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M I N U T E S

JOIDES Executive Committee Meeting
2-3 December 1981
Hotel Sutter - San Francisco, California

Members Present:

W. Nierenberg (Chairman, Scripps Institution of Oceanography)
J. Baker (University of Washington)
N. Bogdanov (U.S.S.R. Academy of Sciences)
G. Brass (University of Miami)
H. Durbaum (B.G.R. - Federal Republic of Germany)
R. Heath (Oregon State University)
C. Helsley (University of Hawaii)
A. Laughton (Natutral Environment Research Council - U.K.)
A. Maxwell (Woods Hole Oceanographic Institution)
M. Peterson (DSDP - non-voting member)
G. Piketty (C.N.E.X.O., France)
R. Reid (Texas A&M University)
J. Schilling (University of Rhode Island)

Members Absent

N. Nasu (Ocean Research Insitute - Univ. of Tokyo, Japan)
B. Raleigh (Lamont-Doherty Geological Observatory)

Liaison

A. Shinn (National Science Foundation)
E. Winterer (Planning Committee)
P. Worstell (JOIDES Office)

Guests

G. Anderson (University of Washington)
J. Clotworthy (Joint Oceanographic Institutions, Inc.)
B. Coleman (Stanford University - COSOD Steering Committee)
L. Frakes (Monash University - Australia)
J. Frautschy (Scripps Institution of Oceanography)
W. Hay (Joint Oceanographic Institutions, Inc.)
P. Henry (Joint Oceanographic Institutions, Inc.)
J. Jarry (French Embassy - Washington, D.C.)
Y. Neprochnov (U.S.S.R. Academy of Sciences)
R. Shipman (University of Texas at Austin)
L. Torchigina (U.S.S.R. Academy of Sciences)

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198 INTRODUCTORY REMARKS AND BUSINESS

W. Nierenberg opened the meeting by welcoming the JOIDES Executive Committee to San Francisco. He introduced members and guests and congratulated Art Maxwell on his recent appointment to Director of the newly created Institute for Geophysics at the University of Texas at Austin. W. Nierenberg thanked Ross Shipman for his continuing interest and support of JOIDES. Nierenberg also introduced Anthony Laughton, who is replacing P. Twinn as alternate to P. Kent for the United Kingdom.

The Executive Committee accepted the agenda, placing Item E -- member-country positions -- later in the discussions to enable members to benefit from earlier reports.

The Committee approved the minutes of the 12 and 14 August 1981 meeting without change..

199 NATIONAL SCIENCE FOUNDATION REPORT

Allen Shinn reported for the National Science Foundation.

I. FUTURE PLANNING

A. Update - Ocean Margin Drilling Program

A. Shinn reviewed what has happened since the last Executive Committee meeting. During the August EXCOM meeting Shinn had reported on a plan which NSF presented to industry in July. The plan called for operating one scientific drilling ship (Explorer) in non-riser and riser modes within a partnership in which countries outside the U.S. could participate in the non-riser operations. (See also Item 190-II, 12 and 14 August 1981 EXCOM minutes.)

The plan required oil company support, but on 6 October 1981 the ten contributing companies elected to terminate financial support to OMDP beyond FY 1981. Although the plan apparently had support among some industry scientists, it failed to gain adequate support at higher management levels, owing partly to delayed development of riser technology and delayed passive margin drilling and to the inability of NSF to bring enough other companies into the agreement. Industry will continue to go ahead with its own riser development; if NSF goes ahead with ship development, Shinn expressed the hope that the groups could perhaps get together again at some (distant) future date.

Some carry-over funds are available to complete synthesis work currently underway and to maintain a mechanism (i.e., the OMD Scientific Advisory Committee) to continue scientific and technical cooperation with industry.

B. U.S. Budgetary Problems

The U.S. Government is also reducing financial support for ocean drilling during this period of general budget reductions. It has reduced an

earlier commitment of $26 million to scientific ocean drilling to about $20 million; somewhat more than $14 million is allocated to the Challenger program and somewhat less than $6 million is budgeted for Explorer design work.

A recent budget crisis closed parts of the U.S. Government between 1 and 5 PM on November 16. Although Congress adopted a "continuing resolution", it needs to pass a regular appropriations bill for the FY 1982 budget before 15 December 1981.

NSF has submitted a $975 million budget; the President has requested this be reduced to $909 million dollars. Although this reduction would not necessarily directly impact the drilling program NSF must nonetheless contend with a political environment of fiscal constraint and possible reduced support.

C. Alternative Plans

In view of the present situation NSF considers four general options as possibilities for future planning:

1. Terminate scientific ocean drilling at the end of FY 1983, when Challenger completes her current phase of drilling.

2. Extend Challenger drilling for up to five years beyond the current phase.

3. Convert Glomar Explorer for non-riser drilling and operate her in lieu of Challenger for an undetermined time.

4. Convert Explorer to a full riser capability and to operate her on both riser and riserless modes.

Because the community is unified in its support of a continued scientific ocean drilling program, Option 1, though a possibility, has little support. Option 4 is financially impossible without the support of industry. NSF is thus prepared to focus on options 2 and 3 and hopes to make some decision with regard to platform and type of program by late Spring 1982.

NSF will assess the responses from the scientific community in general and also consider those from (a) the Conference on Scientific Ocean Drilling, (b) the Academy of Sciences, (c) JOIDES — in particular among the IPOD member countries and potential new members, and will (d) evaluate the relative costs of operating Challenger and Explorer.

D. Glomar Challenger versus Glomar Explorer Operational Cost Comparison

To help assess the relative operational costs of Explorer and Challenger A. Shinn prepared a preliminary cost comparison schedule as follows. Comparative costs include operating costs only, the figures do not include capital investment charges -- those to convert Explorer to a riserless drilling vessel.

Comparative Operating Costs (Daily Rate) for
Glomar Challenger and Glomar Explorer
in a Riserless Mode
(Costs are estimated in 1981 dollars)

	Challenger	Explorer
Crew	12,748 (assuming 45-man crew)	17,900[a] (assuming 53-man crew)
Fuel	3,524	12,422[b]
Return on Investment	9,981	0[c]
G&A	3,509	0
Maintenance	2,000	6,401
Overhead (HQ)	2,789	2,789
Logging	2,540	2,540
Bits	1,110	2,220
Mud and Casing	532	2,660
	38,773	46,941

The calculated operating cost differential is about 20% greater for Glomar Explorer and Shinn estimates that the operating costs shown would comprise about 2/3 of the total program and other costs (as a working assumption) would increase about 50 per cent.

[a] A 17% increase in crew, has a 40% increase in cost partly owing to assuming higher personnel costs.

[b] A 300% increase in fuel costs with Explorer is on the basis of increased horsepower required.

[c] Because Explorer is owned by the Federal Government, costs for return on investment or general administration are carried elsewhere.

Shinn noted that a 12- to 18-month hiatus in drilling would be necessary to convert Explorer for riserless drilling. NSF would hope the cooperative scientific activities among the IPOD partners would extend across this hiatus. A $3 million per year contribution still appears to be a reasonable figure, but NSF would encourage participation of seven full-time equivalent non-U.S. members.

According to Shinn, the choice between ships is influenced by a "now or never" situation. If the community and NSF select Challenger, the opportunity to acquire Explorer will probably be lost. NSF is working to get clear title to Explorer this winter, but the title transfer is in part contingent upon having a funded program.

E. Discussion

The Executive Committee discussed the program options and Shinn's comparative operating cost estimates at length. Discussion centered around (a) bases for relative cost figures (b) total costs of an Explorer program, recognizing that the operating costs do not include conversion or management costs, (c) relative capabilities of Explorer and Challenger and (d) better means to fund U.S. science in support of the program. Comments included:

- Members noted that the NSF table developed Explorer operational costs, the basis of a 53-man crew which would provide a bare minimum comparison. If scientific operations were expanded to the full capabilities possibly using Explorer, costs would increase significantly.

- M. Peterson noted that although the NSF figures were in a general sense consistent with those developed by DSDP, DSDP would estimate a higher relative increase in operation costs of Explorer relative to Challenger.

- Winterer noted that any planning to convert and use Explorer must be done within the context of scientific planning. The community first determines its goals, then its tools. The necessity for a longer drill string is not yet completely clear; the Active Margin Panel is not demanding more than 8500 meters and oceanic layer three can probably be reached with a 5000 to 6000-meter drill string. Moreover, many "deep" passive margin riserless objectives can be reached by location of drill sites on thinly sedimented or eroded margins. On the other hand, compared to Challenger, Explorer not only can handle a longer drill string and carry more casings and mud, but could drill nearer ice in high latitudes, could better hold position, and therefore operate under worse weather conditions, would probably be a more stable platform and hence be better able to achieve better core recovery, and would accommodate more people and larger labs.

- Use of the Explorer might provide the possibility for a totally different mode of operation -- one not confined to 8-week cycles. Assuming significantly less fuel consumption while drilling as compared to steaming, the ship could remain at sea on site or in a region for long periods of time, thus reducing both fuel and salary costs (certain kinds of people would be on board only when needed), and increasing the proportion of drilling time. Real costs of transfers of equipment or people at sea were not known yet and some members question the degree to which this would be possible or desirable.

- The Explorer has the capacity for a very large on-board laboratory. Although during the OMD discussions, planning evolved from including a full suite of facilities and equipment on board ship to a more limited facility and the creation of on-shore research centers, many possibilities exist.

E. Winterer will represent the JOIDES Planning Committee on an Interface Working Group comprising Lockheed, NSF, and JOI people which will coordinate the scientific planning with development of an Explorer design. The Working Group will meet later in December at a Lockheed facility in San Jose, California.

200 DEEP SEA DRILLING PROJECT REPORT

M. Peterson reported for the Deep Sea Drilling Project.

I. RECENT DRILLING RESULTS

A. Leg 81 - Rockall Bank

The Leg 81 shipboard team drilled four sites (552-554) and identified three structural units of the western Rockall margin: outer high, zone of divergent dipping reflectors and an elevated crust. Drilling at Site 554 penetrated basalt flows interbedded with sediments, which the shipboard party believe to represent the sea-ward dipping reflectors seen on profiler records of the area. The cruise was very successful.

B. Leg 82 - Hayes Fracture Zone Region (Mantle Heterogeneity)

The Leg 82 shipboard team drilled nine sites (556-564) -- more than originally planned owing to an extension of the cruise to coordinate with the planned congressional visit to Challenger in the Virgin Islands.[1] Drilling here was also extremely successful, but demonstrated that the problem -- differences in the chemistry of crustal rocks -- was very complicated, and not one of simply delineating large areas of "mantle types." Vertical variations in the degree to which basalts are depleted or undepleted in key trace elements indicate complexity of both processes of magma evolution and of patterns of mantle heterogeneity. The Leg 82 drilling allows us much greater precision in defining the vertical and horizontal distribution of crustal rock types.

C. Leg 83 - Costa Rica Rift

Leg 83 drilling (underway at the time of the meeting) will extend Hole 504B as deep into the oceanic crust as possible. The hole had been re-entered and drilling has penetrated below the flow-basalt layer well into a sequence of dikes.

A potentially serious problem which developed during the EXCOM meeting -- loss of several hundred meters of drill pipe into the hole -- was resolved the following day when drillers were able to retrieve the pipe. The hole was successfully re-entered and drilling continued.

II. FY 1982 BUDGET CONCERNS

DSDP's FY 1982 budget has been cut by $1.2 million to $21 million. The Project is attempting to make budget adjustments without cutting so deeply as to impair its ability to recover to full operational capabilities. Logging, production of cruise reports, and developmental engineering

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[1] NSF subsequently cancelled the visit.

are likely to be hurt by the cuts.

A. Logging

DSDP is making every attempt to keep the logging program together as prioritized by the Planning Committee. Leg 84 (Guatemala Active Margin) will be logged at a cost of about $150 thousand. DSDP has taken funds from development engineering to ensure this. The U.S. Geological Survey, owing to its interest in gas hydrate zones, may agree to pay for the Leg 84 logging. In this case, DSDP would want to put funds immediately back into the development engineering.

Leg 87 (Japan Active Margin) logging would cost about $300 thousand -- a higher cost owing to mobilization and demobilization costs.

B. Publications

Although the Government Printing Office is funded to publish only four Initial Report volumes this fiscal year, DSDP will maintain production efforts in order to expedite volume publication at such time as funds do become available.

The Project will discontinue production and distribution of the Initial Core Descriptions after the Leg 75 issue -- a savings of about $15 thousand per year. It has determined that scientists requesting samples generally use documents other than the ICDs and DSDP is investigating other ways to dessiminate drilling information. One possibility is to use microfilmed the Hole Summaries (the Hole Summaries are prepared onboard ship and are fairly comprehensive, though preliminary reports. They are at present distributed only to the shipboard party and other contributors to the Initial Reports. (See also PCOM Item 348-II, November 1981, for a more detailed discussion of the DSDP budget cut and response.)

III. ENGINEERING DEVELOPMENTS

DSDP is moving ahead with development of the extended core barrel. It plans to test the tool during Leg 84 or possibly Leg 85.

The Project has modified the hydraulic piston corer to accept a heat probe designed by R. von Herzen (WHOI). The tool will be tested during Leg 84.[1]

The wire-line re-entry system may be tested during Leg 88.

The project has been conducting a series of drill-string motion studies, the results of which are not yet available. In conjunction with this and studies to extend the lengths of the string Reynolds Aluminum has discovered a tendency toward spalling in the middle of the drill string. Studies are continuing.

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[1] Subsequently postponed until Leg 86.

IV. SPECIAL PROBLEM - AD VALOREM TAX

Unless the ad valorem tax is waived per interpretation of current legislation or special legislation is enacted to exclude scientific ocean drilling program, DSDP will be assessed taxes amounting to several hundred thousand dollars when Challenger returns to a U.S. port (scheduled Honolulu stop and drydock in Japan). The Project has prepared a brief, setting forth arguments for special legislation. A Shinn noted that the best way would be to find a means to waive the tax within the current policy. Congress would be less likely to pass a bill setting up new precedent which could result in loss of dollars.

201 PLANNING COMMITTEE REPORT

E. Winterer reported on items from the recent Planning Committee meeting held 11-13 November 1981.

I. MEMBERSHIP CHANGES

Because few panels have met since the July 1981 Planning Committee meeting, most membership items are simply announcements of changes in institutional non-U.S. delegates.

Planning Committee Jose Honnorez will replace Wolfgang Schlager as the University of Miami's PCOM representative beginning with the February Planning Committee meeting. W. Schlager will replace J. Honnorez as alternate.

James Kennett has replaced Ted Moore as University of Rhode Island's representative to the Planning Committee. (Moore has left URI to take a position with Exxon in Houston.)

Passive Margin Panel David Roberts has taken a position with British Petroleum, but will continue to chair the Passive Margin Panel. British Petroleum encourages his participation and Roberts sees no problems in finding the time necessary to carry on his duties as panel chairman (per telephone conversation between Roberts and Winterer).

Ocean Paleoenvironment Panel Robert Kidd (Institute of Oceanographic Sciences) will replace Hugh Jenkyns on the Ocean Paleoenvironment Panel (representing the United Kingdom). The Planning Committee agreed to Ted Moore's replacing James Kennett.

Inorganic Geochemistry Panel Michel Hoffert (Université de Louis Pasteur) will replace Yves Tardy on the Inorganic Geochemistry Panel.

Organic Geochemistry Panel Simon Brassel will replace Geoffrey Eglinton on the Organic Geochemistry (representing the United Kingdom).

Site Survey Panel Vincent Renard (C.O.B. Brest) is the French member of the Site Survey Panel. (Earlier JOIDES Journals have listed Roland Schlich as the French representative.)

Hydrogeology Working Group L. Montadert suggested that J. P. Fuchert (C.O.B. Brest) be added to the Hydrogeology Working Group. The Planning Committee saw no objection to this.

The Planning Committee also disbanded the Hydraulic Piston Coring Working Group noting that group had accomplished its goals.

The Executive Committee agreed to all membership changes recommended by the Planning Committee.

II. PLANNED PACIFIC DRILLING (FY 1982-83)

A. Leg 83 - (Costa Rica Rift)

The PCOM planned drilling to deepen Hole 504B (begun during Leg 69) as far as possible into the oceanic crust and to conduct a series of special downhole experiments.

R/V R. Conrad, currently in the shipyard undergoing a mid-life refitting, was not available as planned to assist in the oblique seismic experiment; thus that experiment will not be conducted during Leg 83. The cruise will be shortened by ±5 days, which will recover the time added to Leg 82 (to accommodate the then-planned Congressional visit).

The PCOM approved a contingency plan, should a serious problem arises in deepening 504B, to drill a cluster of shallow single-bit holes on a grid spacing on the scale of 100 meters to develop a three-dimensional view of the hydrothermal circulation in the area.

At the time of the current Executive Committee meeting, drilling was progressing well into Hole 504B. (See also DSDP report, Item 200-I-C, above.)

Leg 83 co-chief scientists are Roger Anderson and Jose Honnorez.

B. Leg 84 - (Middle-American Trench)

Leg 84 will revisit the margin off Guatemala to study its tectonic history and test model's accretionary development. The accretionary hypotheses, in its most simple form, does not apply here and the margin instead had a complex history of development, with episodes of both accretion and non-accretion.

The shipboard team will also devote a hole specifically to the study of gas hydrates. Data concerning the distribution, and facies preferences of the hydrates is particularly useful to the U.S. Geological Survey engaged in study of offshore U.S. sequences in which the hydrates are present. For this reason, the Survey may be able to allocate money to log the Leg 84 holes.

Earlier drilling in the area during Leg 67 terminated before objectives were reached owing to the safety hazard introduced by the hydrates. More recently, site planners obtained excellent reprocessed multichannel seismic records and temperature data, which allow us to extrapolate the

base of the hydrate stability zone into regions where the hydrates are not visible on the profiler record The Safety Panel now approves drilling to depths 100 meters above the extrapolated base of the gas-hydrate stability zone -- allowing penetration to deeper targets to test the tectonic history of the margin and study the hydrates in greater detail.

Co-chief scientists are Jean Aubouin and R. von Huene.

C. Leg 85 - (Equatorial Pacific)

The Leg 85 team will drill in the equatorial Pacific to collect a detailed record of Tertiary oceanographic events. Traversing east to west across the Pacific, and relying heavily on the hydraulic piston corer to collect undisturbed sediment sequences, the shipboard team will attempt to study details of the Neogene ocean climatic system: changes in circulation, fertility, and temperatures. Proponents hope to increase greatly the resolution of climatic events -- tune the Milankovitch clock -- to resolve events to within 20,000 to 100,000 years. The participants will also study the history of the Eocene/Oligocene transition in great detail.

Although the PCOM did not recommend specific Leg 85 co-cheif scientists, the the Ocean Paleoenvironment Panel at its December meeting recommended that Fritz Theyer and Larry Mayer be invited to serve. (Both subsequently have accepted the invitation.)

D. Leg 86 - (Northwest Pacific)

The Ocean Paleoenvironment Panel is at present narrowing site selections and defining the drilling program for the northwest Pacific leg. (The Panel met just immediately preceding the EXCOM meeting). The drilling will probably include a site (NW-9) in the North Pacific to study the Cenozoic history of eolian and chemical red-clay sedimentation.

The PCOM recommended that Ross Heath be invited to serve as a Leg 86 co-chief scientist; he subsequently accepted the invitation.

E. Leg 87 - (Offshore Japan)

The PCOM accepted DSDP's recommendation that Leg 87 comprise two short legs (a) the Japan Trench, (b) the Nankai Trough. Shipboard scientists could be exchanged mid-leg in Yokohama with but little loss of time. This would allow for increased participation of scientists interested in drilling this active margin. The cruise will be greatly enhanced by the several excellent multi-channel records provided by JAPEX that clearly show imbricate thrust faults in the accreting wedge above the subduction zone.

The PCOM recommended that the co-chief scientists serve for the entire leg and that H. Kagami be invited to serve as a Leg 87 co-chief scientist.

F. Leg 88 - DARPA Seismic Experiment

Winterer reported that the Executive Committee was helpful in encouraging DARPA to provide an adequate site survey over the proposed site. DARPA has selected the site on the basis of computer analysis of

various seismic data, but could move it almost anywhere within a 1° radius around the nominal site. The (U.S.) Navy vessel Silas Bent has surveyed the region, although it missed the location proposed by DARPA by 13 miles. The PCOM recommended that the site be located on a known seismic line (e.g., move it to the Silas Bent line.)

The Ocean Paleoenvironment Panel later noted that a site in the DARPA area is too far east to fit into their northwest Pacific transect and so they have no specific recommendations as to its precise location.

Discussion

N. Bogdanov expressed concern over the site-selection process noting that he only recently had learned of the site's location and that Soviet scientists, who have considerable data from the area, were not directly consulted. Inasmuch as the site appears to be located so as best to monitor Soviet nuclear tests, in addition to natural seismic events, he found its selection difficult to justify to his government on a purely scientific basis.

The Executive Committee discussed the problem at length expressing a sympathetic view toward the Soviet position, but also noting that the DARPA experiment had been discussed for a year and a half at meetings to which the Soviets were invited. Members agreed that the DARPA seismic experiment is a unique case -- the planning of which has developed differently from that of other legs. The Downhole Measurements Panel, Planning Committee and members of the Executive Committee, however, have supported the experiments solely for scientific reasons. The JOIDES community saw this as a unique opportunity to collect valuable data from a very sophisticated downhole instrument in an experiment that would otherwise be impossible to organize and fund.

Consensus

The Executive Committee was sympathetic to the Soviet position with regard to the selection of the DARPA site.

In accordance, A. Laughton moved (seconded by A. Maxwell) that the Executive Committee instruct the Planning Committee to carry out more detailed discussions with Japanese, Soviet, and DARPA scientists regarding optimizing the choice of a site for the Leg 88 DARPA hole, bearing in mind the scientific objectives, and that this be done prior to 15 February 1982 or as soon thereafter as is feasible.

Vote: 11 for, 0 against, 0 abstain. The motion passed unanimously.

ACTION/ WINTERER — E. Winterer agreed to investigate a means to organize a meeting among appropriate Japanese, Soviet, and DARPA seismologists.

G. Leg 89 - (Old Pacific)

Leg 89 is planned to sample Jurassic sedimentary rocks -- thought to be the oldest in the Pacific -- at a site east of Guam and west of the Marshall Islands. The Hawaii Institute of Geophysics recently obtained

high-quality dual-channel digital reflection profiler records and proponents believe they have identified a "window" -- the Cretaceous mid-plate basaltic sills that blanket so much of the western Pacific. Despite 6000-m deep water and a sediment sequence 1200 m thick, DSDP engineers state that the objectives are within the limits of Challenger capabilities.

The PCOM suggested several possible co-chief scientists for the cruise, but made no specific recommendations, pending views from the Ocean Paleoenvironment Panel.

H. Leg 90 - (Southwest Pacific)

The PCOM recommended that James Kennett (URI) be invited to serve as co-chief scientist on Leg 90, a cruise planned to address questions about Cenozoic environments -- ocean circulation, climates along a north-south transect in the Southwest Pacific.

I. Leg 91 - (Hydrogeology)

Leg 91 will test models of hydrothermal circulation and rock alteration along a transect on the west flank of the East Pacific Rise at about 15° S latitude. The PCOM has recommended that Margaret Leinen be invited to serve as a co-chief scientist on Leg 91.

J. Schedule Shift

The Planning Committee agreed to DSDP's plan to shift Legs 86, 87, and 88 to address Northwest Pacific paleoenvironments, the Japan Trench, and DARPA drilling, respectively (see also November 1981 PCOM Item 350-V).

III. ATLANTIC (CARIBBEAN DRILLING - FY 1982-83)

Drilling on the Mississippi Fan is scheduled for Leg 92. Proponents require site surveys here both to optimize site locations and to ensure approval of drilling from the U.S. Department of the Interior. The PCOM has recommended that Arnold Bouma be invited to serve as a cruise co-chief scientist.

The Passive Margin Panel has given high priority to drilling a deep stratigraphic test hole off New Jersey (ENA-3), currently scheduled for Leg 93. Although the PCOM suggested several possible co-chief scientists for the cruise, it did not make specific recommendations.

Leg 94 is planned to study paleoenvironments and address problems relative to passive margins in the northeast Atlantic. Leg 94 work will add to understanding global Cenozoic climates. The PCOM recommended that W. Ruddiman (L-DGO) be invited to serve as a Leg 94 co-chief scientist.

The Planning Committee considered three alternative objectives for Leg 95 — the last scheduled during the FY 1982-83 program.

- Paleoenvironments of the NW African Margin
- Transect offshore New Jersey to test the Vail sea-level curve

- Caribbean drilling to address many remaining objectives and to resolve problems arising from previous drilling.

As very long-term planning for scientific ocean drilling comes into better focus, the PCOM will be able to make more detailed plans for the later 1983 drilling.

202 LONG-TERM PLANNING

I. POST-1983 DRILLING PROPOSAL

E. Winterer reported on the status of the post-1983 drilling proposal. The Executive Committee had approved a general outline at the last (August 1981) Executive Committee meeting. The PCOM approved the draft proposal in general terms during its recent (November 1981). At the present meeting, Winterer distributed copies of (a) the draft proposal (compiled from white papers submitted by various JOIDES panels), (b) supplement No. 1 (which takes into account recent events bearing on the proposal), and (c) summary outlining major goals and experimental strategies. (A revised outline, supplement No. 1, and the summary appears as Appendix 1, herein.)

In view of the strong recommendation from COSOD for a long-term program, but in keeping with a credible operational life of Challenger, Winterer, with the help of the PCOM writing committee, expanded the period of operations to eight years. This will also provide a reasonable basis for comparing science attainable and relative costs of the Challenger vs. Explorer.

Although not making substantive changes in the proposal since the November Planning Committee meeting, Winterer has somewhat altered the emphasis on the basis of COSOD conclusions.

In developing the proposal, Winterer

- conceived a global program tracking westward around the world following the seasons. Much of the drilling could be fairly near the continents.

- constructed an 8-year program. The 5-year program discussed by the Planning Committee allowed barely enough time to address major goals and tended to "pull the ship about too much." An 8-year program still cannot attack all the problems defined in the Panel white papers and at COSOD but seems a reasonable period in terms of planning and ship's life.

- scheduled the ship into high latitudes, recognizing that scientific targets need to be addressed there, but that insurance rates for Challenger would be very high and that Challenger's hull probably could not be modified to highest ice standards. (See item IV, below, for discussion.)

- emphasized crustal drilling, especially geology and hydrothermal circulation at rapidly spreading centers. (This is a major objective of

COSOD.)

- included drilling in the Red Sea, although the Red Sea was not specifically targeted by JOIDES panels.

- decided to structure 8-week legs. Although a somewhat artificial mode, it conveniently allows for 51 operational legs plus a 2-month period in which to modify Challenger.

- allowed ample time to plan and support site-survey and related scientific and technical experiments.

- designed the itinerary such that time is built in to develop technology with which to return to previously drilled sites.

II. OMD-SCIENTIFIC ADVISORY COMMITTEE

In conjunction with long-term planning, A. Maxwell reported on the OMD Scientific Advisory Committee efforts. He noted that the basic nature of the OMDP required very long periods on station and involved different interests, thus the planning had proceeded differently from that of JOIDES. Specific targets identified very early allowed extensive study of the regions, resulting in review and integration of extensive data from numerous sources. The syntheses will serve as extremely useful documents. In addition, Maxwell urged planners to adopt the OMD planning philosophy — that of targeting objectives and planning pre-drilling activities to ensure adequate regional study and scientific study in support of the drilling. He also noted that if Explorer is used for continued scientific drilling, the mode of planning and operations would perhaps be somewhere between the JOIDES and OMD approaches. Maxwell also urges the community to consider planning for a 10-year program.

A. Maxwell also noted that he has distributed (by mail) an Ocean Margin Drilling Program Review. (Additional copies are available from JOI, Inc.)

III. CONFERENCE ON SCIENTIFIC OCEAN DRILLING

Robert Coleman, a member of the COSOD Steering Committee, reported on the results of the recent Conference on Scientific Ocean Drilling, held 16-18 November 1981 in Austin, Texas. (See also letter of 24 November 1981 from Larson to Nierenberg which summarizes the results of the conference, Appendix 2.)

Working Group chairman presented summaries of key items from the white papers during the first day, plus special papers from NSF, OMD, and JOIDES people. The conference convened into working groups the second day for open discussion between working group members and other conference attendees. On the third day the working group chairmen identified priorities within their topic categories and the Steering Committee also made several general recommendations.

The five topically oriented working groups identified their top priorities as follows.

1. Origin and evolution of ocean crust

- Processes of magma generation and crustal construction at mid-ocean ridges
- Configuration, chemistry and dynamics of hydrothermal systems

Marine geologists clearly need the capability to spud into areas of thin sediment cover needed to address problems of the oceanic crust. The groups agreed informally that much could be done on ocean crust targets with Challenger drilling.

2. Origin and evolution of marine sedimentary sequences

- Response of marine sedimentation to fluctuations in sea level
- Sedimentation in oxygen-deficient oceans
- Global mass balancing of sediments (continued HPC coring could resolve many of these questions).

3. Tectonic evolution of continental margins and oceanic crust

- Early rifting history of passive continental margins
- Dynamics of fore-arc evolution
- Fore-arc to back-arc structure and magmatic history

Very deep drilling is required to unravel the early rifting history of passive margins.

4. Causes of long-term changes in the atmosphere, oceans, cryosphere, biosphere, and magnetic field

- Ocean circulation history
- Response of the atmosphere and oceans to orbital variations
- History of the earth's magnetic field
- Processes and mechanisms of evolution in marine organisms

5. Tools, techniques and associated studies

The conference attendees discussed primarily the relative features, advantages and disadvantages of Challenger and Explorer for riserless drilling.

Attendees agreed that excellent science could be obtained using Glomar Challenger, but its consensus was that the Explorer was the preferred platform.

Advantages to Explorer

a. Longer operational life - Explorer = 20 years versus 10 years for Challenger.

b. Future capability to conduct riser and well-control drilling.

c. More laboratory and living space enables participation of a larger scientific party.

d. Explorer could operate in higher sea states, increasing the operational "weather window."

e. Explorer could be ice-strengthened to class 1A standards for high latitude work.

f. Drilling Operational costs are only 20 per cent above Challenger costs (NSF estimates).

Disadvantages to Explorer

a. Explorer cannot pass through the Panama Canal and can pass through the Suez Canal only as one-way traffic.

b. Few ports and drydocking facilities can accommodate Explorer.

c. Conversion and operating costs would be substantial.

Coleman also relayed several general recommendations made by the Steering Committee.

a. A world-wide program of long-term drilling is an essential component of research in the earth sciences. The programs described here will require at least a decade to complete and will require drilling in the Atlantic, Pacific, Indian and polar oceans.

b. Future drilling must be part of a larger scientific program that includes adequate support for planning, site surveying, geophysical experimentation, and sample analysis. Longer lead times are required for predrilling activities and more financial support is required for post drilling scientific analysis.

c. The integration of continental geology and marine geology should progress through scientific drilling programs. The oceans are the modern laboratories in which we can observe geologic processes that have occurred over the past 200 x 10^6 years. Understanding these processes is one of the keys to understanding ancient continental geology.

d. International cooperation should continue and expand. The international research programs that have centered on Glomar Challenger drilling have been essential to the success of the program. This international cooperation should be expanded especially if the Glomar Explorer is utilized in the future. The JOIDES/IPOD structure appears to be a good organizational framework for future drilling programs.

Coleman indicated that the complete COSOD report should be available in January or February of 1982.

ACTION/ NIERENBERG

W. Nierenberg thanked Robert Coleman for his report. The Executive Committee also commended R. Larson for his efforts to produce excellent conference, and asked its chairman to write to Larson expressing its appreciation and congratulations.

IV. CONSENSUS

The Executive Committee extensively discussed future

planning, reviewing scientific philosophy, drilling strategy, relative merits of the two platforms, and desirable time frames. Following discussion, the Executive Committee instructed Winterer to move ahead with development of an 8-year proposal. (Winterer already has a 5-year proposal in hand.) He will add a section comparing scientific programs and model drilling plans using Challenger and Explorer and revise the proposal so that it is platform-free. The EXCOM recognizes that such a proposal will serve as a planning document and could be translated into a program using Explorer, should that prove economically feasible and desirable.

The EXCOM urges the PCOM to thoroughly review the document and asked that the later draft be mailed to both PCOM and EXCOM members.

A. Shinn (NSF) told the committee that the complete "telephone book" proposal need not reach NSF until late spring; NSF is prepared to move very quickly on the proposal once the decision regarding platform is made.

The Committee, nonetheless thought it prudent to submit the scientific narrative of an 8-year program to NSF by late December or early January to provide a planning document and ensure that a proposal is in hand.

Members also suggested that planners begin thinking in terms of a 10-year program.

203 PARTICIPATION IN JOIDES/IPOD

I. MEMBER-COUNTRY REPORTS

W. Nierenberg asked the representatives of member countries to comment on their respective countries' positions.[1]

A. France

G. Picketty commented that the French view the drilling as a permanent tool and well understand the need for a long-term program. Making a financial commitment for such a period, however, is more difficult. The French would want to review any financial commitment for the entire period and have good estimates of the amounts involved at the onset. It might be more difficult to justify the increased costs for using Explorer in a riserless mode, that is to do work which could be accomplished with a smaller, less expensive vessel.

EXCOM members noted that both inflation and relative rates of exchange greatly influence costs of any program over the long term and such differentials are impossible to extrapolate periods of longer than two to three years in the future. Some formula of escalation or otherwise dividing costs is perhaps possible, but not simple.

A. Shinn (NSF) will explore solutions to the problem.

[1] Some comments paraphrased from general discussion.

B. West Germany

H. Durbaum reported that he sees no problems with West Germany's joining JOIDES for the 1982-83 period. The Ministry of Research and Technology supports participation and the proposed leg off North Africa is of great interest to several German scientists.

Participation beyond 1983 is less well defined and high budget cuts will result in a serious review of future participation. The Germans are watching the results of COSOD, and what emerges will influence future German planning.

The Geocommission of Germany[1] is preparing a scientific plan for the period between 1983 and 1986; such a plan must focus on new scientific goals to gain acceptance. The Geocommission will meet toward the end of February 1982 and a more clear view of future commitment will probably emerge.

C. United Kingdom

A. Laughton reported that the U.K. clearly intends to continue in the program through 1983. Following some difficulty and delicate negotiations a draft memorandum of understanding for the 1982-83 program is now in hand. (A. Shinn will visit the U.K. in January to complete the negotiations.) The U.K.'s participation, however, is contingent upon a (at least) 2-year program. The U.K. would have great difficulty in contributing funds were the program to be shortened to a single year.

U.K. participation after 1983 is not so clear. No firm view yet exists on choice of drilling platform -- Challenger or Explorer and clearly the cost of the program will determine whether or not the U.K. joins. It would be very wary of putting money into the Explorer as an U.S. asset and any negotiated agreement would have to assure that the U.K. did not subsidize the U.S. government or industry. The scientific community would welcome a long-term plan, but a long-term (10-year) financial commitment would be very difficult at this time. The mechanism exists to make such a commitment so it technically possible, but very unlikely.

D. U.S.S.R.

N. Bogdanov reported that the Soviet scientific community strongly supports the drilling program and continued participation in it. Problems remain, however, which are mostly related to the proposed DARPA drilling (discussed above). The new memorandum of understanding encompasses a two year program. (A. Shinn will go to the U.S.S.R. in January to complete the agreement.)[2]

The U.S.S.R. favors long-term planning, but it would be difficult to convince the government to agree to a 10-year commitment at this time --

[1] Comprises Federal and state governments and universities.
[2] The trip was subsequently postponed owing to the U.S.'s "postponement of The Sciences and Technology agreements with the U.S.S.R."

particularly if costs escalate every two years and additional dues are required. The drilling program has a great deal of support at the Academy of Sciences, but the U.S.S.R. does have other programs to fund.

II. POTENTIAL NEW MEMBER COUNTRIES

A. Australia

L. Frakes (Monash University) briefed the Executive Committee on the status of Australian participation. He noted that the consortium on Ocean Geoscientists began in 1975 with its objective to encourage Australian involvement in the marine sciences. The group has produced a publication (Consortium for Ocean Geosciences Publication No. 1, eds. P. J. Cook, K.A.W. Crook and L. A. Frakes, April 1981) outlining Australian interests. The report comprises three parts: Active Margins, Passive Margins, and Paleoenvironments. (Copies are available from P. J. Cook, Consortium for Ocean Geosciences of Australian Universities, c/o Research School of Earth Sciences, Australian National University, P. O. Box 4, Canberra, A.C.T. 2600, or in limited numbers from the JOIDES office.)

Although the Australians have not actively participated on Challenger since IPOD began in 1975, individual Australian scientists have maintained a keen awareness of the geologic problems they wish to see addressed by drilling and have support future involvement in JOIDES. The scientific community is unified in its support for membership. The next step is to secure industry support and cooperation of a government agency (probably the Bureau of Mineral Resources) to represent Australia. Marine science is a stated priority of the new Director of the BMR (Dr. R. Rutland) and he has succeeded recently in acquiring a $2 million budget for its support. Although that is generally good news, the marine geologists must recognize that the BMR has other priorities in marine sciences besides ocean drilling.

Australia is also conducting preliminary discussions with New Zealand concerning a joint membership in JOIDES. New Zealand has a ship available to conduct site surveys.

Next August (1982) COGS will request a charter budget from the BMR for a 5-year period. The Australians hope to continue their informal involvement in JOIDES/IPOD to keep abreast of organizational and planning efforts.

B. Other Potential Members

Canada and the Netherlands continue their interest in joining IPOD. Brian Bornhold attended the Planning Committee representing Canada, but niether Canadian nor Dutch representatives were able to attend the current Executive Commitee meeting.

III. REPORT FROM "GUIDELINES COMMITTEE"

A. Options

At its last meeting, the Executive Committee asked Allen Shinn, Jacques Debyser, Hans Durbaum, and Art Maxwell to form an ad hoc committee

to recommend guidelines for encouraging and accommodating increased membership in JOIDES.

The committee was unable to meet formally, but A. Maxwell, J. Debyser and A. Shinn discussed the matter during COSOD; A. Shinn and A. Maxwell also discussed the matter on various other occasions.

A. Shinn presented the report by the guideline sub-committee to the Executive Committee. (H. Durbaum having not participated in the discussions, and disagreeing with the suggestions set forth, asked his name not be attached to the document.) (Appendix 3) Shinn emphasized the importance of developing a mechanism to involve countries with lesser financial resources to benefit from their scientific contribution, and to gain political and monetary benefits. As international support for scientific ocean drilling programs increases, so will the support it receives within the U.S. government and funding agencies.

A. Maxwell noted that the committee was guided by certain principles in developing their suggested plan (Plan D defined below).

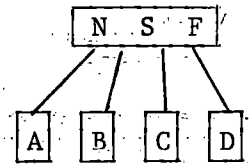
- JOIDES must keep all partners currently in JOIDES as full members at full cost.

- Nations with the financial resources and scientific competency could join only as full members.

- Interested nations with lesser resources would be invited to participate at cost levels they can afford.

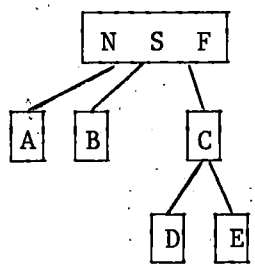
Shinn diagrammed four possible "scenarios" for membership.

Plan A



Plan A is the current situation in which NSF has a memorandum of understanding with each member nation and each nation is a full partner.

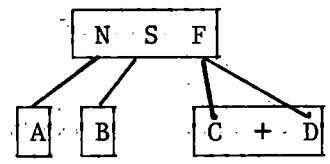
Plan B



In Plan B, NSF deals directly with countries A and B as full members. A

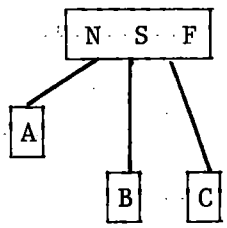
memorandum of understanding with partner "C", however, is with a consortium comprising more than one nation. Partner C acts as a holding company for members of its consortium. Although in this plan NSF would only deal with a single entity, it is concerned that the arrangement could lead to an uncontrolled situation involving numerous partners -- greatly increasing the complexity of participation.

Plan C



In Plan C, nations B and C form a consortium, but each country of the consortium B+C has an independent and direct relationship to NSF. A problem here is that if partner B defaults, partner A and NSF are left in an untenable position.

Plan D



In Plan D NSF makes separate agreements to each member country. Country A is a full member, for example, but countries B and C are admitted at lower cost and with reduced privileges. The relationship could be reasonably simple, i.e., defined as either full membership, 2/3 membership, or 1/3 membership. NSF and the ad hoc committee (except Durbaum) support Plan D. (In past discussions the EXCOM has also termed this "associate or partial membership".)

Possible examples of reduced privilege include participation at PCOM and EXCOM meetings, but no voting privilege and/or participation on board ship proportional to contribution.

B. Discussion

Members of the Executive Committee viewed the suggested plan with some reservation. (Historically the Committee has favored full membership in JOIDES, viewing consortia as a possibility, if necessary, and affiliate membership as less favorable.) Items from the discussion included:

- If some sort of membership involving reduced privileges and reduced

costs were allowed, some current non-U.S. members would have some difficulty in convincing their governments to pay full membership dues. H. Durbaum noted that the West Germans would find such an arrangement particularly difficult to support.

- JOIDES membership is predicated on the ability of member institutions to provide an adequate number of scientists, competent in the appropriate specialties of the earth sciences, to serve on advisory panels and as members of the shipboard scientific parties. A consortium could bring together certain strengths and provide depth to the organization, but JOIDES would not want simply to bring to the table numerous people without adequate substance.

- Certain forces exist within each member country between political and scientific interests. Plans C and D could create problems and a dilution of the scientific thrust as they could create too much leverage for special-interest groups.

- Any arrangement with reduced privilege would have to require relatively a large premium for a relatively small amount of privilege to motivate nations to continue full membership. All members must recognize that the purpose of JOIDES is to define scientific objectives and to give scientific advise to the contractors that actually carry out the work.

- In an affiliate membership, division of privilege could not be made on the basis of "voting rights" above. Simply participating on a committee ensures introduction of ideas; moreover, many decisions of advisory panels are made by consensus, and not by formal vote.

- One member suggested that perhaps an arrangement would be possible whereby nations could make smaller contributions for participation only in legs in certain areas. Some members noted that this comes dangerously close to "buying a leg," a policy which has been repeatedly rejected by JOIDES.

C. Consensus

The EXCOM agreed to encourage Canada and Australia to join as full members. A. Shinn, A. Durbaum, and J. Debyser will meet during early January (in conjunction with finalizing their respective memoranda of agreement) and will further discuss and develop a plan to increase JOIDES membership.

IV. UNIVERSITY OF TEXAS AT AUSTIN

The University of Texas at Austin (which currently is a member of the JOI Board of Governors) has re-applied for membership to JOIDES. (See letter of G. J. Fonken, Vice President for Academic Affairs and Research, the University of Texas at Austin, to W. Nierenberg, dated 28 August 1981, Appendix 4). R. Shipman noted that the University originally applied for membership at the time JOI was founded (1975), but was asked to await resolution of certain organizational problems. In view of potential expansion of JOIDES membership, the University of Texas reiterates its interest in becoming an equal partner in JOIDES.

ACTION/ NSF/JOIDES OFFICE

W. Nierenberg noted that the University of Texas membership had already been delayed much too long and recommended it be granted membership. Other members, however, considered possible difficulties in that such membership would increase the U.S. vote to two-thirds. Members were uncertain what the exact statement of the Appendix A in the Memorandum of Understanding between the U.S. and non-U.S. was and asked that this be resolved before the University of Texas be admitted. Should Texas be admitted a 2/3 majority could rest entirely within the U.S. membership.

Consensus

The Executive Committee thus postponed resolving the question of membership for the University of Texas at its next meeting to allow present members to review the benefits and ramifications of its membership. Members also asked that NSF prepare a statement indicating additional cost for additional U.S. members.

204 COOPERATION WITH THE SEABED WORKING GROUP

I. UPDATE

E. Winterer reported that Seabed Disposal group continues its interest in cooperate efforts with JOIDES. The PCOM had encouraged the proponents to submit scientific proposals to various JOIDES panels: i.e., the Sedimentary Petrology, Inorganic and Organic Geochemistry, Passive Margin and Ocean Paleoenvironment panels. Members of the group (Les Shepard) have now prepared a more concrete proposal focussing on scientific aspects of drilling in the Nares Abyssal Plain. Interests of the Seabed Working Group strongly overlap those of the JOIDES panels and there are some indications that the Working Group could contribute financially to the effort.

W. Nierenberg at an earlier meeting had also asked EXCOM members to be prepared to discuss the Seabed Working Group liaison as a policy matter.

II. DISCUSSION

G. Piketty: The French are greatly interested in addressing problems of nuclear waste disposal and would properly support a cooperative effort in the area where the scientific goals intersect.

H. Durbaum: The Germans would be somewhat hesitant to see JOIDES involved with deep-sea disposal of nuclear wastes. Such cooperation is difficult politically for West Germany to support as it is actively engaged in research concerning dry-rock waste disposal. In addition, such cooperation is very difficult to control and/or coodinate.

T. Laughton: We can support cooperation with the Seabed Working Group on the basis of learning about the long-term behavior of an area. Although that knowledge is applied to social questions, it is scientific questions which we address -- the same scientific questions we ask anyway.

But if indeed the science proposed could compete with other proposed

JOIDES science, then why would a financial commitment from the Seabed Working Group be necessary or even desirable?

In response, E. Winterer noted that a financial commitment would perhaps encourage JOIDES to conduct the science at a site of particular interest to the Seabed Working Group. A. Shinn also noted that NSF would not want to discourage new ideas and new sources of funds and NSF would find it difficult to support a laboratory (Sandia) with IPOD fund which it would be doing, if the working group did not contribute.

Consensus

The Executive Committee considers seriously matters of cooperating with special groups such as the Seabed Working Group. It recognizes problems in such arrangements: both political, philosophical and technical. It generally agrees that such arrangements should be treated on a case-by-case basis and evaluated on their scientific merits. The EXCOM does not rule out cooperative efforts between JOIDES and other groups to address objectives of mutual interest so long as such programs are made sufficiently early so that they may be handled through JOIDES panels and the PCOM in the usual manner.

205 "OWNERSHIP" OF DSDP-DRILLED HOLES

At its last meeting the Executive Committee had noted that with the realization of wire-line re-entry a question as to "ownership" of the DSDP-drilled hole might arise. J. Knauss prepared an excellent and well informed discussion paper (Appendix 5) regarding legal control and responsibility for the areas surrounding the holes but he was not present at the meeting. The EXCOM thus agreed to postpone further discussion on the subject until a later meeting at which he could be present.

206 LEG 77 - POTENTIAL SAFETY PROBLEM

In response to a query from A. Shinn, E. Winterer and M. Peterson reported that problems surrounding possible safety violations had been addressed and steps taken to "better tune" the system.

The main concern was that the Leg 77 shipboard party did not halt drilling at Site 535 after encountering hydrocarbons. Poor ship-to-shore communications compounded the problem. (Leg 77 safety concerns are also treated under PCOM Items 325-II, February 1981; 335-V, July 1981; 349-II-E, November 1981.)

Y. Lancelot has written to co-chief scientists of subsequent cruises clarifying and reinforcing safety procedures. DSDP is also taking steps to revise the shipboard handbook. DSDP and the Safety Panel, of course, recognize that not every possible set of circumstances can be addressed in any handbook.

The Planning Committee is satisfied that DSDP has taken steps to

tighten interpretation of the guidelines and improve ship-to-shore communications. The attention drawn to the situation has diminished the possibility of future problems.

207 FUTURE MEETINGS

The Executive Committee had tentatively planned to meet next during the week of 25 March 1982 at the Alton-Jones Center, University of Rhode Island. At the suggestion of Allen Shinn (NSF), the EXCOM agreed to hold its next regular meeting in May of 1982. At that time adequate substantive information will be available concerning costs of Explorer conversion and positions of current and potential non-U.S. JOIDES partners.

The Executive Committee will thus next meet

21-22 May 1982
Washington, D.C.
(JOI BOG will meet 20 May)

The EXCOM thanks John Knauss for his kind invitation to meet at URI, but in view of the other related meetings (IPOD) to be held in Washington, D.C., selected that site for the May meeting.

The EXCOM held open the possibility of convening a special meeting in the interim, should events so dictate. The Committee recognizes that nearly six months pass before its next meeting and that it will not have the opportunity to act immediately upon the Planning Committee recommendations (per February 1982 meeting). Consequently, each member is urged to communicate closely with his PCOM counterpart to ensure that the Planning and Executive Committees continue to coordinate their efforts.

The EXCOM's summer meeting will be

1-2 September 1982
Kyoto, Japan
Noriyuki Nasu -- Coordinator
(JOI BOG will meet 31 August 1982)

W. Nierenberg suggested members also hold 3 September 1982 open for a possible excursion.

208 CLOSING REMARKS

W. Nierenberg thanked the Executive Committee and guests for their attention and conscientious spirit of endeavor and the Joint Oceanographic Institutions, Inc. for hosting the excellent Chinese dinner at the Empress of China.

W. Nierenberg adjourned the meeting at 11:30, 3 December 1981.

November, 1981

PRELIMINARY DRAFT
Outlines of Post-1983 Drilling Proposal (5-year)

I. INTRODUCTION

II. SUMMARY (not yet written)

III. SCIENTIFIC OBJECTIVES AND PROPOSED DRILLING PROGRAM

A. Origin and Evolution of Oceanic Crust

1. Igneous history and structure of crust generated at ocean ridges
   - a. Igneous processes
   - b. Mantle hetrogeneity
   - c. Metamorphism
   - d. Seismic and magnetic structure
   - e. Proposed drilling program
2. Ocean Hydrothermal Systems
   - a. Introduction
   - b. Scope and strategy
   - c. Hydrologic systems to be tested
   - d. Drilling program
3. Igneous history of other oceanic provinces
   - a. Oceanic plateaus
   - b. Midplate volcanism
   - c. Convergent margins, forearc basins and volcanic arcs
   - d. Back-arc basins

B. Origin and Evolution of Marine Sedimentary Sequences

1. Sedimentation of pelagic and continental margin sequences
   - a. Gravity-controlled sedimentation
   - b. Ocean-current sedimentation
   - c. Anoxic sediments and mid-water O_2-minimum zone
   - d. Red clays
   - e. Facies
   - f. Hiatuses
   - g. Proposed drilling program
2. Post-depositional alteration of pelagic and continental margin sediments
   - a. Effects of burial and heat on mineralogy, organic geochemistry, physical properties and textures
   - b. Effects of burial, heat and advection on pore waters
   - c. Relations between diagenesis and seismic stratigraphy
   - d. Effects of tectonic overpressures

APPENDIX 1A

C. Tectonic Evolution of Ocean Crust and Continental Margins

1. Ocean crust

   a. Tectonic processes close to active spreading ridges
   b. Subsidence rates as a function of age
   c. Plate tectonic (kinematic) history of the world ocean basins
   d. Origin of depth anomalies
   e. Ocean crust near transform faults
   f. Tectonic processes leading to and accompanying back-arc basin spreading
   g. Tectonics of seamounts and seamount chains; subsidence rates; origin of guyots
   h. Tectonics of deep-water mid-plate volcanism; relation to eustatic sea-level changes

2. Passive continental margins

   a. Introduction
   b. Current (1979-81) and scheduled (1981-83) passive margin tectonic objectives
   c. Timing of rifting, continental breakup and the formation of the continent-ocean boundary
   d. Subsidence mechanism and history

3. Convergent margins

   a. Forearc tectonics
   b. Volcanic arc tectonics, arc geology and evolution
   c. Back-arc tectonics
   d. Drilling program

4. Margins dominated by transform faults

5. Complex marginal seas

D. Causes of Long-Term Changes in the Oceans, Atmospheres, Cryosphere and Biosphere

1. Paleoceanography and paleoclimatology

   a. Oceanic states, changes and events
   b. Gateways and oceanic circulation

2. Biogeography and mode and tempo of biotic evolution

3. Additional objectives and special projects

4. Target areas for shallow (HPC) coring

5. Areas for deep drilling

IV. DOWNHOLE MEASUREMENTS AND EXPERIMENTS

A. Downhole Logging

B. Downhole Experiments

C. Downhole Recording

V. NEW DRILLING CAPABILITIES ..... (DSDP writes)

VI. REFURBISHING AND IMPROVING THE DRILLING PLATFORM ..... (DSDP writes)

VII. MODEL DRILLING PLAN

November 25, 1981

SUPPLEMENT No. 1
Post-1983 Drilling Proposal

The rush of events during the autumn of 1981 has greatly changed the situation for scientific ocean drilling, and to avoid this proposal being perceived as overcome by these events, we set out here the relation of this proposal to the new situation created by the demise of the Ocean Margin Drilling (OMD) Program and by the results of the Conference on Scientific Ocean Drilling (COSOD). The major effects of these events are that: 1) the community is unanimous in support of a very long-term ocean drilling program, 2) OMD scientific goals may be jeopardized and 3) the possibility is opened to use Glomar Explorer for JOIDES drilling.

The COSOD meeting reached unanimity that the marine earth science community has a long-term need for access to levels deep beneath the sea bed for purposes of sampling and making measurements, and that this in turn demands a long-term drilling program. The technology required and available will change, but the scientific need will remain. This present proposal is for a period of 8 years (from 1983-1991), which is a term still shorter than the time it takes to accomplish the high priority scientific objectives set forth in the JOIDES Advisory Panel White Papers, but which is a term credibly within the life expectancy of a refurbished Glomar Challenger.

The scientific goals of the OMD program were not different from the JOIDES programs, as embodied in the recommendations ("White Papers") of the JOIDES Advisory Panels. The difference in the programs (aside from the mechanics of funding) was in the technology available to carry them out: OMD was to use Glomar Explorer, complete with a riser and blowout-prevention system, while JOIDES was using Glomar Challenger, without a riser. Thus certain shared goals were technically achievable only with Explorer, while

APPENDIX 1B

others could be achieved with either vessel. Because of the large amounts of time needed for most of the individual drill holes, the OMD program limited itself to a much smaller set of drill targets than JOIDES, and focussed mainly on thickly sedimented passive margins off the U.S. Eastern and Gulf coasts.

In this proposal we try to incorporate as many of the scientific objectives of the OMD program as are technically feasible from Glomar Challenger. We believe, for example, that at least some of the early history of the North Atlantic and Gulf coast passive margins can be reached by drilling where the sedimentary cover is thin by reason of slow accumulation rates or by erosion. The successes of Leg 77 in the Gulf of Mexico demonstrate that deep levels can be sampled and a nearly complete composite stratigraphic column assembled by drilling sequences of carefully sited holes. Is the ocean crust, we aim for thorough explanation of Layer 2 rather than several deep penetrations into Layer 3 as envisioned in OMD. On the other hand, we do not see that the limits on penetration for Challenger are any less than for Explorer in riserless crustal drilling (at least to depths of 7 or 8 km beneath the drill ship), and we hold out the possibility of sampling Layer 3 at some time during the proposed Challenger program, at a site where drilling conditions happen to be favorable. The high-latitude drilling proposed in OMD consisted of one 2-month leg in the region of the Weddell Sea, and this is not feasible from Challenger unless we pay a higher insurance premium and have favorable ice conditions. We have operated Challenger successfully next to Antarctic during Legs 28 and 35.

The cancellation of OMD means that Glomar Explorer can be considered as an alternate to Challenger as a platform for the work set out in this JOIDES proposal, and indeed this alternative was much discussed at COSOD. The choice of platform(s) is a complex issue, and requires knowledge of the technical capacities and life expectancies of each of the two vessels and their drilling systems in light of the scientific goals and priorities of the drilling program, and an estimate of the conversion and operating costs for each vessel. Based on more than a dozen years of operating experience we can make reliable assessments of capabilities and costs for Challenger, but we do not yet have sufficient data to make comparable assessments for Explorer. Engineering studies now in progress suggest that these data for Explorer should become available within the next six months, and we will be ready with a revised proposal for use of Explorer if these studies show that this is the more appropriate platform for a long-range program.

The most likely differences in the scientific program that we would propose for Explorer, as compared to what we propose herein for Challenger are:

1) greater emphasis on very high latitude work,
2) deeper penetration into soft sediments or crustal rocks that require casing to ensure hole stability,
3) deeper penetration into older (>50 m.y.) oceanic crust, where the water depth exceeds 5000 meters,
4) drilling of trench sediments and the toe of the inner trench wall in great water depths.

II. SUMMARY

We propose a long-term (8 years) program of scientific ocean drilling as an essential and integral part of basic research programs at the forefront of marine geology, geochemistry and geophysics. The approach is multidisciplinary, the participation is international, and the reach is global.

The scientific objectives are grouped under the following titles:

(A) Origin and Evolution of Oceanic Crust

(B) Origin and Evolution of Marine Sedimentary Sequences

(C) Tectonic Evolution of Ocean Crust and Continental Margins

(D) Causes of Long-Term Changes in the Oceans, Atmosphere, Cryosphere and Biosphere

Major goals and experimental strategies for each of these are given below.

A. Origin and Evolution of Ocean Crust

- To elucidate the mechanics of the processes that build the volcanic pile that forms the upper part of the ocean crust, in order to understand the mechanics of the eruptive processes. The pile comprises overlapping flows erupted from vertical fissures in the narrow zone where lithospheric plates spread apart.
- To study the systems of water circulation in the crust that give rise to hot (350°C) springs at the spreading centers, that form ore deposits of iron, copper and zinc sulfides at the sea floor, that cool and chemically alter the crustal rocks, and that, by exchange reactions with crustal rocks, help control the composition of seawater itself.

- To learn the nature of the lower part of seismic Layer 2 and the uppermost part of Layer 3, in order to test the widely held view that these consist of sheeted dikes of diabase overlying gabbro, as known from ophiolite sequences exposed in mountain belts.

The strategy is to drill clusters of holes on very young rifted and unrifted crust, and on older crust, with the holes spaced only hundreds of meters apart, in order to obtain a three-dimensionsl picture. Each cluster of holes constitutes a natural laboratory from which we can extract samples of fluids and rocks and in which we can emplace instruemnts for measurement of in situ conditions over long terms of time.

To locate drill sites properly require extensive surveys, probably including observations from manned submersibles. Drilling at sites very close to the active spreading centers (except in special places where rapid sedimentation blankets even crust of zero age) requires development of a bare-rock spud-in capability.

B. Origin and Evolution of Marine Sedimentary Sequences

- To understand the three-dimensional anatomy and sedimentation history of
  - gravity-driven sedimentation systems, including submarine slides, debris flows and deep-sea fans
  - deep ocean-current sedimentation systems, including contourite drifts and mudwaves
- To examine the imprint of mid-water open-ocean oxygen-minimum zones on continental slope sediments

- To learn the nature of the processes of formation of hiatuses in marine -- especially in deep-sea -- sediments, and the relation of these processes to sea level changes.

The strategy is to drill networks or traverses of closely-spaced holes, at the scale of the horizontal variability of the sedimentary systems under study. The hydraulic piston corer is the main tool required. Site surveys require very closely spaced high-resolution seismic lines, and detailed bathymetric control, either from deep-towed instruments or from surface swath-mapping.

C. Tectonic Evolution of Ocean Crust and Continental Margins

- To study tectonic processes close to the active spreading ridges using long-term borehole seismometers implanted by the drill ship.
- To establish the crustal age patterns and latitudinal motion history of crust crucial for completing a global kinematic history of lithospheric plate movements. These regions include the southwest Indian Ocean, the South Pacific, and the Cretaceous Magnetic Quiet zone in most major ocean basins.
- To learn the nature and process of formation of the mysterious (and as yet unsampled) seaward-dipping reflectors seen beneath the sedimentary section in seismic reflection records along many passive continental margins, and which may reveal important information on early rifting processes, especially on margins where listic faulting is unimportant.

- To test models of rifting and continental breakup, and of later "drift-stage" subsidence by examining the very early history of subsidence along transects across selected passive margins.

The strategy for this passive margin work will be to drill (a) "starved" mature margins, where sedimentation rates have been so slow that the early history is within the reach of the drill, (b) eroded mature margins, (e.g., in submarine conyons), (c) immature margins.

- To test models of convergent-margin forearc tectonic processes: accretion, erosion and subduction bypassing by examining, in a number of contrasting convergent margins
  - the distribution and history of horizontal and vertical displacements across the forearc
  - the pore-fluid pressures, strain patterns and lithification processes in accreted and subducted sediments and in the zone of slip between downgoing and overriding lithospheric plates
  - the paleobathymetry, geochemistry and tephrachronology of forearc basins.
- To understand the complex temporal relations among subduction, arc volcanism and back-arc spreading and particularly to learn why volcanism and spreading are more episodic than subduction.
- To test the hypothesis that certain back-arc basins (e.g., the Bering Sea Basin) consist of older oceanic crust, "captured" by the building of an island arc on oceanic crust.
- To test models for the tectonic behavior of the continental margin at a ridge-trench intersection.

The strategy for the convergent margins is to drill transects across whole trench-arc-back arc systems in places where high-quality multichannel seismic data gives us a picture of the geometry. The drill supplies the fourth, or time dimension, and yields the history of vertical motion and tectonic mechanisms.

D. Causes of long-term changes in the oceans, atmosphere, cryosphere and biosphere

- To understand the distinct shifts in the state of the ocean-climate system, especially the prominent step-like changes in the Cenozoic.
- To understand the thermal frequency response of the oceans to insolation changes induced by orbital variations.
- To understand the effects on both shallow and deep circulation of changes in the passages -- the "gateways" -- connecting ocean basins.
- To document the history of ocean climate and biotic evolution in higher latitudes, both for the Cenozoic, when the ocean was cooling and the present system of deep-water circulation was evolving, and for the Mesozoic, when the polar regions were much warmer than today.
- To document the paleogeography and hypsography of the Mesozoic ocean.
- To understand the oceanographic-climatic origins of the widespread richly carbonaceous sediments -- "black shales" -- in all oceans during mid-Cretaceous times.
- To test the model that changes in the ocean-climate states of the Mesozoic are the result of changes in global sea level.
- To test competing models of evolution of marine biota -- phyletic gradualism vs punctuated equilibrium -- by using the near-global coverage and very high resolving power (thousands of years) obtainable in hydraulic piston cores of pelagic sediments.

- To test hypotheses for the sudden and massive extinctions of oceanic biota at the end of the Cretaceous by recovering continuous and undisturbed sections in different oceans, depths and latitudes.

The strategy calls for exploiting all means for obtaining complete and undisturbed cores, e.g., the hydraulic piston corer and the extended core barrel. The program is global and will push Glomar Challenger to its high-latitude limits.

We plan to take full advantage of the drill holes to conduct a wide variety of downhole geophysical and geochemical experiments, both during and after the drilling. A full program of logging will be conducted at every site where useful logs can be obtained, and we will need a variety of special logging tools, e.g., for the high-temperatures in very young ocean crust. New types of downhole equipment will be required for many experiments, and because these must be engineered not only to perform their tasks, but also to match the particular constraints of the drilling system, we have provided funds in the budget to assure appropriate engineering support to experimenters.

To carry out all the scientific tasks laid out in this proposal, Glomar Challenger requires a mid-life refurbishing and certain improvements.

[DSDP to supply rest of paragraph]

University of Rhode Island, Kingston, R.I. 02881
Graduate School of Oceanography, Narragansett Bay Campus

DIRECTOR S.I.O.
NOV 30 1981

November 24, 1981

Dr. William A. Nierenberg, Chairman
JOIDES Executive Committee
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, CA 92093

Dear Bill:

Since I shall be unable to come to the JOIDES Executive Committee meeting in San Francisco on December 2-3, 1981, I am writing this letter as a report of the COSOD meeting, and hoping that Bob Coleman of the COSOD Steering Committee will be able to present it in person. Also included are copies of the COSOD agenda, abstracts of papers presented at COSOD and a copy of Al Shinn's introductory speech. As you know, the meeting was organized around the following five working groups:

Working Group Structure:

1. Origin & evolution of oceanic crust
2. Origin & evolution of marine sedimentary sequences
3. Tectonic evolution of continental margins & oceanic crust
4. Causes of long-term changes in the atmosphere, oceans, cryosphere, biosphere, and magnetic field.
5. Tools, techniques and associated studies

The first day was spent listening to the working group chairmen present the essestials of the white papers that the working groups had prepared. These were followed by shorter presentations by the chairmen of the OMD Planning Advisory Committees (PACs) and the JOIDES problem panels. About mid-morning on the second day we broke down into working groups when discussions and input were encouraged from conference attendees outside the formal COSOD, OMD, or JOIDES structures. These working group discussions were co-chaired by the working group chairman and a Steering Committee liaison member. Key input was heard at this point from "wild card participants" who were invited for this purpose and whose expenses were paid for by conference funds. The wild cards were as follows:

Mike Arthur - deep sea sedimentology
Kevin Burke - world regional geology
Eric Barron - cretaceous climate modelling
Garry Brass - cretaceous climate modelling
Bernd Simoneit - organic geochemistry

APPENDIX 2

Conrad Newman - carbonate sedimentology
Fred Dunnibier - downhole instruments
Robert Detrick - tectonics, marine geophysics
John Malpas - igneous petrology

I asked that the working groups use the white papers as their working documents and that they try to reach a consensus on the most important scientific programs that can be attacked with ocean drilling. On the afternoon of the third day, the working group chairmen presented summary statements that contained a prioritized scientific program. After eliminating duplicate programs the top priority scientific problems identified by the first four working groups are as follows:

Working Group 1, Ocean Crust - Top priorities

Processes of magma generation and crustal construction at mid-ocean ridges
Configuration, chemistry and dynamics of hydrothermal systems

Working Group 2, Marine Sediments - Top priorities

Response of marine sedimentation to fluctuations in sea level
Sedimentation in oxygen-deficient oceans

Working Group 3, Tectonics of Continental margins - Top priorities

Early rifting history of passive continental margins
Dynamics of fore-arc evolution
Fore-arc to back-arc structure and magmatic history

Working Group 4, Paleoenvironments - Top priorities

Ocean circulation history
Response of the atmosphere and oceans to orbital variations
History of the earth's magnetic field
Processes and mechanisms of evolution in marine organisms

The discussions of working group five essentially were centered around a description of characteristics of a refitted Glomar Challenger and a Glomar Explorer converted for riserless drilling. Stated in terms of advantages and disadvantages of Explorer, the most important of these appear to be the following:

Explorer Advantages:

1) Tolerate higher sea states because Explorer is much larger - Explorer displacement = 60,000 tons; Challenger displacement = 11,000 tons.

2) Much more lab and living space: Explorer: 66 crew + 84 scientific party = 150 total; Challenger: 45 crew + 35 scientific party = 80 total

3) Ice strengthening to Norway class 1A is possible

4) Larger mud capacity, 5000 bbls liquid storage

5) Longer drill string, Explorer: 33,000 feet, all steel; Challenger: 28,000 feet with 11,000 feet of aluminum

6) Longer anticipated vessel life, Explorer: ~ 20 years; Challenger: ~10 years

7) Ability to use riser/blowout preventer at a later date

Explorer Disadvantages

1) Cannot transit Panama and probably can only transit Suez Canal as one-way traffic

2) Limited port access and dry-docking facilities, however 9 U.S. ports can handle Explorer

3) Larger conversion and subsequent operating costs

After these characteristics were outlined and the scientific programs had been presented, I moderated an open discussion in the general assembly that lasted about an hour. The various speakers all expressed essentially the same view in various ways. It was recognized that many of the top priority scientific objectives could be accomplished with the Challenger, but that a large number of other scientific objectives would require Explorer capabilities. Thus, the Glomar Explorer, initially configured for riserless drilling is clearly the vessel of choice for a long-term, world-wide program of scientific ocean drilling. It was also recognized that the final choice of vessel would rest on a yet-to-be-conducted cost analysis. I summarized this for the group, and called specifically for dissenting opinions. Hearing none, we established this preference of drilling platform as the unanimous consensus of the general assembly.

The following day the Steering Committee met and rewrote a lot of the working group summary statements which are still in draft form. In addition the Steering Committee made the following general recommendations, also stated here in draft form:

1) A world-wide program of long-term drilling is an essential component of research in the earth sciences. The programs described here will require at least a decade to complete and will require drilling in the Atlantic, Pacific, Indian and polar oceans.

2) Future drilling must be part of a larger scientific program that includes adequate support for planning, site surveying, geophysical experimentation, and sample analysis. Longer lead times are required for pre-drilling activities and more financial support is required for post drilling scientific analysis.

3) The integration of continental geology and marine geology should progress through scientific drilling programs. The oceans are the modern laboratories in which we can observe geologic processes that have occurred over the past 200×10^6 years. Understanding these processes is one of the keys to understanding ancient continental geology.

4) International cooperation should continue and expand. The international research programs that have centered on Glomar Challenger drilling have been essential to the success of the program. Especially if the Glomar Explorer is utilized in the future, this international cooperation should be expanded. The JOIDES/IPOD structure appears to be a good organizational framework for future drilling programs.

We are now working to assemble the final COSOD report. We hope to have it finished early next year.

Sincerely yours,

Roger

Roger L. Larson
Chairman, COSOD Steering Committee

RLL:jc
cc: R. Coleman, Stanford Geology Dept.

P.S. Also enclosed is a list of conference attendees names and addresses.

WAN 027

DRAFT

SUGGESTED PLAN FOR INCREASING THE MEMBERSHIP OF JOIDES

Taking into consideration several countries expressed desire to participate formally in IPOD, and also recognizing that increased costs make it important to expand the base of support, we have investigated the possibility of special new conditions for membership. Realizing that six of the more economically and scientifically developed countries are already participating in IPOD, it is important to find a mechanism whereby these countries will continue as at present and other countries might join at both a full or reduced level of cost and activity.

First priority should be to encourage countries that meet certain economic and scientific standards to join JOIDES as full members having equal rights and privileges with existing members. Examples of countries which might meet these criteria are Canada and Australia.

Secondly, several countries not having such extensive scientific and economic resources should be encouraged to participate with both lesser commitments and reduced privileges. For example, such partial membership could carry with it the right to sit on both Planning and Executive Committees without vote and to participate fully in other JOIDES committees and panels. Further, partial membership would carry the privilege to send scientists to sea on the IPOD drilling ship with the number of scientific spaces to be proportional to those of full membership in an amount equal to that country's percentage of full membership contribution.

APPENDIX 3

These conditions for partial membership should in no way interfere with present JOIDES policy to invite scientists from any country to take part in either the planning or drilling activities which require their expertise. Similarly, the JOIDES sample distribution policy would remain unchanged, that is, to make samples available to qualified scientists from any country.

While JOIDES would retain the right to elect new members in either of the categories mentioned above, it is recommended that NSF adopt the above principles as guidelines when negotiating financial arrangements with new members.

Allen Shinn, Chairman
Jacques Debyser
~~Hans Durbaum~~ *
Arthur Maxwell

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*H. Durbaum is a member in the ad hoc membership committee, but neither participated in nor agrees with all the conclusions in this document.

THE UNIVERSITY OF TEXAS AT AUSTIN
AUSTIN, TEXAS 78712

Vice President for Academic Affairs and Research

DIRECTOR S.I.O.

SEP 2 1981

August 28, 1981

Dr. William Nierenberg
Chairman, JOIDES
c/o Scripps Institution of Oceanography
La Jolla, California 92037

Dear Chairman Nierenberg:

When The University of Texas at Austin asked to become a part of the Joint Oceanographic Institutions, Inc., we were requested to hold in abeyance our pursuit of membership in JOIDES because of the delicate political balance in the International Phase of the Ocean Drilling project. This seemed a reasonable request, so our participation has been limited to the status of an interested non-voting observer.

There are now several countries in various stages of membership or consortium application. The University of Texas at Austin assumes that at the admission of any foreign participant, we will also become a fully participating voting member. However, to assure this, please consider this letter an official request for such status.

Sincerely yours,

G. J. Fonken
Vice President for Academic
Affairs and Research

GJF:bp

xc: Dr. James Baker
Dr. William W. Hay

APPENDIX 4

"Who Owns the Holes"

The increasing possibilities for reentering drilled holes in the deep seabed, either for further drilling or for emplacing instrumentation for "down hole measurements" has raised the question as to what rights JOIDES has to control access to the holes. Presently no one else has the capability to do either in deep water, but it appears likely that the technology for placing unattended instruments in previously drilled holes may soon be widespread.

International ocean law is presently in flux because of negotiations for a comprehensive Law of the Sea Treaty, the present version of which is a "draft convention." However, at least a few of the Draft Convention provisions which apply to this question are sufficiently recognized that I believe they will apply with or without a treaty. The first is "Marine scientific research activities shall not constitute the legal basis for any claims to any part of the marine environment or its resources" (Article 241). Whatever else JOIDES may do we cannot deny access to the hole because the U.S. or anyone else claims sovereignty to the hole because of JOIDES activities. "Safety zones" are another generally accepted concept in maritime law. Although I am sure Article 260 was not written for holes in the bottom of the sea, JOIDES might possibly evoke this provision since the concept is to minimzie interference. "Safety zones of a reasonable width not exceeding a distance of 500 metres may be created around scientific research installations in accordance with the relevant provisions of this Convention. All States shall ensure that such safety zones are respected by their vessels." I am not sure how we would enforce the honoring of safety zones around our holes.

APPENDIX 5

The deep seabed of the ocean can generally be divided into that part where coastal States have jurisdiction and that part where they do not. The Draft Convention aims to determine those boundaries with more precision than is presently the case. Putting aside the question of the seaward extent of coastal State jurisdiction, the coastal State can control the circumstances of drilling on that part of the continental shelf under its jurisdiction and, although some may question it, the coastal State probably has jurisdiction over any later down hole experiment in those holes. (It cetainly does, if the Draft Convention is in place.) Thus for those holes drilled with permission of a coastal State, JOIDES can negotiate arrangements with that coastal State for any further experimental use of the holes by itself or others.

For the seabed areas seaward of coastal State jurisdiction, however defined, there will be an International Seabed Authority under the Draft Convention with wide ranging jurisdiction. However, the Authority has no jurisdiction over the conduct of marine scientific research by others, including deep sea drilling for scientific research purposes. The power of the Authority over marine scientific research is limited to "carry out marine scientific research," "promote and encourage the conduct of marine scientific research" and "coordinate and disseminate the results of such research" (Article 143). I suppose if JOIDES so wished, the Authority could play a role in coordinating the further use of JOIDES drilled holes, but I see no reason for encouraging them to do so. In the absence of a treaty there will be no international body with any jurisdiction over the deep seabed beyond national jurisdiction.

In summary: JOIDES cannot legally control the reuse of its holes

on the deep seabed. For those holes drilled within coastal State jurisdiction, the coastal State can exercise that authority insofar as it exercises control over marine scientific research done within areas over which it claims jurisdiction. No similar authority can be exercised on the deep seabed beyond national jurisdiction at present. Even if an LOS Treaty is adopted, the International Deep Seabed Authority could not exercise such jurisdiction unless encouraged by those nations concerned. Since the governments of JOIDES members wish to minimize the delegation of power to the Authority, this is unlikely to occur.

Since JOIDES can exercise only very limited legal control over the reuse of its holes, it might look to developing protocols on use of holes which could be generally agreed to by the international scientific community. Such protocols approved by the IUGG and widely published might be as effective as legal sanctions.

John A. Knauss

JAK:abb

9/10/81