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MINUTES

JOIDES Planning Committee Meeting
6-8 October 1982
Lamont-Doherty Geological Observatory
Palisades, New York

PCOM Members Present

J. Honnorez, Chairman (Rosenstiel School of Marine and Atmospheric Science)
J. Aubouin (France)
W. Bryant (Texas A & M University)
R. Buffler (University of Texas)
J. Cann (United Kingdom)
J. Creager (University of Washington)
D. Hayes (Lamong-Doherty Geological Observatory)
K. Hinz (Federal Republic of Germany)
J. Kennett (University of Rhode Island)
K. Kobayashi (Japan)
Y. Lancelot (DSDP, non-voting member)
H. Schrader (Oregon State University)
F. Theyer (University of Hawaii)
R. Von Herzen (Woods Hole Oceanographic Institution)
E. Winterer (Scripps Institution of Oceanography)

NSF Liaison

P. Borella
I. MacGregor
S. Toye

JOIDES Office Liaison

D. Marszalek

PCOM Member Not Present

L. Nikitin (USSR)

Guests and Observers

J. Clotworthy (JOI, Inc.)

ACTION AND NOTA BENE ITEMS
JOIDES PLANNING COMMITTEE MEETING
6-8 October 1982

Page	Responsibility	Subject
10	Honnorez, Exp. Conversion Steer. Comm.	Investigate methods of vibration and noise reduction aboard Glomar Explorer.
14	Panel Chairmen	Respond to PCOM motion 382-A.
15	Lancelot, DSDP	Improve reliability of core-orientation device.
17	Alewine(DARPA), Honnorez	Investigate possibility of DARPA providing an extra re-entry cone for Leg 91 (Tonga Trench).
21	Honnorez	Contact chairman of major panels to determine necessity for meeting prior to disbanding. Solicit suggestions from panel members for potential members of AODP advisory panels.
22	PCOM	Activate the following Working Groups at next PCOM meeting (or soon after): E. Pacific S. Atlantic N. Atlantic Atlantic Marginal Seas
22	AODP Science Advis. Subcomm.	Draft mandates for AODP advisory panels.
25	IPOD representatives	Determine or estimate member country future level of activity in site surveys, regional syntheses, post-cruise studies for presentation at January PCOM meeting.

JOIDES Planning Committee Meeting
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PCOM meeting, 6-8 October 1982

378 OPENING REMARKS AND BUSINESS

I. OPENING REMARKS

J. Honnorez, Planning Committee chairman, opened the meeting at 9:05, 6 October 1982. D. Hayes (L-DGO) and B. Raleigh (Director, L-DGO) welcomed the Planning Committee to Lamont-Doherty Geolgoical Observatory.

II. AGENDA AND MINUTES

J. Honnorez announced a change in the agenda; A. Ballard (DARPA) would visit the PCOM on Thursday, 7 October to make a presentation regarding the DARPA experiment and request for a new DARPA leg. The Agenda was approved.

Minor corrections were made to the 7-9 July minutes of the Planning Committee meeting. The minutes were accepted by a motion introduced by E. Winterer and seconded by J. Creager.

Vote: 12 for, 0 against, 1 abstain.

379 NATIONAL SCIENCE FOUNDATION REPORT

S. Toye reported that I. MacGregor (NSF) will meet with congressional representatives on 7 October to discuss the Advanced Ocean Drilling Program. MacGregor would then meet with PCOM on Friday, 8 October.

S. Toye informed PCOM OF NSF activities relating to funding of the Advanced Ocean drilling Program:

Congress adjourned the previous week and will reconvene in December. The Housing and Urban Development appropriation which includes the NSF budget was passed. Ocean drilling received special attention during the appropriation process. Congress saw only a portion of the DSDP budget.

$24.0 m	for DSDP (including JOI Contract) in the original NSF budget
14.0 m	NSF request from Congress
10.0 m	NSF/IPOD funds ($2.0 m x 5 IPOD countries)
NSF/IPOD	funds are actually $8.0 m reflecting loss of USSR contribution.
$9.0 m	earmarked for AODP was noted and acknowledged, but not officially requested pending the Administration's decision regarding the future ocean drilling program. The $9.0 m is no longer intact; $2.0 m was used in lieu of the lost USSR contribution and $1 m for site surveys.

At present the House has approved $12.0 m for DSDP and no funds for AODP. S. Toye stressed that the $12.0 m figure is not realistic and NSF is confident that DSDP will eventually be allocated the required $24.0 m.

Toye also commented that the 1983 NSF budget is $1.02 billion, $14.0 m more than requested, so other research areas will not be impacted by ocean drilling costs.

Discussion

E. Winterer expressed concern over the availability of funds for site surveys. S. Toye noted that sufficient funds will be available for 2 site surveys.

E. Winterer asked if the USSR was being encouraged to reactivate their membership, to which S. Toye reponded negatively.

R. von Herzon noted that OMB and OSTP are visiting Woods Hole today, indicating that the agencies are still considering the AODP. Toye indicated that OSTP is concerned about cost overruns in relation to AODP; NSF is making clear that Explorer costs are "off the shelf" items and not likely to result in cost overruns.

J. Honnorez requested from Toye information on the NOAA committee to study Explorer and Challenger costs related to AODP.

Toye responded that at the end of last July the Director of NSF asked the Director of NOAA to form a committee to review cost estimates of Explorer conversion. The committee consists of the Associate Administrator of NOAA (J. Winchester) naval architects, Maritime Administration cost estimators and others. A two month review of the records revealed:

a) operations estimates for Explorer or Challenger at about $50 k/day ± 5% are correct.

b) conversion cost estimate for Explorer may be partly in error. The original estimate of $69.6 m ($26.9 m shipyard and $42.7 m other) was revised in September to $75.6 m (reflecting an engineering decision to use new diesel engines to burn heavy fuel oil). The committee estimate was $88.6 m; the increase due to the estimated cost of shipyard labor. The "cost overrun" is therefore about 17%.

F. Theyer asked if the $50 k/day estimate includes the cost of heavy fuel oil; Toye responded that it did.

R. von Herzen noted that according to A. Shinn (NSF), the largest uncertainty in conversion cost estimates is the state of the economy at the time the conversion is performed.

Discussion shifted to new membership in IPOD. J. Honnorez informed PCOM that Canada had been invited to the PCOM meeting (a representative of Canada did not attend the meeting).

In response to a request by D. Hayes to report on recruitment of new members, Toye reported that negotiations with Canada are the most advanced, Australia and New Zealand are interested and currently meeting jointly to discuss membership, Petrobras (Brazil) is interested, and China has sporadically expressed interest. Countries attending the Versailles summit decided to try to develop joint science initiatives; the U.S. is promoting ocean drilling which is compatible with the interests of all member countries.

(I. MacGregor of the National Science Foundation joined the Planning Committee on Friday, 8 October. He reported on the previous days meeting with congressional staff).

During a seven hour meeting 7 October the Advanced Ocean Drilling program was thoroughly discussed. Items discussed included Explorer design, operating costs and conversion costs, science, and budget. The Foundation at this time still does not know the fate of AODP. In summary, all options (no AODP, extended Challenger program, or Explorer program) are still viable. A decision will be made by January at the latest.

Discussion

In response to questions from E. Winterer, I. MacGregor informed PCOM that discussions with OMB and OSTP are still continuing, and that Explorer financing options include amortization, total payment of conversion costs at the beginning of AODP, or a combination of the two means of financing.

J. Cann noted that a $4 m short fall in the 1983 Challenger budget coupled with a loss of 1 or 2 foreign members would mean a short fall of $7 m to $9 m. He also indicated that the U.K. most likely would not be able to pay its full contribution in 1984 if Challenger (rather than Explorer) is chosen as the drilling platform.

I. Macgregor (NSF) said that NSF would cover the costs of an AODP Challenger program to make up for any loss in foreign contributions. Although the exact configuration of the AODP is still ambiguous, the Planning Committee should assume that there will be a program and should plan as if Explorer will be the drilling platform. PCOM can assume that the AODP platform will have drilling capabilities at least equal to those of the present Challenger.

Y. Lancelot (DSDP) - a hiatus of at least one year will occur at the end of the present Challenger program, this may present problems for foreign participants, especially France. J. Aubouin - it is difficult for France to terminate funds to a program and then start up again. The lack of a decision on AODP by NSF presents problems for France. J. Cann - it is difficult for foreign participants to comprehend how the U.S. can start a fiscal year without funds.

380 DEEP SEA DRILLING PROJECT REPORT

Y. Lancelot reported for DSDP.

The Challenger is presently in port at Yokahama undergoing maintenance. One Japanese worker was killed in an accident involving removal of a rudder. The positioning system is being serviced and the thrusters and rudders overhauled. The hull is being cleaned (2 yrs. since last drydock) and showed no deterioration.

Leg 87. (Japan Margins). Technical problems were encountered during drilling, primarily from weather (a typhoon passed over the ship), and the drill "sticking" in the drill hole. A BHA was lost in the first Nankai Trough hole (sticking and high torqueing). Similar drilling conditions were encountered in the Japan Trench but drilling produced interesting results. Physical properties indicated a slower rate of subduction than anticipated. Rough swells and 40 ft. seas required that the thrusters be used to avoid broaching; the ship was not damaged.

Leg 88. (DARPA). This leg also experienced drilling problems resulting in a disappointment for DARPA. The reentry cone was apparently set too high and the casing stuck before the total previous depth was reached. Weather was also a problem because of the deep site and difficulty in reentry. A request from DARPA to try again was denied based on evaluation of the site by the shipboard party and threatening weather conditions. DSDP decided to terminate the leg and try to reschedule a DARPA leg at a later time.

Lancelot expressed concern that communications with the ship during the DARPA experiment did not always follow the accepted procedure of being channeled through DSDP; at times the ship communicated directly with DARPA and NSF. (S. Toye noted that it is strict NSF policy to communicate with the ship only through DSDP). In view of the potential for such a situation leading to conflicting instructions to the ship, Lancelot requested that the PCOM reaffirm that ship operations are the responsibility of DSDP alone.

Discussion

R. von Herzen - DARPA may have only been making suggestions to the shipboard party and therefore was not in conflict with DSDP procedures. Lancelot noted that the cruise operations manager had to intervene at times to maintain DSDP control of ship operations.

E. Winterer - the problem may result from the misconception that the Challenger may be under "charter" to DARPA; NSF should ensure that non-JOIDES participants in cruises understand DSDP procedures and responsibilities.

J. Aubouin (France) - in agreement with Winterer's concern, especially as it may affect future drilling. PCOM should make clear that the purpose of the drilling program is science and that direction from non-science interests will not be accepted.

S. Toye (NSF) - part of the problem was that the situation occurred over a holiday weekend and key persons were not able to be reached by DARPA.

J. Aubouin - all cruise data should be published. If the ship is used as a tool for other (non-scientific) experiments then a separate contract should be negotiated.

J. Honnorez - nothing bad actually happened as a result of the mixed communications. Use this situation as an opportunity to reaffirm the established ship operations procedure.

J. Creager - the EXCOM chairman (A. Berman) should inform DARPA by letter of ship operations procedures. DARPA agreed in 1980 at the Paris meeting to publish initial data in the DSDP Initial Reports.

J. Aubouin - non-scientific use of the Challenger may result in drilling restrictions in certain geographic areas considered sensitive by some governments.

K. Hinz (W. Germany) - PCOM should make clear that scientific ocean drilling is not an "umbrella" for non-scientific activities.

Concensus

The following motion resulted, introduced by E. Winterer and seconded by J. Creager.

In light of the experience of Leg 88, the Planning Committee reaffirms its' position that all scientific operations of the drilling program are under the direct authority and supervision of the Chief Scientist of DSDP. All participants at sea or ashore are expected to conform fully to established JOIDES and DSDP policies.

Vote: 12 for; 0 against; 0 abstain.

Leg 89. (Old Pacific). Challenger is expected to depart Yokahama 10 or 11 October. Leg 89 is anticipated to be technically difficult; a 7.3 km drill string is planned. DSDP analysis indicates that the stress will be close to limiting conditions and is therefore difficult to assess. Operational constraints will be determined next week.

Stress will be greatest during 3 critical phases:

a) during lowering of the reentry cone and casing

b) when drill string is at maximum length before the addition of heavy-wall pipe, and

c) when deep into the hole and hard rock is encountered.

New pipe is being delivered by NKK at Yokahama. The inside diameter of "old" pipe is being modified to meet specifications. Total pipe available is not known because inspection by NKK is still in progress. A substantial number of CEMSCO pipe has been rejected after inspection.

Maximum allowable penetration will be limited by sea conditions. In particular it appears that basement penetration will probably have to be limited to less than 200 meters.

The Ontong/Java Plateau site will be drilled on Leg 89. Initial data will be handled by Leg 89 and appear in Vol. 89 of the Initial Reports. The synthesis and special studies will be attached to Leg 90, as that site is part of the Leg 90 transect.

Discussion

E. Winterer - what are contingency plans for Leg 89? Y. Lancelot - primary plan is to drill MZP-6 and Ontong/Java site; alternate is hole 462 and Ontong/Java site. The question remains: if more time is required to drill into Jurassic sediments, can the Ontong/Java be dropped?

E. Winterer - the most important objective is to drill old ocean Jurassic sediments; if mid-Cretaceous volcanics are encountered then the Ontong/Java site should be drilled. PCOM members agreed to this prioritization: the Ontong/Java site can be dropped only if it is clearly demonstrated that Jurassic sediments are within reach of Glomar Challenger and only a few more days are required.

J. Cann (United Kingdom) - can Leg 89 be lengthened? Y. Lancelot - only by 2 or 3 days maximum.

Leg 90. Staffing is complete. The scientific party will consist of 16 people. The leg will terminate in Wellington, New Zealand.

DSDP Publications

Six volumes have been completed this year. SP^4 technical manual has to be edited, the Site Survey Volume is well advanced: camera-ready pages are being "pasted-up" at this time.

Volume 70 is completed and waiting for NSF to approve a contract with a new printer after Rand McNally has declined offer to continue with printing the Initial Reports.

DSDP Funds

The 1983 program plan will soon be sent to NSF. The budget has been revised from $22.35 m to $22.2 m, placing DSDP in a very tight financial position. To run the program on existing inventory is a very risky operation - for example there will be 4 reentry cones for 3 reentry sites; no extra casing; enough cement for 1 deep site (ENA-3); 3 logging cables for a full (except for Leg 90) logging program; and a limited number of beacons eliminating any possible last minute changes to a multi-site plan.

DSDP strongly objects to the $22.2 m budget. Cuts may have to be made in logging, engineering and (for the first time) in operations. No contingency exists for equipment loss.

Future Ship Operations Contract

Discussion relating to the current DSDP budget led to a query from F. Theyer to S. Toye (NSF) of the necessity for an open bid for the science operations

contract for AODP. S. Toye responded that AODP will be a new program with a new ship and must go through the bidding process.

E. Winterer - when will bids be requested? S. Toye - as soon as NSF gets Administration approval.

J. Creager - has contract posture changed (DSDP contract was not bid in 1966). S. Toye - the new drilling program will be bid. As clarified by A. Shinn (NSF) at the last EXCOM meeting (1-2 Sept.), bidding will be open to all academic institutions.

381 EXPLORER CONVERSION REPORT

The agenda called for J. Honnorez, chairman of the Explorer conversion steering committee to report to PCOM. The report, however, was made by R. Dinsmore and J. Schiff, consultants to JOI on Explorer conversion. A detailed presentation using graphic illustrations of the proposed layout of Explorer laboratories, work areas, living accommodations, and core handeling facilities was made. Engineering aspects of the planned conversions were made available in a handout (Appendix A).

Questions and comments from PCOM members included the following:

ACTION H. Schrader questioned why the laboratories were not located on the upper deck where noise would be less of a problem. R. Dinsmore replied that the basic layout had been decided by Lockheed, but he and J. Schiff will look into vibration problems and methods of noise reduction.

J. Honnorez - do shops (wood, machine, electrical) require as much space as shown in the plans? After some discussion PCOM agreed that the designated space was required for the shops to function properly.

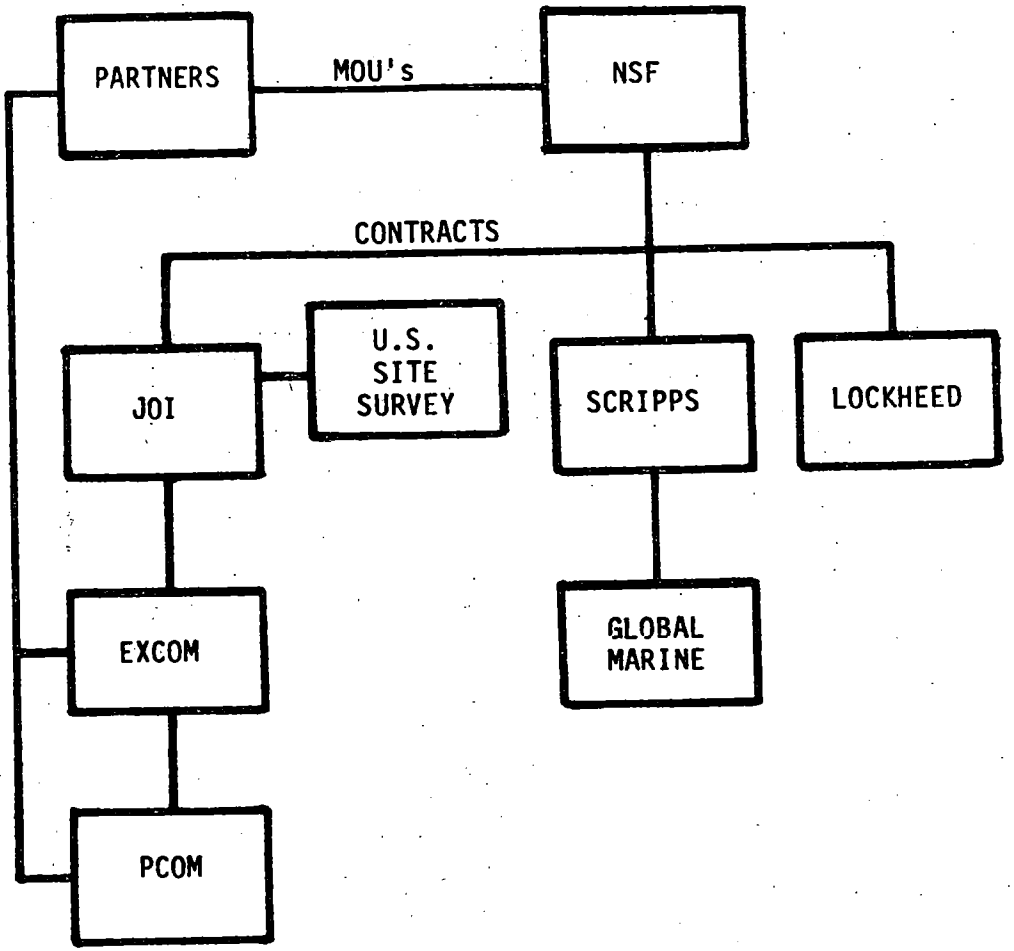
In a response to a question from J. Aubouin (France) concerning living accommodations, R. Dinsmore noted that two large dormitories will be converted to 2-man staterooms. Explorer will be able to accomodate 150 persons in 2 and 4-man staterooms. The anticipated shipboard party is 51-53 ships crew and 40-50 science crew.

382 JOIDES EXECUTIVE COMMITTEE REPORT

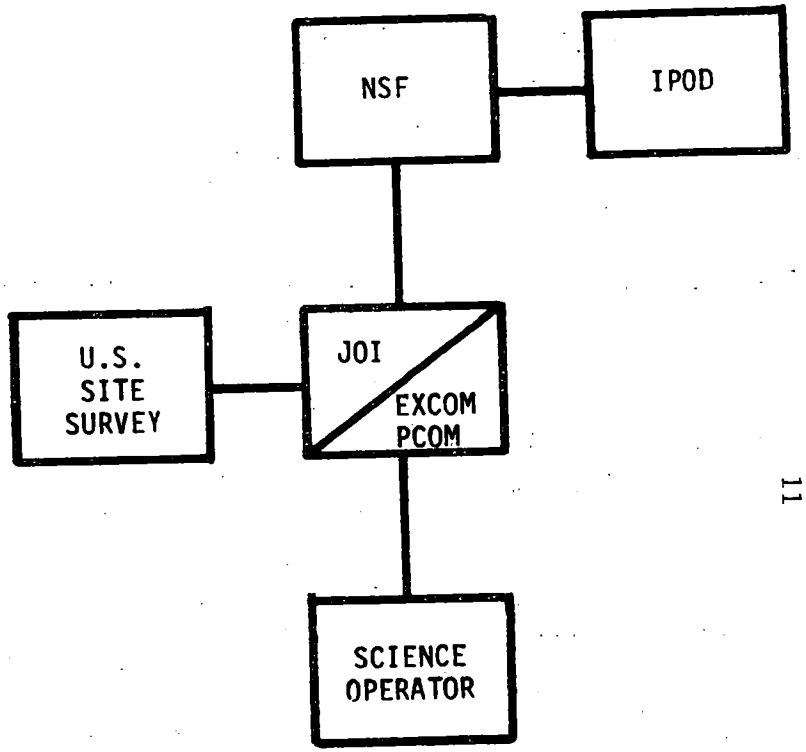
J. Honnorez, PCOM chairman reported. Two main points of interest to PCOM were discussed at the last EXCOM meeting (1-2 Sept.) in Kyoto, Japan.

1) EXCOM response to PCOM's motion 376A (interposition of JOI, Inc. between NSF and the science operator, as shown in EXCOM's diagram of a proposed future advisory structure for AODP, p. 27 of 21-22 May EXCOM meeting minutes).

2) Non-US JOIDES members concern that JOI, Inc., as a U.S. corporation, cannot adequately represent non-U.S. interests.



Existing Management Structure



Proposed AODP management structure.

Regarding item 1, the Executive Committee pointed out that the proposed advisory structure shown on p. 27 (EXCOM minutes) was not accepted, and that the existence of "Annex A" precludes filtering by JOI, Inc. by scientific input from JOIDES. (A copy of Annex A is attached as Appendix B).

J. Honnorez then presented the following diagrams (see next page) of the existing and proposed management structure, reproduced from the EXCOM minutes of 1-2 September.

Discussion

J. Cann (U.K.) - the proposed management structure is unacceptable to the U.K.; JOI, Inc. cannot represent both U.S. internal interests and international interests.

J. Aubouin - is it possible for an international corporation (JOI-International) to exist as a legal entity under U.S. jurisdiction. J. Clotworthy (JOI, Inc.) - this is now under investigation; the ability of NSF to contract with such an organization may be a problem.

E. Winterer - the contract legally binds the science operator to take scientific advice from JOIDES; this arrangement is satisfactory. J. Creager - Scripps Institution of Oceanography was not contracted to take advice from JOIDES; JOIDES was recognized only after JOI, Inc. was formed.

J. Cann - JOI, Inc. should coordinate U.S. interests only; an "AODP Council" or similar body should direct science. The makeup of the Council should reflect each country's financial contribution to the drilling program (see attached diagram on following page).

Y. Lancelot (DSDP) - the science operator should be allowed to function without undue interference from non-DSDP "management." The managerial role of NSF has increased since creation of the Office of Scientific Ocean Drilling. The creation of another management entity would increase interference.

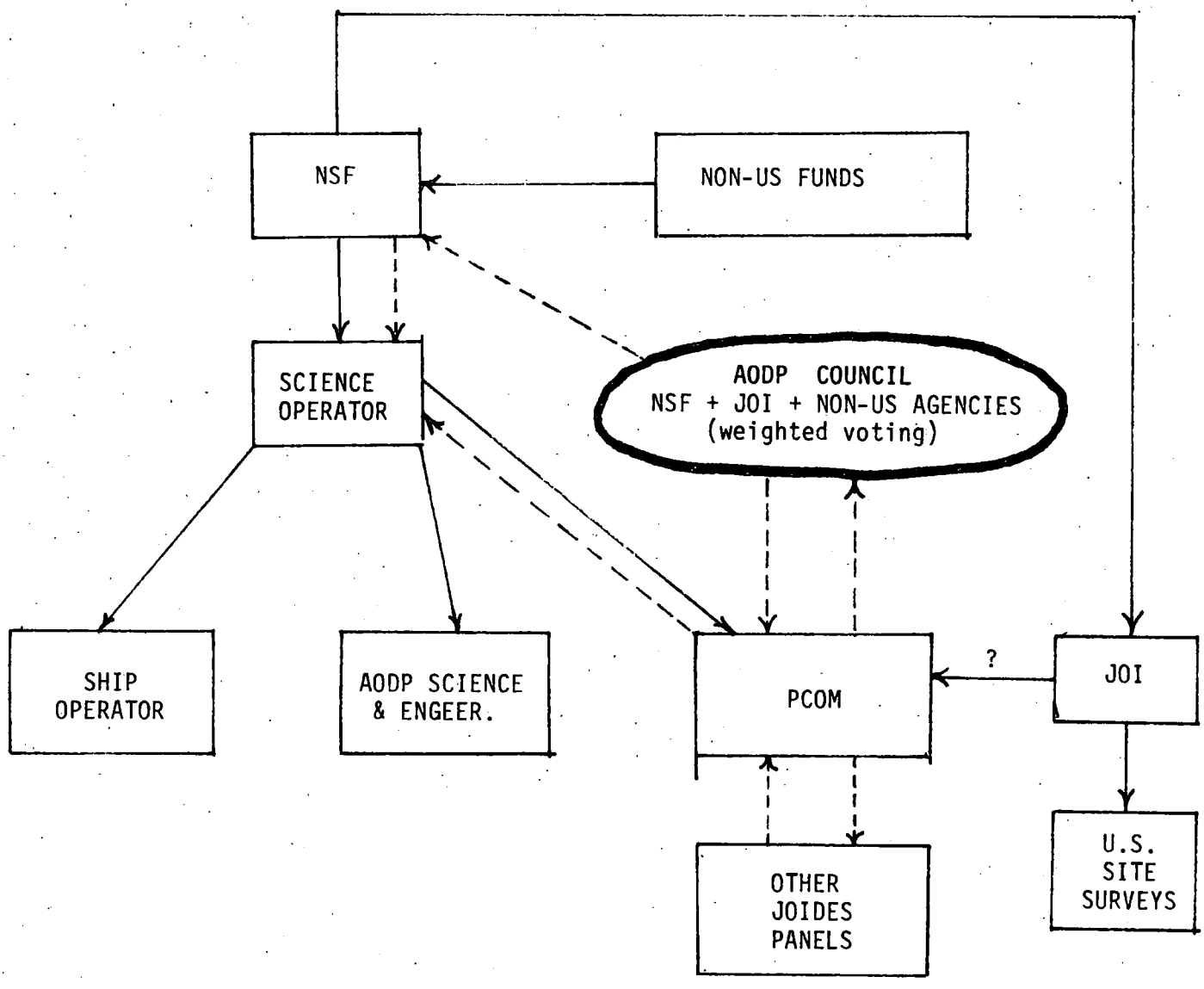
J. Clotworthy (JOI, Inc.) - JOI, Inc. was in part formed to protect the members of the Science advisory structure from the legal responsibility for scientific decisions. In effect it is a shield to protect EXCOM from financial responsibility.

Concensus

Ship operations should be under the control of the project Chief Scientist and free from excess interference by management. The Planning Committee recognizes that the management structure of AODP is to be determined by the Executive Committee; PCOM only wishes to make its views known.

J. Honnorez noted that the Executive Committee has asked PCOM to:

1) prepare a budget and schedule for science and engineering/technology development for AODP.



J. Cann "Flow Chart"

——— Funds

------- Advice

2) prepare a plan for the phase-out of the existing advisory structure and phase-in of the future structure.

3) prepare a list of areas of interest and their priority as a basis for submission and coordination of site and regional survey efforts.

J. Honnorez requested that item 3 (site and regional surveys) be discussed at this time; points 1 and 2 are agenda items to be covered later.

D. Hayes - as a rule the U.S. does "residual" site surveys on relatively short notice; the survey areas then become target areas for drilling. Coordination of site surveys would require a special panel.

J. Honnorez - planning for surveys would be facilitated if a decision were made on either an east or west coast start-up. K. Hinz, D. Hayes and E. Winterer proposed an Atlantic start-up because more useable site survey data are now available for the Atlantic than for the Pacific. F. Theyer agreed with an Atlantic start-up but prefered that site surveys be initiated early in the AODP in both the Atlantic and the Pacific. D. Hayes - PCOM should not decide on ocean until after Site Survey Panel meets in January.

Concensus

Decide on the ocean for AODP now, and try to arrange for the Site Survey Panel to meet as soon as possible (Action - J. Honnorez). The Atlantic ocean should be the start-up even if conversion is done on the West Coast; should a west coast shipyard be selected than a brief drilling program in the Pacific and/or Antarctic could be part of the transit to the preferred ocean. The following motion resulted:

ACTION 382-A

The Planning Committee identifies the first areas to be drilled during AODP as (a) the Atlantic Ocean and contiguous seas including the Mediterranean, (b) the Weddell Sea and the contiguous parts of the southern ocean, and (c) the Pacific Ocean.

It requests panel and working group chairmen to perform the following tasks:

1) To identify, on the basis of the 8-year plan and the COSOD report, targets within the preview of their panel that lie within the above areas.

2) To consult with proponents of these targets and to develop a scientific rationale for drilling to achieve these targets.

3) To specify as closely as possible sites and site survey requirements necessary to achieve these targets.

4) To send these specifications to the chairmen of the JOIDES and JOI site survey panels before December 1982.

5) To come to the January PCOM meeting prepared to discuss these targets.

PCOM requests the JOIDES site survey panel to come to the Janaury PCOM meeting with as close a definition as possible of the site survey requirements to meet the targets defined by panel chairmen.

Panel chairmen should take into account the fact that planning will be for about 18 months of Atlantic drilling, 3 months of Antarctic drilling, and 6 months of Pacific drilling, divided between all panels. Definition of an excessive number of targets by any panel should be avoided.

Vote: 13 for; 0 against; 0 abstain.

383 CORE ORIENTATION DEVICE/LEG 85 PROBLEM

F. Theyer reported on problems experienced during Leg 85 with core orientation. The device uses a camera and triggering mechanism to photograph a compass face as the core is "shot." Problems were both operational (lack of communication between scientist and technician, empty film chamber, etc.) and technical (film fogging; trigger failure, etc.). About 50% of the orientation data was useable.

The main problem, however, results from the fact the only one orientation reading is made. F. Theyer suggested a new (different) system.

R. von Herzen - integrate core orientation device with the HPC temperature recording device resulting in digital (not photographic) data.

ACTION Lancelot - DSDP will tackle the problem immediately.

384 ARCHIVE SAMPLING

(Background: during the previous PCOM meeting of 7-9 July, Y. Lancelot reported that the archive halves of cores were to be sampled, with permission from NSF. He requested PCOM guidence on future sampling of archive material. J. Honnorez asked W. Riedel, Core Curator, and S. Gartner (ex-NSF) for additional information regarding past cases of archive sampling).

J. Honnorez read a letter from W. Riedel informing PCOM that "toothpick" size samples only were taken on one occasion from an archive half of a depleted core, and it is not policy to sample the archive halves of cores.

After a brief discussion, PCOM decided to leave as is the policy for core sampling and sample distribution.

385 ORCA BASIN - LEG 95B

J. Honnorez requested PCOM members to consider conflicting opinions on the scientific merit of the Orca Basin, specifically if it should be drilled as part of the Mississippi Fan study, Leg 95B. The Passive Margin Panel and the COMFAN group revised proposal has placed a low priority on the Orca Basin. A letter from the SP chairman, G. Klein to the PCOM chairman supports drilling the Orca Basin, as does a letter from M. Arthur (OPP chairman).

Discussion

W. Bryant - the letter from M. Arthur is misleading in the statement that the SP^4 request for triplicate HPC coring on at least one fan site is "essentially routine, non-funded SP^4 objective. . ." Bryant noted that more than 20 scientists are involved and $0.5-1 m has been budgeted for the effort.

E. Winterer - Orca Basin is a target of opportunity but has direct relation to fan processes.

J. Kennett - agrees with Winterer that results from the Orca Basin would have a direct bearing on interpreting the Mississippi Fan cores. The Orca Basin cores would contain a detailed meltwater history which has a large influence on the fan deposits. OPP would rate the Orca Basin highly.

Concensus

Allow 3 days for drilling the Orca Basin at the end of Leg 95B after the fan objectives have been achieved.

386 DARPA EXTENSION

During the PCOM meeting, J. Honnorez invited A. Ballard to make a presentation for a new DARPA leg. A. Ballard (NORDA), R. Alewine (DARPA), T. Jordan (SIO) and J. Orcutt (SIO) presented the case for a DARPA leg. Data relating to the proposed DARPA leg were distributed to PCOM members and are attached as Appendix C. A brief synopsis of the presentation follows:

R. Alewine - DARPA would like to try again to complete the experiment at a new site, the Tonga Trench. Approximately 23 days would be added to the Challanger program. The experiment would be a joint Navy/DARPA/SIO effort. Suggested co-chief scientsits are W. Menard (USGS) and A. Ballard (NORDA).

A. Ballard - experiment failed because of an inability to case the hole and keep it open. The pipe broke above the BHA, possibly due to sub-standard pipe. A second attempt 600 ft. north of the pilot hole also failed. Problem was with equipment, not weather.

Y. Lancelot - a report has been made and the problem is being evaluated. PCOM need not concern itself with the technical aspects.

T. Jordan - proposed sites are near the active part of Tonga Trench (sites A, C, D and E). Site was selected because of favorable overlying sediment characteristics; site C is the backup site (see Appendix C for site locations).

J. Orcutt - would be a classical seismological experiment with important scientific objectives (Appendix C). A teleseismic experiment of this type has never been done before. About 650 events of a magnitude above 3.5 are expected to be recorded in a 40 day period.

Discussion

ACTION R. Alewine was asked if DARPA would provide an extra cone; he replied that he will investigate the possibility of providing an extra cone.

J. Aubouin (France) - objects to the applied nature of the science and asked if DARPA has contacted the French Navy (France has an atomic testing facility at Mururoa). R. Alewine responded that DARPA has contacted the French "Atomic Energy Commission" and will share data with that organization. Data will also be made available to JOIDES and will be published in the DSDP Initial Reports.

(Discussion continued after the DARPA visitors departed.)

Discussion among PCOM members was brief and the following decisions were made:

a) A new DARPA leg will be granted

b) Co-chief scientist staffing will be decided by DSDP; it is likely that only one of the candidates nominated by DARPA (A. Ballard or W. Menard) will be approved, to balance the orientation of the science crew.

J. Honnorez recommended that J. Natland (DSDP) be considered for the co-chief scientist position.

387 HOLE 504B

R. Steven and M. Bender were invited by PCOM to present a case for drilling in hole 504B, in lieu of an additional hole requested by M. Leinen and D. Rea (co-chief scientists for Leg 91 - Hydrogeology).

R. Steven reported that returning to hole 504B for an oblique seismic experiment (not related to DARPA) would require 9-14 days. The non-DARPA part of Leg 88 was very successful. The seismic borehole experiments are needed to link downhole logging measurements and large-scale geophysics. Five days are required for the experiment, plus some contingency time; other experiments (water sampling, wire-line reentry, etc.) would be performed if weather becomes a problem.

M. Bender made a brief presentation for returning to hole 504B for hydrothermal measurements.

He reported that the downhole water sampling at 504B would require 12-18 hrs. The results would be important to the understanding of hydrothermal circulation and the metaliferous sedimentation rate.

388 CHALLENGER SCHEDULE

After the DARPA and hole 504B presentations, PCOM considered modifying the Challenger schedule to accommodate the requests. Y. Lancelot (DSDP) presented the following schedule for consideration (see Table 1).

Discussion

J. Aubouin - doubted that an additional hole as requested by D. Rea and M. Leinen is necessary, and favored drilling 504B (supports Plan A - Table 2).

D. Hayes - no site survey exists for the proposed additional hydrogeology hole.

F. Theyer - the R. Steven experiment (Hole 504B) presents a new type of data, complements DARPA and should be performed.

The relative merits of drilling Barbados (Plan B-2) or the New Jersey Transect (Plan A and Plan B-1) were also discussed.

J. Cann - concerned over limited time available for drilling Barbados, and the technological difficulties likely to be encountered drilling in an active subduction complex. T. Lancelot agreed with J. Cann that 14 days is a short time period for accompleshing the objectives.

J. Aubouin and R. von Herzen noted that Barbados objectives complement leg 78A. They prefered Plan A.

E. Winterer - New Jersey transect proposed drilling through unconformities has implications for future drilling.

J. Honnorez - the new DARPA leg results in a loss of 5 days to the drilling program. DARPA should pay for the five days, and the extra days used to ease up the tight schedule.

The Planning Committee by straw vote then decided to retain hole 504B by voting either for Plan A (10 votes) or Plan B-1 (2 votes), indicating a clear preference for Plan A with 1 abstension. The preference was then expressed as a motion, introduced by R. Buffer and seconded by J. Creager:

The Planning Committee adopts Plan A (Table 1) as is up to Leg 94, leaving the remaining days as contingency and using any remaining days for either Leg 95A or 95B as needed.

PCOM calculates that an additional 5 days of steaming are required to accommodate the new DARPA leg. A requisite for granting the new DARPA leg is that DARPA makes available to the remainder of the drilling program the 5 days.

Vote: 10 for; 2 against; 1 abstain.

[NOTE: Shortly after the meeting a new schedule was formulated by DSDP which demonstrated that the total number of days to be charged to DARPA was 27, and that there would be no further rescheduling penalty down the line.]

TABLE 1.

PLAN A Hydrogeology = 33 days OPS + 22 days steaming
Includes 9 days for Hole 504-B

LEG	DEPART		TOTAL	OPS	ST	ARRIVE		PORT	OBJECTIVE
89	Yokohama	10 Oct 82	50	31	19	Noumea	29 Nov	5	Old Pacific
90	Noumea	4 Dec 82	39	28	11	Wellington	12 Jan	5	SW Pacific
91	Wellington	17 Jan 83	39	26	13	Papeete	25 Feb	5	Tonga Trench
92	Papeete	2 Mar 83	55	33	22	Balboa	26 Apr	5	Hydrogeology
93	Balboa	1 May 83	62	55	11	Halifax	2 Jul	5	ENA-3
94	Halifax	7 Jul 83	61	36	25	New York	6 Sep	5	NE Atlantic Paleoenvir.
95-A	New York	11 Sep 83	58 { 19	15	4	Ft. Lauderdale	30 Sep	1	New Jersey Transect
95-B	Ft. Lauderdale	1 Oct 83	39	35	4	Galveston	9 Nov	12	Mississippi Fan
							+12		
							21 Nov		

PLAN B-1 Without 9 days for 504-B (Minimum Hydrogeology)

92	Papeete	2 Mar 83	46	24	22	Balboa	17 Apr	5	Hydrogeology
93	Balboa	22 Apr 83	62	51	11	Halifax	23 Jun	5	ENA-3
94	Halifax	22 Jun 83	61	36	25	New York	28 Aug	5	NE Atlantic
95	New York	2 Sep 83	24	20	4	Ft. Lauderdale	26 Sep	5	New Jersey Transect
96	Ft. Lauderdale	1 Oct 83	39	35	4	Galveston	9 Nov	12	Mississippi Fan
							+12		
							21 Nov		

PLAN B-2

94	Halifax	28 Jun 83	63	36	27	San Juan	30 Aug	5	NE Atlantic Paleoenvir.
95	San Juan	4 Sep 83	22	14	8	Ft. Lauderdale	26 Sep	5	Barbados
96	Ft. Lauderdale	1 Oct 83	39	35	4	Galveston	9 Nov	12	Mississippi Fan
							+12		
							21 Nov		

389 FUTURE AODP ADVISORY STRUCTURE

J. Honnorez reported for the AODP advisory structure subcommittee consisting of H. Beiersdorf (FRG), D. Hayes (L-DGO), R. Moberly (HIG), E. Winterer (SIO) and Honnorez as chairman. He then presented the following scheme for discussion:

Planning Committee

Engineering/Technical Panel

Thematic Panels:	Regional W.G.:
Ocean Crust	N.E. Pacific Rim
Margin Tectonics	N. Atlantic
Sedimentary Sequences	S.E. Asia
Geologic History	Southern Ocean
	Central, S., S.W. Pacific
	Mediterranean, Black Seas
	Indian Ocean
	S. Atlantic
Discipline Panels	Operational Panels

J. Honnorez compared the above and the existing advisory structures and noted that in the proposed scheme, engineering and technology Panel has a more important role than in the present structure. He suggested that PCOM determine the hierarchy of the various advisory groups.

Discussion

D. Hayes - advisory structure should be more like a pyramid, with very few cosmopolitan panels at the top of the structure. J. Aubouin agreed and suggested 3 thematic panels (Margin, Crust, and Paleoenvironment) with other panels in the present advisory structure as disciplines).

J. Cann - not entirely in agreement with above comments. Part of the problem with the present advisory structure is a lack of communication between Working Groups and the Planning committee; solution is to raise the status of Working Groups to approximately the same level as the thematic Panels. Only 5 Working Groups need to be activated for the early phase of the Explorer program:

N. Atlantic
Mediterranean and Black Seas
S. Oceans
S. Atlantic
S.E. Pacific

E. Winterer - not opposed to a pyramid-type structure but thinks the work load would be too much for a few panels. Defects in the present structure are:

a) inability to plan ahead for site surveys and regional studies (could be solved by the creation of autonomous Working Groups), and b) ship not efficiently utilized in solving regional problems.

Y. Lancelot - panel reporting is presently a problem. If Regional Working Groups are heavily staffed with thematic Panel members, then reporting would be efficient.

J. Creager - panels of both broad and narrow perspectives are needed, but neither should control the structure. Thematic Panels have a broad overview, lead to the establishment of working groups as needed, and receive both proposals for drilling and refined reports.

Most PCOM members expressed concern that the new advisory structure be able to incorporate new ideas from outside (non-panel) sources. Most felt that the existing structure allowed too many new and good ideas to "fall through the cracks." There was general agreement that the new advisory structure should be flexible and responsive to new ideas.

Discussion on the future advisory structure for AODP continued the following day, 8 October. J. Honnorez opened the discussion with a request for PCOM to make decisions regarding phase-out of the existing advisory structure and phase-in of the AODP advisory structure. The following items were discussed:

Phase-out/in adivsory structure: PCOM considered establishing all or part of the AODP advisory structure before terminating the meeting. The following items were raised during discussion:

a) set up a provisional structure now and populate the structure with panel members during the next PCOM meeting (25-28 January 1983).

b) make a first effort at setting up an advisory structure at this meeting, have the existing panel chairman review the proposed advisory structure and then consider their ideas before formulating the AODP advisory structure at the next PCOM meeting.

Concensus

General agreement was reached on the following items leading to phase-out of the existing advisory structure and phase-in of the AODP advisory structure.

a) Only those existing panels which have a direct involvement in the remaining Challenger program should remain active.

ACTION b) Only those panels which have requested panel meetings from the JOIDES office to this date (8 October) will be allowed to meet. J. Honnorez (PCOM chairman) will contact each of 4 major panel chairmen to determine the necessity for meeting prior to disbanding. (At this time it appears that only the Passive Margin Panel would have reason to hold a panel meeting).

c) Panel chairman should solicit suggestions from their panels for possible replacement members.

d) AODP advisory structure. Dissolve the existing discipline panels and absorb them into the Thematic Panels. Combining thematic and discipline panels would result in the following 3 or 4 panels:

Ocean Crust Panel
Margin Tectonics Panel
Sedimentary Sequences Panel } Ocean Environment Panel
Geologic History

e) Reduce the number of panels to as few as possible.

f) Regional working groups should have the same status as thematic Panels.

g) Soon after the January 25-28 PCOM meeting, organize and activate the following RWGs:

E. Pacific (to 140°W)
S. Atlantic
N. Atlantic
Atlantic Marginal Seas (Mediterranean, Caribbean, Gulf of Mexico)

h) All or part of the existing advisory structure and the AODP advisory structure may co-exist for several months to ensure harmonious phasing-in and out of the advisory structures.

Scope of Panel mandates: The issue of either broadly defined or narrowly defined mandates was discussed. Some members felt that a mandate would be too restrictive and that only the field of operation of each panel should be defined; others preferred a narrowly defined mandate with a larger number of panels. E. Winterer noted that R. Moberley had already attempted to write mandates for panels of the AODP advisory structures.

Concensus

ACTION Draft mandates would be written by the AODP science advisory structure subcommittee. J. Honnorez requested J. Cann be added to the subcommittee to replace the two members (H. Beiersdorf and R. Moberly) presently at sea.

390 JOI SCIENCE AND TECHNOLOGY DEVELOPMENT AD HOC COMMITTEE - U.S. BUDGET AND SCHEDULE

NSF requested that JOI provide a plan and budget including co-mingled funds for science and engineering/technology developments during the Explorer conversion period.

J. Honnorez and D. Hayes presented the graph shown in Figure 1, noting that the scale and shape of the cost curve represents the infomation required by NSF for AODP cost planning.

Discussion

P. Borella (NSF) - only a finite amount of funds is available and the cost of Explorer conversion must be considered. J. Honnorez - Explorer will not be efficiently used unless adequate science and technology are available.

R. von Herzen and F. Theyer - post cruise support should be available to maximize science. Post-cruise synthesis may require returning to drill sites for additional surveys.

Site Surveys and Syntheses:

J. Clotworthy (JOI) read the following EXCOM motion (EXCOM draft minutes, motion 223-A, 1-2 September 1982).

(EXCOM motion 223-A) "The Executive committee recommends that the Planning committee provide a list of areas of interest and their priority as a basis for submission and coordination of site and regional survey efforts.

To this end, PCOM members should be invited to present annually the cruise programs of their institutions (or nation), followed where possible by a formal undertaking to carry out said survey in specific areas.

Coordination of scientific effort and equipment is desirable."

Discussion

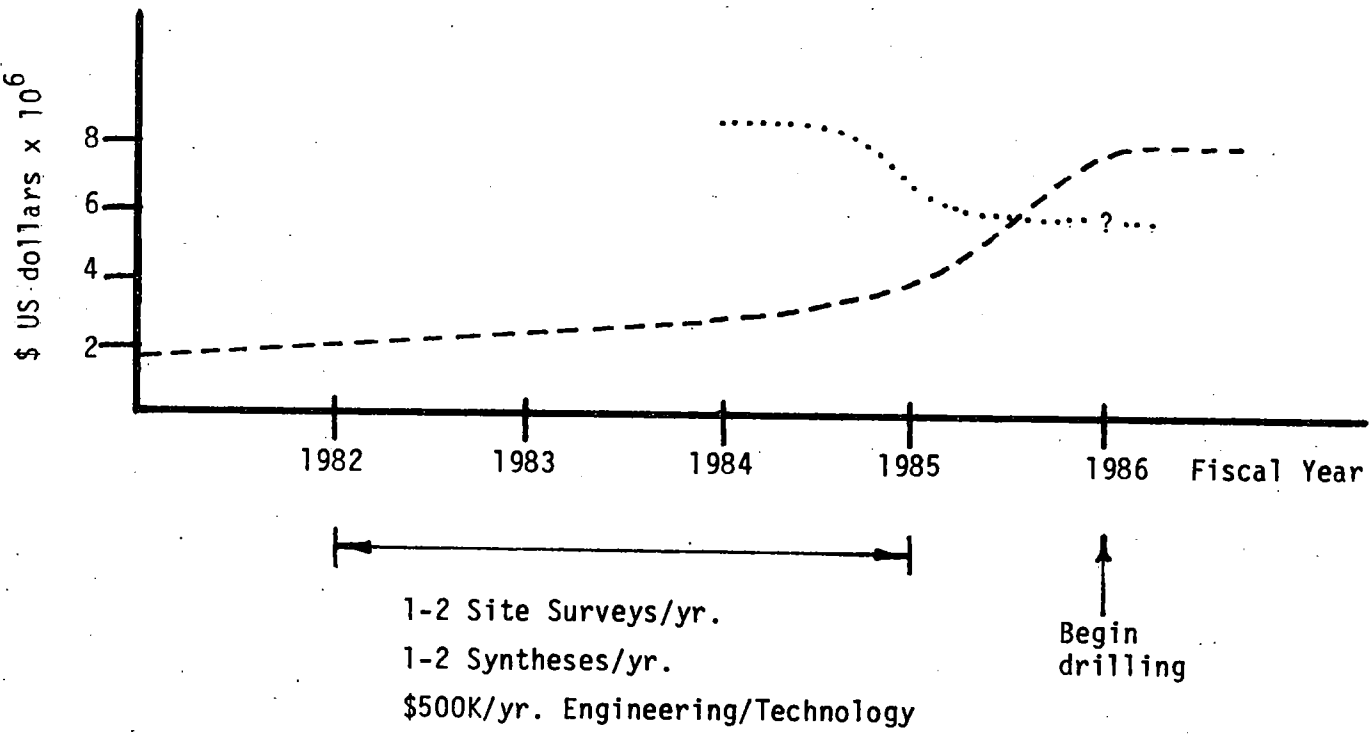
E. Winterer and others - historically 1 useable site survey is made yearly. At least 6 surveys/year are needed; 8/year to keep ahead of drilling. For FY 84/85, 8 surveys/year are needed. At $700 K/survey = $4.2 m. Synthesis cost has been $3 m/11 syntheses. Approximately 4 syntheses ($270 k) needed at start of AODP.

I. MacGregor (NSF) - It is in the interest of JOIDES to use past costs to document the need for future funds and to provide the documentation to NSF.

NSF is considering the following in establishing budgetary constraints:

Science Services	Science Development
Site surveys/regional syntheses	Regional syntheses/science
IPOD	Logging (instrumentation and ideas)
Management	Engineering (drilling)

Science Services items are controlled by JOIDES and typically funded through contracts in response to RFPs; Science Development is not controlled by JOIDES, and is typically funded through grants.


$ US dollars x 10^6
8
6
4
2
1982
1983
1984
1985
1986
Fiscal Year
?
1-2 Site Surveys/yr.
1-2 Syntheses/yr.
$500K/yr. Engineering/Technology
Begin drilling
NSF Cost Estimate
PCOM Cost Estimate

Concensus

ACTION Each non-U.S. member representative should try to determine (at least approximate) the likely level of activity in site surveys, regional synthesis and post-cruise studies, for presentation at the next PCOM meeting.

PCOM recognizes the need for science services and science development and alerts IPOD members to these needs.

J. Honnorez appointed a subcommittee consisting of R. von Herzen, D. Hayes (will present data to EXCOM), and J. Honnorez to determine U.S. costs for science and engineering/technology development.

391 FUTURE MEETINGS

J. Honnorez reported that the upcoming PCOM meeting in the San Francisco bay area 25-28 January 1983 is still in the planning stage. All panel chairmen will be invited to attend. A visit to the Explorer will be made during the meeting.

J. Cann (UK) reported that the location of the June 1983 PCOM meeting will not be Swindon (NERC) as previously planned. Newcastle or a small town in the vicinity of Newcastle is the likely location.

Dates of the meeting are 1-3 June 1983.

The cost of the field trip after the PCOM meeting will be subsidized by NERC; a 3 day trip to Scotland (including transportation, meals and lodging) should cost $150/person, and $180/person for a 4 day trip.

The PCOM meeting after the June (UK) meeting will be held in Seattle, Washington in September 1983. J. Creager is in the process of making arrangements.

392 CLOSING REMARKS

J. Honnorez thanked D. Hayes (L-DGO) for meeting arrangements and adjourned the Planning Committee meeting at 14:45, 8 october 1982.

EXPLORER CONVERSION FOR SCIENTIFIC OCEAN DRILLING

W. F. Perkins — Lockheed Missiles and Space Company, Inc.
F. A. Agdern — National Science Foundation
D. H. Reudelhuber — SEDCO, Inc.

Abstract

The design of a conversion of the GLOMAR EXPLORER from a heavy-lift vessel to a drillship is in process. The conversion is directed toward providing means for continued scientific drilling and coring of the crust in the deep oceans. Major features of the conversion are described in summary fashion together with operational capabilities. Provisions for future use of a marine riser in a second conversion step are noted. Laboratories and associated scientific support spaces are described with the general observation that the conversion offers an unprecedented opportunity for thorough scientific work at sea.

INTRODUCTION: Significant advances in understanding the processes of evolution of the earth have been made over the past two decades. In large measure, the progress has been possible because of the data provided from core samples of the ocean floor obtained by the highly successful Deep Sea Drilling Project (DSDP). The DSDP has been sponsored by the National Science Foundation (NSF) for over 15 years and operations have been conducted by the Scripps Institution of Oceanography over that period using the ship, GLOMAR CHALLENGER, to obtain cores in the deep ocean.

The overall scientific objectives of the DSDP have always included some needs for coring under conditions beyond the capabilities of CHALLENGER. The capabilities to drill on the margins, where a marine riser for well control may be required, and in polar regions where ability to transit through floating ice is needed, are particularly notable. Consequently, engineering studies were begun about eight years ago to determine if CHALLENGER's design could be reasonably extended to meet these needs or if, in the long run, a new ship should be constructed for deep ocean scientific drilling. Results of a series of studies, Refs. (1) through (6), have supported the contention that a drillship larger than CHALLENGER is needed to meet the long-term objectives of continued scientific drilling. Further, the studies have concluded that conversion of the EXPLORER to a drillship is the most viable alternative for obtaining the essential features required for scientific drilling in the foreseeable future.

The preliminary design of the EXPLORER conversion to a drillship is currently in progress under a contract to the NSF, Office of Scientific Ocean Drilling. Lockheed, SEDCO, Earl & Wright, Western Gear Corporation, and Honeywell Marine Systems are working under the Systems Integration Contract to establish principal features during 1982 and to complete design work in mid-1983.

This paper contains summary descriptions of design features for conversion of the EXPLORER to a scientific drillship together with principal requirements leading to the design. In particular, the provisions for conducting scientific work onboard the ship and for expanding capabilities to include drilling with a marine riser are noted with the conclusion that the large size of the ship is a major attribute in the context of a long-term scientific drilling program.

REQUIREMENTS: In 1979, the NSF began detailed planning of a drilling program to supersede the DSDP and meet future scientific objectives. Comprehensive specifications of performance and engineering requirements for a drilling vessel were developed by the Foundation under a contract awarded to the Santa Fe Engineering Services Company. This work was complemented by support from Government agencies, studies from other contractors in specialty areas, scientific planning from the academic community, and engineering advice and review from the petroleum industry. The resulting Performance Specification consequently

addressed all design issues from environments through operations and logistics considerations.

Condensed versions of the system requirements with greatest influence on design of the EXPLORER conversion are:

- Drilling and coring with drill string lengths up to 33,200 ft.
- Dynamically-positioned, normal drilling operations in the presence of 15-ft significant wave height (27-ft max), 45-knot winds with gusts to 60 knots, surface currents in excess of 2 knots.
- Dynamically-positioned, standby mode in the presence of 26-ft significant (50-ft max) wave height with 60-knot winds and gusts to 90 knots.
- Storage and handling of casing strings with an aggregate length of casing onboard (including running string) of about 56,000 ft.
- Onboard storage of mud, cement, provisions, and fuel for prolonged operations at remote sites with minimal replenishment at sea.
- Laboratories and other related scientific facilities to allow comprehensive investigations at sea in a variety of specialties.

Other requirements of special note for the conversion include ice strengthening and winterization, expansion of personnel accommodations from 100 to 150, automatic equipment for tubular handling, and a plant management system for control and monitoring of various equipment and functions.

The design criteria for the conversion of the EXPLORER have not changed significantly during the Preliminary Design period. However, revised scientific program planning over the last year has permitted deferral of the development and use of the marine riser and subsea systems for about three years. Since the ship must eventually have the capability to employ the riser, there has been no material effect on ship conversion features in preliminary design. Possible deferral of installations related to riser and subsea systems are being defined in preparation for a planned two-step construction. However, other than installation of the riser itself, the subsea equipment, riser tensioners, and well control equipment, most features of the conversion will probably be incorporated in the first construction.

PRINCIPAL CHARACTERISTICS: An abbreviated list of principal characteristics for the EXPLORER, following conversion, is given in Table 1.

TABLE 1
PRINCIPAL CHARACTERISTICS

A.B.S. CLASSIFICATION	✠A1 Ⓔ AMS MOBILE OFFSHORE DRILLING UNIT, UNLIMITED OCEAN SERVICE, ICE CLASS 'C'
CONSTRUCTION	WELDED STEEL, A.B.S. LONGITUDINALLY FRAMED
LENGTH, OVERALL	619'-4"
BREADTH, MOLDED	115'-8-1/2"
DEPTH, MOLDED AT SIDE	50'-10"
MOON POOL SIZE	41'-8" X 47'-8"
HEIGHT TO DERRICK TOP	258'-10"ABL (APPROX.)
DISPLACEMENT AT SUMMER LOADLINE	57,074 L.T. (APPROX.)
LIGHTSHIP DISPLACEMENT	23,000 L.T. (APPROX.)
OPERATING DISPLACEMENT (EST.)	44,422 L.T. W/O RISER AND BOP
OPERATING DRAFT (EST.)	30'-2"
SERVICE SPEED (EST.)	9 TO 11 KNOTS
PROPELLERS	TWO, 15-FOOT DIA., 6600 HP EACH
TUNNEL THRUSTERS	3 FWD AND 2 AFT (ORIG.) 2150 HP EACH
RETRACTABLE, AZIMUTHING THRUSTERS	1 FWD AND 2 AFT (NEW) 2150 HP EACH
ENDURANCE	200 DAYS (BASED ON ESTIMATED FUEL RATE AND CAPACITY)
	200 - 300 DAYS (BASED ON REEFER AND DRY STORES CAPACITY)
NUMBER OF BERTHS	42 FWD AND 108 AFT

CONVERSION FEATURES: It is important to note that most of the present ship installations are preserved and used as is, needing only reactivation to become part of the complete system. Existing hull structure, main and station keeping propulsion, electrical plant, communications and navigation gear, auxiliary systems, and accommodations will all be used. New installations and changes are almost exclusively related to the drilling, mud, additional stationkeeping, and plant management systems and the new scientific spaces.

Figure 1 is the outboard profile of the EXPLORER in the converted configuration. The significant changes to the ship are in the mid-body between forward and aft deckhouses. Of special note in Figure 1, are:

- Three, new azimuthing thrusters (retractable) below the keel
- Relocation and upgrading or replacement of existing deck cranes

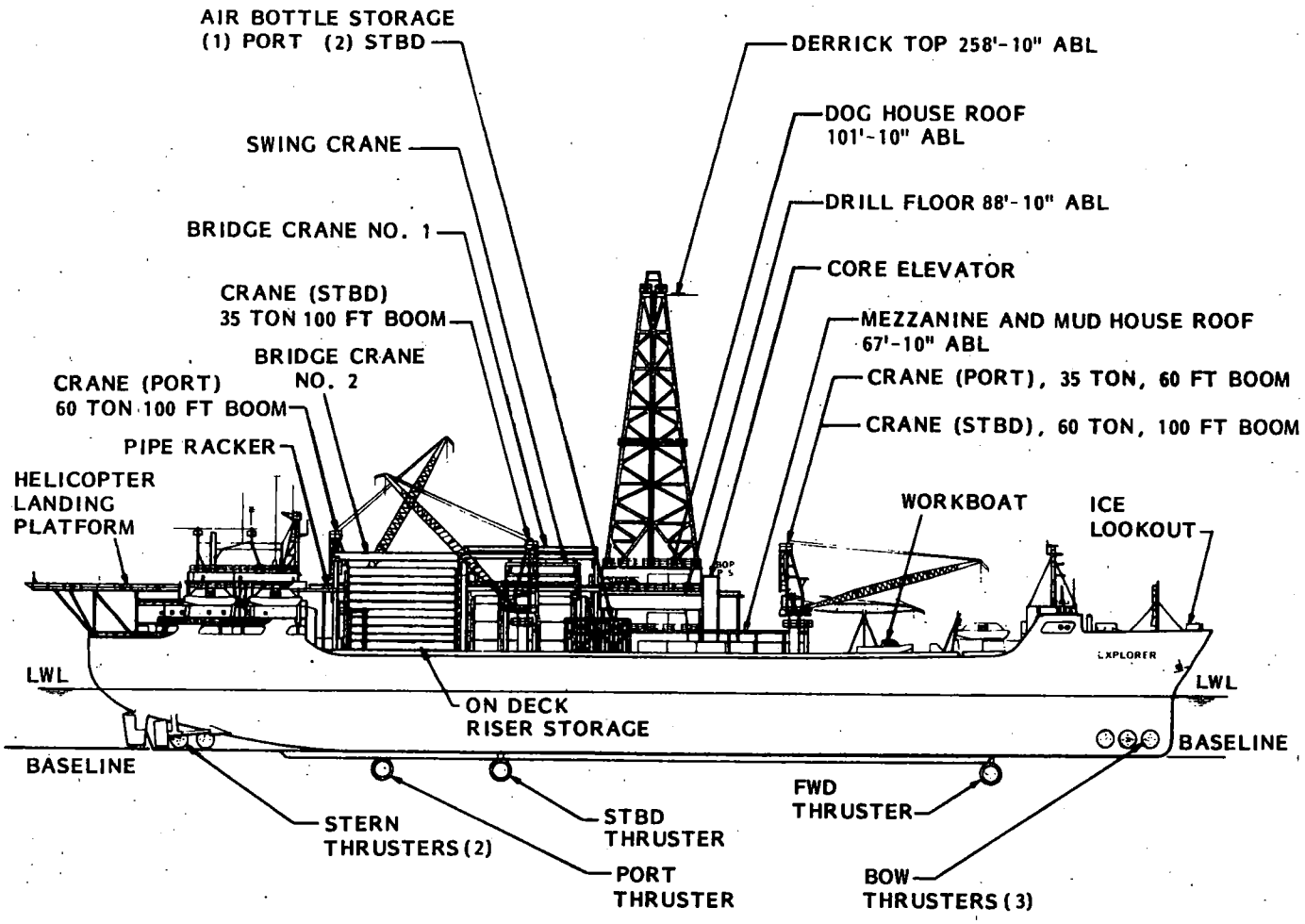


FIGURE 1, OUTBOARD PROFILE

- Provisions for two Blowout Preventer (BOP) stacks
- New derrick, substructure, and related decks
- Riser and casing handling and storage provisions
- Automatic piperacker
- Core elevator from drill floor to upper 'tween deck for protected transfer of cores to the science spaces

Figure 2 is the Inboard Profile. Principal changes to the ship are illustrated and summarized as follows:

- Moon pool (42 ft long x 48 ft wide) provided by new cofferdams (existing well is 200 ft long and extends from space designated 'LABS' to between casing and riser holds)
- Additional 2-man state rooms in the forward deck house (presently bunk rooms)
- Laboratories on upper and lower 'tween decks (present storage and hydraulics equipment spaces no longer required)
- Bulk tanks, mud and cement equipment, sack storage, and mud tanks forward of the new moonpool in new spaces created by reduction of the existing moonpool
- Casing hold in new space aft of the moonpool
- Riser hold in same space presently used to store pipe

Other major aspects of the design for conversion of the EXPLORER to a drillship are:

- Modernization of the automatic control for main screws and side thrusters for dynamic positioning and stationkeeping
- Additional electrical plant capacity of 9200 kw to service the additional thrusters and drilling equipment
- Computer-based management of the electrical system and monitoring of ship functions

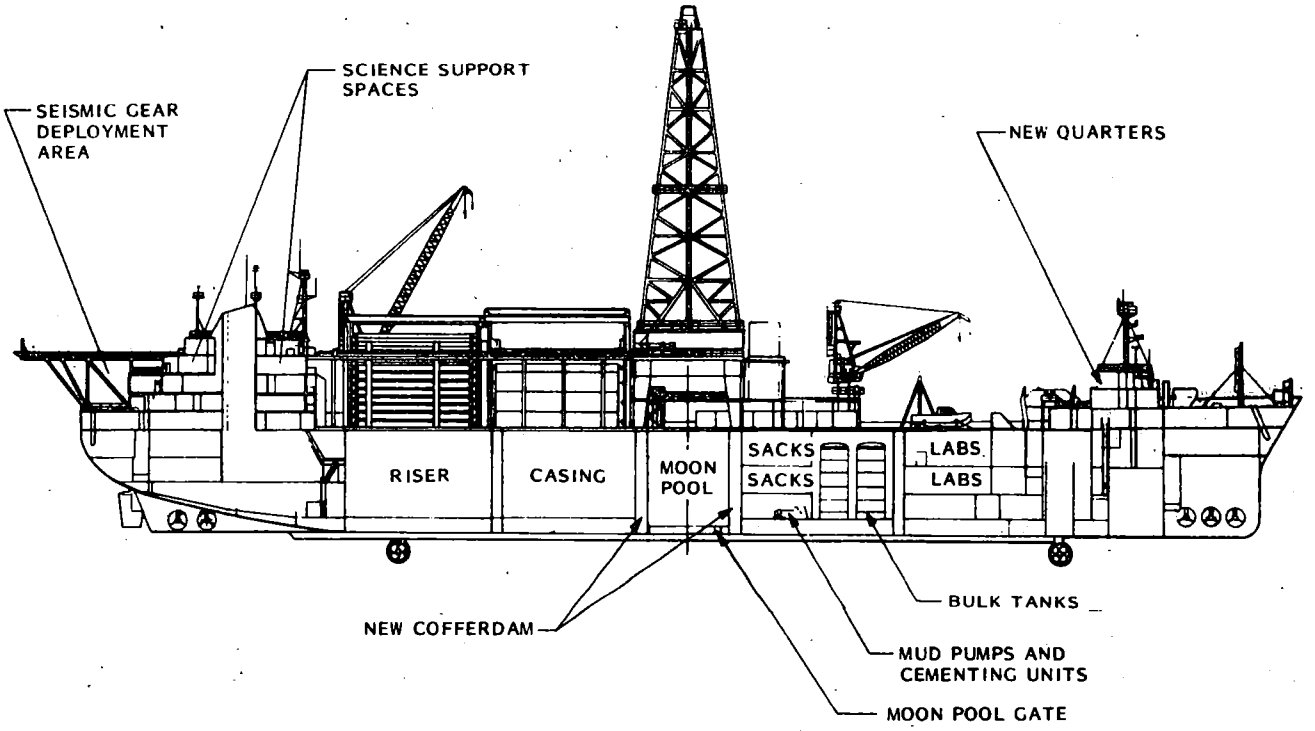


FIGURE 2, INBOARD PROFILE

- Facilities for scientific needs in addition to main laboratories

DRILLING EQUIPMENT: The performance requirements of the equipment needed for future scientific drilling and coring are detailed in the specification prepared by the NSF as noted under the REQUIREMENTS Section. The essential purpose of the system is to provide efficient means for the retrieval and analysis of cores. The drilling and core-handliing equipment and laboratory spaces have been designed and arranged to optimize operations to that end. Building upon the unique and highly successful equipment developed for scientific drilling in the DSDP program, new state-of-the-art equipment is planned incorporating the best features of DSDP, as well as those of industry. Unique features, compared with current practice for most offshore rigs, are summarized as follows:

- Drill pipe with 4 in. ID for wireline core barrel operations
- Power sub and swivel - 1000 HP/750 Ton
- Derrick - 2 Million lbs dynamic load
- Compensator - 1 Million lbs load, 25-ft stroke
- Drawworks rated at 4000 HP mechanical input
- Derrick and substructure sufficient to handle 13,200 ft riser
- Riser storage capacity
- Mid-level disconnect handling capability
- Bulk storage capacity
- Three, 1600 hp mud pumps together with a complete suite of pits and mud processing equipment
- Dual cementing pumps with electric drives plus one emergency diesel-driven pump
- Automatic piperacker for 33,000 ft of drillpipe

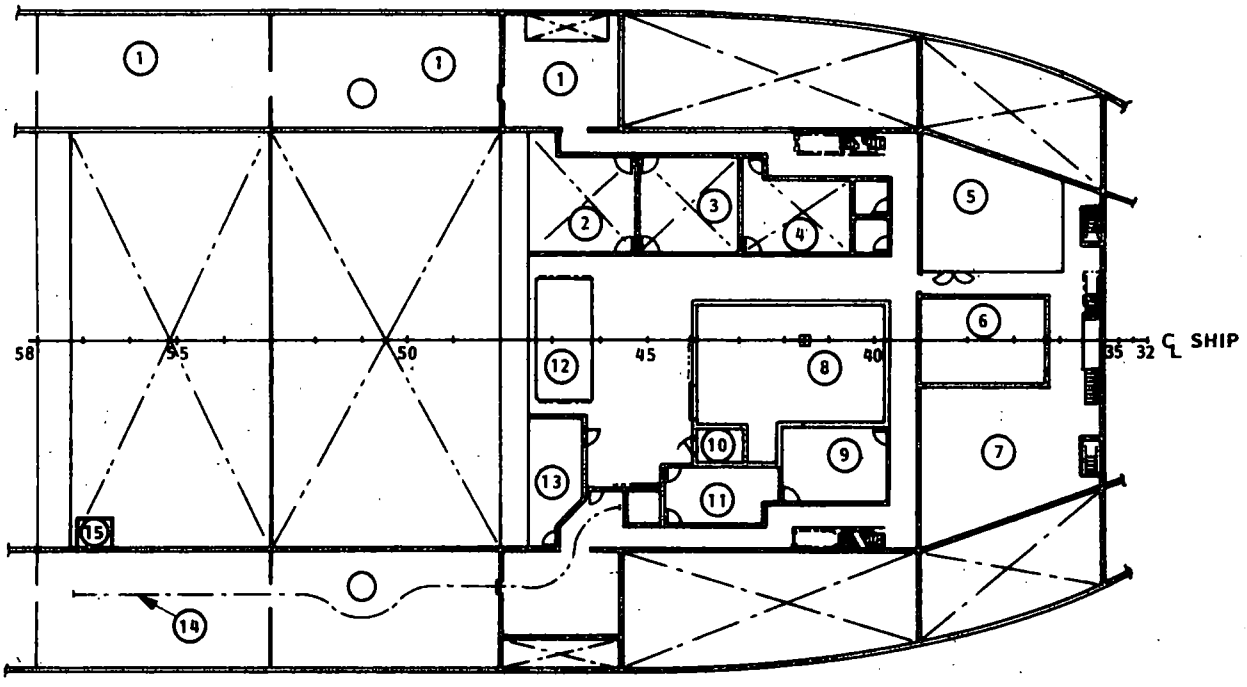
CORING OPERATIONS: Core barrels are run and retrieved without setting aside any part of the drilling equipment. In practice this capability is effected by careful planning, and knowledge of the actual operating sequence during core barrel retrieval and running. Because the coring operations are repetitive and time consuming, a simple yet efficient system is used.

All core barrels are run and retrieved from the drill floor level. A system utilizing the maximum amount of presently available, standard equipment has been designed. The system can be used easily for standard rotary table drilling with a kelly, in addition to the primary method using a power sub and swivel combination. Core barrels can be tripped without setting equipment aside using power sub.

Once the core has reached the drill floor it is cut into approximately 5-foot sections and prepared for transportation to the laboratory spaces. The cutting and transportation operation may be accomplished in either a horizontal or vertical fashion depending on the analysis requirements for a particular core. A cart and rail system maintains positive control of the cores throughout their trip from the drill floor, down the elevator to the upper 'tween deck, and forward to the laboratory spaces. The system also provides maximum protection from the weather associated with severe environments expected for future operations.

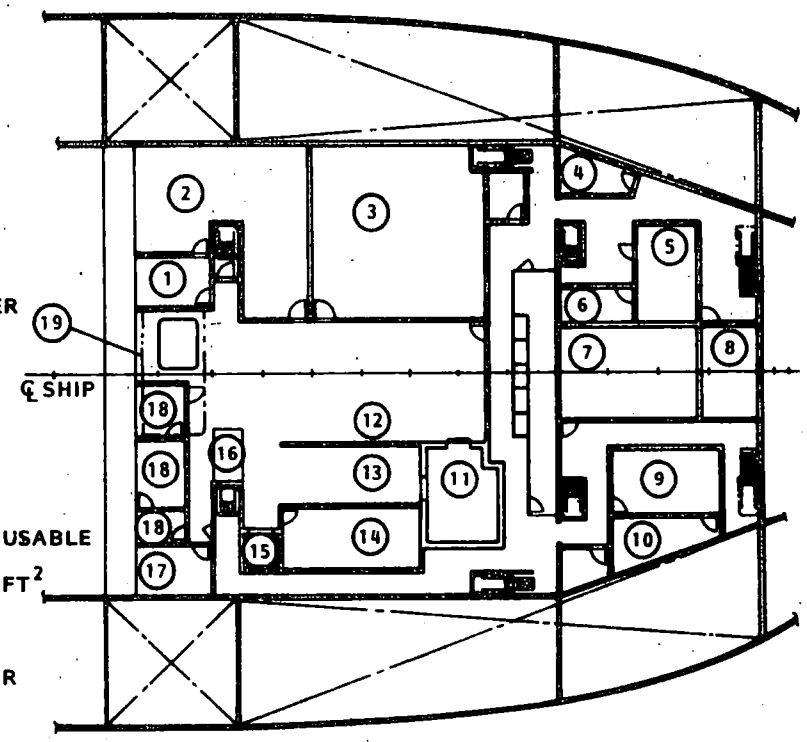
SCIENTIFIC SPACES: The purpose of the EXPLORER conversion is to provide an efficient means for collection and scientific analysis of cores. The size of the ship provides a unique opportunity for scientific work at sea as the cores are taken. More than 50 accommodations are available for scientific personnel so that any extensive facility can be properly manned and used for onboard investigations. Approximately twenty laboratory spaces have been designated together with about ten supporting spaces such as shops, library, offices, and computer room. Ample space for working materials and core storage are included in the design. In all, about 10,000 square feet have been allocated to scientific purposes in the forward areas alone.

The principal laboratories have been located on upper and lower 'tween decks, between the forward deckhouse and existing cofferdam. (See Fig. 2.) A preliminary design of the layout for these spaces was developed using the experience of scientists and technicians associated with CHALLENGER and DSDP operations. Figures 3 and 4 are the arrangements of upper and lower 'tween deck scientific spaces, respectively.



① WING WALL (PASSAGE TO AFT DECKS)
② WOODWORKING SHOP, 331 FT^3
③ MACHINE SHOP, 306 FT^3
④ ELECTRONICS SHOP, 253 FT^3
⑤ STORES, 533 FT^2, 7462 FT^3
⑥ THRUSTER ACCESS
⑦ RECREATION ROOM
⑧ REEFER CORE STORAGE 734 FT^2, 10276 FT^3
⑨ SEMI/MICRO-PROBE LAB 247 FT^2
⑩ FREEZER 50 FT^2
⑪ SECOND LOOK LAB 200 FT^2
⑫ HATCH (OVER) 21'8" X 10'-0"
⑬ X-RF/X-RD LAB 170 FT^2
⑭ CORE HANDLING TROLLEY
⑮ CORE ELEVATOR

FIGURE 3, UPPER TWEEN DECK SCIENTIFIC SPACES



(1) CURATORS OFFICE, 105 FT^2

(2) PALEONTOLOGY LAB, 574 FT^2

(3) CHEMISTRY LAB, 802 FT^2

(4) STORAGE, 73 FT^2

(5) CONFERENCE ROOM, 165 FT^2

(6) OFFICE, 72 FT^2

(7) RESERVED, ACCESS TO THRUSTER

(8) STORAGE, 142 FT^2

(9) THIN SECTION LAB, 198 FT^2

(10) POLISH (THIN), 117 FT^2

(11) CORE CUTTING ROOM, 171 FT^2

(12) CORE PROCESSING LAB, 360 FT^2 USABLE

(13) PHYSICAL PROPERTIES LAB, 328 FT^2

(14) CRYO MAGNETICS, 242 FT^2

(15) CORE ELEVATOR (FROM/TO UPPER 'TWEEN DECK)

(16) CORE RACK

(17) REPAIR AND CALIBRATION SHOP, 100 FT^2

(18) PHOTO EQUIPMENT ROOMS (90 FT^2) (94 FT^2) (72 FT^2)

(19) HATCH (OVER), 21 FT-8 IN. X 10 FT-0 IN.

FIGURE 4, LOWER TWEEN DECK SCIENTIFIC SPACES

The cores are brought forward from the drill floor in the upper 'tween deck passage and then put on an elevator to the lower 'tween deck where the analysis center is located. Cores enter at a physical properties station where they can be analyzed by a magnetometer prior to being split longitudinally in the sound-insulated cutting room. If necessary, the cores can be diverted to a cryogenic magnetometer first. Upon being split, the core may exit through either the physical properties or core processing lab depending on the needs and desires of the particular scientific party on board.

In general, one half of the core will go immediately to core storage, while the working half enters the core processing laboratory and a photographic record is made. Disciplines with a high degree of interface - paleontolgy, chemistry, and sedimentology - are located in, or adjacent to, the core processing area. The thin section laboratory, with its separate polishing room, X-RAY lab and the SEM/micro-probe lab are located more remotely since only small samples are required for this work.

After processing, the working half is also moved up to the refrigerated core storage on the upper 'tween deck. A second-look lab is located adjacent to core storage where any section may be re-examined conveniently. Service spaces, also located on this deck, are the electronic, machine and woodworking shops. These shops are intended for science support only and are in addition to a full complement of shops for ship servicing provided aft.

A large staging area under the 22-ft by 10-ft hatch provides a significant degree of flexibility in accessing the scientific spaces. Transportation modules, from the small air cargo type used by DSDP to a large 8x8x20 van, can be placed on the upper 'tween deck for easy loading and removal of cores. Also, unique equipment in pre-outfitted 8x8x20 vans can be placed onboard and directly into the science spaces for the particular use.

In addition to the two large laboratory areas, space is provided on the drill floor and mezzanine for logging or downhole experiments vans. Provisions

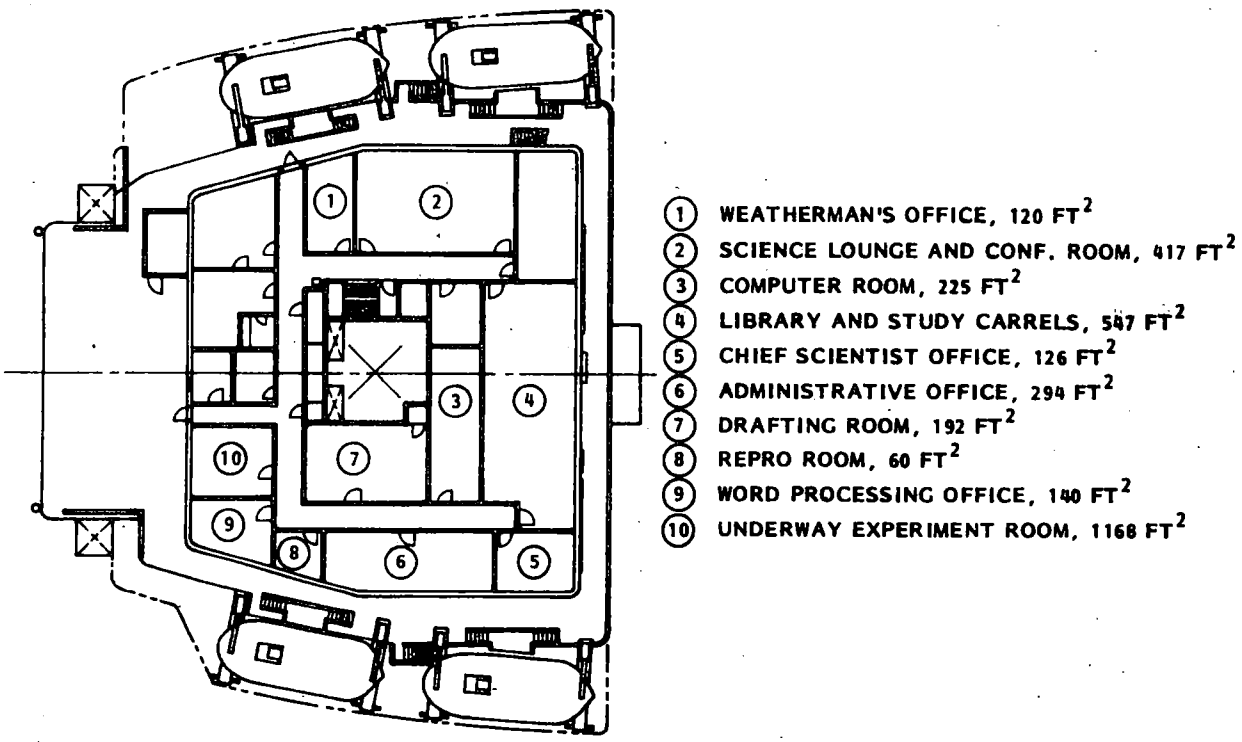


FIGURE 5, AFT DECK HOUSE SCIENCE SUPPORT SPACES

have been made for 200 sq-ft vans, 2 on each deck. The aft deck house shown in Fig. 5 incorporates additional scientific support spaces such as offices, computer and word processing facilities, library with study carrels, lounge and conference room and provisions for underway (seismic) experiments. Data recording, processing, and transmitting equipment are provided for ready access onboard through distributed terminals and for transmittal to shore.

CONCLUSIONS: In summary, exceptional consideration has been given to the scientific purposes of the EXPLORER conversion to a drillship. It is expected that the completeness of the facilities will lead to more extensive investigation and analysis of the cores at sea with resulting benefits to the quality of the scientific work. The initial conversion of the ship to operate without a marine riser will provide the opportunity to transfer the successful operational procedures of DSDP while developing and exploiting the capabilities of the EXPLORER. In the future, drilling with a marine riser on the margins and for greater penetration of the crust will be reasonably implemented since the design has provided for equipment and space needed for this mode of drilling. In all, the size and capabilities of the ship will assure that all foreseeable scientific objectives for coring in the deep ocean can be met.

References

(1) Oceanographic and Vessel Evaluation for IPOD Ocean Margin Study, Ocean Resources Engineering (September 1975).

(2) Feasibility of Converting Glomar Explorer into a Deep Water Drilling and Coring Vessel, Global Marine Development (February 1977).

(3) Ocean Margin Drilling Program - Evaluation of ORE Report, Phase I, Donhaiser Marine, Inc. (July 1978).

(4) Ocean Margin Drilling Program - Evaluation of GMDI Report, Phase II, Donhaiser Marine, Inc. (August 1978)

(5) Ocean Margin Drilling Program - Glomar Explorer Operations Analysis, Phase IV, Donhaiser Marine Inc. (October 1979)

(6) Ocean Margin Drilling - A Program for Scientific Ocean Drilling and Research in the 1980's. Volume III - Final Report Technology Development: Conceptual Baseline Design and Cost Estimate, Santa Fe Engineering Services Company.

ANNEX A

Terms of Reference for
JOIDES EXECUTIVE COMMITTEE
FOR IPOD

1. This committee shall formulate scientific and policy recommendations with respect to the Deep Earth Sampling Programs. It shall conduct Deep Earth Sampling Program planning, as well as evaluation and assessment of the Program as to its accomplishments as compared to the goals and objectives which have been established. It may be assigned managerial and operational responsibilities for appropriate tasks.

2. The members of this committee shall be representatives of oceanographic and marine research institutions or other organizations which have a major interest in the study of the sea floor and an adequate capability in terms of scientific manpower and facilities to carry out such studies.

3. The initial membership of this committee will be the same as the existing JOIDES Executive Committee. The appointment of additional members will be determined by the Governors on the recommendation of the JOIDES Executive Committee for IPOD.

4. Each institution or organization designated for participation on this committee by the Board of Governors shall provide one voting member, normally the director or senior deputy thereto.

5. The Executive Committee shall reach all its decisions by two-thirds majority vote of all members. A quorum shall constitute two-thirds of the Executive Committee. Notices of meetings and agendas will be sent to members 60 days prior to the time of the meetings. If a member of the Executive Committee is absent from a duly called meeting of the Executive Committee, he or she may designate an alternate from his or her institution, with full authority to act for him or her in his or her absence.

6. The Committee may establish subcommittees for cognizance of certain components of the Deep Earth Sampling Program. Areas of cognizance and the terms of reference for each subcommittee shall be defined by the Executive Committee. In particular a Planning Committee shall be established. It shall be composed of one member designated by each member of the Executive Committee. The vote in this committee shall be on the basis of absolute majority.

7. The Committee, and all subcommittees thereto, shall keep written records of their proceedings.

8. Members of this Committee, and members of subcommittees duly appointed thereby, while acting within the terms of reference, shall be indemnified, and held harmless by the corporation from and against any and all liabilities, damages and demands, losses, costs, and expenses arising from acts or omission related to performance as committee members.

9. These terms of reference, on approval by all members of the existing JOIDES Executive Committee, will supercede all previous JOIDES agreements.

DARPA Scientific Objectives

- Noise Study
  - Decrease in noise level with depth of burial
  - Frequency-wavenumber characteristics
  - Temporal behavior
  - Test of noise models
- Refraction Study
  - Structure of oceanic crust
  - Anisotropy of crust and upper mantle
  - Shear-wave propagation characteristics
- Teleseismic Study
  - Comparison of signal quality and SNR of OBS and downhole sensors
  - Structure of the oceanic upper mantle
  - Anisotropy of sub-lithospheric mantle

Distances between sites and points of interest.

Site	Wellington	Honolulu	Papeete	Trench	Mururoa
A	970 Nm	2950 Nm	1500 Nm	3.2°	31.5°
C	1240 Nm	2720 Nm	1290 Nm	4.0°	31.1°
D	1334 Nm	2678 Nm	1147 Nm	6.0°	27.7°
E	1305 Nm	2758 Nm	1131 Nm	7.6°	26.1°

Possible sites for the MSS S. Pacific experiment.

Site	Latitude	Longitude	Depth (uncorr. m)	Trans. layer thickness (m)	Airgun data
A	25° 20' S	171° 40' W	5500	70-80	C17-13 '74 Nov 24 1300 h
C	22° 10' S	169° 50' W	5500	60-70	EL40 '69 Oct 23 1200 h EL40 '69 Nov 03 1400 h
D	22° 20' S	167° 10' W	5500	40-50	EL40 '69 Oct 24 1500 h C17-13 '74 Dec 05 0000 h
E	23° 40' S	165° 50' W	5700	50-60	C17-13 '74 Dec 05 1600 h

Date	R/V Melville	D/V Glomar Challenger
Jan 6	Dp. Pearl Harbor	
13		Dp. Wellington
17	Survey site	
18		
19		Drill pilot hole
20		
21		
22	Deploy ATNAV-II bottom	Drill main hole
23	navigation system	
24	Deploy OBS array for	
25	noise and refraction	
26	experiments	
27		
28		Install MSS
29	Refraction experiment	
30		
31		Record MSS on deck
Feb 1		
2		
3		
4	Redeploy OBS array	
5	for passive experiment	Deploy BPP
6		
7	Dp. site	
8		Dp. site
12	Ar. Papeete	
14		Ar. Papeete
15	Pequod Buoy Work (WHOI)	
Mar 8	Ar. Papeete	
9	Install IRR equipment	
13	Dp. Papeete	
18	Recover OBSs	
19		
20	Recover BPP	
21		
22	Redeploy BPP mooring	
23		
24	Dp. site	
28	Seamount dredging work (Menard)	
29		
30		
31		
Apr 1	Ar. Papeete	