpose (indicated as ".... ....").