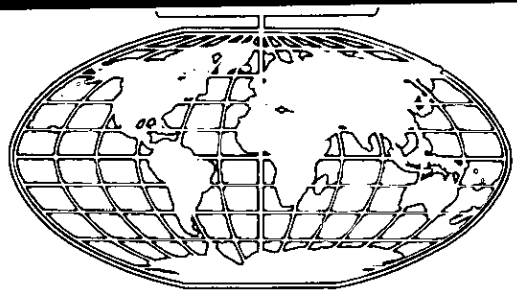
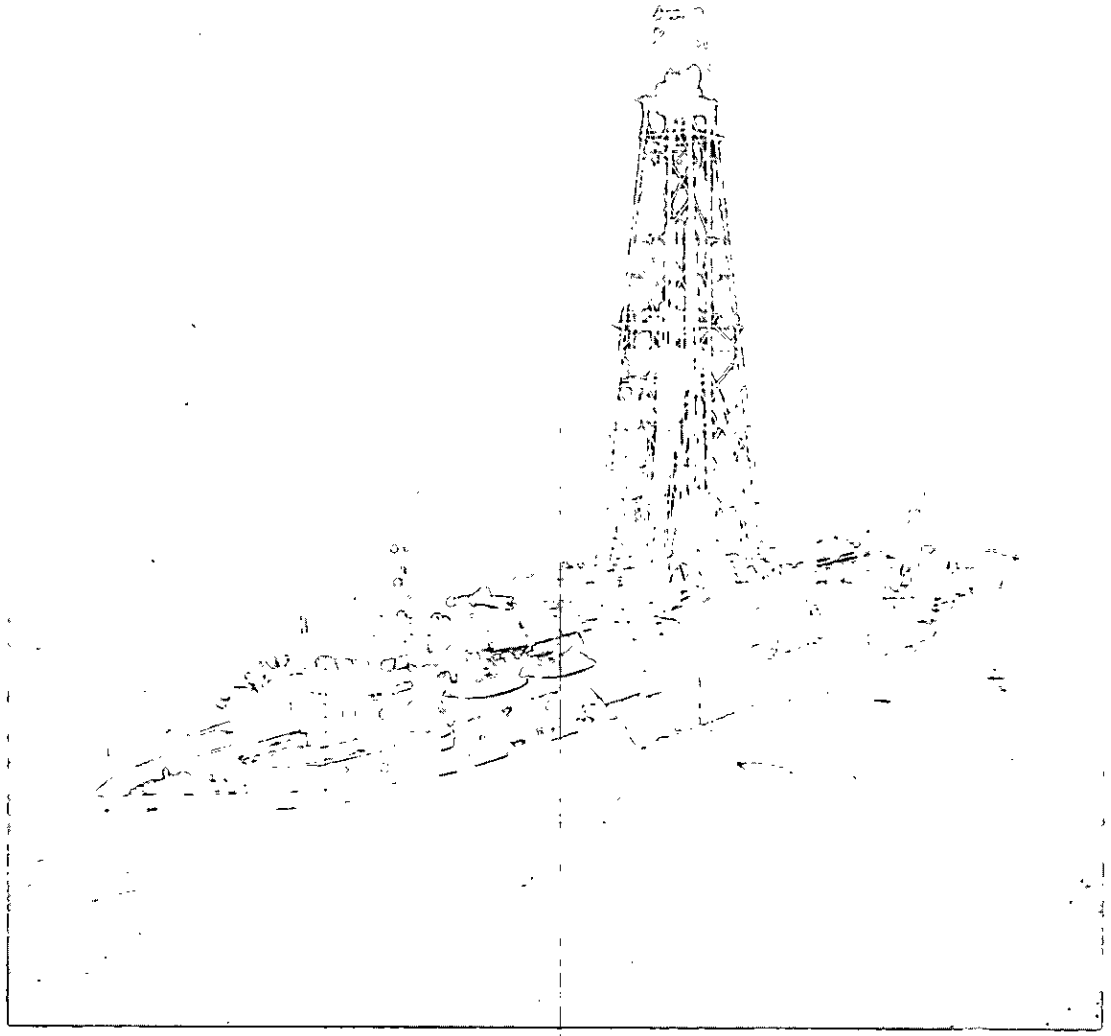


JOIDES Journal

VOL. XIV, No. 4, December, 1988

A GUIDE TO THE OCEAN DRILLING PROGRAM



JOIDES Journal

VOL. XIV, No. 4, December, 1988

TABLE OF CONTENTS

PREFACE

The continued evolution of scientific ocean drilling and the Ocean Drilling Program has resulted in many changes in the organization and facilities that are available.

Continuing requests for information about the Program and its constituent parts have resulted in the need to update this Special Issue of the JOIDES Journal which is intended to be a brief but reasonably comprehensive guide to the Ocean Drilling Program.

Within such a compilation, the amount of detailed information is necessarily restricted. Users are advised to consult the appropriate contact points which are listed in the Directory section at the back of this issue.

Updates to the Special Issue will be published as changes in the Ocean Drilling Program require.

December 1988

OCEAN DRILLING PROGRAM ORGANIZATION & STRUCTURE

INTRODUCTION

The Ocean Drilling Program (ODP) is an international effort to explore the structure and history of the ocean basins. The Program's focus is to provide core samples and data from downhole experiments in the ocean basins, and to provide facilities for the study of these samples and data.

Study of the ocean basins will lead to a better understanding of the structure and composition of the earth's crust, the processes of plate tectonics, conditions in ancient oceans, and climatic changes through time. This understanding will, in turn, lead to a fuller comprehension of the evolution of the earth.

The Ocean Drilling Program (ODP) is funded by the U.S. National Science Foundation (NSF) together with contributions from international partner nations. International partners in the program include the Canada/Australia Consortium, the European Science Foundation, the Federal Republic of Germany, France, Japan, and the United Kingdom.

ODP is managed by Joint Oceanographic Institutions, Inc. (JOI) as the prime contractor to NSF. JOI is a consortium of ten U.S. oceanographic institutions which provides management support to large multi-institutional research programs.

The overall objectives of ODP are established by the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), an international group of scientists representing U.S. institutions and international partner nations. JOIDES provides planning and advice on scientific goals and objectives, facilities, scientific personnel, and operating procedures.

Operation of the drillship, including final planning and implementation of all cruises, is managed by Texas A&M Research Foundation at Texas A&M University.

As Science Operator, Texas A&M University (TAMU) is also responsible for implementing science plans and operations; engineering developments to improve drilling technology; selecting scientists for shipboard science parties; designing and maintaining shipboard laboratories; curating and distributing core samples and data; publishing scientific results; and assisting with ODP public relations.

The Lamont-Doherty Geological Observatory (LDGO) Borehole Research Group manages wireline logging operations. LDGO is responsible for obtaining electronic measurements in the drill holes, and for supplying the geophysical and geochemical services involved in the acquisition, processing, and presentation of in situ wireline logging measurements. Basic logging services are provided by Schlumberger Offshore Services under contract to LDGO.

The ODP Site Survey Data Bank is also located at Lamont-Doherty Geological Observatory. The Site Survey Data Bank houses regional geophysical and site survey data, and is responsible for assisting JOIDES advisory panels in developing ODP drilling programs.

The management structure for the Ocean Drilling Program is shown in Figure 1.

NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent federal agency which was established in 1950 to promote and advance scientific progress in the United States.

ODP falls under the Oceanographic Centers and Facilities Section of the Ocean Sciences Division of the Directorate for Geosciences. The Directorate for Geosciences manages most NSF programs in the environmental sciences.

The ODP office at NSF is responsible for overseeing the Program and for administering commingled funds from

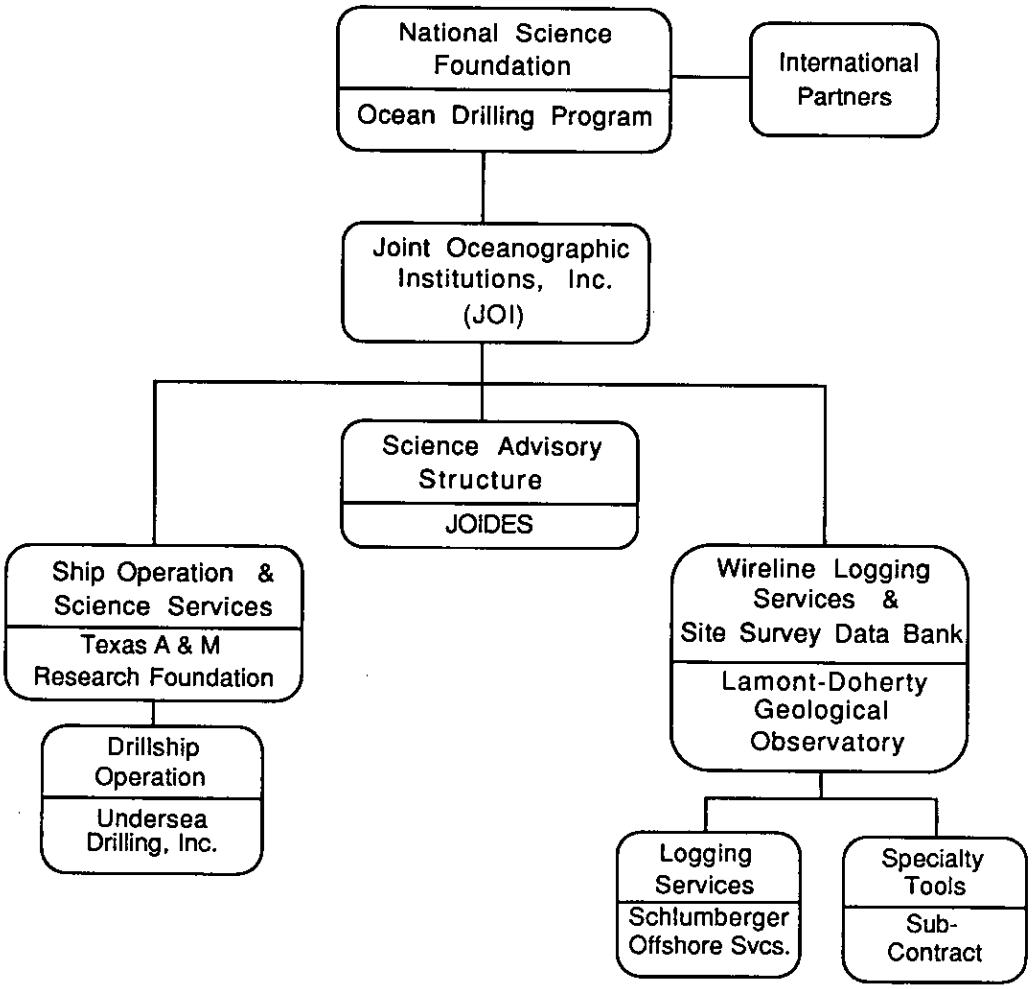


Figure 1. Management structure of the Ocean Drilling Program.

the international partners. It is also responsible for supporting drilling-related U.S. science activities.

INTERNATIONAL PARTICIPATION

Memorandum of Understanding

A prerequisite for participation in ODP is a Memorandum of Understanding between NSF and the responsible funding agency in a partner nation.

The Memorandum of Understanding outlines the relationship between NSF and the partner agency (see p. 4).

Ocean Drilling Program Council

The ODP Council was established as a consultative body and represents all JOIDES member countries. The ODP Council provides a forum for exchange of views among member nations and reviews financial, managerial and other matters regarding the overall support of ODP. Each member nation has one representative on the ODP Council.

The ODP Council meets annually at a meeting convened by NSF. The Director of the Oceanographic Centers and Facilities Section of NSF acts as standing chairman of the Council.

A complete listing of ODP Council members is included in the Directory section of this issue (p. 74).

JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

Joint Oceanographic Institutions, Inc. (JOI) is a consortium of ten U.S. oceanographic institutions which was established in order to focus their collective capabilities on large oceanographic research projects.

JOI evolved from a unique and effective organization, the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). JOIDES provided the scientific leadership for the highly successful Deep Sea Drilling Project (DSDP). In 1976, the JOIDES member institutions formed a new organization, JOI, to plan and manage joint research efforts, and to facilitate scientific ocean drilling and oceanographic research in general.

JOI operates under the direction of a Board of Governors consisting of one representative from each U.S. member institution. JOI is responsible for managing the scientific planning and operations for ODP, and for ensuring that the scientific directions provided by JOIDES are carried out in a cost-effective manner by the program subcontractors.

JOI is also responsible for supporting the U.S. science community's participation in ODP, through a separate program.

The ten JOI institutions are:

- University of California at San Diego, Scripps Institution of Oceanography
- Columbia University, Lamont-Doherty Geological Observatory
- University of Hawaii, Hawaii Institute of Geophysics
- University of Miami, Rosenstiel School of Marine and Atmospheric Science
- Oregon State University, College of Oceanography
- University of Rhode Island, Graduate School of Oceanography
- Texas A&M University, College of Geosciences
- University of Texas, Institute for Geophysics
- University of Washington, College of Ocean and Fishery Sciences
- Woods Hole Oceanographic Institution

MEMORANDUM OF UNDERSTANDING

Between the National Science Foundation and
Participating Countries in the Ocean Drilling Program
as a Regular Member

Article 1: MEMBERSHIP STATUS - The (institution) of (country) elects to be a regular member with rights, privileges, and financial commitments as defined.

Article 2: DURATION - (Institution) endorses, in principle, a ten-year program of Ocean Drilling including the first-year planning period followed by a nine-year drilling and coring program. This Memorandum of Understanding ensures (country) involvement in all scientific activities that take place between its effective date and September 30, 1993.

Article 3: SCIENTIFIC PLANNING - Scientific planning and direction of the Ocean Drilling Program shall be the responsibility of JOIDES. (Institution) will be a member of JOIDES, and will be represented on each committee, panel, or working group thereof. International membership and representation in JOIDES is restricted to regular and candidate members, including consortia, but excluding the individual members of consortia. Candidate members will be members of JOIDES during the planning period only. JOIDES shall have the right to comment and advise on the annual program plans and budgets prepared by the contractors, prior to their adoption by the National Science Foundation.

Article 4: OCEAN DRILLING COUNCIL - (Country) will be a member of the Ocean Drilling Council. The members of the Council will be representatives of each country contributing to the support of the Ocean Drilling Program, regardless of whether it is participating as an individual member or as a member of a consortium. Members of the Council and their alternates will be designated by the participating countries. There will be one representative of each participating country, except that additional representation from the United States may be appropriate.

The Council shall serve as a consultative body reviewing financial, managerial, and other matters involving the overall support of the Ocean Drilling Program. The Council shall provide a forum of exchange of views among the contributing countries. No formal voting procedures will be established.

The National Science Foundation representative will serve as permanent Chairman of the Council. A formal agenda will be prepared for each meeting and written records of each meeting will be kept. The National Science Foundation will provide secretariat services to the Council.

The Council will normally meet once each year. The annual meeting shall include a financial report and discussion, an audit report, a review of scientific and technical achievements for the past year, draft program plans and budgets for the coming year, and other topics of mutual interest. Normally, all regular meetings of the Council will take place in Washington, DC.

Liaison representatives of prime contractors and important scientific planning entities will be available to the Council.

Article 5: RIGHT TO MAKE PROPOSALS; DATA PRIVILEGES - The (Institution) will have the right: a) to make proposals to JOIDES of scientific projects of technical objectives of special interest to (country); b) to participate in the analysis, and have access to the data, of geophysical and other site surveys performed in support of the program; and c) to all engineering plans, data or other information developed under contracts supported by program costs.

Additional site surveys may be contributed by (country) as its scientific interests and available resources allow. Site surveying will be coordinated by JOIDES.

Article 6: VISA AND CUSTOMS FACILITATION - The National Science Foundation will facilitate, to the extent feasible, through collaboration with the appropriate authorities, the granting of visas and other forms of official permission for entry to and exit from the United States of personnel, equipment, and supplies when required for participation or utilization in the Ocean Drilling Program.

Article 7: PARTICIPATION ON BOARD THE ODP DRILLSHIP - The Science Operations Contractor, with the advice of JOIDES, selects the scientific team for each cruise. Space on the average will be available for two scientists representing (country) on each cruise of the ODP drillship. It is recognized that some cruises may be of special scientific interest to (country) scientists more (country) participation may be appropriate. It is expected that one (country) scientists per annum will be invited to serve as co-chief scientist on Ocean Drilling Program cruises.

(Country) will have the opportunity to participate in the technical parties on Ocean Drilling Program cruises.

Article 8: INITIAL REPORTS OF THE OCEAN DRILLING PROGRAM - (Country) scientists will have access, through the (institution), to Ocean Drilling Program data and core samples. The (institution) will endeavor to ensure that the participating (country) scientists and institutions shall provide the scientific data resulting from site surveys and laboratory analyses in time for preparation of the Initial Reports of the Ocean Drilling Program or their equivalent. One hundred copies of each volume of the official scientific publications will be provided to the (institution) for free distribution among (country) scientific establishments. These volumes may be published in (country) in full or in part, without payments to or additional agreements with the United States. The (institution) will provide the National Science Foundation with copies of all (country) publications that are based on program material.

Article 9: FINANCIAL CONTRIBUTION - The (institution) will support the Ocean Drilling Program with financial contributions payable to the National Science Foundation in U.S. dollars in amounts and periods to be specified by Annex A to this Memorandum of Understanding. Such Annex will be amended at regular intervals, but not more than once annually, in order to adjust contribution levels in proportion to changes in the level of drilling operations costs actually experienced by the Program. Estimates of potential adjustments will be submitted to (institution) 18 to 20 months prior to the U.S. fiscal year concerned by the adjustment, for appropriate discussion during the annual Ocean Drilling Program Council meeting.

The financial contributions of all participants will be co-mingled to support the total program costs. "Program costs" are determined by the National Science Foundation, and are those costs incurred in support of contractors performing functions for joint planning and operations of the Ocean Drilling Program, and program direction and management costs incurred by the National Science Foundation which relate to international participation. Activities which may be carried out by the National Science Foundation's contractors in direct support of the United States scientific undertakings are not program costs and will not be funded from co-mingled accounts.

Article 10: SALARIES, TRAVEL AND EXPENSES - Salaries, travel and expenses for participants representing (country) will be borne by (country).

Article 11: CONSULTATION - Meetings of the National Science Foundation and representatives of the (institution) may be held at any time upon the request of either party to discuss the terms and conditions of this Memorandum and other matters of mutual interest.

Article 12: TERMINATION NOTICE - Obligations arising from this Memorandum of Understanding may be terminated by either party giving the other party written notice at least one year in advance. Provisions for refunds of contributions, arising out of unilateral termination, are specified in Annex A.

* Annex A outlines financial obligations to accompany all MOUs.

SCIENCE ADVISORY STRUCTURE: JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES)

INTRODUCTION

In 1964, four institutions (University of California's Scripps Institution of Oceanography, Columbia University's Lamont-Doherty Geological Observatory, the University of Miami's Rosenstiel School of Marine and Atmospheric Science, and the Woods Hole Oceanographic Institution) joined together to form the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). This became a national effort to explore the geological and geophysical structure of the seafloor through a systematic program of ocean drilling, the Deep Sea Drilling Project (DSDP).

In 1968, the University of Washington joined the four original institutions, and in 1975, the oceanographic institutions of the University of Hawaii, the University of Rhode Island, Oregon State University, and Texas A&M University, became members. The University of Texas joined the consortium in 1982, bringing the total to ten member institutions.

International participation in this deep sea drilling effort is one of its most distinctive features. From 1974 to 1976, five nations formally joined the Deep Sea Drilling Project to begin the International Phase of Ocean Drilling (IPOD). The oceanographic institutions of the Federal Republic of Germany, France, Japan, the United Kingdom, and the U.S.S.R. became members of JOIDES and participated as full scientific and financial partners in DSDP.

Four of these nations are current members of JOIDES and are active in the Ocean Drilling Program (ODP), which succeeded DSDP in 1983. Canada and the European Science Foundation, which represents 12 European countries, became members in 1983, and in 1988, Australia became a participant through the establishment of the Canada/Australia Consortium.

International member institutions of JOIDES are the Bureau of Mineral Resources, Australia; Department of Energy, Mines and Resources, Canada; Bundesanstalt fur Geowissenschaften und Rohstoffe, Federal Republic of Germany; Institut Francais de Recherche pour l'Exploitation de la Mer, France; Ocean Research Institute of the University of Tokyo, Japan; Natural Environmental Research Council, United Kingdom; and the European Science Foundation Consortium for Ocean Drilling (ECOD), including Belgium, Denmark, Finland, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey.

In addition to the ten U.S. institutions and the international partners, many U.S. universities, government and private research laboratories, and private industries also participate in JOIDES and the Ocean Drilling Program.

JOIDES is responsible for providing scientific direction for ODP, and consists of an Executive Committee and a science advisory structure headed by a Planning Committee. The JOIDES organization is shown in Figure 1.

EXECUTIVE COMMITTEE

The primary governing arm of the JOIDES organization is the Executive Committee (EXCOM). EXCOM members are representatives of research institutions, or other organizations, which have an interest in the study of the sea floor, and the capability of carrying out such studies. EXCOM operates under Terms of Reference, which are included on p. 10.

EXCOM approves scientific and operational plans developed by the Planning Committee, and sets policies for the achievement of the program's objectives.

The Chairmanship of EXCOM rotates among the U.S. JOIDES institutions, excluding the Science Operator and Wireline Services institutions. The term of office is two years.

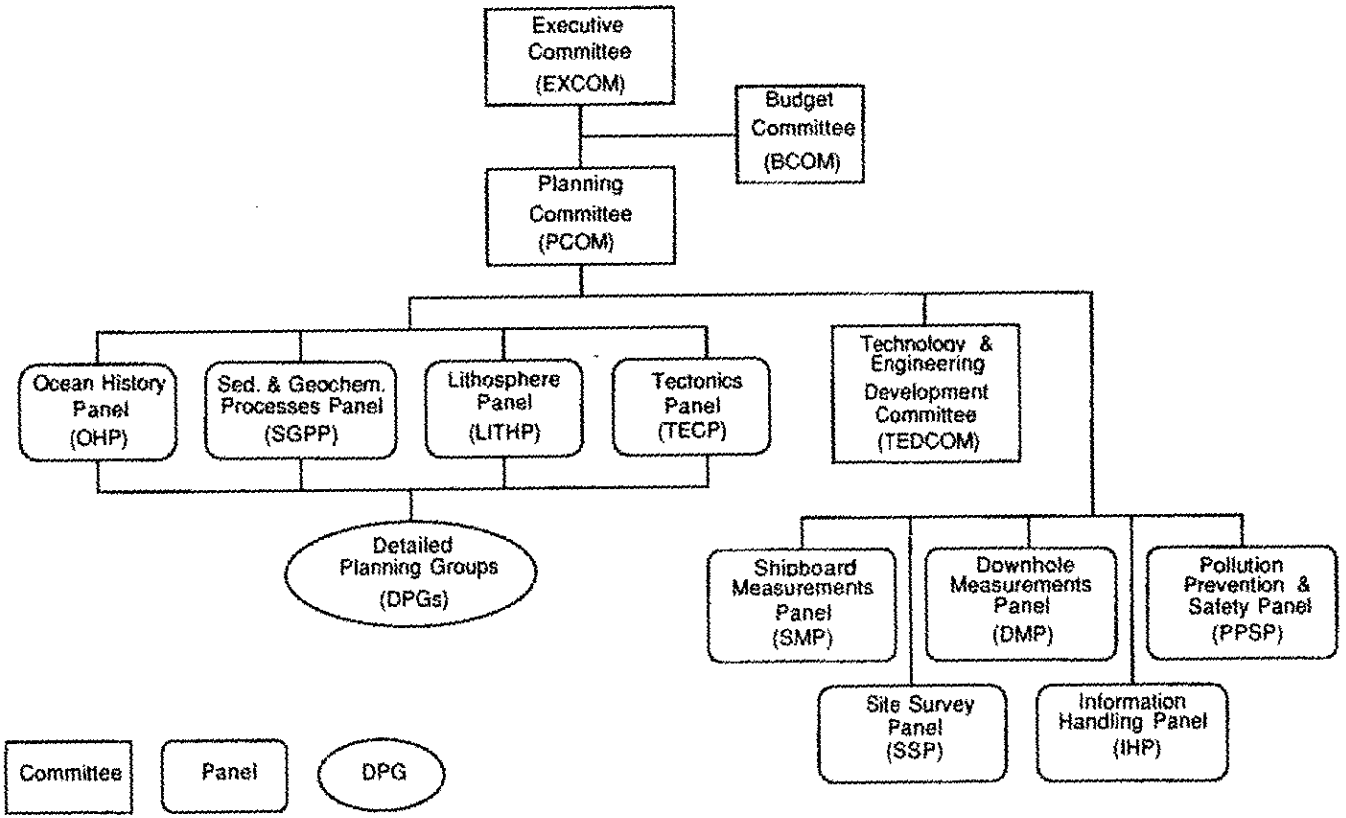


Figure 1. JOIDES science advisory structure.

BUDGET COMMITTEE

The Budget Committee (BCOM) includes representatives from both EXCOM and the Planning Committee, and meets according to a budget review process scheduled by JOI and NSF. BCOM's mandate is to provide guidance in developing the annual ODP Budget and Program Plan, and to make recommendations on long-term budget issues. BCOM also provides advice as budget questions or problems arise.

Terms of Reference for the Budget Committee are included on p. 11.

PLANNING COMMITTEE

The Planning Committee (PCOM) evaluates advice from the science advisory structure, prioritizes scientific objectives, and formulates drilling programs designed to optimize the scientific productivity and operational efficiency of ODP. Recommendations on scientific objectives and final drilling plans are forwarded to EXCOM for final approval.

PCOM members are appointed by their institutions, and all appointees must satisfy the fundamental criteria of having the ability and commitment to provide mature and expert scientific direction to the program.

PCOM operates under Terms of Reference for the Science Advisory Structure (see p. 12).

The PCOM Chairmanship rotates among the U.S. JOIDES institutions, together with the EXCOM Chairmanship.

JOIDES SCIENCE ADVISORY STRUCTURE

The science advisory structure is headed by PCOM and consists of four thematic panels, five service panels, a Technology and Engineering Development Committee, and short-lived detailed planning groups.

Terms of Reference for the JOIDES Science Advisory Structure (p. 12) includes mandates and guidelines for each panel. These mandates are only guidelines for panel activities; PCOM may ask panels to take up topics not in their original mandates.

At the 1987 Annual Planning Committee meeting, a special subcommittee met to evaluate the science advisory structure. In the Planning Committee's desire to move from a geographically-oriented to a thematically-driven program, it was recommended that the advisory structure be revised. PCOM formulated a revised panel structure and prepared new Terms of Reference. EXCOM adopted the revised structure, which was implemented in January 1989.

The revised panel structure is intended to be more responsive to COSOD priorities, offer fair treatment of proposals, facilitate long-range planning and provide the best technical advice to PCOM.

An expanded system of thematic panels evaluates proposals and assists PCOM in formulating long-range plans and objectives. Regional panels have been phased out and replaced with short-lived detailed planning groups, appointed by PCOM to synthesize highly ranked proposals into operational drilling programs. Service panels were slightly reorganized to provide stronger liaison and communication among panels, and a new panel was added to address onboard geophysical measurements and data processing issues.

Thematic Panels

Thematic panels identify long-range objectives and problems that are best solved by ocean drilling. These objectives are based on input received from the scientific community-at-large in the form of proposals, reports, and white papers. They are responsible for reviewing and evaluating proposals, and may request that PCOM establish detailed planning groups to assist in developing specific drilling plans for particular themes or regions.

Thematic panels include the Lithosphere Panel, Ocean History Panel, Sedimentary & Geochemical Processes Panel, and the Tectonics Panel.

Detailed Planning Groups

Detailed planning groups (DPGs) help focus scientific problems identified by the thematic panels. They are

responsible for helping thematic panels translate broad thematic programs into concrete drilling plans, and for addressing specific problems referred to them by the PCOM or the thematic panels.

DPGs are created by PCOM as required for specific tasks, and are disbanded when their function is complete. Mandates, guidelines and duration of operation are specified by PCOM as required.

Technology and Engineering Development Committee

The Technology and Engineering Development Committee (TEDCOM) is responsible for ensuring that the proper drilling tools and techniques are available to meet the objectives of ODP drilling targets. TEDCOM identifies the new drilling tools and techniques to be developed and monitors the progress of their development.

Service Panels

Service panels provide advice and guidance to other JOIDES panels, and to the organizations responsible for processing, curating, and distributing samples, data, and information to the scientific community. Apart from advising the JOIDES panel structure, service panels are not directly involved with the selection of drilling targets or the definition of cruise objectives.

The five service panels are the Downhole Measurements Panel, Information Handling Panel, Pollution Prevention and Safety Panel, Site Survey Panel, and the Shipboard Measurements Panel.

JOIDES OFFICE

Conduct and support of JOIDES activities is provided through the JOIDES Office. This office, under the direction of the PCOM Chairman, is responsible for coordination of PCOM and the advisory panels, and for integrating advice from the panel structure in a manner suitable for policy decisions by EXCOM.

The JOIDES Office also produces the JOIDES Journal which summarizes program activities and keeps the scientific community informed of the JOIDES planning process.

A Non-U.S. Liaison/Executive Assistant to the PCOM Chairman assists with PCOM planning activities; coordination of international site survey planning, and international meetings; attends meetings as directed by the PCOM Chairman; and monitors JOIDES scientific proposals. This position rotates among the international member countries and is appointed by JOI following recommendations from EXCOM.

A Science Coordinator acts as recording secretary for both EXCOM and PCOM, and is responsible for preparing formal minutes of those meetings. The Science Coordinator is also responsible for editing the JOIDES Journal, submitting bi-monthly activity reports to JOI, and attending meetings as directed by the PCOM Chairman.

An Office Coordinator manages the JOIDES office and is responsible for coordinating office procedures and communications, maintaining records on panel meetings and activities, and assisting the Science Coordinator with the JOIDES Journal. The Office Coordinator also attends meetings and prepares reports as directed by the PCOM Chairman.

TERMS OF REFERENCE FOR

JOIDES Executive Committee for the Ocean Drilling Program (ODP)

1. This committee shall formulate scientific and policy recommendations with respect to the Ocean Drilling Program (ODP). It shall conduct the ODP 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 membership of this committee is now comprised of one representative of each of the four non-U.S. countries or consortia with an active Memoranda of Understanding (MOU) with the National Science Foundation (NSF) [Canada, European Science Foundation, France, Federal Republic of Germany, Japan, and the United Kingdom] and one representative of each of the ten existing U.S. institutions [University of California at San Diego, Columbia University, University of Hawaii, University of Miami, Oregon State University, University of Rhode Island, Texas A&M University, University of Texas at Austin, University of Washington, and Woods Hole Oceanographic Institution]. The appointment of additional members will be determined by the JOI Board of Governors on the recommendation of the JOIDES Executive Committee. In the case of representatives of non-U.S. country participants, the existence of a valid MOU with NSF is a prerequisite to membership.

   Membership of any member may be cancelled by the Board of Governors on the recommendation of the JOIDES Executive Committee or in the event of a non-U.S. country participant ceasing to have a valid MOU in existence.

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 an affirmative vote of at least two-thirds of all members, including members from at least three non-U.S. members. A quorum shall constitute two-thirds of the Executive Committee. 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 with full authority to act for him or her in his or her absence.

6. The Executive Committee may establish subcommittees for cognizance of certain components of the Ocean Drilling Program. Areas of cognizance and the terms of reference for each subcommittee shall be defined by the Executive Committee. In particular a Planning Committee and a Budget Committee shall be established.

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

8. Members of the Executive Committee, and members of subcommittees duly appointed thereby, while acting within the terms of reference, shall be indemnified, and held harmless by JOI, Inc. 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, upon ratification by members of the existing JOIDES Executive Committee and adoption by JOI, Inc. will supercede all previous JOIDES agreements.

Ratified by EXCOM: 15 September 1988
Adopted by JOI Board of Governors: 15 September 1988

TERMS OF REFERENCE FOR

JOIDES Budget Committee for the Ocean Drilling Program (ODP)

1. General Purpose. The Budget Committee (BCOM) provides JOIDES overview and first review of the ODP Program Plan and budgets therein.

   The ODP Program Plan is compiled by JOI, Inc., the ODP prime contractor. In it, a one-year Science Plan, developed by PCOM and the JOIDES advisory structure, is presented. Budgets in the Program Plan include those of the Science Operator and Wireline Logging Contractor. The Program Plan also includes a list of scientific and technological development needs, including estimated costs, which have been reviewd by the JOIDES Science Advisory Structure and which are required for successful completion of the Plan.

   The ODP Program Plan (including budgets) is then submitted in draft form to the National Science Foundation (NSF). BCOM meets as occasion demands, according to a program plan and budget timetable, in order to provide continuous guidance in developing the final version of the budget in the program plan. The committee consults with JOI, Inc. and the subcontractors if budget questions or problems arise. BCOM reports to EXCOM at its spring meeting (the joint EXCOM/ODP Council meeting). At that time the full EXCOM approves the final ODP Program Plan and a detailed budget for the upcoming fiscal year. BCOM's written reports are also submitted to PCOM.

2. Mandate. The Budget Committee is to review the ODP Program Plan and budgets therein and evaluate how well the program plan and budget address the priorities which have been defined by EXCOM and PCOM. This review is to be reported to EXCOM and PCOM.

   BCOM also acts on behalf of EXCOM on budget matters that EXCOM delegates to it. BCOM can request that liaisons from the ODP subcontractors, JOI or NSF attend its meetings.

3. Meetings. BCOM meets in accordance with a schedule for developing the ODP Program Plan (Appendix 1). Up to three meetings per fiscal year may be necessary to provide input on the ODP Program Plan and Budget. Meetings may be required in the entire phase of developing the budget and program plan.

4. Membership. BCOM consists of five members: three EXCOM members (2 non-U.S. and 1 U.S.) and two PCOM members, one of whom is the present PCOM Chairman. The second PCOM member is a U.S. member, ideally the immediate past PCOM Chairman. A quorum shall consist of two of the EXCOM members and one of the PCOM members. BCOM members are appointed by EXCOM. EXCOM or PCOM members representing JOIDES institutions with major ODP subcontracts will not be appointed.

Ratified by EXCOM: 15 September 1988
Adopted by JOI Board of Governors: 15 September 1988

* Appendix 1 is a timetable for development of the annual Budget and Program Plan

TERMS OF REFERENCE

Science Advisory Structure of JOIDES for the Ocean Drilling Program (ODP)

The purpose of the ODP Science Advisory Structure of JOIDES is to enable the formulation of the most productive scientific plan for the program. JOIDES is open to suggestions and proposals from the entire scientific community, and its plans shall be open to continued review and revision.

1. Science Advisory Structure

The Science Advisory Structure of JOIDES will consist of a Planning Committee, a Technology and Engineering Development Committee, four thematic panels and five service panels. Ad hoc Detailed Planning Groups (DPGs) may be approved by the Planning Committee as requested by the panels or by the Planning Committee itself.

2. Committees, Panels, and Detailed Planning Groups

Each committee, panel and detailed planning group will operate under a mandate, along with guidelines as to membership and frequency of meetings. Mandates, guidelines, and amendments to them, for the standing panels, shall be proposed by the Planning Committee for approval by the Executive Committee. Mandates, guidelines and duration of operation for the short-lived Detailed Planning Groups will be specified by PCOM as required.

3. Planning Committee

3.1 General Purpose. The Planning Committee reports to the Executive Committee and advises JOI, Inc., the Science Operator and Wireline Services Operator, plans designated to optimize the scientific productivity and operational efficiency of the drilling program.

More specifically, the Planning Committee is responsible (a) for long term planning on the order of 5 to 10 years utilizing input from COSOD-type conferences and thematic panel input; (b) for developing a general science plan and general track of the drilling vessel about four years in advance of drilling; (c) for fostering communications among and between the general community, the panels, the Science Operator, the Wireline Logging Contractor and itself; (d) for soliciting, monitoring, and coordinating the evaluation of drilling proposals; and (e) for maintaining a 12 to 18 month scientific plan and for drafting a scientific drilling program at the Planning Committee Annual Meeting to be incorporated into the Program Plan for the next fiscal year.

3.2 Mandate. The Planning Committee is responsible for the mandates of the various panels and planning groups and their membership. It approves their meetings and agendas and may assign special tasks to them. The Planning Committee sponsors and convenes COSOD-type conferences at intervals determined by long-term science plans for ODP. PCOM, through the JOIDES Office, assigns proposals to thematic panels, DPGs and, if relevant, to service panels, for review. PCOM sets the scientific objectives of the proposals into final priority after they are reviewed by the panels. The Planning Committee nominates chief scientists to the Science Operator, who ultimately chooses them.

PCOM periodically reviews the JOIDES advisory structure in the light of developments in science and technology and recommends amendment of its panel structure and mandates. Much of the working of the Planning Committee is carried out by the commissioning of reports from the panels, the detailed

planning groups, ad hoc subcommittees of its own membership, and by its chairman at the JOIDES Office.

3.3 Structure. The Planning Committee is empowered to establish an infrastructure appropriate to the definition and accomplishment of tasks described in its annual program plan as approved by the Executive Committee and the National Science Foundation.

Communication with the panels and active DPGs is maintained by having their chairmen meet with the Committee annually, and by assigning committee members as non-voting liaison members to its panels and working groups. Where counsel and communication are deemed important, other individuals may be asked ad hoc to meet with the Committee or a panel.

3.4 Membership. Each member of the Executive Committee shall designate one member of the Planning Committee and an alternate to serve in the absence of the designated member. One quarter of the Planning Committee members shall rotate off the Committee annually, so that its membership is replaced every four years. Reappointment shall be made only in exceptional circumstances. All appointees to the Planning Committee shall satisfy the fundamental criteria of having the ability and commitment to provide mature and expert scientific direction to the program. Balance of fields of specialization on the Planning Committee shall be maintained as far as possible. The chief scientists of the Science Operator and Wireline Logging Services Contractor, the JOI program director and an appointee of the NSF are non-voting, liaison observers.

3.5 Organization. The planning Committee meets at least three times a year, normally in November, April and August, based on the timetable for producing the ODP Program Plan. Robert's Rules of Order govern its meetings.

3.6 Vote and Quorum. Within the framework of the Memoranda of Understanding with each non-U.S. participating country (or consortium designee), it is intended that the U.S. members shall constitute at all times at least a majority of members. Substantive issues decided by formal vote require the vote of a majority of all members. A quorum shall consist of at least two-thirds of the non-U.S. members and at least two-thirds of the U.S. members.

3.7 Chairmanship. The Chair of PCOM shall rotate with the JOIDES Office among the U.S. JOIDES institutions, excluding the Science Operator and Wireline Logging Services Contractor institutions. The term of office is normally two years.

4. Thematic Panels

4.1 General Purpose. Thematic Panels are mainly, but not exclusively, process orientated. They are established by the Planning Committee to develop scientific drilling objectives based on COSOD-type conferences. The Thematic Panels play an important role in defining the long-term scientific objectives of ocean drilling.

Thematic Panels are composed of a number of members from U.S. institutions and one member from each non-U.S. participant. PCOM approves the panel membership including size and balance of expertise. Panelists will serve three years, with one-third of the panelists being replaced each year. The chairmen are appointed by PCOM. Thematic panels meet at least twice a year, but may meet more frequently as requested by PCOM. PCOM convenes the panel meetings and approves their meeting dates, locations, and agendas. The mandates are guidelines and do not restrict panels. Considerable overlap in thematic coverage has evolved and is expected to continue to evolve. The Planning Committee may ask Panels to take up topics not in their original mandates.

4.2 Specific Responsibilities. Each thematic panel will be responsible for planning the drilling of sites at the following levels:

(a) Long-range identification of objectives and problems that are best solved by ocean drilling;

(b) Review proposals submitted to JOIDES, followed by written evaluations to PCOM for each proposal reviewed;

(c) Make recommendations for necessary site surveys needed to achieve the scientific objectives of a traget area;

(d) Make recommendations to PCOM for establishing Detailed Planning Groups for further developing drilling plans for specific target themes and/or regions;

(e) Advise the Planning Committee on the selection of possible co-chief scientists;

(f) Provide advice to PCOM on requirements for technical drilling operations, downhole measurements, and shipboard/shore-based sample handling (in consultation with the appropriate service panel, if necessary);

(g) Provide advice to PCOM on technical development needs required to achieve long-range scientific objectives.

4.2.1 In the course of the work specified in paragraph 4.2, the Thematic Panels will maintain the close contact with the appropriate DPGs and provide PCOM with written evaluations of the recommendations made by these planning groups.

4.2.2 Each Thematic Panel is responsible to the Planning Committee, and will respond directly to requests from it, as well as reporting to it on a regular basis.

4.2.3 The Thematic Panels will act as a means of disseminating and correlating information in the appropriate problem areas by:

(a) Monitoring the progress made by ODP cruise participants and other scientists on the results from shorebased research on samples; encouraging shore-based laboratory work on samples recovered through ODP drilling;

(b) Encouraging its members to contribute to symposia at which the results of drilling will be discussed;

(c) Publishing progress reports in the open literature to inform and encourage participation in the project;

(d) Generating "White Papers" as requested by PCOM;

(e) Providing input to PCOM for the summary of scientific achievements of ODP for inclusion in the ODP Program Plan.

4.3 Lithosphere Panel: Mandate

The Lithosphere Panel is concerned with the origin and evolution of oceanic crust and mantle. In particular, important areas of investigation are volcanic, metamorphic, hydrothermal, structural and alteration processes occurring in the ocean crust. Also of importance to the Lithosphere Panel are mantle-crust interactions, mantle dynamics and composition, and solid-earth geochemical cycles.

(a) Processes of submarine volcanology, intrusion and plutonism; crustal construction at spreading axes; petrology, geochemistry, mineralogy, and

magnetic and other physical properties of igneous and metamorphic rocks from the ocean floor, from seamounts, from oceanic plateaus, from volcanic arcs and from basins adjacent to volcanic arcs.

(b) Processes of submarine hydrothermal circulation; petrology, geochemistry and mineralogy of hydrothermally altered rocks and hydrothermal deposits from the ocean floor; geochemistry and physical properties of hydrothermal solutions; aging of ocean lithosphere.

(c) Processes of mantle convection and melting and their relationship to basaltic rocks of the ocean basins. Mapping of mantle (geochemical) reservoirs and domains. Implications of solid earth geochemical cycles and fluxes of the global plate tectonic cycle. Mass balance problems.

4.4 Tectonics Panel: Mandate

Tectonics Panel is concerned with large-scale structural features and processes of deformation, including those active today at plate boundaries and those recorded in structures and sediments of former plate boundaries.

The Panel is also interested in the origin and evolution of large-scale constructional crustal features. The drilling-based tectonic studies that are evaluated and promoted by the Tectonics Panel fall into six groups, each listed below with some specific (but not exclusionary) examples:

(a) Passive (extensional) margins - rifting history, rift-drift evolution and associated igneous activity, structure and origin of continent-ocean boundary zones; structural symmetry/asymmetry of conjugate margins; passive margins in back-arc basins; structural variability along-strike; thermal and mechanical evolution; history of vertical crustal movements; post-rift subsidence, tectonism and sea-level history, their interrelations, and their effects on the sedimentary record; tectonic synchroneity.

(b) Sheared (translational) margins - deformational history including crustal extension, shortening and vertical movements; structure and evolution of continent-ocean boundary zones; effect of tectonics on syn-rift and post-rift sedimentary record.

(c) Active (convergent) margins - mechanics, kinematics, and mechanisms of deformation within accretionary wedges; thermal evolution and fluid flow; history of island-arc magmatism; sedimentation and deformation in fore-arc and back-arc basins; collision-associated deformation.

(d) Divergent oceanic plate margins - structural evolution of mid-ocean ridge axes along "normal" spreading segments; origin and evolution of ridge-axis discontinuities (small offsets, overlapping spreading centers, transform faults, etc.); tectonic segmentation along mid-ocean ridges; origin of structural/tectonic asymmetries across spreading centers and ridge-axis discontinuities.

(e) Origin and history of submarine plateaus, microcontinents, aseismic ridges, seamount chains, and other large-scale features constructed, fragmented, or deformed during ocean-basin evolution; history of vertical motion of these features and its relation to eustacy.

(f) Plate driving forces and sub-lithospheric structures and processes: Global stress measurements to evaluate plate-driving forces; global seismic network to monitor stress accumulation and release and; measurements of rates and magnitudes of strain at active plate margins and at deforming zones within plates.

4.5 Ocean History Panel: Mandate

The Ocean History Panel is concerned with the historical aspects of the sedimentary record in the oceans. Specifically included are:

(a) Long-term history and driving mechanisms of the evolution of the ocean, atmosphere and biosphere. Central to this theme are relations among plate tectonics and ocean paleocirculation, sedimentation patterns, global paleoclimates, glacial and ice-sheet evolution, sea level change and its effect on marine sedimentation and evolution of marine life.

(b) Short-term variability of the earth's ocean circulation and climate and their relationship to boundary conditions and external forcing.

(c) The processes and mechanisms of evolution of the marine biota.

(d) The biostratigraphic record and its relationship to chronostratigraphy including radiometric dating, magnetostratigraphy, isotope and chemostratigraphy, lithostratigraphy and sequence stratigraphy.

4.6 Sedimentary and Geochemical Processes Panel: Mandate

This panel is concerned with marine sedimentation and diagenetic processes, origin and evolution of marine sediments and seawater chemistry, global sediment and geochemical mass balances, hydrothermal processes in sedimented regions. Specifically included are:

(a) Sedimentary processes, facies and physical properties - The sedimentary processes of terrigenous, biogenic, volcanogenic and chemical sediments; sedimentation and tectonics, e.g. evolution of submarine fans, and evolution of basins; factors controlling the nature of sedimentary facies; the origin of unconformities, disconformaties, hiatuses and sedimentary cycles; slope stability and redeposition and; physical properties of sediments.

(b) Organic and inorganic sedimentary geochemistry and diagenesis - The rates and nature of early to late diagenetic processes; the evolution of sediment to rocks; geochemistry of interstitial and formation waters; petrology, mineralogy, magnetic and other physical properties, and geochemistry of diagenetic phases of bulk sediments; and chemical paleoceanography.

(c) Temporal and spatial global mass balances of sediments and cycling of elements - How much and what types of sediments being subducted; relationship of sediments to tectonic and paleoceanographic processes such as sea level fluctuations and anoxic events; unconformities and disconformities; the carbon, sulfur and phosphorus cycles; marine evaporites in early rifting systems and evaporite giants.

(d) Fluid circulation and geochemical budgets - Magnitudes and rates and plumbing systems of gravity and tectonically driven circulation in passive and active continental margins; chemical fluxes, biological activity, physical, mineralogical and geochemical alteration of margin sediments induced by fluid flow; interaction between submarine hydrothermal fluids and sediments, mineralogy, petrology, physical and geochemical properties of the hydrothermally altered sediments, and the geochemical evolution of the hydrothermal fluids; the origin and distribution of base metal deposits in continental margins and sedimented hydrothermal systems.

(e) The aging of the oceanic crusts - Low to moderate temperature alteration of oceanic crust; rates and types of reactions and associated chemical fluxes; changes in physical properties and fluid circulation with age.

5. Technology and Engineering Development Committee: Mandate

The Technology and Engineering Development Committee (TEDCOM) is responsible for ensuring that the proper drilling tools/techniques are available to meet the objectives of ODP drilling targets, especially those for achieving highly-ranked objectives identified in ODP long-range planning.

TEDCOM identifies, within a proper time frame and within budgetary constraints, the new drilling tools/techniques to be developed, helps JOI and the Science Operator write RFPs for engineering firms which lead to the development of the tools/techniques, and monitors the progress of their development.

Members of the TEDCOM are engineers nominated by PCOM. Liaison should be maintained between TEDCOM and the Downhole Measurements Panel. An ODP/TAMU engineer is assigned to act as Science Operator liaison with TEDCOM.

6. Detailed Planning Groups: Mandate

6.1 General Purpose. Detailed Planning Groups are short-lived planning groups which may be created by the Planning Committee, in response to requests by the Thematic Panels or by the Planning Committee itself, for more intensive study of certain aspects of planning that may arise. The Detailed Planning Groups will be held to the minimum necessary membership and travel expenses. DPGs provide written documents to those thematic panel(s) specified by PCOM. The DPG documents are transmitted to PCOM with the written evaluation of the appropriate thematic panel.

6.2 Structure of Detailed Planning Groups.

The Detailed Planning Groups are responsible for:

(a) Helping Thematic Panels to translate their broad thematic programs and highly-ranked ODP proposals into concrete drilling plans;

(b) Recommending integrated drilling programs for their assigned topics and regions of interest;

(c) Advising on regional and site surveys needed for future drilling;

(d) Preparing drilling prospectuses which synthesize all thematic and site survey input.

6.3 Membership. PCOM chooses DPG members for their expertise and experience with respect to the assigned thematic topics and in regions where these topics can be addressed. Members are recommended by the thematic panels and by PCOM and are appointed by PCOM or by the PCOM Chairman if necessary. The chairmen are appointed by PCOM.

The DPGs are composed of a number of members from U.S. institutions, and should maintain full representation, if possible, from the non-U.S. JOIDES institutions. A maximum number of 16 members is suggested.

Active DPGs meet at the request of PCOM as frequently as required by ship scheduling and routing. PCOM establishes liaison between standing DPGs and Thematic Panels by the appointment of non-voting liaisons.

7. Service Panels

7.1 General Purpose. Service Panels provide advice and services to the JOIDES Advisory Structure, and to the various entities responsible for the processing, curation and distribution of samples, data and information (including

publications) to the scientific community. The Service Panels can respond to specific requests from the Science Operator, the Wireline Logging Contractor, or JOIDES panels, but in all cases, must report their findings to the Planning Committee as well. When recommendations from the service panels involve fiscal decisions or major programatic changes, these must be channeled through PCOM.

The Service Panels, beyond their help to the JOIDES Advisory Structure, are not directly involved with selection of drilling targets or definition of cruise objectives.

Service Panels have specific mandates. Service panels meet at least once a year or as requested by PCOM. PCOM appoints the chairman and panelists and keeps membership, including representation from the non-U.S. JOIDES institutions, under review.

7.2 Site Survey Panel: Mandate

7.2.1 General Purpose. The general purpose of the Site Survey Panel is to provide information and advice to the Planning Committee on the adequacy of and need for site surveys in relation to proposed drilling targets.

7.2.2 Mandate. The Site Survey Panel is mandated to:

(a) Review site survey data packages prepared by the ODP Site Survey Databank and to make recommendations as to their adequacy to the Planning Committee in light of the needs defined in mature proposals of the Detailed Plannign Groups and thematic panels;

(b) Identify data gaps in proposed future drilling areas and to recommend appropriate action to ensure that either 1) sufficient site survey information is available for pinpointing specific drilling targets and for interpretation of drilling results, or 2) that sites not be drilled;

(c) Provide guidelines for proponents and panels as to required site survey data and to examine the opportunities and requirements for the use of new technologies for surveying potential drill sites;

(d) Promote international cooperation and coordination of site surveys for the benefit of the Ocean Drilling Program, particularly between participating ODP nations' survey activities;

(e) Promote the logging of all data used for planning drilling targets with the ODP Databank.

7.2.3 Liaison. The Panel maintains liaison with the ODP Site Survey Data Bank Manager and the non-U.S. liaison at the JOIDES Office, who both attend SSP meetings.

7.3 Pollution Prevention and Safety Panel: Mandate

7.3.1 General Purpose. The general purpose of the Pollution Prevention and Safety Panel is to provide independent advice to the Planning Committee and to the Ocean Drilling Program with regard to safety and pollution hazards that may exist because of general and specific geologic circumstances of proposed drill sites.

7.3.2 Mandate. All drilling operations involve the chance of accident or pollution. The principal geologic safety and pollution hazard in ocean drilling is the possible release of substantial quantities of hydrocarbons from subsurface reservoir strata. In most deep sea regions, the risk of hydrocarbon release can be reduced or eliminated by careful planning and proper site

surveys. Additionally, safety problems may arise in drilling hot hydrothermal systems for lithosphere targets.

Those who plan each Ocean Drilling Program cruise and select its drilling sites are initially responsible to propose only sites that are considered reasonably safe. The JOIDES Pollution Prevention and Safety Panel independently reviews each site to determine if drilling operations can be conducted safely.

The preliminary site survey information and the operational plan are reviewed for each site. Advice is communicated in the form of: (1) site approval, (2) lack of approval, or (3) approval on condition of minor site relocation or amendment of the operational plan. Approval is based on the judgment of the Panel that a proposed site can be safely drilled in light of the available information and planning.

7.3.3 Liaison. The Pollution Prevention and Safety Panel maintains liaison with the Site Survey Panel, and a designated SSP member attends its meetings. A representative from the Science Operator also attends the meetings. The Planning Committee Chairman is a non-voting member of the Panel and normally attends meetings.

7.4 Information Handling Panel: Mandate

7.4.1 General Purpose. The general purpose of the Information Handling Panel is to provide information and advice to the Planning Committee and the Ocean Drilling Program with regard to satisfying the needs of the scientific community for timely access to data, samples and publication and to assist program managers in setting priorities.

7.4.2 Mandate. The Information Handling Panel is mandated to advise PCOM on:

(a) Types of publications to be produced; publication formats; schedules and deadlines; publications policy and goals of the ODP publications program;

(b) The operation of the core repositories; curatorial policy; filling of sample requests; curatorial data management; long-term goals for the preservation of the core materials and other physical samples obtained by ODP and DSDP; and establishment and operation of the various micropaleontology reference centers;

(c) The types and contents of the databases to be maintained by ODP; treatment of raw data; establishment of uniform procedures and standards for data handling and processing; structure, philosophy and goals of the information systems produced by the program; and management of databases, information systems and data centers. This last topic also includes coordination between various data centers established by ODP and those for DSDP archives;

(d) The minimum standards of quality and completeness necessary for data to be included in the various data bases and information systems, including data recording, transcribing and checking procedures;

(e) Shipboard and shore-based computer facilities, equipment and procedures; software development; data collection techniques; and meeting the computational needs of shipboard and shore-based scientists, as well as providing access to data bases for all interested parties. Input from the Shipboard Measurements Panel on these issues, if necessary, should be reviewed;

(f) Long-term preservation of the raw data generated by ODP and DSDP; preservation of all past records bearing on sample history; and preservation of any other records of the program which might benefit future workers;

(g) The relationship between the ODP and DSDP data centers and national depositories such as the National Geophysical Data Center, World Data Center A for Marine Geology and Geophysics, etc., and the fulfillment of statutory obligations for data transfer. It also includes transfer of data to data centers established by ODP member countries, such as the one in France, and to the Micropaleo Reference Centers.

7.5 Downhole Measurements Panel: Mandate

7.5.1 General Purpose. The general purpose of the Downhole Measurements Panel is to advise JOIDES on methods and techniques for determining the physical state, chemical composition, and dynamic processes in ocean crust and its sediment cover from downhole measurements and experiments. Areas of responsibility include: routine logging (including industry standard and special tools widely used in ODP); routine data processing and interpretation; new and adapted logging tools, techniques, and data processing; downhole experiments and data acquisition (including downhole recording).

7.5.2 Mandate. The Downhole Measurements Panel is mandated to:

(a) Report to and advise PCOM on logging and downhole measurement programs of ODP;

(b) Advise on and recommend to the ODP Wireline Service Contractor the required logging facilities;

(c) Advise PCOM on the the scientific desirability and technical feasibility of proposed programs;

(d) Monitor progress reports, results, tools and techniques from U.S. and international downhole instrumentation development groups;

(e) Solicit and expedite new logging capabilities and experiments;

(f) Evaluate new technology and recommend future measurement directions.

7.5.3 Membership. Membership consists of a well-balanced representation with approximately half being logging and other downhole technologists and half having scientific backgrounds and interests. The Wireline Services Operator and Science Operator of ODP shall each be represented by non-voting members on the Panel.

7.6 Shipboard Measurements Panel: Mandate

7.6.1 General Purpose. The Shipboard Measurements Panel is concerned with the inventory, operation, condition of scientific instrumentation on board the JOIDES RESOLUTION and data handling for onboard measurements.

7.6.2 Mandate. The objectives of the panel are:

(a) To provide expert advice and make recommendations to the Planning Committee regarding the inventory and utilization of scientific equipment on the drillship;

(b) To represent the interests of the ODP user community with respect to the scientific procedures and equipment on the RESOLUTION;

(c) To direct panel activities, via PCOM, toward acquiring and maintaining the best possible shipboard scientific capability within the constraints of the ODP budget.

The panel is concerned with general types of instrumentation and issues:

(a) Underway geophysical equipment;

(b) Equipment for handling core samples;

(c) Physical properties, paleomagnetics and geotechnical measurements;

(d) Petrological, mineralogical, sedimentological, biological, organic and inorganic geochemistry analysis and equipment for performing these measurements such as microscopes;

(e) Computers managing data from shipboard equipment (in consultation, if necessary, with the Information Handling Panel);

(f) Utilization of laboratory space on the RESOLUTION.

7.6.3 Membership. The panel will consist of members from U.S. institutions and from non-U.S.JOIDES members or consortiums. Representation from all non-U.S members should be maintained, if possible. The number of members should not exceed 15 and these should be appointed so as to represent the range of disciplines within the scope of the panel's activities.

Ideally, a majority of those serving on the panel should have participated on a cruise of the RESOLUTION.

7.6.4 Liaison. The SMP must maintain continuing liaison with the Planning Committee, the Science Operations of ODP/TAMU (in consultation with ODP/TAMU marine technicians and engineers), the Information Handling Panel, and the Downhole Measurements Panel. Ex-officio liaison representatives of these panels and organizations should attend each meeting.

7.6.5 Scheduling. As the SMP will normally not deal with time-critical issues, two meetings per year should suffice. Meetings at ODP/TAMU in College Station at regular intervals is recommended and occasional meetings that include a visit to the RESOLUTION would be valuable.

Ratified by EXCOM: 15 September 1988
Adopted by JOI Board of Governors: 15 September 1988

SCIENCE PLANNING PROCESS

INTRODUCTION

The science planning process for ODP has four major components:

1. Definition of broad scientific goals by international Conferences on Scientific Ocean Drilling (COSOD);

2. Identification of long-range scientific objectives for ODP, based on the COSOD goals, and the synthesis of COSOD goals and ODP objectives into a coherent plan for achieving both;

3. Input from the geoscience community-at-large through drilling proposals submitted to ODP and;

4. Evaluation of those proposals in light of the COSOD goals and long-range ODP objectives.

In this process, the scientific community-at-large and JOIDES each play two important roles. The community provides broad scientific goals through the COSOD conferences, as well as the proposals which provide data and drilling targets which ultimately address these goals. JOIDES must translate the broad goals defined by COSOD into specific long-range scientific objectives and develop plans for their implementation, including plans for any necessary technical developments. The JOIDES panel structure provides the means for evaluating the proposals submitted to ODP.

Scientific input from the COSOD conferences is translated into an implementation plan with specific objectives. This plan then serves as a framework for evaluating the drilling proposals submitted to JOIDES. Refined COSOD objectives are communicated to the scientific community in the form of thematic white papers and other planning documents produced by the JOIDES advisory structure. This is a critical step in the planning process as it presents the objectives of ODP to the scientific community and generates new proposals. Drilling plans are ultimately based on proposals; they provide the scientific "fuel" on which ODP runs.

CONFERENCES ON SCIENTIFIC OCEAN DRILLING

The international ocean drilling community has convened two major conferences for state-of-the-science review. These COSOD conferences provide an opportunity for the international geoscience community to meet and discuss major scientific problems which should be addressed by ocean drilling. Reports from these conferences provide an important source of scientific input and define important long-term drilling goals.

The first international Conference on Scientific Ocean Drilling (COSOD I) was held in late 1981. The mandate of COSOD I was to determine how ocean drilling and associated programs could be organized and coordinated to attack the most pressing scientific problems in the most productive way.

At COSOD I, major long-range drilling goals were identified. The final conference report outlined crustal, tectonic, paleoceanographic, and sedimentological drilling goals designed to guide ten years of science planning. Some of the goals outlined in COSOD I required more focused engineering development for ODP. For example, the hard-rock guide base, used successfully on Legs 106, 109 and 118, was a direct response to the need for more advanced drilling techniques.

A second COSOD conference (COSOD II) was held in July 1987 to provide scientific direction for the next decade of ocean drilling. COSOD II considered past drilling results, latest theory, and the newest technology developments, and formulated recommendations for an ambitious program of drilling experiments. The COSOD II report outlined long-range goals for refining our knowledge of interconnected global systems, and the active participation of communities studying global change and long-term

monitoring reflected the desire for a wider application of ocean drilling in solving fundamental questions of the earth's evolution.

Copies of the COSOD I and II reports are available from JOI.

JOIDES PLANNING PROCESS

The challenge to the JOIDES science advisory structure is to take the broad scientific goals formulated by the COSOD conferences, and incorporate them into a feasible drilling schedule.

The JOIDES science advisory structure is responsible for prioritizing scientific issues to be addressed by ODP. It identifies where and how ODP drilling can help solve fundamental scientific questions, and how drilling can extend our current knowledge of the ocean basins.

Each thematic panel produces a white paper which consolidates these drilling priorities and provides initial strategies for drilling. The white papers ideally include implementation plans for achieving this science, including time and resources requirements, ways to interface with other global programs (such as RIDGE, WOCE, IRIS), and technology requirements for each drilling environment. Technology requirements are especially important due to their impact on the ODP budget and the schedules for engineering and logging developments.

Short-Range Planning

The JOIDES Planning Committee bases its recommendations on the drilling priorities outlined by the thematic panels. In its mandate, PCOM is instructed to provide science planning four years in advance of the drillship. At its Annual Meeting, held at the end of each calendar year, PCOM makes specific recommendations for future drilling. These thematically-focused plans are summarized by PCOM and become part of a four-year program plan produced by JOI.

The first year of this plan is included in a fiscal year program plan, which includes detailed budgets anticipated for that year. Cost estimates and a timetable for engineering developments, including schedules for on-shore and shipboard testing of new technology, are also included. This one-year plan, the annual ODP Program Plan and Budget, is produced by JOI, reviewed by NSF and other funding agencies, and approved by the JOIDES Executive Committee.

Long-Range Planning

Longer-range planning has become increasingly important for ODP. It is required for renewal of the Memoranda of Understanding between the ODP partner nations, and for continued program funding. As new lines of investigation emerge, long-range plans help guide proponents and provide a managerial framework for long-term funding and budget planning. They also provide the link between the broad COSOD goals and the specific four-year science plans developed by the JOIDES science advisory structure.

A long-range planning document is scheduled for completion in the spring of 1989, which will present JOIDES thematic priorities, together with implementation plans based on various funding projections. The long-range planning document will emphasize ODP's role in the study of global systems and the important educational function that ODP serves, and identify potentials for commercial benefits from ODP.

Options for alternate vessels and platforms, wireline re-entry for deploying long-term monitoring devices, and ways of synthesizing past results will also be presented. Some proposed projects, such as deep crustal penetration, will require long-term commitment of engineering efforts to improve recovery in brittle or high-temperature rock. Choices will have to be made on the best uses of time and funds. For example, drilling in Arctic regions, which involves on-station drilling for months in a hostile environment, will require primary resources other than the JOIDES RESOLUTION. Another important

planning issue is how ODP will interface with other global programs.

THE ROLE OF PROPOSALS IN LONG-RANGE PLANNING

ODP is a proposal-driven system. Through proposals, individual scientists or groups have the opportunity to respond to ODP's thematic priorities and contribute their expertise.

It is important to note that proposals ultimately drive the ship, as they are the primary documents reviewed by the thematic panels. These panels continually evaluate proposals submitted to JOIDES, and make recommendations on which ones constitute important and exciting science for the future. In their review, thematic panels look for questions which are relevant to global geoscience, which present a testable hypothesis, and which detail an experiment to test an idea or model.

In light of long-range planning requirements, proposals should be submitted well in advance of anticipated drilling. Funding for regional and seismic studies is another component of long-range planning. These studies must be completed or in progress before a program can be given serious consideration.

To refine the proposals submitted to JOIDES, detailed planning groups (DPGs) may be established to provide in-depth review and synthesis of drilling targets. An advantage of DPGs over the previous system of regional panels is that proponents, often the primary data holders, can be fully involved without conflict of interest becoming an issue.

The proposal process gives tremendous opportunity for individuals and groups to promote their ideas through ocean drilling, but places the burden of site survey planning on them as well.

Figure 1 illustrates how a proposal moves through the JOIDES planning process to reach the stage of actual drilling. Guidelines for submitting proposals are described in detail on p. 26.

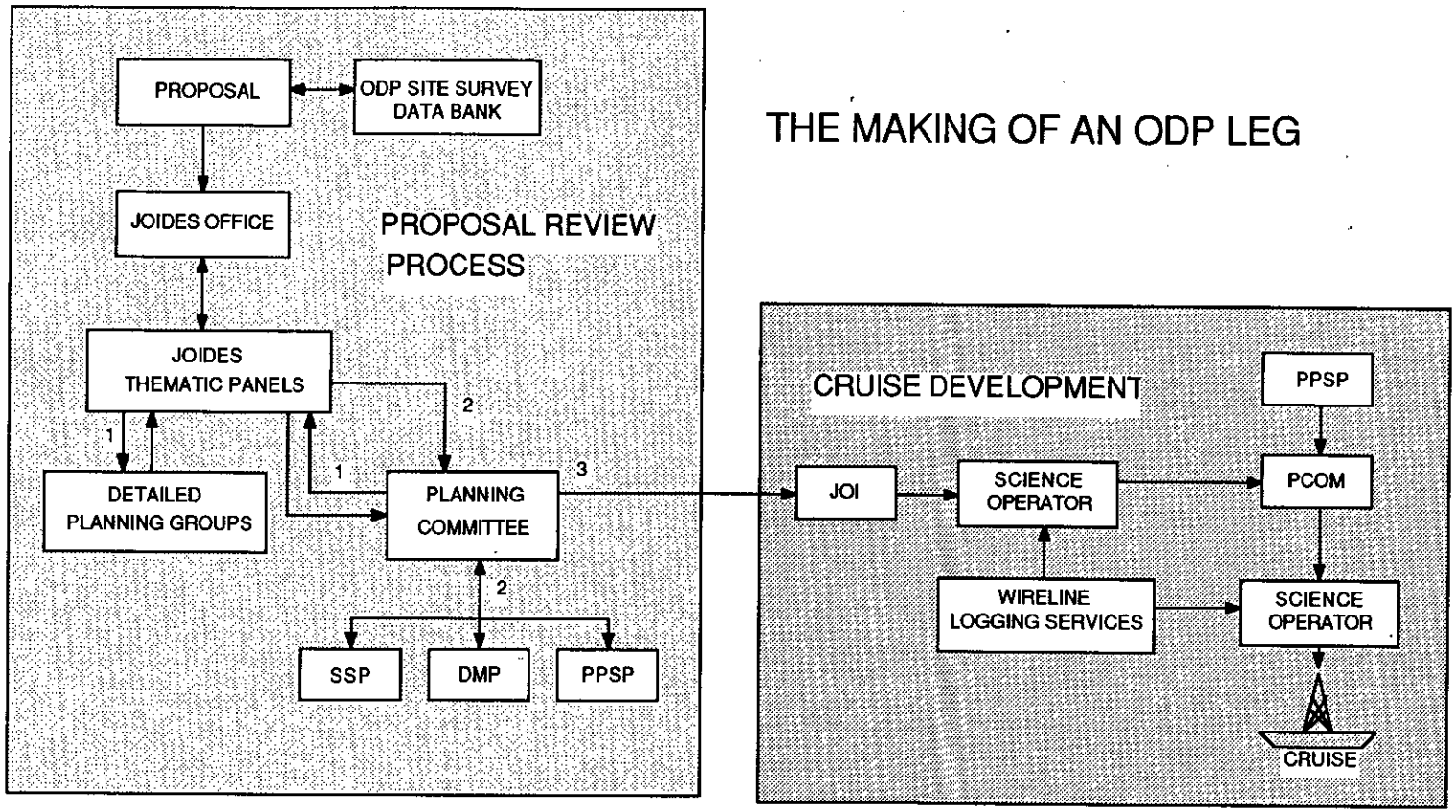


Figure 1. JOIDES science planning process which illustrates the development of an ODP leg from proposal to final drilling.

GUIDELINES FOR PROPOSAL SUBMISSION

INTRODUCTION

The purpose of the JOIDES scientific advisory structure is to formulate the most productive ocean drilling plan which will answer scientific questions about present-day and earlier processes of the earth. Drilling is based on suggestions and proposals from the entire scientific community.

Before a specific proposal or set of proposals leads to drilling, JOIDES must be convinced that:

a. the scientific objectives are of high priority;
b. drill sites are located to address those objectives in the best and safest manner possible, and
c. the operational plan to drill them has a reasonable chance of success.

PCOM depends primarily on the thematic panels for advice on scientific objectives. Service panels, detailed planning groups, the Science Operator, Wireline Logging Services, and Site Survey Data Bank, provide advice on optimum and safe drill sites.

JOIDES accepts proposals into the planning process as:

Preliminary Proposals. These are ideas for scientific ocean drilling. Examples are objectives aimed at a specific process, general drilling targets, or experiments in the borehole. Such proposals may lack a strong scientific focus, geographic specificity, or site survey data.

Mature Drilling Proposals. These are proposals which address specific scientific themes by drilling in specific areas.

Proposals are reviewed and set into priority by one or more of the JOIDES advisory panels. Only mature proposals are ultimately prioritized by PCOM for actual drilling. Thus, ideas which become part of the drilling program do so either by evolving into a mature proposal, or by being incorporated into an existing proposal with multiple objectives.

Maturity is gained by obtaining a favorable thematic evaluation, and meeting certain site-specific requirements.

REVIEW PROCESS

Proposals submitted to the JOIDES Office are logged and acknowledged, and forwarded to each of the four thematic panels for review of their scientific content. Although it is unlikely that all panels have an interest in any specific proposal, in a proposal-generated, thematically-controlled program the only fair assessment is by having all thematic panels review all proposals.

Proposals may also be sent to service panels or detailed planning groups if so requested by the proponent, or if deemed appropriate by the JOIDES Office. Informational copies are sent to JOI, the Science Operator at TAMU, and the Site Survey Data Bank at LDGO.

Thematic evaluations are based on the experience and judgment of the panel members, and in the context of the panel white papers, COSOD I and II, and other reports. Panels may request additional information from proponents and may suggest that the proposal be modified to enhance its scientific merit. A copy of the Proposal Review Sheet used in evaluating a proposal is attached as Figure 1.

Proposals of limited scope may be incorporated into a proposal of broader scope by the advisory panels. Proposals receiving a favorable thematic evaluation will be considered further by JOIDES.

As a proposal matures and proceeds through the system, service panels may make recommendations on technical aspects of the proposed drilling (e.g. site survey review, safety review, downhole measurements review, shipboard measurements review, etc.).

PCOM monitors and directs the proposal review process, reviews recommendations made by the advisory panels, decides the fate of proposals, and

PROPOSAL REVIEW

Number:

Title:

Proponents:

Evaluation by _____ Panel

(Check as appropriate)

☐ 1. Not within the mandate of this panel.

☐ 2. Does not address high-priority thematic objective.

☐ 2a. Does, however, have secondary interest to us if is of high priority to some other thematic panel.

☐ 3. Addresses thematic objectives, but with deficiencies.

☐ 4. Addresses high-priority objectives of this panel.

For 2a. and 3: Provide brief statement:

Other Comments:

Date _____

Return to: JOIDES Planning Office
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, HI 96822

A copy will be sent to the proponent(s).

Figure 1. Proposal Review Sheet used by JOIDES advisory panels in evaluating scientific proposals submitted to ODP.

ultimately integrates the approved proposals into a detailed drilling plan and ship track.

Figure 2 is a schematic representation of the proposal review process.

PROPOSAL SUBMISSION

The time required for a proposal to be processed and become a part of the drilling plan depends on the scientific value of the proposal and the completeness of the required data when submitted. Proponents are therefore urged to submit as complete a package as possible.

Ten copies of proposals must be submitted to the JOIDES Office.

MINIMUM REQUIREMENTS

Mature Proposals

A mature proposal should discuss the following items:

1. Specific scientific objectives and priorities.

2. Proposed site locations and alternative sites.

3. Background information, including regional and local geological setting and identification of existing geophysical and geological data.

4. Drilling requirements for each objective (e.g. estimated drilling time, steaming time, water depth, drill string length to deepest objective, re-entry, etc.). The Science Operator at TAMU can provide tables with the necessary information.

5. Logging as well as downhole experiments and other supplementary programs (with estimated time, specialized tools, etc.). Wireline Logging Services at LDGO can provide assistance.

6. Explanation of known deficiencies in the data required for location of drill sites (site surveys), and data required for the interpretation and extrapolation of drilling results (regional geophysics).

   See p. 46 for ODP site survey data standards. Contact the ODP Site Survey Data Bank at LDGO for additional information.

7. Statement of potential safety problems in implementing the proposed drilling (see Guidelines for Safety Review, p. 33).

8. Other potential problems (weather windows, territorial jurisdiction, etc.).

9. The name and address of a person assigned as the proponent for each site, who will serve as a contact for JOIDES when additional information is required.

Proponents are also required to submit a Site Summary Form for each proposed drilling site (Figure 3). Copies of all forms which should be included with a proposal can be obtained from the JOIDES Office.

Data Availability and Deposition

Proponents are asked to identify available data in three categories:

1. Primary data necessary and sufficient to support the scientific proposal. The ODP Site Survey Data Bank is authorized to duplicate and distribute these data as needed for ODP evaluation and planning procedures.

2. Other data relevant to the proposal which may be obtained from publicly accessible data bases.

3. Data which will eventually be available for public access but has release clauses imposed by the data holder. These data can not normally be considered in evaluating the scientific merit of a proposal; they may, however, be used to support safety considerations.

It is emphasized that supporting data for proposals in the above categories must be deposited in the ODP Site Survey Data Bank to ensure that a proposal is considered mature. Guidelines for the submission of data to the Site Survey Data Bank are detailed on p. 46.

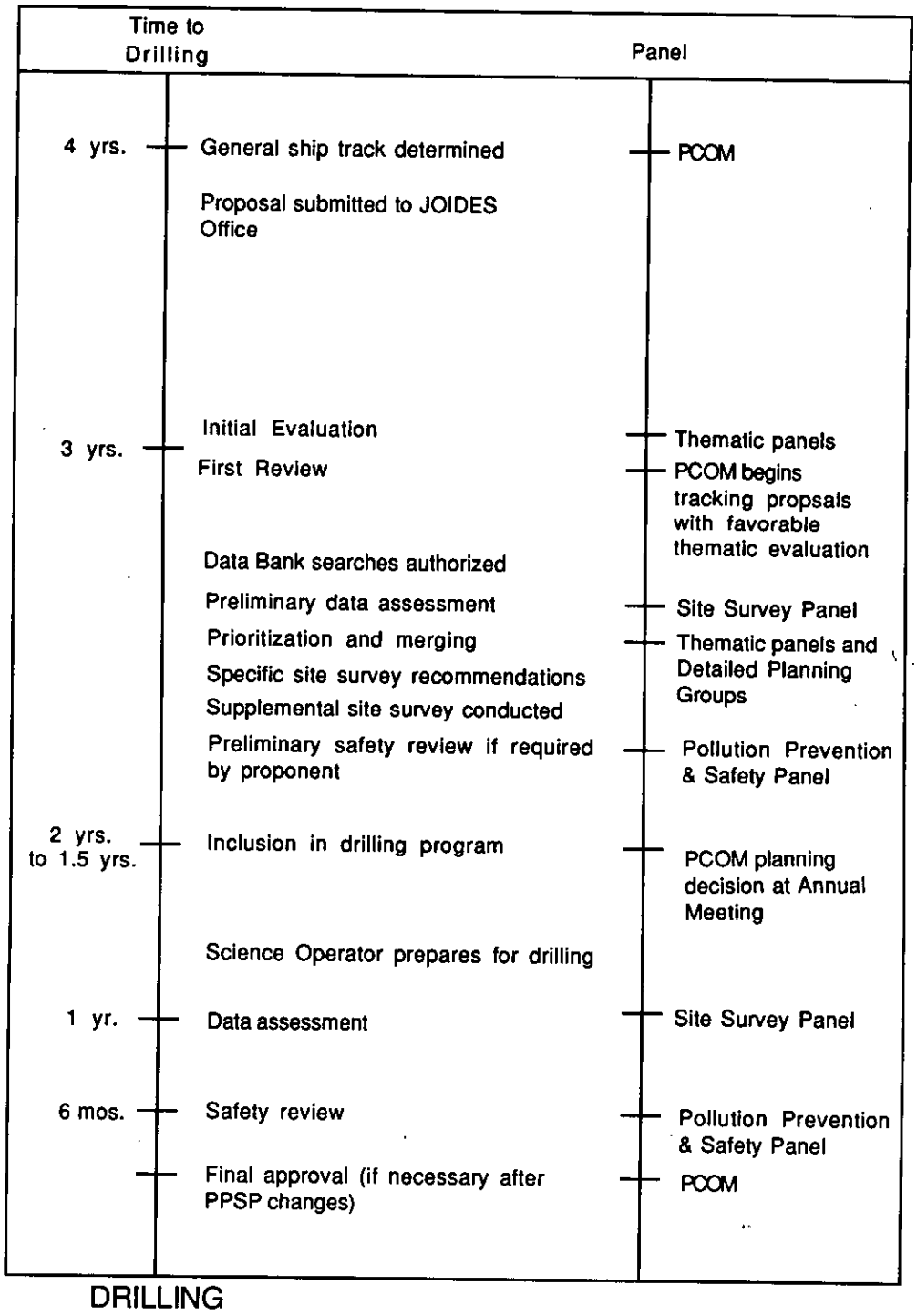


Figure 2. Process and approximate timeline for review and development of JOIDES proposals.

ODP PROPOSAL : SITE SUMMARY FORM

(Submit 10 copies of proposal)

Proposed Site:	General Objective:
General Area:	
Position (Lat/Long):	Thematic Panel Interest:
Alternate Site:	

Specific Objectives: _____

_____

_____

Background Information: (Indicate status of data as outlined in the guidelines)

1. Regional Geophysical Data:
   Seismic Profiles: _____
   _____
   Other Data: _____
   _____
2. Site Survey Specific Data:
   Seismic Profiles: _____
   _____
   Other Data: _____
   _____

Operational Considerations:

Water Depth (m): _____ Sed. Thickness (m): _____ Total Penetration (m): _____

HPC: ____ Double HPC: ____ Rotary Drill: ____ Single Bit: ____ Re-entry: ____

Logging: _____

Nature of Sediments: _____

Rocks Anticipated: _____

Weather Conditions: _____

Windows: _____

Territorial Jurisdiction: _____

Other: _____

Special Requirements: (staffing, instrumentation, etc.) _____

_____

_____

Proponent: (address, phone & electronic mail) _____

_____

_____

Figure 3. Site Summary Form required for each proposed site.

Special Submission

Letters of Intent to Submit may be sent to the JOIDES Office at any time. Revised proposals and supplemental information should reference the original log number assigned by the JOIDES Office, and may also be sent to the JOIDES Office at any time. A proposal sent directly to a panel will not be considered before it is received and logged at the JOIDES Office.

PRELIMINARY TIME ESTIMATES FOR CORING AND LOGGING OPERATIONS

Guidelines have been prepared by both the Science Operator and the Wireline Logging Services Contractor for estimating ODP coring and logging times. TAMU has compiled and revised curves for estimating these times in the following publication:

Preliminary Time Estimates for Coring Operations, ODP Technical Note No. 1 (Revised December 1986).

In this publication, drill string and wireline trip time curves reflect actual operating times on ODP Legs 103 through 108 (excluding Leg 106, which was not representative of routine operations). Curves for drill string trip time and rotary (RCB), advanced piston (APC), and extended core barrel (XCB) coring cycles are included. They can be used for estimating times in both single-bit and re-entry holes. The curve in Figure 4, for instance, plots the average time for a complete APC coring cycle.

The curves, along with procedures for calculating approximate coring and logging times, are available to assist proponents in developing realistic drilling times. Whenever possible, time estimates for ODP holes should be based on data from similar locations and/or lithologies.

Because of the complexity of ODP operations, however, these estimates should not be used for detailed operational planning. Once a site has been approved and its objectives defined, detailed planning becomes the responsibility of the Science Operator.

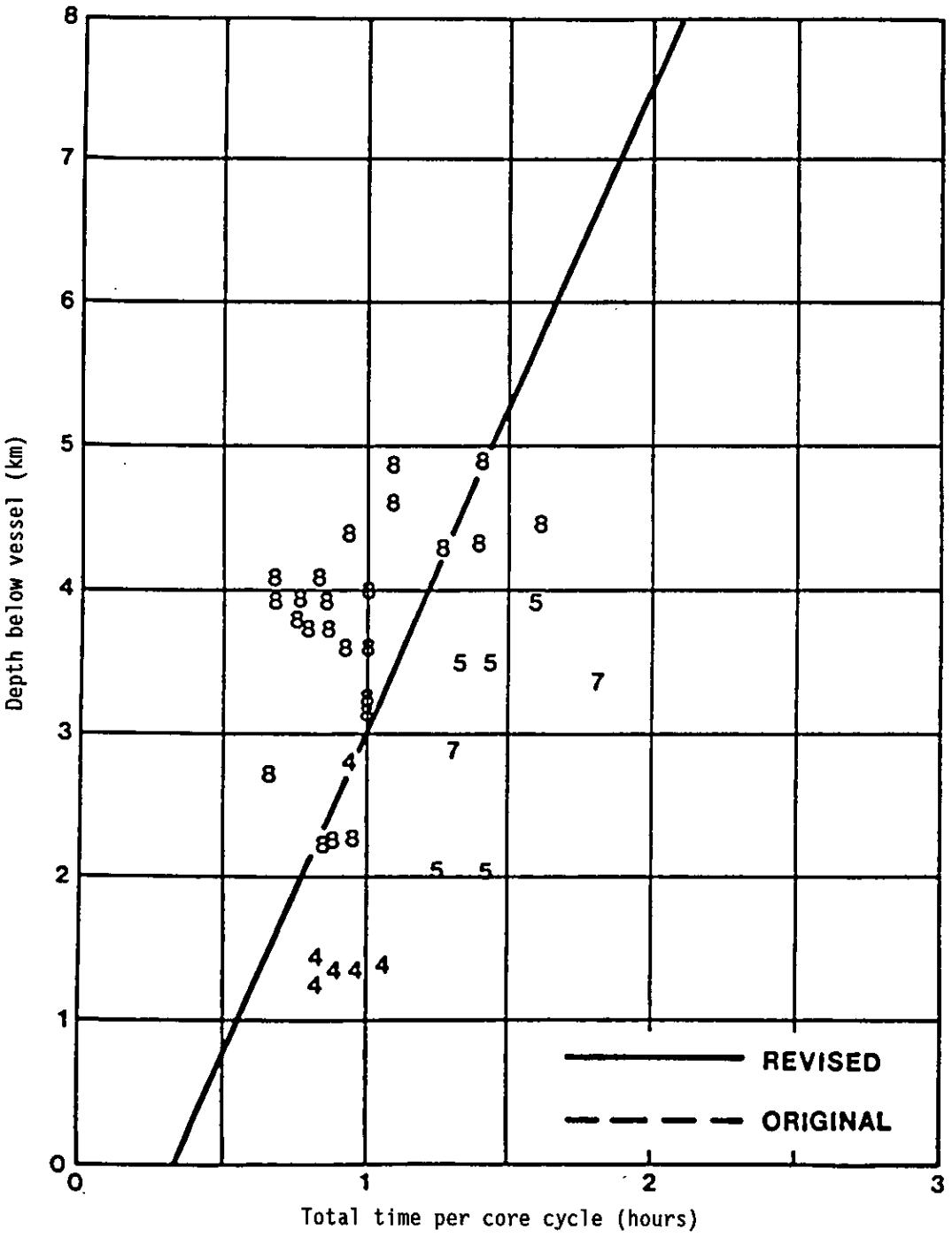


Figure 4. Advanced Piston Corer (APC) Round Trip. As there is theoretically no rotating time involved in piston coring operations, the data points (which represent the last digit of ODP leg numbers) show complete coring cycle times. Time spent on orientation and temperature measurements is included. In this case, the revised curve is coincident with one based on the last two years of DSDP operations.

GUIDELINES FOR SAFETY REVIEWS

INTRODUCTION

Safety reviews are a critical element in the process of planning a drilling leg. In addition to the JOIDES Pollution Prevention and Safety Panel (PPSP), the Science Operator (TAMU) also has an independent group of safety advisors. Advice and recommendations from both groups are incorporated into the final decision on whether or not a proposed site will be drilled.

Although the risk of encountering oil or gas while drilling into the seafloor can rarely be eliminated, it is critically important that it be reduced to an absolute minimum. The potential impact of an ocean polluting incident on ODP could be very severe, leading perhaps to an interruption in the drilling schedule, or worse, termination of the program.

The primary responsibility for documenting hazardous sub-seafloor conditions rests with the Co-Chief Scientists. They are ultimately responsible for ensuring that adequate technical data are obtained, and for processing these data for examination by the safety panels. Failure to document safety considerations in a thorough manner could result in rejection of a site by the safety panels.

GEOLOGICAL DRILLING HAZARDS

The most critical safety and pollution hazards in ocean drilling are the possible release of hydrocarbons from a subsurface reservoir, or penetration into a superheated hydrothermal system.

In most deep sea regions, the risk of hydrocarbon release can be reduced or eliminated by careful planning, judicious choice of drilling locations based on proper site surveys, and by taking special precautions when coring at potentially hazardous sites.

SAFETY REVIEW PROCEDURES

Safety panel review is a complex procedure which varies from leg to leg, depending on the geological setting of the drill sites, and the quantity and quality of data available. These guidelines provide only the overall scope of the review which should include a synthesis of the geological, geochemical and geophysical data at each site.

Material for safety panel review is usually presented in two stages. The first stage consists of material mailed to members of the JOIDES and the TAMU safety advisors approximately two weeks prior to a formal review meeting. This material should acquaint them with the location, elements of structure and stratigraphy, any safety problems which may exist at each site, and include a Safety Review Checksheet for each site. These documents allow individual panel members time to research their own files and the literature on possible hydrocarbon or other hazards for the various sites.

The second stage is a formal presentation of all available data at a safety review meeting. In preparation for this meeting no effort should be spared in compiling all data of possible significance. The panels are necessarily reluctant to approve sites where data is insufficient to support a safety evaluation. Avoiding reference to negative data can be a greater deterrent to panel approval than bringing such data into the open where its merits can be judged relative to the overall safety aspects of a site.

It should be noted that proposals to drill on structural highs will generally be rejected; relocation of the site off-structure may be recommended. The panels are also likely to relocate drill sites to cross-points of seismic reflection lines, especially on continental margins and where structure may be a factor.

Much of the data required for safety review is also required to support submission of a formal mature proposal to JOIDES. Data which should be submitted to the ODP Site Survey Data Bank and data format requirements are described on p. 46.

SCHEDULES FOR SAFETY REVIEW

The program schedule requires safety reviews to be held at least three months before a leg begins. It is advisable, however, to conduct the review even earlier if possible, so that if a site is rejected, it is still possible to obtain new geological, geophysical and geochemical data for alternate sites.

Both the JOIDES and TAMU safety panels are present at a safety review meeting. In reviewing the data, questioning the proponents, and discussing problems, there is no distinction between the two panels. However, the panels arrive at independent conclusions which are not necessarily identical. If there is a difference of opinion between the two panels, the most conservative advice is followed.

Preliminary Safety Reviews

If, early in their planning, the proponents of a drilling program or of a single site, anticipate serious concerns about safety, they are urged to request a preliminary safety review. This entails submission of initial reconnaissance information and allows preliminary assessment of the problem before a major commitment of time and money is made. A preliminary review can be done at a scheduled safety review, or can be accomplished by mail canvassing of the JOIDES safety panel members. In any event, the matter should be discussed with the PPSP Chairman before any arrangements are attempted.

SAFETY PANEL RECOMMENDATIONS

At the formal safety review meeting, the panels will draw conclusions on the safety of each proposed site, and will advise the Co-Chief Scientists that the site:

a. is approved as proposed;
b. should be moved to a location which minimizes the risk but which is still compatible with the scientific objectives;
c. is rejected due to inadequate data or inherent risk.

The safety panels may recommend a preferred order of drilling if safety is a factor, and also specify any conditions of approval, such as maximum depth of penetration, or special monitoring requirements.

DOCUMENTATION FOR SAFETY REVIEW

Documentation Required for Mailing to Safety Panel Members

1. Small scale regional map showing bathymetry, nearest land area and location of proposed sites. One map may serve for all sites.

2. Track chart showing track lines and location of proposed site. Specific lines, or segments of lines, submitted for review should be indicated.

3. Cross-tie seismic reflection lines of sufficient length and detail to define all possible elements of closure. The following annotations should appear on these lines:

   a. site number, location and penetration depth;
   b. direction of traverse;
   c. horizontal scale in kilometers;
   d. vertical scale in seconds (unless depth section);
   e. major course corrections;
   f. important reflections and their identification;
   g. intersection point of cross-tie lines.

   Seismic events on the profiler line should be legible at least to the depth of penetration proposed for the site. With this in mind, these data can sometimes be presented on photographic prints. When using prints, suitable negatives, together with annotation, should be sent to the ODP Site Survey Data Bank.

4. Sketch of major structural elements. The major tectonic features should be indicated, as well as structural lows, sediment thicks and thins, and zones of particular reflection character.

5. JOIDES Safety Review Checksheets completed by the Co-Chief Scientists. Material submitted for each site should be indexed and annotated for ready identification of regional structural features, line

locations, line directions, and locations of other data, such as wells, grab samples, piston cores, etc.

For the sake of consistency, all measurements in safety review documents should be in the metric system.

Documentation for Formal Safety Review

At the formal safety review meeting, Co-Chief Scientists are expected to briefly present the scientific objectives of the leg, using regional maps, sections and published material as appropriate. This presentation should provide a comprehensive regional picture within which the scientific objectives and safety hazards of each site can be evaluated. For each site, the Co-Chief Scientists will present geological characteristics and identify possible hazards.

Required items for all sites include:

1. Bathymetric Data. As much bathymetric data as is available should be provided.

2. Track Charts. Locations of all geological, geophysical and geochemical data; locations of example lines, and proposed sites must be clearly shown.

3. Maps. Structure contour maps, sediment thickness maps, and depth to clathrate layer maps are essential requirements.

4. Seismic Reflection Data. All seismic lines necessary to defend a site will be brought to review meetings by the Co-Chief Scientists or site proponent. In the event either panel recommends moving a site location, it is necessary to have sufficient seismic data to support the new location.

   Documentation should also be provided for any alternate locations. The panels will not approve drilling penetration below the depth of resolution on the seismic records. All available velocity information should be provided.

5. Seismic Refraction, Gravity, and Magnetic Data.

6. Hydrocarbon Occurrences. Occurrences of hydrocarbons, or lack thereof, at nearby boreholes and exploration wells should be tabulated. Oil companies should be encouraged to release such data. Potential source rocks should be identified and mapped if possible.

7. International Jurisdiction and Extent of Nearby Oil Leases.

8. Other Site Survey Data. Lithologic descriptions of any piston cores or dredge samples recovered near the drill site, and bottom water and sediment analyses for the presence of hydrocarbons should be provided.

9. Regional Geologic Map or Cross-sections. For sites whose anticipated stratigraphic sequence can be compared with nearby onshore or other drilled sequences, a surface geologic map and/or cross-section is useful in evaluating a site. If available, source or reservoir rock data should be included.

SCIENCE OPERATOR: TEXAS A&M UNIVERSITY

The Science Operator for the Ocean Drilling Program is Texas A&M University (TAMU), located at College Station, Texas. Its management structure is shown in Figure 1.

As Science Operator, TAMU's responsibility is to collect cores from the ocean basins and to assure that adequate facilities are available for the analysis and preservation of these samples. In order to discharge this responsibility, TAMU (under guidance from the JOIDES community) was responsible for the lease-procurement and conversion of the drillship SEDCO/BP 470, a dynamically-positioned drillship with riser capabilities.

The drillship, referred to as the JOIDES RESOLUTION, was outfitted with scientific and drilling equipment, and special onboard laboratories (see p. 50 for detailed descriptions of shipboard facilities).

TAMU's ongoing responsibilities include, but are not limited to, the following activities.

SHIP OPERATIONS

TAMU is responsible for developing final operational plans and drilling schedules based on scientific direction from JOIDES. This includes, among other activities, ensuring equipment availability, defining operational limitations, providing an adequate supply of consumables (beacons, drill bits, etc.), assessing safety and operational procedures prior to drilling, and ensuring the organized transportation of personnel and necessary supplies between cruises.

TAMU subcontracts with Underseas Drilling, Inc. for operation of the drillship which is leased from Overseas Drilling, Ltd., a company owned by British Petroleum, and SEDCO FOREX, a subsidiary of Schlumberger Offshore.

CRUISE STAFFING

TAMU staffs the ship with scientific and technical support personnel which include the groups described below.

Co-Chief Scientists

TAMU is responsible for final selection of two Co-Chief Scientists for each cruise, based on recommendations made by the Planning Committee. TAMU coordinates with the Co-Chief Scientists through pre-cruise and post-cruise meetings. In general, it is the policy to select one Co-Chief Scientist per year from each of the international partner nations.

Shipboard Scientific Staff

Typically up to 25 in number, the shipboard scientific staff represents a team of specialists in the various fields of geoscience (petrology, sedimentology, geophysics, etc.). The shipboard science party is drawn from universities, government, and industry in JOIDES member countries.

Technical Support Crew

The technical support crew, also up to 25 in number, are highly trained TAMU employees, including electronic and marine technicians, curatorial representatives, computer experts, and an experienced drilling superintendent who oversees drilling operations and acts as liaison between drilling and scientific activities.

SHIPBOARD LABORATORIES

TAMU maintains and supports shipboard laboratories designed to meet the needs of the shipboard scientific staff (see p. 51 for details).

DATA COLLECTION AND DISSEMINATION

This function includes storing, archiving, and disseminating cores and other scientific data collected during the course of the program. TAMU is curator of all cores obtained by ODP and by DSDP. Cores are maintained at repositories on the East, West and Gulf coasts, located at LDGO, Scripps Institution of Oceanography, and TAMU, respectively. These repositories have scientific laboratory and computer facilities to

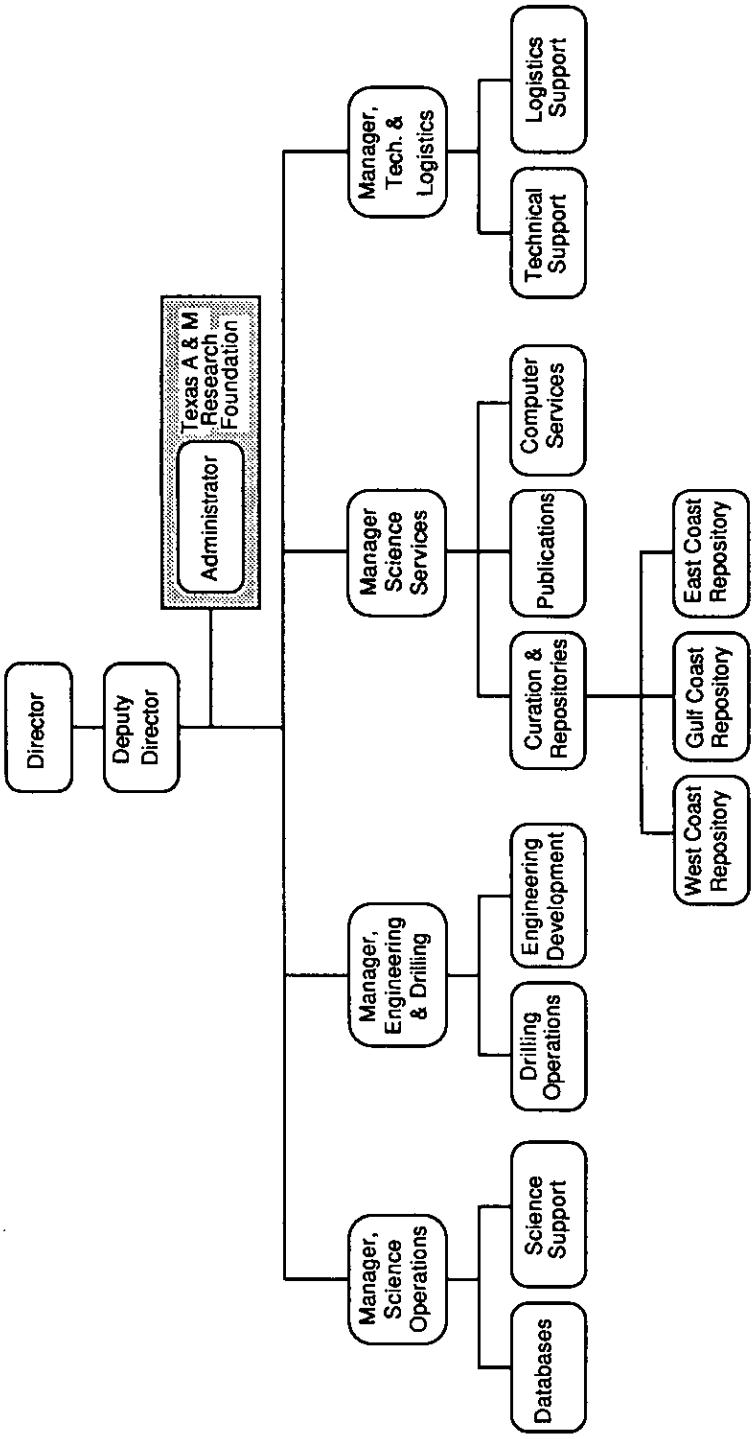


Figure 1. Management structure of Texas A&M University, the ODP Science Operator.

accommodate visiting scientific investigators.

Prime scientific data is archived in databases maintained by TAMU (see Data Distribution Policy, p. 59).

PUBLICATIONS

TAMU is responsible for publication of an authoritative series of reference books which summarize the objectives and results of each cruise: the Proceedings of the Ocean Drilling Program. These volumes are issued in two parts, Initial Reports detailing shipboard results, and Scientific Results describing shore-based results and synthesis papers.

The reports include pre-drilling geological and geophysical site surveys, objectives, planning documentation, core records, physical and geochemical measurements, logging data, core photographs, paleontology and petrological reports and syntheses.

TAMU issues pre-cruise scientific prospectuses, based on JOIDES panel recommendations on site priorities, about two to three months prior to sailing date.

Post-cruise contributions reporting shipboard results are also issued from TAMU, mainly through Geotimes and Nature articles, and Preliminary Reports.

In addition, TAMU provides public information such as press releases, informational brochures, films, shipboard tours, and speaking engagements presented by the scientific and technical staff.

ENGINEERING DEVELOPMENT

TAMU has worked toward improvement of existing drilling and downhole techniques, and the development of new ones required to meet scientific objectives established by the JOIDES community.

These tasks include enhancement of bare-rock drilling capabilities; improvements in core recovery, quality, and orientation; research on the operating limits of long drill strings; and the application of slimline through-pipe mud motor technology to ocean drilling.

WIRELINE LOGGING SERVICES: LAMONT-DOHERTY GEOLOGICAL OBSERVATORY

INTRODUCTION

The Borehole Research Group at Lamont-Doherty Geological Observatory (LDGO) is the prime logging contractor for ODP, and provides a full suite of geophysical and geochemical logging services. These services include acquisition, processing, and presentation of in situ logging measurements to JOIDES scientists.

LDGO provides state-of-the-art oil industry logging, customized to the needs of JOIDES scientists, and specialty logs useful to scientific logging. LDGO also provides interpretation and distribution services so JOIDES scientists can use the logs to solve particular scientific problems.

The Downhole Measurements Panel (DMP) is designated by PCOM to recommend long-term equipment and service developments, coordinate and integrate LDGO logging services with other downhole programs, and assist in identifying new technology, and recruiting logging scientists for each cruise.

The ODP logging program has achieved state-of-the-art levels on the JOIDES RESOLUTION. Logging data recorded on ODP legs are being used to solve scientific problems of paleoenvironment, stratigraphy, geochemistry, basement structure, hydrogeology, geomechanics and tectonics. Logs complement core data and provide the only continuous measurement within an ODP borehole, which is particularly important when core recovery is low.

OVERVIEW OF LOGGING SERVICES

The management structure of the Borehole Research Group at LDGO shown in Figure 1. See the Directory section of this issue (p. 76) for a listing of scientific and management personnel.

Components of a Logging Program

ODP logging services have several major components. First, LDGO has subcontracted for basic oil-field type logging services from Schlumberger Offshore Services. Schlumberger, the industry leader, supplies LDGO with commercial logging services on every ODP leg.

Second, Stanford University has been a subcontractor for the adaptation of specialty logging services not available through Schlumberger, such as borehole imaging and 12-channel sonic logging.

Third, a Log Analysis Center at LDGO provides computer processing, log analysis and interpretation services for post-cruise use by ODP scientists.

Logging Personnel

To carry out the downhole program at sea, three logging personnel are included on each ODP leg: a Logging Scientist from the JOIDES scientific community, a Schlumberger Field Engineer to operate Schlumberger tools, and an LDGO Logging Scientist to assist the Co-Chiefs Scientists and JOIDES Logging Scientist.

The JOIDES Logging Scientist is chosen by the Science Operator from applications recommended by DMP. The JOIDES Logging Scientist is primarily responsible for log interpretation and preparation of logging chapters in shipboard reports and subsequent post-cruise reports.

SHIPBOARD DATA ACQUISITION

Geophysical data are recorded by lowering probes into the borehole on the end of a wireline. Analysis of wireline logs depends on comparing the results from different lowerings of various tool combinations. Each combination of tools therefore includes some form of gamma ray detector. Different logging runs can generally be depth shifted using this common measurement.

The Schlumberger tools, described below, can be stacked for simultaneous measurements from different tools. Specialty logs, also described

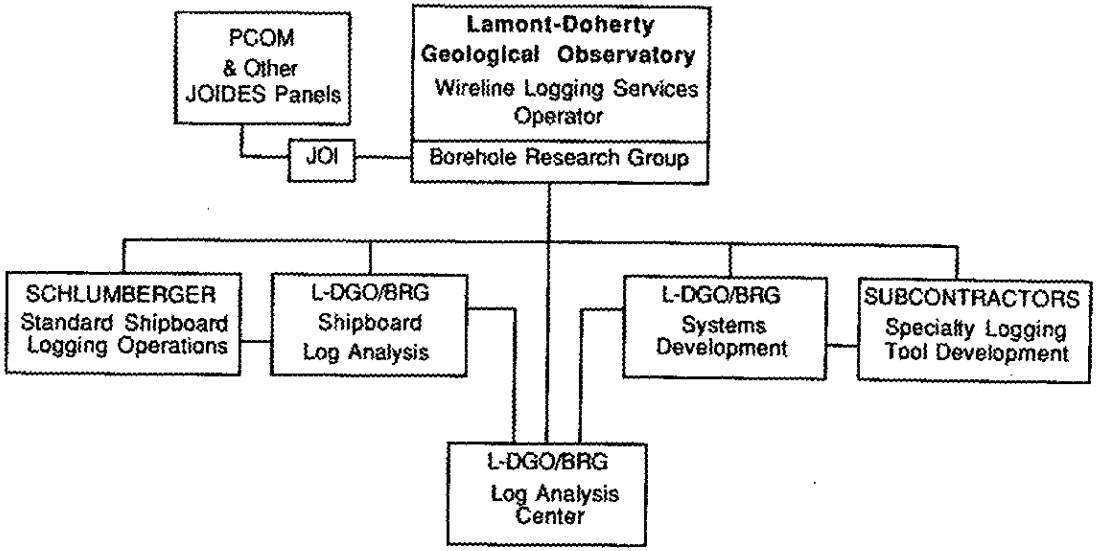


Figure 1. Management structure of the Borehole Research Group at Lamont-Doherty Geological Observatory, the ODP Wireline Logging Services Contractor.

below, are recorded during a separate lowering. Data are recorded at 0.152 m intervals in the borehole.

JOIDES policy requires that all holes 400 mbsf or deeper be logged. Logging plans in the cruise prospectus may call for runs on shallower holes, if logging data would be useful. As of mid-1988, JOIDES recommended that deep XCB holes be logged at the 750 mbsf point with standard Schlumberger combinations. Because hole conditions may deteriorate at depth, this policy ensures that some data are recorded if the hole is lost in further drilling.

SCHLUMBERGER LOGS

Schlumberger logs, the standard measurements for ODP holes, are run by the Schlumberger Logging Engineer. These tools are combined in multiple-tool strings for efficient operations. Seismic stratigraphic, lithoporosity, and geochemical tool combinations are run. Some overlap exists among these combinations and some measurements are common to two lowerings. Some of the more sophisticated post-cruise processing and analysis cannot be accomplished without data from all three lowerings.

An additional tool which measures vector magnetic field, hole azimuth and hole deviation can be run with either the lithoporosity or geochemistry package.

LDGO plans to reduce Schlumberger logging runs to two strings early in 1989. This reduction will be accomplished by running more tool types on each of the two strings rather than by eliminating tools. The purpose of the change is to reduce the amount of ship time required for logging.

Schlumberger tools are normally less than 9.33 cm in diameter in order to fit through the drillpipe, and are temperature rated to 125-175° C. Table 1 summarizes the Schlumberger tools and their applications.

STANDARD SCHLUMBERGER RUNS

Seismic Stratigraphic Combination

The seismic stratigraphic combination includes the long spacing sonic (LSS), phase induction (DIT), gamma ray (GR) and caliper (MDC) tools. The combination is a valuable stratigraphic tool which directly measures compressional wave sound velocity, and indirectly measures porosity and clay mineral percentages, the two variables which most often affect velocity.

Lithoporosity Combination

The lithoporosity combination includes natural gamma ray spectrometry (NGT), lithodensity (LDT) and compensated neutron porosity (CNT-G) tools. This combination provides measurements of formation porosity and density as well as an estimate of the radioactive elements uranium (U), potassium (K) and thorium (Th). The Th/K ratio from the gamma ray spectrometry tool can be used to indicate the presence of different types of clay. The U/Th ratio gives qualitative information on the oxidation state of the formation.

Geochemical Combination

The geochemical combination includes natural gamma ray spectrometry (NGT), induced gamma ray spectrometry (GST) and the aluminum clay tool (ACT), which is a second NGT paired with a Californium-source CNT-G neutron tool. Its value to geochemistry is the ability to measure relative concentrations of eleven elements: silicon, calcium, iron, sulphur, aluminum, manganese, hydrogen, chlorine, potassium, thorium and uranium.

Post-cruise processing of combined data from the geochemical and lithoporosity combinations yields dry-weight percentages for the major elements.

ADDITIONAL SCHLUMBERGER TOOLS

Magnetometer/Hole Orientation (GPIT)

An additional measurement cartridge can be included in the lithoporosity or geochemical string to determine hole azimuth and deviation and the vector components of the magnetic field.

LOG	ACRONYM	PRINCIPLE	THRU PIPE	COMBINABLE	SEISMOGRAMS/SYNTHETIC	LITHOLOGY/MINERALOGY	POROSITY	GEOCHEMISTRY (# elements)	OTHER
SONIC	LSS	travel time of sound (2 receivers)	N	X	G	F	G	--	
RESISTIVITY									
- shallow	SFL	resistivity to current	N	X	F	F	VG	--	
- medium	ILM	induced current	N	X	F	F	VG	--	
- deep	ILD	induced current	N	X	F	F	VG	--	
GAMMA RAY	GR	natural gamma ray emissions	N	X	P	VG	--	--	
CALIPER	CALI	hole diameter	N	X	--	P	--	--	quality control for other logs
DUAL LATEROLOG	DLL	resistivity to current	N	X	F	F	VG	--	
NEUTRON POROSITY (Am/Be Source)	CNT-G	absorption of bombarding neutrons	Y	X	P	F	VG	1	
SPECTRAL GAMM RAY	NGT	natural gamma ray emissions	Y	X	P	VG	--	3	
DENSITY	LDT	absorption of bombarding gamma rays	N	X	G	G	G	--	
GAMMA SPECTROSCOPY	GST	capture of bombarding neutrons	Y	X	F	VG	F	6	
NEUTRON POROSITY (Cf Source)	ACT	absorption of bombarding neutrons	Y	X	P	F	VG	2	
12 CHANNEL SONIC	MCS	travel time of sound (12 receivers)	N	X	VG	F	G	--	shear velocity, apparent attenuation
TELEVIEWER	BHTV	travel time + reflectivity of borehole wall	N	X	P	F	--	--	stress directions, fracture orientations, structural dip, formation morphology
3-AXIS MAGNETOMETER	GPIT	oriented magnetic field including inclination	N	X	P	F	--	--	magnetic reversals, stratigraphy, fault zones

Table 1. Schlumberger logging tools and their applications.

Dual Laterolog (DLL)

Induction logging probes do not produce reliable results in highly resistive formations such as oceanic basalts. The Schlumberger DLL provides the deeper measurement of resistivity into the rock with high precision at high resistivities.

Well Seismic Tool (WST)

A wellbore clamped, single component geophone is used to record vertical seismic profiles in a borehole. It provides a measure of formation velocity at seismic frequencies by measuring travel time between the wellbore geophone and a surface seismic shot.

The tool accurately determines the depth of seismic reflectors penetrated by the hole. Estimates of travel time to reflectors below the depth of penetration can also be made with this experiment. These data are useful in depth correlating reflectors on nearby seismic lines. The WST is routinely aboard the drillship, but is only scheduled for specific legs.

SPECIALTY TOOLS

ODP owns several logging tools which are run by the LDGO Logging Scientist onboard the RESOLUTION.

Borehole Televiewer (BHTV)

Borehole acoustic televiewers are employed to detect and evaluate fractures and bedding that intersect the borehole wall. An acoustic beam scans horizontally around the circumference of the borehole as the tool moves vertically. Televiewers are very sensitive and can outline small features such as fractures, vugs or other large porosity and bedding planes. The dip and orientation of fractures or bedding planes can frequently be determined. Measuring the travel time of the reflected pulse yields a 360 caliper log which can be used to detect spalled zones related to horizontal stresses in the wellbore.

BHTV data can be reduced to provide a fracture log and a log of detected structural features. Where present, breakout orientation is used to determine the orientation of the greatest and least horizontal principal stresses.

Multichannel Sonic Log (MCS)

The complete waveform of the acoustic or sonic signal is recorded by the MCS log at 12 receivers, each spaced 15 cm apart. Subsequent waveform analysis can determine velocities of compressional waves, shear waves, Stoneley and normal modes, and compressional wave energy and frequency content. The various elastic properties of the formation can thus be estimated. Due to the number and spacing of the receivers, this tool yields significantly better results than the Schlumberger two-channel waveform log.

DEVELOPMENTAL TOOLS

Formation Microscanner (FMS)

The FMS is a high-resolution dipmeter which has been modified from a Schlumberger design for ODP use. It can provide sharp images of the borehole, used to identify fractures, sedimentary and structural dip, and to delineate fine-scale facies and structures. This tool may be used instead of the BHTV in soft rock and coarse-grained hard rock. The vertical resolution of other tools can be improved with FMS data. This tool is scheduled for its first ODP use in mid-1989.

Wireline Packer

The wireline packer is designed for real-time monitoring of formation pore pressure and for selective sampling of pore fluids. It is expected to be most useful in moderately to highly lithified formations. ODP use of the wireline packer should significantly increase our understanding of oceanic igneous and sedimentary pore fluids, and their effects on geochemical measurements of oceanic crust. The first ODP test of the wireline packer will be on Leg 124E in January 1989.

Temperature Tool (TLT)

The Temperature Logging Tool (TLT) was designed and built by LDGO. This

high-precision, low-temperature logging tool is self-contained, and is attach-able to the Schlumberger and LDGO specialty logging tools. Thus, several temperature logs can be obtained at any logged site, with no increase in logging time. The tool has two purposes:

1. to greatly increase the proportion of ODP holes with heat-flow measurements, and

2. to detect intervals with active fluid flow through the perturbation of the temperature/depth trend.

This tool was first used successfully on Leg 123; it is still considered a developmental tool, pending reliable results from future cruises.

Downhole Magnetometer/Susceptometer

Researchers from the University of Washington, in conjunction with the Borehole Research Group (BRG), have built a 3-component magnetometer and susceptometer. The tool was successfully tested on Leg 118, and then turned over to the BRG for future ODP use. Like other third-party tools used on ODP legs, this tool is designed for basalt logging and lacks sufficient sensitivity for sediment logging. In early 1989, a gyroscope will be added to this tool for orientation of the magnetometer data.

SPECIALTY BOREHOLE LOGS

ODP Tools

The Science Operator (TAMU) and the Logging Contractor (LDGO) divide responsibilities for downhole measurements. TAMU is responsible for downhole measurements made in conjunction with drilling. LDGO is responsible for downhole measurements made after drilling is completed.

Measurements made with TAMU tools include pore-fluid sampling, temperature measurements in sediment or in open borehole, permeability measurements using drill string packers, and orientation of APC cores. Many other types of measurement are possible and several new tools such as a pressure core barrel, APC lateral stress tool, and an APC pore water sampling tool are now under development by investigators working with ODP.

A complete guide to ODP tools for downhole measurements is available from TAMU/ODP Technical Note No. 10 (see below).

Specialty Logging Tools

Occasionally, shipboard scientists bring specialty logging equipment on board to run experiments at particular sites. Examples include magnetic susceptibility on Legs 102 and 109 and 3-axis magnetic field determination on Leg 102. Software is available to permit data acquisition on the LDGO logging computer.

There are several restrictions and operational requirements which should be noted by prospective logging investigators. Most importantly, special logging must be evaluated by DMP and scheduled by PCOM. Other considerations include TAMU weight restrictions, limitations in cable speed, and other specifications for compatibility with ODP equipment.

LOG ANALYSIS

Preliminary log analysis is undertaken onboard the RESOLUTION, followed by full log analysis after each cruise. A work station at LDGO is available for post-cruise log analysis. As analysis techniques are developed, they are tested first at LDGO and then added to the shipboard analysis system.

Shipboard Analyses

Schlumberger logs are recorded by a computer which produces a display of the primary logging curves. It can also provide a quick look at computed values for a few analyses.

Specialty borehole logs obtained on the drillship are controlled by, recorded, and displayed on a MASSCOMP 561 system. Additional programs have been developed to run the MCS and BHTV logs. General purpose data acquisition routines are also available which can record the data from a wide variety of experimental logs. These include a continuous logging program and programs to record data

from hydraulic fracturing experiments and flow tests.

LDGO can work with individual scientists interested in running experiments which would benefit from the real-time capabilities of the MASSCOMP system.

Post-Cruise Analyses

The MASSCOMP computer at the LDGO Log Analyses Center runs a log analysis package (TERRALOG) which can do crossplots, lithologic analyses and corrections as well as displaying the new analyses in standard log format. Once a data tape has been copied for use on this system, LDGO and JOIDES scientists perform these analyses in the course of preparing the logging chapters of the shipboard report.

All specialty log analyses are available at the LDGO Log Analysis Center, including a menu-driven analysis package which produces camera-ready log plots. This program is also used for archiving and data distribution.

Log data for any leg are available to all interested scientists, either as log plots or digitized tapes, one year after the leg has been completed.

ODP LOGGING RESOURCES

Log Analysis Centers

An additional Log Analysis Center in the United Kingdom, which will serve the European community, is planned to begin operation in 1989.

Logging Schools

LDGO holds short courses in the JOIDES partner nations to acquaint interested scientists with downhole logging and its applications. These short courses are announced in the JOIDES Journal and EOS, and are often held in conjunction with professional meetings.

Publications

The following publications provide extensive information on ODP logging and downhole measurements:

Lamont-Doherty Borehole Research Group, Wireline Logging Manual for the Ocean Drilling Program. 1988 (Third Edition).

Becker, K., 1988. A Guide to ODP Tools for Downhole Measurements. Technical Note No. 10, Ocean Drilling Program.

SITE SURVEY DATA BANK: LAMONT-DOHERTY GEOLOGICAL OBSERVATORY

INTRODUCTION

The ODP Site Survey Data Bank is located at the Lamont-Doherty Geological Observatory (LDGO). It has served the JOIDES community since 1975 by archiving and distributing site survey and other geophysical data to various panels and individuals associated with scientific ocean drilling.

The most important tasks of the Site Survey Data Bank are as follows.

1. Assisting the JOIDES Site Survey Panel in the preparation and development of the Site Survey Program.

   This entails synthesis of the geophysical data submitted by drilling proponents and presentation of data packages to Site Survey Panel (SSP) members for evaluation and assessment. The Data Bank serves as the primary operational arm of this panel.

2. Assisting the Pollution Prevention & Safety Panel (PPSP) by preparing data packages and other information prior to each meeting of the panel.

3. Providing data packages to Co-Chief Scientist for every drilling leg.

   These packages contain sub-bottom and bathymetry profiles gathered during site survey work, and any other pertinent data contributed to the Data Bank. Also provided are digests, charts, and reports from areas in which the drillship will operate. In all, four complete sets are provided in hard copy: two for use on the ship, and two for shore-based use of the Science Operator.

4. Preparing packages of site survey and other geophysical data for JOIDES panels and working groups to aid in the proper planning and evaluation of drilling operations.

5. Providing data upon request to the Science Operator (TAMU) to aid in the planning of future ODP legs.

The Data Bank also provides facilities for post-cruise syntheses and for regional syntheses, which are encouraged by the COSOD reports.

Oversight for the Site Survey Data Bank is provided by SSP, which promotes international cooperation as well as providing an independent view of the Data Bank's activities. The relationship is analogous to that between the Borehole Research Group and the Downhole Measurements Panel (DMP).

A major data resource has been built up, and continues to grow, as data from mature drilling proposals are deposited at the Data Bank, providing a geophysical data repository akin to the core repositories.

SITE SURVEY DATA STANDARDS

The most commonly used techniques for site surveying have been bathymetry, magnetic and gravity field measurements, coring and dredging, heat flow, single- and multi-channel seismic reflection profiling, and crustal seismic refraction and wide angle reflection sonobuoy measurements.

In recent years, more advanced surveying techniques such as SEABEAM and various side scan sonar systems have become commonplace.

Targets

TARGET categories describe broad types of drilling objectives. Individual sites with multiple objectives may be required to meet the standards of two TARGET categories. For example, sites frequently have shallow APC objectives (TARGET A) and deeper sedimentary and basement objectives (TARGET D or E).

TARGET A: Generally APC/XCB penetration.

TARGET B: Greater penetration than a few hundred meters on a passive margin.

TARGET C: Greater penetration than a few hundred meters on an accretionary wedge, pre-arc, or sheared margin.

TARGET D: Greater penetration than a few hundred meters in a deep ocean environment. Often includes basement penetration.

TARGET E: Sediment thicknesses of less than a few hundred meters in a deep ocean ridge crest or fracture zone environment.

TARGET F: Bare rock drilling, probably on zero age crust.

TARGET G: Elevated features with widely varying sediment thicknesses. Sediment slumping may be a problem on flanks. Basement is often an objective.

Techniques

All geophysical methods are not appropriate for all sites, and specific combinations are chosen to get the maximum useful information for the minimum cost. Table 1 shows site survey requirements for each TARGET environment.

1. Deep penetration SCS: Large source single-channel seismic.

2. High resolution SCS: Watergun single-channel seismic or small chamber airgun in some situations. Digital acquisition preferred, but usually not necessary.

3. MCS and velocity determination: Multi-channel seismic including velocity determination (stacking velocities and semblance plots) when accurate depths are critical. Velocity analysis to determine sediment thickness over proposed sites.

4. Grid of intersecting seismic lines: A seismic grid and/or crossing lines over the proposed site. Density of the seismic grid required depends on each particular situation.

5. Refraction: Sonobuoy or ocean bottom seismometer refraction profiles. Expanding spread profiles or wide-angle refraction profiles.

6. 3.5 kHz or 12 kHz: High frequency data for near-bottom high resolution to resolve small scale features and give some indication of sediment type.

7. Multibeam bathymetry: SEABEAM or SeaMARC II bathymetry or equivalent. In some cases the greater resolution of SEABEAM may be required. Areas where slumping may occur should have multibeam bathymetry and/or side scan sonar.

8. High resolution imagery: High resolution imagery-acoustical reflectivity from towed sonar devices or optical images, recorded on film or video, are needed to fully interpret multibeam bathymetric data on fans and in topographically complex terrains.

9. Heat flow: Pogo-type profiles or piston core heat flow measurements in detail, appropriate to the scientific problem.

10. Magnetics and gravity: Regional magnetics should be available on any location for which the magnetic age of ocean crust is important. Gravity is seldom an absolute requirement, but should be obtained on any profiles for which subsidence studies are planned. SEASAT derived gravity information often complements the regional magnetic picture.

11. Coring: Cores should be taken near all paleoenvironmental sites. All re-entry site should be supported by cores, core descriptions and geotechnical measurements. The two limiting factors for re-entry operations are sufficient sediment thickness, and the ability to wash through the sediment section.

    Site proponents should contact the Science Operator at TAMU for further clarification on geotechnical requirements for their particular circumstances.

12. Dredging: Dredging may be required when basement drilling is included in the objectives.

DRILLING ENVIRONMENT (TARGET)

DATA TYPE

		A	B	C	D	E	F	G
		Paleoenvironment or Fan (APC/XCB)	Passive Margin	Active Margin	Open Crust (>400 m sediment cover)	Open Crust (<400 m sediment cover)	Bare-rock Drilling	Aseismic Ridge, Plateau or Seamount
1	Deep Penetration SCS	(X)	(X)	(X)	X or 3			(X)*
2	High Resolution SCS	X	(X)	(X)	(X)	X	X	X
3	MCS & Velocity Determination		X	X	X or 1		(X)*	(X)*
4	Grid of intersecting Seismic Lines	(X)*	X	X	(X)*	(X)	(X)	(X)*
5	Refraction		(X)*	(X)*	(X)*	(X)	(X)*	(X)*
6	3.5 kHz	X	X	X	X	X	X	X
7	Multi-beam Bathymetry	(X)*	(X)*	X or 8	(X)	(X)*	X	(X)*
8	High Resolution Imagery	(X)*		X or 7			X	(X)*
9	Heat Flow		(X)*	(X)*		(X), H	(X), H	
10	Magnetics & Gravity		(X)	(X)	(X)*	(X)*		(X)
11	Cores: Paleoenvironmental/geotechnical	X	(X), R	(X), R	R	R, H	X	(X)*, R
12	Dredging					(X)*	X	(X)*
13	Current Meter (for bottom shear)	(X)*	(X)*	(X)*			(X)*	(X)*

X = Vital
(X) = Desirable
(X)* = Desirable, but may be required in some cases
R = Vital for re-entry sites
H = Required for high temperature environments

Table 1. Site survey requirements for each type of drilling objective (TARGET).

13. Current meters: Information on bottom currents will be required when bottom shear might be a problem. Shallow water sites may need tidal current information as well.

GUIDELINES FOR SUBMISSION OF GEOPHYSICAL AND SITE SURVEY DATA

Site survey data must be presented in a reasonable format. Digital seismic data should be processed to a reasonable level; the more processing the better. Data at each step of processing should be part of the data package.

Data should be submitted in the following forms:

1. Digital magnetic tape of underway geophysical data values (topography, magnetics, gravity) merged with smoothed final navigation. The preferred format is MGD77, which expects a "header" record as well as data records.

2. Cruise report describing survey results in detail.

3. Large sepia or mylar copies (suitable for ozalid reproduction) of single-channel seismic reflection profiles. The preferred format for 3.5 kHz records is on 35 mm film negative.

4. Large sepia copies or mylar (suitable for ozalid reproduction) of processed multi-channel seismic reflection of profiles.

5. Large photographic negatives of any side scan sonar data collected (GLORIA, SeaMARC I and II).

6. Large sepia copies (suitable for ozalid reproduction) of any SEABEAM data presented at a contour interval deemed appropriate.

7. Large sepia or mylar copies (suitable for ozalid reproduction) of any specialized data sets (sediment thickness maps, bathymetry/magnetic contour charts, velocity analyses, etc.) developed in the course of a cruise report. The format and nature of the presentation of these data will be variable and will depend upon the nature of specific interest at each site.

DATA AVAILABILITY

At the Site Survey Data Bank, underway geophysical data are stored digitally in NGSDC or MGD77 format, and are available in the form of magnetic tapes or in various geophysical data display methods (annotation of geophysical values along ship track, profiles along ship track, etc.). In addition, seismic profiles collected during site surveys are also archived. Contour maps, heat flow charts, bottom photographs, and other forms of data presentation compiled in preparation of cruise reports are also available.

Single channel seismic profiles are generally available in the form of large photocopies; multi-channel seismics are usually presented in analog form and are reproduced by diazo processing. In most cases the Data Bank does not have access to original digital tapes of seismic data. Side scan sonar data are available as glossy photographs, sometimes in mosaic form, and SEABEAM data are presented in the form of large contour maps.

In addition to data collected explicitly for ODP, the Data Bank maintains a vast amount of background geophysical and seismic data collected by academic institutions from all over the world. These data are a valuable supplement to the site survey data and are often included in packages prepared for JOIDES panels and individuals during the course of Data Bank operations.

Proponents should be aware that they have the prime responsibility for obtaining and providing data in support of their drilling proposals. However, the Data Bank is frequently able to supplement the data holdings of proponents. Any individual seeking data in support of a drilling proposal, or for post-cruise studies, is encouraged to request data from the Site Survey Data Bank.

Data deposits and inquiries should be addressed to the ODP Site Survey Data Bank at LDGO (see Directory, p. 74).

JOIDES RESOLUTION: FACILITIES & SHIPBOARD CAPABILITIES

THE DRILLSHIP

The JOIDES RESOLUTION (officially registered as the SEDCO/BP 471) was originally built as a joint venture between SEDCO and British Petroleum (BP). It was designed by Earl and Wright and built in Halifax, Nova Scotia in 1978 by Hawker Siddeley (Canada) Ltd. The ship is 143 m long, 21 m wide, and has a displacement of 16,862 metric tons. The derrick is 61.5 m above the water line.

The JOIDES RESOLUTION was contracted by the Science Operator (TAMU) in March 1984 from a SEDCO subsidiary, Underseas Drilling, Inc. The contract is for five years with options to continue for an additional ten years.

The JOIDES RESOLUTION is capable of deploying 9,150 m of drill string and of conducting drilling operations in water depths up to 8,235 m, utilizing a computer-controlled dynamic positioning system. The primary advantages of the JOIDES RESOLUTION, as compared to the GLOMAR CHALLENGER of DSDP, include increased power in terms of transit speed and maneuvering capability, better station-keeping capabilities, greater stability, drilling depth capabilities, new drilling equipment and increased space for berthing, laboratories, and storage.

A ship schematic is shown in Figure 1.

Drilling Capabilities

Efficient drilling operations result from several factors. A 400 ton in-line heave compensator provides dependable weight compensation for coring operations and downhole experiments, resulting in increased bit life. A new electric top drive features higher rotary speed range and increased torque. The ability to optimize RPM increases bit life and penetration rate. With greater penetration per bit, the number of time-consuming re-entries is reduced. The use of an "iron roughneck," eliminates use of the cumbersome suspended tongs from most phases of the operation, making pipe connections faster and safer.

There is an unobstructed 7 m diameter moonpool on the RESOLUTION making it possible to deploy cones through the moonpool. A refurbished electric-hydraulic logging winch provides efficient, quiet and almost maintenance-free performance and has a 9,450 m cable.

In the future, the ship can be converted to deploy a marine riser for continental margin drilling, where a circulating mud system would be required.

Dynamic Positioning

The ship's dynamic positioning system has undergone major modification to include capability for long-baseline and short-baseline systems, as well as the original ultra-short baseline system. This system, which performs remarkably well in hostile sea conditions, enables the ship to maintain a fixed position in relation to the hole being drilled.

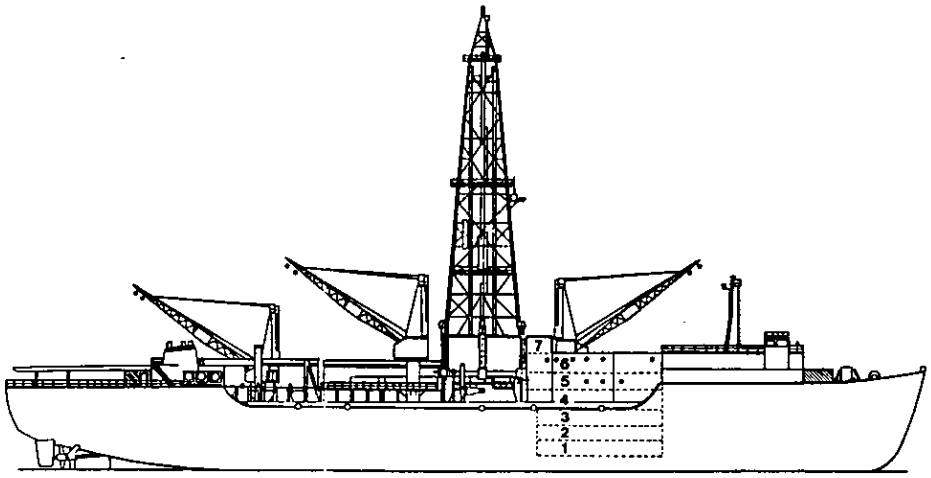
Navigation

The RESOLUTION is equipped with all the basic systems (including SATNAV and LORAN C). The global positioning system is a significant improvement to the RESOLUTION's navigational capabilities. It provides more precise satellite positioning data and aids greatly in locating drillsites with small margins of error.

Communications

A state-of-the-art satellite communications system offers direct telephone, telex, facsimile, direct data transmission and electronic mail capabilities from most operating areas to ODP headquarters at TAMU, without regard to atmospheric conditions and communications windows.

Continuous wave and limited single-side band capabilities are also available onboard the RESOLUTION for operating areas outside satellite communications coverage or as a backup in the event of an equipment failure.



DECK 7: Lab House Top
Downhole Measurements

DECK 6: Bridge Deck
Core Receiving
Physical Properties Lab
Paleomagnetics Lab
Core Splitting
Core Description and Sampling
Photo Station

DECK 5: Fo'c'sle Deck
Microscope Lab
Paleo Prep Lab
Chemistry Lab
Thin Section Lab
X-Ray Lab

DECK 4: Main Deck
Computers
Computer User Room
Science Lounge
Yeoperson's Lounge
Curator's Office

DECK 3: Upper 'tween Deck
Electronics Shop
Photo Darkroom
Photo Finish Room

DECK 2: Lower 'tween Deck
Refrigerated Core Storage
Cold Storage
Second-Look Lab

DECK 1: Hold Deck
Refrigerated Core Storage
Freezer

Poop Deck
Underway Geophysics Lab

Fo'c'sle Deck (Forward)
Library

Figure 1. Cutaway schematic of the JOIDES RESOLUTION.

Cruising Range

For normal drilling operations the RESOLUTION can remain at sea for about 120 days and carry almost four million liters of fuel. The cruising range is dependent on underway speed and the ratio of on-site to underway time. The RESOLUTION's average speed is 10-11 kts.

Ice/Cold Weather Operations

The RESOLUTION's hull is rated ABS Ice Class 1B for navigation in medium ice conditions. This, according to SEDCO, is the highest ice classification of any drillship currently in service. It increases the safety of transiting to and from high-latitude areas. However, site operations in areas where there is an immediate threat of contact with icebergs or pack ice requires support of an ice-picket vessel (this was successfully done on ODP Legs 105, 113, 114 and 119). The SEDCO vessel was designed and constructed for work in cold- weather localities, and most work areas are enclosed and/or warmed with a hot water heating system.

Stability

Due to its great size and displacement, the RESOLUTION is inherently more stable than was the GLOMAR CHALLENGER. This is born out by stability calculations and computer modeling, and results of early cruises indeed demonstrate that the newer vessel is less affected by sea/swell conditions at any given time.

Drill Pipe Storage and Handling

Drill pipe is stored on an automatic piperacker which can handle up to 9,150 m of pipe. Pipe is transported to the drill floor from three storage bays by an automated handling system in stands of 27.4 m each.

Casing Storage

The number of meters of casing that can be stored on the RESOLUTION is dependent upon the diameter of the casing, other equipment being stored, and whether outside storage is used. There is, however, sufficient below decks storage in the riser hold to ensure that operational capabilities will not be limited by inadequate casing storage.

Auxiliary Transportation

A 21 x 21 m helipad is installed on the RESOLUTION, complete with a helicopter refueling station. This provides helicopter access which can be very important in terms of transferring equipment and personnel, and in emergency medical evacuations.

The vessel also has an inflatable Zodiac launch with an outboard motor. This has been found to be the safest way of transferring personnel between vessels of disparate size in high seas. It can also be used to deploy and recover various instruments.

Living Quarters

Living quarters onboard the JOIDES RESOLUTION include one-, two-, and four-person staterooms designed to accommodate a maximum scientific and technical crew of 50 people. They are located forward of the laboratory spaces with connecting passageways to the laboratories on two levels.

SCIENTIFIC LABORATORIES AND EQUIPMENT

The laboratories onboard the JOIDES RESOLUTION contain the largest and most varied array of seagoing scientific research equipment in the world. The drillship has more than 1,116 square meters of laboratory space, divided into twelve major analytical areas. Each laboratory on the RESOLUTION is designed to include state-of-the-art instrumentation.

Underway Geophysics Laboratory

The Underway Geophysics Laboratory is located on the poop deck, immediately forward of the fantail area, and is where the collection, processing, and display of a variety of geophysical data is undertaken.

Single-channel seismic data are collected and processed primarily from two 1.3 cu. cm and one 65.5 cu. cm waterguns. For bathymetric data, both 3.5-kHz and 12-kHz precision depth recorder systems are onboard. Magnetic data from a proton precession magnetometer are recorded on the header of

the seismic tapes. Navigation data are collected on the bridge and in the lab by Magnavox MX702As and GPs. Computing for underway geophysics is independent from the ship's main scientific computer, and is based on two super-micro 561 Masscomp computers.

Sedimentology Laboratory (Figure 2)

The core laboratory on the bridge deck is divided into areas known as the core entry lab, core splitting room, sampling area, and sedimentology lab. Core splitting is physically isolated from the remainder of the laboratory. After whole-core GRAPE (Gamma Ray Attenuation and Porosity Evaluator), p-wave, and magnetic susceptibility measurements are made with the multi-sensor track (MST) system, cores are split and taken to the sedimentology lab for description (including photography) and sampling.

Equipment onboard includes a range of microscopes, core sampling equipment, the GRAPE device for vertical core scanning, and physical properties equipment. Physical properties equipment includes a pycnometer for bulk and dry density, porosity and water content; transducer configurations for shear- and compressional-wave velocity analyses; motorized vane equipment for shear strength measurements; and thermal conductivity equipment.

The paleomagnetics section has a 3-axis, pass-through cryogenic magnetometer for either split core scan or discrete samples. There are also demagnetizers and a spinner magnetometer available.

Chemistry Laboratory

The chemistry laboratory is situated on the fo'c'sle deck (see Figure 3). This lab includes two gas chromatographs, one dedicated to hydrocarbon monitoring for natural gas analysis, and one with a capillary column for gas stripping. There is a fluorometer and ultraviolet ray box in the core laboratory for qualitative analysis of hydrocarbon shows. Organic carbon can be determined using either a Rock-Eval device for whole-rock pyrolysis or an elemental analyzer for measuring amounts of organic carbon, hydrogen, nitrogen, and sulphur.

In addition to the routine carbonate bomb, there is a photometric analyzer which provides measurements of carbonate constituents in sediments. Interstitial water dissolved ion determinations are carried out with an ion chromatograph. An automatic titration system for alkalinity and a temperature-compensated refractometer for salinity measurements are run routinely.

Other equipment includes hydraulic presses, balances, freeze driers, grinders, and materials and supplies usually found in a well-equipped, chemistry laboratory.

Microscopy and Thin-Section Laboratories

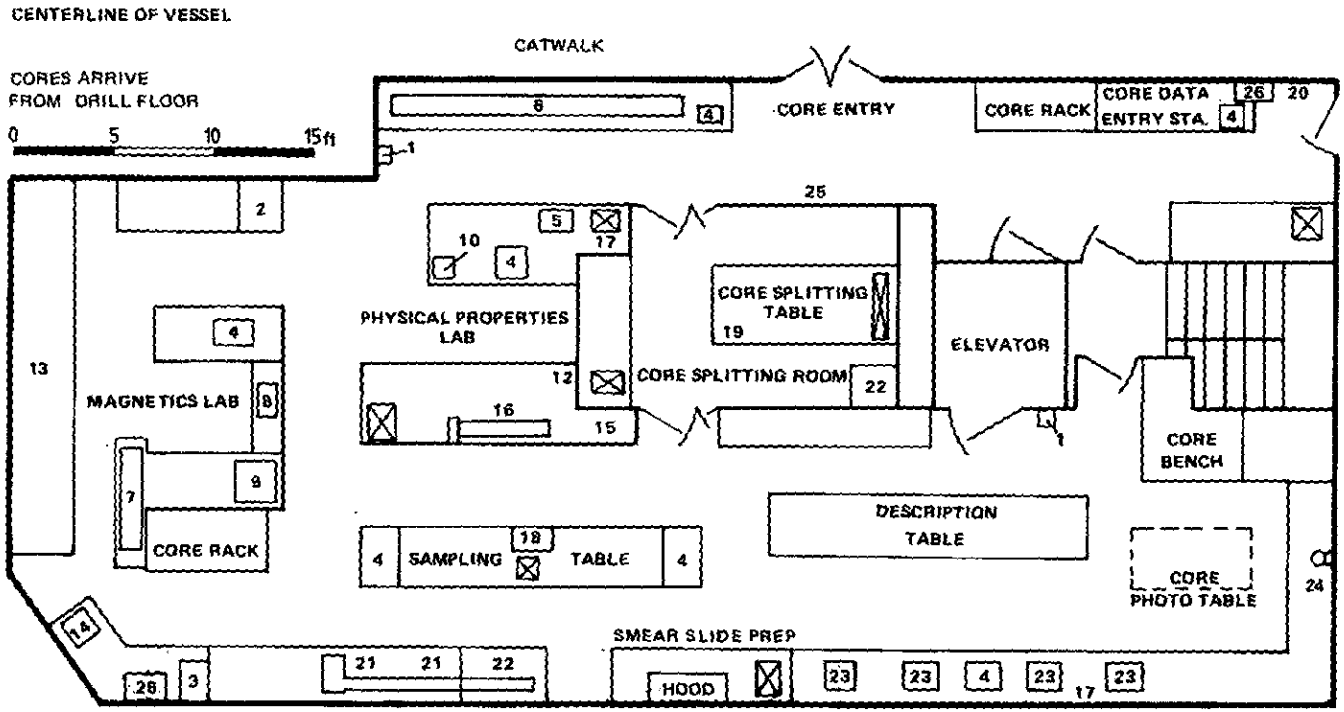
The thin section laboratory is equipped to provide thin sections by traditional methods, as well as by automated machines for large quantity output. The microscopy lab includes eight microscopes for thin section, rock sample, and paleontological study, including polarizing petrographic microscopes, microscopes with reflected light, photographic and video capabilities and standard photo microscopes. These laboratories are also part of the fo'c'sle deck laboratory complex (Figure 3).

Paleontology Preparation Laboratory

This laboratory is also situated on the fo'c'sle deck (Figure 3). Standard preparatory equipment is available for all microfossil groups.

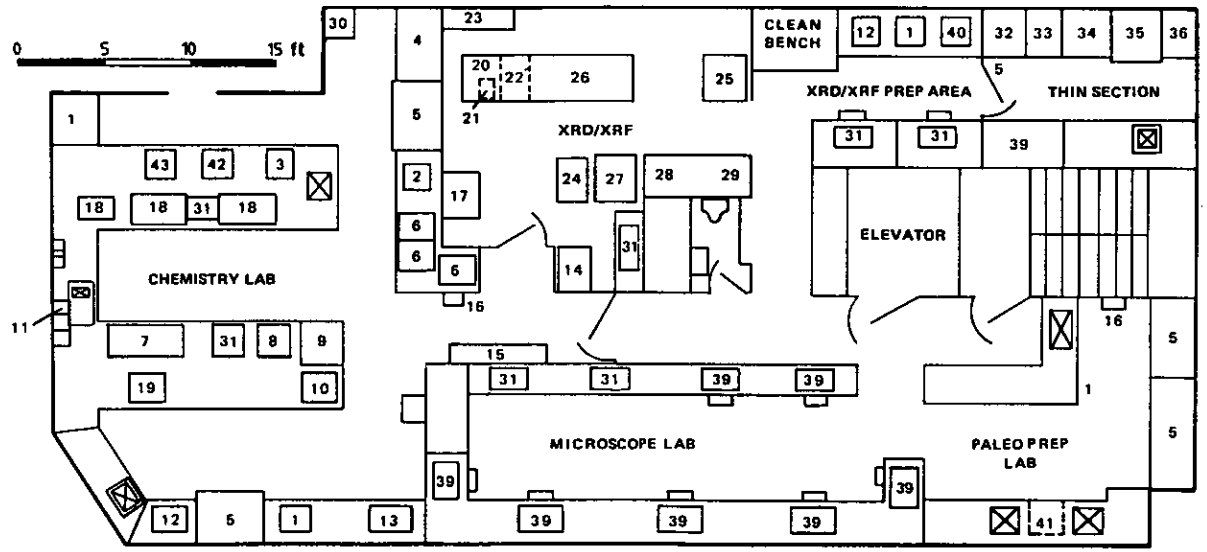
X-ray Fluorescence/X-ray Diffraction Laboratory

This lab completes the fo'c'sle complex (Figure 3) and is the most advanced laboratory of its type on any ocean research vessel. The X-ray fluorescence spectrometer, used for determination of major and trace element composition of sediments and rock samples, is fully microprocessor controlled with automatic sample loading. For X-ray diffraction there is a parallel system, also fully automatic and microprocessor controlled, to determine the mineral composition of 32 samples in one run.



1. Safety Shower & Eye Bath
2. Electronics Rack
3. Faxitron (X-Ray)
4. Computer Terminal
5. Thermal Conductivity
6. MST
7. Thermal Demagnetizer
8. Mini-Spin Magnetometer
9. A/C Demagnetizer
10. Penta-Pycnometer
11. Thermal Demagnetizer
12. Balance
13. Cryogenic Magnetometer
14. Trim Saw
15. Vane Shear
16. Velocimeters
17. Oven
18. Heat Sealer
19. Capstan Motor & Core Splitter
20. Tool Box
21. Mini-Corers
22. Felker Saw
23. Microscope Station
24. Close-up Photo Table
25. Data Board
26. Rig Floor Monitors

Figure 2. Sedimentology Laboratory on the Bridge Deck of the JOIDES RESOLUTION.



1. Balance
2. Automated C.H.N.S. Analyser
3. Rock Evaluation System
4. Canopy Hood
5. Fume Hood
6. Presses
7. Ion Chromatograph
8. Automatic Titration
9. Freeze Dryer
10. Freeze Below
11. Water Purification System
12. Griners
13. Atomic Absorption
14. Storage Cabinet
15. Gas Storage & Central Regulator
16. Safety Shower & Eye Bath
17. HP1000 Computer for Chemistry Lab
18. Gas Chromatograph
19. Spectro Photometer
20. Electronics/Computer Cabinet
21. XRF Monitor
22. PW/1730 X-Ray Generator
23. Gas Bottle Storage
24. DEC Minicomputer and XRD Controller
25. Heat Exchanger
26. X-Ray Spectrometer
27. XRD PW /1720 Generator
28. Color Plotter
29. Color Terminal
30. Ovens
31. Computer Terminal
32. SAW GS-10
33. Petro-thin Grinder
34. Logi Tech LP-30 Grinder Polisher
35. Buehler Lap Wheel
36. W-20 VAC Impregnator
37. Fine Polisher
38. Slide Prep
39. Microscope
40. Furnace
41. Steam Washer Below
42. CaCO3 Coulometer
43. TOC Coulometer

Figure 3. Fo'c'sle Deck Laboratory Complex onboard the JOIDES RESOLUTION.

Photographic Laboratory

An advanced photographic facility has been installed on the upper 'tween deck and is fully equipped with a large variety of photographic equipment.

Downhole Instrumentation Laboratory

The downhole instrumentation laboratory is located above the bridge deck, and houses equipment for logging tasks. It is divided into a wet lab for tool storage, cleaning and repair, and ancillary equipment; the dry section contains electronic equipment and a Masscomp data acquisition system.

Computing and Information Services

The shipboard computer facility is located on the main deck adjacent to the science lounge. The computer system itself is comprised of a central minicomputer cluster (VAX 11/750 and MicroVax 3500 machines) and a collection of over 45 microcomputer workstations.

The workstations are of several types including IBM PC compatibles, Apple Macintoshes and DEC PRO350s. All shipboard computers are linked in such a way as to facilitate the transfer of information and allow each of the systems to perform the work it does best. The workstations are located conveniently throughout the laboratories and elsewhere around the ship. A variety of printers and plotters are available, together with a wide range of software.

ADDITIONAL INFORMATION

Further details concerning the drillship are available in the following publications which can be obtained from the Science Operator (see Directory, p. 75 for addresses).

1) Onboard JOIDES RESOLUTION

2) Operational and laboratory capabilities of the JOIDES RESOLUTION, ODP Technical Note No. 2, June 1985

3) Shipboard Scientists Handbook, ODP Technical Note No. 3, revised 1987

PUBLICATIONS POLICY

The publications policy for ODP has evolved from that used in its predecessor program, the Deep Sea Drilling Project, and has several distinct elements.

PRE-CRUISE SCIENTIFIC PROSPECTUS

A Scientific Prospectus for each leg is issued as an informal series about two months before the cruise. The prospectus is prepared by the Co-Chief Scientists and the ODP Staff Scientist, and contains a synopsis of scientific problems to be addressed, brief descriptions of approved sites, and technical specifications of drilling and logging plans for each site.

SHIPBOARD SCIENTIFIC REPORTS

Three informal and two formal reports are prepared by the shipboard science party aboard the JOIDES RESOLUTION. Each of the five reports is required to be completed before the ship docks. The informal reports are distributed by the Science Operator (TAMU) to a limited number of recipients immediately following the cruise.

Informal Reports

Hole Summaries. Upon completion of drilling at each site, the shipboard scientists, individually and as a group, prepare a report of the results. At the end of the cruise, these site reports, together with core description forms (barrel sheets), are assembled into one report called the Hole Summary.

A copy is returned to TAMU for distribution to shipboard scientists, and to others who plan to contribute to the Proceedings of the Ocean Drilling Program for that leg. This report has the status of a personal communication and so cannot be referenced. Copies of the report include a cover letter which explicitly states that the contents are background information and not intended for publication. Distribution occurs within one month after the cruise ends, and is limited to those who have a real "need to know."

Preliminary Reports. This report consists of a general and highly condensed discussion of preliminary scientific results of the cruise. It is distributed to JOIDES panel members, individuals who assisted in planning the cruise by contributing knowledge and expertise, and others with special involvement in ODP activities.

Press Releases. Cruise-related press conferences are held only if a cruise produces information which is of outstanding public interest. However, a press release is prepared for each cruise which briefly outlines the cruise objectives, accomplishments, and results in lay language. The contents and wording of press releases are subject to approval by JOI and NSF. Press releases are telexed to TAMU before the ship docks, and are released soon after the cruise ends.

Formal Reports

Articles are prepared for publication in Geotimes and Nature, and represent press releases to the scientific community. The articles are not highly technical because their readership, though largely scientific, is more generalist than specialist. Articles are limited to two or three printed pages in Geotimes, and to 800 words for "News and Views" in Nature. Both articles are authored by the entire shipboard science party, and are published two or three months after the end of the cruise.

POST-CRUISE REPORTS

General Geological Articles

The publication of such articles is entirely at the discretion of the shipboard science party. The party is encouraged to prepare a technical article discussing cruise results for a major journal, such as Science or the Geological Society of America Bulletin, as soon as possible after the cruise ends. Again, authorship

consists of the full scientific science party.

Proceedings of the Ocean Drilling Program

The Proceedings for each leg is a two-part volume, composed of an Initial Reports portion and a Scientific Results portion. The Proceedings volume serves two purposes. First, it details materials and data recovered by each cruise, and provides the scientific community-at-large with a basis for selecting samples and data for detailed study. Second, it provides shipboard and shore-based scientists with an opportunity to publish an integrated report of their scientific findings.

Papers submitted to the Proceedings contain research of the same quality as those submitted to other major scientific journals. Owing to its specialized nature, the Proceedings is also a suitable medium for papers which contain high-quality data not yet ready for final interpretation.

Initial Reports. This portion of a volume is published approximately 14 months after the cruise ends. Contents include site chapters, core photographs and barrel sheets, and other reports resulting from the cruise, such as site-survey and underway-geophysics chapters.

Scientific Results. This portion of a volume is published approximately three years after the cruise, allowing time for shipboard and shore-based cruise participants to complete their studies. Thus, contributions to this publication are the result of up to one and one-half years of research, and may be authored by individual participants or by consortia. All manuscripts are peer-reviewed under the guidance of an editorial review board consisting of the two Co-Chief Scientists for the cruise, the ODP Staff Scientist, an ODP staff editor, and an external science specialist.

MISCELLANEOUS REPORTS

ODP/TAMU produces other publications as occasional series.

Technical Notes

A series of Technical Notes is published which covers technical subjects such as preliminary time estimates for coring operations, laboratory procedures onboard the RESOLUTION, and handbooks for specific science disciplines.

Technical Reports

Although no reports in this series have yet been published, the series is intended to present results of specific research and/or technological developments in more depth than do the Technical Notes.

OTHER PUBLICATIONS

Wireline Logging Services

The Borehole Research Group at Lamont-Doherty Geological Observatory publishes a manual of wireline logging techniques and applications. Logging results from drilling operations are included in the Proceedings of the Ocean Drilling Program.

JOIDES Journal

The JOIDES Journal is published three times a year by the JOIDES Office. It serves as a means of communication among the JOIDES advisory panels, NSF, international organizations, and interested earth scientists. The JOIDES Journal provides information on JOIDES committees and panels, cruise schedules, science summaries, and meetings schedules.

DATA DISTRIBUTION POLICY

INTRODUCTION

Samples from the Ocean Drilling Program and the Deep Sea Drilling Project are made available in order to:

1. provide support to shipboard scientists and shorebased investigators who are preparing contributions to ODP reports;

2. provide materials for individual investigators to conduct detailed studies beyond the scope of ODP reports;

3. provide paleontological reference centers with samples for reference and comparison purposes; and

4. provide educators with samples for teaching purposes.

The ODP Curator is responsible for distributing samples and for preserving and conserving core material. The Curator is also responsible for enforcing this sample distribution policy, and for maintaining a record of all samples distributed, both onboard the ship and subsequently from the core repositories. (This information is available to interested investigators on request.)

Every sample distributed, whether from the ship or from a core repository, is labeled with a standard identifier, which includes leg number, site number, hole letter, core number, core type, section number, and interval within the section from which the sample was removed. It is imperative that this standard identifier be associated with all data reported in the literature, and that residues of the sample remain labeled throughout their lives, so that later workers can relate the data to the cores.

CORE REPOSITORIES

Distribution of sample materials is made directly from the core repositories by the ODP Curator or a designated representative. Core repositories are located at Lamont-Doherty Geological Observatory, Scripps Institution of Oceanography, and Texas A&M University.

DSDP cores collected from the Atlantic and Antarctic Oceans and the Mediterranean and Black Seas (DSDP Legs 1-4, 10-15, 28, 29, 35-53, 71-82, and 93-96) are housed at the East Coast Repository at the Lamont-Doherty Geological Observatory.

DSDP cores from the Pacific and Indian Oceans and the Red Sea (DSDP Legs 5-9, 16-27, 30-34, 54-70, and 83-92) are housed at the West Coast Repository at the Scripps Institution of Oceanography. Interstitial water samples, gas samples, and frozen whole-round samples (archived specifically for organic geochemical analyses) from all DSDP Legs are also stored at the West Coast Repository.

Cores collected by ODP from the Pacific and Indian Oceans and the Red Sea are housed at the Gulf Coast Repository at Texas A&M University. Interstitial water, gas and frozen organic geochemistry samples collected by ODP are also stored at the Gulf Coast Repository.

Thin sections and smear slides from each leg are archived with the cores at the appropriate repository. Photographs of all cores, microfilm of prime data, and copies of resulting publications are also kept at each repository.

Cores are available for examination by interested parties at the repositories. Investigators are welcome to visit the repositories in order to inspect cores and to specify sample locations when that is required for their research. Time and space in the workrooms are limited, so advance appointments are required. Occasionally, space may be fully booked several weeks in advance, so investigators are urged to call for appointments well ahead. Only the Curator or an authorized delegate may actually remove samples from the cores.

A reference library of thin sections, smear slides and archive photographs is maintained at the repositories for use by visiting investigators. All thin sections and smear slides produced onboard the ship or in the repositories belong to this library.

DISTRIBUTION OF SAMPLES AND GEOPHYSCIAL DATA

Samples for Research Published in ODP Reports

Any investigator who wishes to contribute to the reports of a scheduled cruise may write to the Curator, to request samples from that cruise. Requests for a specific cruise must be received by the Curator at least two months in advance of the departure of that cruise, in order to allow time for a suitable shipboard sampling program to be assembled.

Requests should state the nature of the proposed research, the size and approximate number of samples needed, and any particular sampling technique or equipment which may be required. Requests are reviewed by the Co-Chief Scientists and ODP Staff Scientist for the cruise, and by the Curator. Approval or disapproval is based upon the scientific requirements of the cruise, as determined by the JOIDES advisory structure.

The scope of a request must be such that samples can be processed, proposed research can be completed, and a paper can be written in time for submission to the relevant ODP cruise report.

Funding for sample-related activities must be secured by the investigator, independently of requesting the samples. Sample requests should be addressed to the ODP Curator (see Directory, p. 74, for address).

Co-Chief Scientists may invite investigators who are not cruise participants to perform special studies of selected core samples in direct support of shipboard activities. If this occurs, the names and addresses of these investigators, and details of all samples loaned or distributed to them, must be forwarded to the Curator immediately after the cruise. These investigators are expected to contribute to cruise reports as though they had been cruise participants. All requirements of this Sample Distribution Policy apply.

Except for specific instances involving ephemeral properties, the total volume of samples removed during a cruise-related sampling program will not exceed one-quarter of the total core recovered. No coring interval will be completely depleted. One-half of all recovered materials will be retained in the archives in as pristine a condition as possible. Investigators requesting shipboard samples of igneous materials may receive a maximum of 100 igneous samples per cruise.

Because many sample requests are received for shipboard work, and because the time of the shipboard party is at a premium, Co-Chief Scientists are strongly urged to limit shipboard sampling to the minimum necessary to accomplish cruise objectives. Shore-based invetigators whose requests for samples are approved should expect to receive samples after the cores are delivered to the repository, and should schedule research activities accordingly.

Samples for Research Published Outside of ODP Reports

Researchers who wish to use samples for studies beyond the scope of ODP reports should obtain sample request forms from the Curator. Requestors are required to specify the quantities and intervals of core required, to clearly state the nature of the proposed research, to state the time required to complete the research and submit results for publication, and to specify funding status and the availability of facilities for conducting the research.

If samples have previously been received from ODP or DSDP, the requestor will be required to account for the disposition of those samples by citing published works, four copies of which must be sent to the Curator. If no results have been published, this requirement can be fulfilled by sending a report on the status of the research.

If samples have not previously been received from ODP or DSDP, the requestor will be required to show that the samples will be used for responsible research. This requirement can be met by sending a copy of the requestor's resume and bibliography to the Curator. If the requestor is a student, this requirement can be met by sending a copy of the dissertation or research proposal endorsed by the student's advisor.

Unused and residual samples should be returned and data should be sent to the Curator if the project has terminated. Paleontological materials may be returned either to the ODP Curator, or to one of the designated paleontological reference centers. If material is returned to a reference center, the Curator must be notified when it is sent.

In order to ensure that all requests for highly desirable but limited samples can be considered together, approval of requests and distribution of samples will be delayed until 12 months after completion of the cruise or 2 months after publication of the core descriptions, whichever occurs first. The only exceptions to this policy will be made for specific requests involving ephemeral properties. Requests for samples may be based on core descriptions published in ODP reports, copies of which are on file at various institutions throughout the world. Copies of original core logs and data are kept on open file at ODP, and at the repositories.

Investigators who wish to study ephemeral properties may request a waiver of the 12 month waiting period. Such requests will automatically be referred to the relevant Co-Chief Scientists. If approved, the investigator will join shore-based contributors to the shipboard science effort, and will be subject to the same obligations.

Requests for samples from researchers in industrial laboratories will be honored in the same manner as those from academic organizations. Industrial investigators have the same obligations to publish all results promptly in the open literature, and to provide the Curator with copies of all published reports, and all data acquired in their research.

Samples will not be provided until the Curator is assured that funding for the proposed research is available or unnecessary. If a sample request is dependent in any way upon proposed funding, the Curator will provide the funding organization with information on the availability of suitable samples.

Most investigations can be accomplished with sample volumes of 10 ml or less. Investigators must provide explicit justification of requests for larger sample sizes, or for frequent intervals within a core. Requests which exceed reasonable size or frequency limits will require more time to process,and are unlikely to be granted in their entirety.

Requests for samples from thin layers, stratigraphically important boundaries, or sections which are badly depleted or in unusually high demand, may be delayed in order to coordinate requests from several investigators. Investigators who submit such requests may expect to receive suggestions for alternate sampling programs. It may also be suggested that they join a research consortium which will share the samples. In any event, such exceptional requests will require more time for processing than more routine requests.

Samples for Micropaleontological Reference Centers

As a separate and special repository activity, selected samples are distributed to micropaleontological reference centers for study by visiting scientists. Foraminiferas and calcareous nannofossils can be viewed; radiolaria and diatoms will be prepared in the future.

Four micropaleontological reference centers are located in the U.S. at Lamont-Doherty Geological Observatory, Palisades, NY; Smithsonian Institution, Washington, DC; Texas A&M University, College Station, TX; and Scripps Institution of Oceanography, La Jolla, CA. Four international centers are located

Basel Natural History Museum, Switzerland; Moscow Institute of the Lithosphere, U.S.S.R.; Tokyo National Science Museum, Japan; and New Zealand Geological Survey, New Zealand. See the Directory section of this issue (p. 74) for a listing of curators at the various reference centers.

Further details concerning the paleontological reference centers are given in a brochure (available from TAMU) and are reported periodically in the JOIDES Journal.

Samples for Educational Purposes

Samples are available in limited quantities to college-level educators for teaching purposes. Interested educators should request application forms from the ODP Curator. Requestors are required to specify the following information:

1. preferred sample size and location;
2. a very clear statement of the nature of the course work in which the samples will be used;
3. how the samples will be prepared and how they will be used in the classroom;
4. a detailed explanation as to why similar materials derived from outcrops or dredge hauls cannot be used. It is not acceptable to argue that less effort is required to obtain samples from ODP than to assemble them from other sources;
5. certification that funds are available to prepare the materials for classroom use.

In general, only samples which are abundant and which are in little demand for research purposes should be requested for educational purposes. The Curator will not approve requests for materials which are limited in supply or for which demand (real or potential) is great, including most paleontological materials.

DISTRIBUTION OF LOGGING DATA

Logging data acquired on each ODP leg is available to each member of the shipboard scientific party. Practical limits to data distribution are such that some time is required to process, correct, and display the data in a form appropriate for preliminary science.

Contractually, Schlumberger supplies six blueprints of each run. These go to the LDGO Logging Scientist, the JOIDES Logging Scientist, the Co-Chiefs Scientists (2), the ODP Staff Scientist and the permanent archives at LDGO.

These copies are made on a simple-to-use ozalid machine onboard the ship. Copying procedures are coordinated by the LDGO Logging Scientist, and it is intended that no interested scientist will leave the ship without copies of the logs.

Original proprietary tapes and field-edit tapes of the logging data are delivered to LDGO by the LDGO Logging Scientist. An edited version of the blueprints is distributed to each member of the shipboard party approximately two months after the end of the leg. Upon the request of interested scientists, original or processed data are supplied in either LIS or ASCII format starting about two months (original data) or four months (processed data) after the end of the cruise.

LDGO multichannel sonic tapes are returned to LDGO for processing. Unprocessed data are available starting two months after the end of the leg.

The scientific community-at-large has access to logging data from each leg beginning one year from the end of that leg.

Distribution of data tapes to the National Geophysical Data Center (NGDC) also occurs after one year. Logging tapes are deposited with the appropriate agencies in JOIDES partner nations upon request.

WHOLE ROUND CORE SAMPLES

ODP permits routine whole round core sampling of soft sediments onboard the drillship for two major analytical programs: interstitial (pore) water and organic geochemistry. Occasional whole round core sampling

for consolidation testing is allowed under special circumstances. To avoid depletion of the core by whole round sampling, the specific policy stated below will apply. Exceptions must take the form of proposals for designing the leg and must be submitted through the JOIDES Office.

The intent of routine shipboard geochemical sampling is to obtain a systematic set of data describing geochemical processes in sediments, particularly in those shallow sediments where epigenetic/diagenetic changes are actively occurring. Routine whole-round sampling provides adjacent samples for gas, interstitial water, and particulate organic matter analyses. It is desirable to maximize the information gained from each whole-round sample removed from the core, and to obtain the routine analytical measurements on every sample, in order to assemble the most useful data set.

An interstitial water (IW) sample is cleaned and squeezed in a Carver hydraulic press in the chemistry lab. Part of the resultant pore water is analyzed immediately and the rest is put into glass vials or plastic tubes and sealed for return to an ODP repository. The pressed cake of sediment is bagged and refrigerated for eventual storage at a repository; however, portions may be sub-sampled onboard for other investigations.

The 25 cm whole-round samples designated for shorebased organic geochemical (OG) work are labelled, sealed in plastic, capped, and frozen. These frozen samples are stored onboard until a frozen shipment can be sent to a repository from port.

The routine shipboard sampling program for interstitial water (IW) and organic chemistry (OG) is as follows:

CORE 1: A 5 cm whole-round is taken from section 3 or 4 for interstitial water (5 cm) and gas analysis (10 cc) with the natural gas analyzer (headspace technique). Vacutainer samples are taken if gas pockets are observed.

CORE 2: 50 cm^3 of working half are taken for interstitial wate and the immediately adjacen 10 cm^3 are taken for gas analysis. Biostratigraphers must designate the region to be sampled. Samples are removed immediately upon splitting.

CORE 3: A 30 cm^3 whole-round is taken for shorebased organic geochemistry (25 cm frozen sediment), interstitial water (5 cm), and headspace gas analysis (10 cm^3 are taken from IW sample).

CORES 4 & 5: Repeat CORE 2 program.

CORES 6, 9, 12, etc.: Repeat CORE 3 program.

Whole round samples may be requested for consolidation testing. A maximum of one 8-10 cm section per lithologic unit of unlithified sediment is allowed from core sections experiencing no coring disturbance. If this sampling frequency will excessively deplete the core sampling must be restricted to a duplicate core at the site. Sampling of whole-round cores for triaxial testing is an exception to this policy and must be reviewed by the JOIDES advisory structure.

If time and resources permit, Co-Chiefs may authorize an additional hole dedicated to this purpose. That is, sampling is restricted to the third copy of the interval to be sampled. At least two copies of the cored interval should be preserved intact.

Triaxial samples should be taken only from APC holes, unless the material sampled is entirely lithified. Sampling of RCB/XCB/NCB unlithified material is not approved. Triaxial samples may be taken from dedicated holes without restraint, subject to approval of the Co-Chiefs Scientists. For samples taken from the first or second holes at a site, a reasonable sample would include a maximum of three 15-cm-long whole-round sections taken adjacent to one another (45 cm maximum).

No more than one triaxial sample should be taken per 60 m of recovered material, with a maximum of four samples per site. No triaxial samples may be taken until all other whole-core measurements (GRAPE, p-wave logging, paleomagnetics, thermal conductivity, etc.) have been completed, and the core is about to be split. Biostratigraphers must explicitly approve the interval selected for triaxial sampling before the samples are taken.

All whole-round samples must remain intact until the shipboard scientists have determined that stratigraphically-critical intervals will not be destroyed.

PUBLICATION OF RESULTS

Any publication of results, other than in ODP reports, within 12 months of cruise completion must be approved and authored by the entire shipboard party and, where appropriate, shorebased investigators. After 12 months, individual investigators may submit related papers for open publication, provided their contributions have already been submitted and accepted to the ODP Proceedings volumes.

Investigations which are not completed in time for inclusion in ODP volumes for a specific cruise may be published in a later edition of the ODP volumes. They may not appear in another journal until the report for which they were intended has been published.

SAMPLING OBLIGATIONS

Investigators who receive samples incur the following obligations:

1. To publish significant results promptly: however, no contribution maybe submitted for publication prior to 12 months after termination of the leg unless it is approved and authored by the entire shipboard party.

2. To acknowledge in all publications that the samples were supplied through the international Ocean Drilling Program.

3. To submit four copies of reprints of all published works to the ODP Curator. These reprints will be distributed to the repositories, the ship, NSF, and the Curator's reprint file. All reprints received will be logged in an on-line bibliographic data base.

4. To submit all final analytical data obtained from the samples to the ODP Data Base Supervisor. Please consult the Data Base Supervisor, or announcements in the JOIDES Journal, for information on acceptable data formats.

   Investigators should be aware that they may have data obligations under NSF policies, or the policies of other funding agencies, which require submission of data to national data centers.

5. To return all unused or residual samples, in good condition and with a detailed explanation of any processing they may have experienced, upon termination of the proposed research. In particular, all thin sections and smear slides manufactured onboard the ship or in the repositories are to be returned to the Curator. Paleontological materials may be returned either to the Curator or to one of the designated paleontological reference centers.

Failure to honor these obligations will prejudice future applications for samples.

DSDP AND ODP DATA AVAILABLE

INTRODUCTION

The extensive data collected during the 15 years of DSDP drilling now constitutes a valuable resource for synthesis studies, and for providing source material for ODP participants. All DSDP data files were transferred from Scripps Institution of Oceanography to the National Geophysical Data Center (NGDC) as of May, 1987. DSDP data is also available from the ODP Data Librarian at Texas A&M University. Either the National Geophysical Data Center (NGDC) or TAMU may be contacted for DSDP data, depending on the format desired.

A primary source of data and interpretations of DSDP drilling is the Initial Reports series of DSDP. Most of the Initial Reports are still in print and are available from TAMU. Contact TAMU for information on volume availabilty and cost.

DATA AVAILABLE FROM ODP/TAMU

Much of the data generated onboard ship and published in program reports is routinely captured by the ODP and DSDP data bases. Data supplied by investigators who have received samples are also incorporated, so data sets larger than can be published are available to investigators. Magnetics, downhole logging,seismic reflection, bathymetric data, and other data collected by the drilling vessel become available for distribution at the same time as core samples.

ODP databases currently include all DSDP computerized data files (Legs 1-96). Geological and geophysical data collected by ODP (Legs 101 through the most current ODP leg past the 12-month sampling moratorium) are available, as well as all core photos taken by DSDP and ODP (Legs 1 through current post-moratorium leg). Table 1 lists and briefly describes the data available.

Most data collected by ODP are available as copies (paper and microfilm) of original data collected onboard the JOIDES RESOLUTION. Underway geophysical data are on 35 mm continuous roll microfilm. All other data are on 16 mm microfilm.

All DSDP data, and most ODP data, are contained in a computerized database which can be searched on almost any specified criteria. All data files can be cross-referenced so that a data request can include information from more than one data file. Some data are also available electronically.

For example, a customized search could be done to locate all samples (from DSDP and ODP Legs) taken in the Indian Ocean with $CaCO_3$ greater than 55%, and a composition including greater than 10% quartz. Computerized data are currently available on hard-copy printouts, on magnetic tape, or through the BITNET network.

Photos of cores and seismic lines collected by ODP and DSDP are also available. Seismic lines, whole core and closeup core photos are available in black and white 8x10 prints. Whole core color 35 mm slides are also available.

The following can also be requested:

1. ODP Data Announcements, which contain information about the ODP database;
2. Data File Documents, which contain information about specific ODP data files;
3. ODP Technical Note #9, "Deep Sea Drilling Project Data File Documents", which includes all the DSDP data file documents.

To obtain data or information contact the ODP Data Librarian at TAMU (see Directory, p. 74). Small requests can be answered quickly and free of charge. If a charge must be made to recover expenses, an invoice will be sent and must be paid before the request is processed.

DATA AVAILABLE FROM NGDC

DSDP data files can be provided by the National Geophysical Data Center (NGDC) in their entirety, on magnetic tape according to user specifications.

	Data Source	Description	
LITHOLOGIC & STRATIGRAPHIC DATA			
Visual Core Descriptions			
- Sediment / sedimentary rock	Shipboard Data	Core color, sedimentary structures, disturbances, large minerals and fossils, etc.	
- Igneous / metamorphic rock	Shipboard Data	Lithology, texture, structure, mineralogy, alteration, etc.	
Smear Slide Descriptions	Shipboard Data	Nature and abundance of sedimentary components.	
Thin Section Descriptions	Shipboard Data	Petrographic descriptions of igneous and metamorphic rock., including mineralogy texture, alteration, vesicles, etc.	
Paleontology	Initial Repots	Abundance, preservation and location for 26 fossil groups. "Dictionary" includes more than 12,000 fossil names.	
Screen	Processed Data	Computer-generated lithologic classifications. Basic compos tion data, average density, and age of layer.	
PHYSICAL PROPERTIES			
GRAPE (Gamma Ray Annenuation Porosity Evaluator)	Shipboard Data	Continuous whole-core density measurements.	
Grain Size	Shore Laboratory	Sand-silt-clay content of a sample.	Legs 1-79 only
Index Properties: bulk and grain density, water content, porosity	Shipboard Data	Gravimetric and volumetric measurements from a known volume of sediment.	
Liquid & Plastic Limits	Shipboard Data	Atterberg limits of sediment samples.	
Shear-Strength Measurements	Shipboard Data	Sediment shear-strength measurements using motorized and Torvane instruments.	
Thermal Conductivity	Shipboard Data	Thermal conductivity measurements of sediments using a thermal proble.	
Velocity Measurements	Shipboard Data	Compressional and shear-wave velocity measurements.	
Downhole Measurements			
- Heatflow	Shipboard Data	In situ formation temperature measurements.	
- Pressure	Shipboard Data	In situ formation and hydrostatic pressure.	
SEDIMENT CHEMICAL ANALYSIS			
Carbon-carbonate	Shipboard Data, shore laboratory	Percent by weight of total carbon, organic carbon, and carbonate content of sample.	Hydrogen percents for Legs 101, 103, 104, 106-108; nitrogen percents for Legs 101, 103, 104, 107, 108
Interstitial Water Chemistry	Shipboard Data, shore laboratory	Quantitative ion, pH, salinity, and alkalinity analyses of interstitial water.	
Gas Chromatography	Shipboard Data	Hydrocarbon levels in core gases.	
Rock Evaluation	Shipboard Data	Hydrocarbon content of a sample.	
IGNEOUS / METAMORPHIC CHEMICAL ANALYSIS			
Major Element Analyses	Shipboard Data, shore laboratory	Major element chemical analyses of igneous, metamorphic, and some sedimentary rocks composed of volcanic material.	
Minor Element Analyses	Shipboard Data, shore laboratory	Minor element chemical analyses of igneous, metamorphic, and some sedimentary rocks composed of volcanic material.	

Table 1. ODP and DSDP Data Available

	Data Source	Description	
X-RAY MINERALOGY			
X-Ray Mineralogy	Shore laboratory	X-ray diffraction.	Legs 1-37 only
PALEOMAGNETICS			
Paleomagnetics	Shipboard Data, shore laboratory	Declination, inclination, and intensity of magnetization for discrete samples and continuous whole core. Includes NRM and alternating field demagnetization.	
Susceptibility	Shipboard Data	Discrete sample and continuous whole-core measurements.	
UNDERWAY GEOPHYSICS			
Bathymetry	Shipboard Data	Analog records of water-depth profiles.	Available on 35 mm continuous microfilm
Magnetics	Shipboard Data	Analog records and digital data.	Available on 35 mm continuous microfilm
Navigation	Shipboard Data	Satellite fixes, course adn speed changes run through a navigation smoothing program, edited on the basis of reasonable ship and drift velocities, and merged with depth and magnetic data.	Available in MGD77 exchange format
Seismics	Shipboard Data	Analog records of sub-bottom profiles and unprocessed signal on magnetic tape.	Available on 35 mm continuous microfilm
SPECIAL REFERENCE FILES			
Leg, Site, Hole Summaries	Shipboard Data, initial core descriptions	Information on general leg, site, and hole characteristics (cruise objectives, location, water depth, sediment nature, drilling statistics, etc.)	
DSDP Guide to Core Material	Initial Repots, prime data files	Summary data for each core (depth of core, general paleontology, sediment type and structures, carbonate, grain size, x-ray, etc.)	Legs 1-85 only
AGEPROFILE	Initial reports, hole summaries	Definition of age layers downhole.	
COREDEPTH	Shipboard Summaries	Depth of each core. Allows determination of precise depth (in m) of a particular sample.	
AIDS TO RESEARCH			
ODASI	ODP-affiliated scientists and institutions. May be cross-referenced and is searchable.		
Keyword Index	Computer-searchable bibliography of DSDP/ODP related papers and studies in progress.		
Sample Records	Inventory of all shipboard samples taken.		
Site Location Map	DSDP/ODP site positions on a world map of ocean topography.		
Thin Section Inventory	Inventory of all shipboard thin sections taken.		

NGDC can also provide a full range of correlative marine geological and geophysical data from other sources. NGDC will provide a complimentary inventory of all data available on request. Inventory searches are custom tailored to each user's needs (geographic area, parameter measured, etc.).

Information from the DSDP Site Summary file is fully searchable and distributable in PC-compatible form on floppy diskette, in the form of computer listings and graphics, or on magnetic tape. Digital DSDP geophysical data are fully searchable and available on magnetic tape. NGDC is working to make all digital DSDP data files fully searchable and available on CD-ROM (compact disk read only memory), which will be compatible with both IBM-PC and Macintosh systems.

In addition to DSDP data files, NGDC can also provide analog geological and geophysical information from DSDP on microfilm. Two summary publications are available:

1. "Sedimentology, Physical Properties, and Geochemistry in the Initial Reports of the Deep Sea Drilling Project volumes 1-44: An Overview", Report MGG-1;
2. "Lithologic Data from Pacific Ocean Deep Sea Drilling Project Cores", Report MGG-4.

Data requests can be made by telephone or by letter. Costs for services are: $90 per magnetic tape, $30 per floppy diskette, $20 per reel of microfilm, $12.50-12.80 per copy of Report MGG-1 and $10 per copy of report MGG-4. Costs for computer listings and custom graphics vary. Prepayment is required by check or money order (drawn on a U.S. bank), or by charge to Mastercard, VISA, or American Express. A $10 surcharge is added to all shipments ($20 for foreign shipments), and a $15 fee is added to all rush orders. Shipping and handling is included in the prices quoted.

Data Announcements describing each DSDP data set in detail are available at no charge, on request. For additional information on data availability, costs, and ordering instructions, contact the NGDC, Marine Geology and Geophysics Division (see Directory, p. 75, for address).

NATIONAL ODP STRUCTURES

CANADA\AUSTRALIA CONSORTIUM

In April 1985, Canada became a regular member of the Ocean Drilling Program. In November 1988, Canada and Australia signed a Memorandum of Understanding whereby Australia shares one-third of Canada's ODP membership. Thus the Canada/Australia Consortium for the Ocean Drilling Program was formed.

The governing structure for the consortium is equivalent in both Canada and Australia.

A National Committee, made up of scientists and administrators, oversees each country's scientific involvement in the program. The Committees' responsibilities include choosing shipboard participants, scientific and technical planning, and dissemination of information to the respective scientific communities. Operation of the National Committees is administered by a Secretariat which is responsible for ensuring proper communication with the science community, and the management of meetings and workshops. In Canada this committee is the responsibility of the Canadian Geoscience Council (CGC) and reports to the CGC and the Canadian Council for the Ocean Drilling Program.

A Council made up of senior government, industry and University representatives is responsible for each country's interest in matters of policy and finance. The Councils include representation from each of the government agencies funding ODP, and represent the respective countries in intra-governmental discussions. In Canada, this Council is chaired by a senior official of the Department of Energy, Mines & Resources (EMR). In Australia, the Council is chaired by a senior official of the Bureau of Mineral Resources (BMR) and includes representation from the Australian Research Council, Vice-Chancellors Committee, and the Antarctic Division of the Department of Arts, Sports, Environment, Tourism and Territories (ASETT).

The Canada/Australia Consortium is represented by a Consortium Board comprised of the chairmen of the National Committees, the chairmen of the Councils, and the permanent secretary to the Consortium Board, who is the Director of the Canadian Secretariat. This Board represents the interests of the Consortium in ODP. The Consortium office is housed at the Canadian ODP Secretariat.

Funding for the Ocean Drilling Program in Canada is provided by the Department of Engery, Mines and Resources/ Geological Survey of Canada (EMR/GSC) 43.3%; Department of Regional and Industrial Expansion (DRIE) 19.7%; Department of Fisheries and Oceans (DFO) 12.3%; and the Natural Sciences Engineering and Research Council (NSERC) 24.5%. In addition, in 1988-89 private industry provided access to $20,000 of recoverable funds to provide for travel to and from the JOIDES RESOLUTION.

Funding for the Ocean Drilling Program in Australia is provided by the Bureau of Mineral Resources (BMR) 35%; Australian Research Council 52%; Vice-Chancellors Committee 9%; and Department of Arts, Sports, Environment, Tourism and Territories (ASETT) 4%.

Since joining ODP, Canada has placed 44 scientists onboard the JOIDES RESOLUTION, and Australia has placed a total of nine scientists onboard the RESOLUTION. These figures translate into many more scientists who have had hands on experience in ODP. The Canadian ODP newsletter, "The Resolution Report," has a circulation of over 700. Canadian industry has benefitted directly by supplying over 2.7 million dollars worth of goods and materials to the program since 1985.

It is expected that the new level of cooperation between Canada and Australia will provide exciting scientific benefits for both countries.

EUROPEAN SCIENCE FOUNDATION

The European Science Foundation (ESF), a consortium of organizations from five European countries, was established in December 1983 as an international, non-governmental organization. The consortium held candidate member status in ODP from early 1984 until September 1985. During this period, and until early 1986, the founding members were joined by various organizations from other European countries, eventually totaling twelve: Belgium, Denmark, Finalnd, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland and Turkey.

In April 1986 the decision was reached that the "ESF Consortium for Ocean Drillng (ECOD)," should apply for regular membership in ODP. A Memorandum of Understanding with NSF was signed and ESF has participated as a full member of ODP since June 1986.

The management structure of ECOD was finalized in June 1986. The ESF Management Committee for ODP (EMCO) is responsible for political, managerial, organizational and financial matters, and for overseeing long-term scientific planning. Scientific and operational matters are entrusted to the ESF Scientific Committee for ODP (ESCO). Both committees report to the ruling bodies of ESF. Each participating country is represented on each of the two committees by a voting delegate and, if necessary, by a non-voting alternate. However, normal practice is to reach decisions by consensus.

EMCO is assisted by an administrative secretariat located at the ESF Office. A scientific secretariat, located with the ESCO Chairman, assists ESCO. Operating costs of both secretariats are paid from a special budget. This budget, as well as the ODP membership fee, are jointly financed by all members of ECOD. Support costs, including all travel, are funded nationally by participating countries.

FEDERAL REPUBLIC OF GERMANY

The Federal Republic of Germany has been involved in scientific ocean drilling since 1975 when it became a regular member of DSDP and participated in the International Phase of Ocean Drilling (IPOD). In March 1984, the Federal Republic of Germany was the first non-U.S. country to sign a full Memorandum of Understanding with NSF for participation in ODP.

Finances for the ODP membership contribution come through the Deutsche Forschungsgemeinschaft (DFG), the German equivalent of NSF. DFG provides 50% of the contribution, with the other 50% being provided by the Bundesministerium fur Forschung und Technologie (BMFT), the federal ministry of research and technology. The DFG represents the Federal Republic on the ODP Council.

The Bundesanstalt fur Geowissenschaften und Rohstoffe (BGR), the federal institute for geosciences and natural resources, coordinates German activities within ODP, provides managerial assistance, and representation on the JOIDES Executive and Planning Committees.

DFG has established a priority program, "Schwerpunktprogramm ODP/DSDP," providing grants totalling approximately DM 2.5M to provide back-up to the ODP within the FRG. Participants are individuals from universities, government agencies and industry. This research includes ODP-related surveys, investigation of core samples and other borehole data, as well as onshore field investigations closely related to offshore drilling targets.

For offshore surveys related to ODP, the FRG has three large research vessels: the POLARSTERN, the METEOR and the SONNE. The POLARSTERN has ice-breaking capabilities, and all ships are equipped with modern navigational aids, multi-beam echosounders, and conventional geological and geophysical gear.

Although the FRG has a worldwide involvement in ODP, some concentration of activities in the Atlantic, Norwegian Sea, Antarctic, SE Asian, and SW Pacific areas is inevitable.

FRANCE

France became a full member of DSDP in 1975 and has been a full member of ODP since 1984. France has an administrative organization similar to that of ODP. This consists of an Executive Committee composed of representatives of various French organizations and ministerial delegates.

An ODP Scientific Committee meets three or four times a year. Members are scientists from different institutions (University, CNRS, IFREMER, BRGM, IFP, ORSTOM, oil industry), and are selected either as the French representatives on the JOIDES panels or from their special field of expertise.

A Bureau of five members has been appointed by the French ODP-Executive Committee to insure coordination and promotion of the Program, and to solicit new actions for improved scientific and technological participation. There are also working groups corresponding to the JOIDES panels which consist of six to eight people chosen for their competence in the appropriate theme or region.

The Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER) is the national oceanographic agency which represents France in the Ocean Drilling Program. The ODP budget at IFREMER covers the ODP subscription, travel funds, and other support for the Program.

Ship operations are another budgetary item within IFREMER. Cruises are devoted to regional surveys useful for ODP. In addition, IFREMER allocates ship time each year, depending on the quality of proposals, for MCS surveys relevant to ODP site surveys. Review of proposals is conducted by the Scientific Committee of IFREMER. The ODP Scientific Committee can give advice to this national committee concerning the priority of relevant ODP proposals.

The French science support program consists of special allocations given by the Institut de Sciences de l'Univers (INSU). Proposals are examined by the scientific committee. Funding is especially dedicated to pre-cruise studies, follow-up studies related to shorebased work, syntheses, etc. Specific support is also provided by other agencies (such as ORSTOM, IFP, and BRGM) to their scientists involved with ODP.

JAPAN

Japan became a full member of DSDP in 1975, and has been a full member of ODP since October, 1985.

The Monbusho (Ministry of Education, Science, and Culture) is the government agency which provides finances for ODP in Japan. The University of Tokyo's Ocean Research Institute (ORI) is responsible for scientific operation of the program. Various scientific planning decisions are made by the Japanese National Committee for ODP which is composed of scientists from ORI and other universities and research institutions.

Administrative decisions for ODP are made following recommendations of the Geodetic Council, an advisory board to the Cabinet organized by the Monbusho, which assigned reviewing tasks to its subcommittee, the Special Committee for Deep Ocean Floor Investigation.

Participation in ODP, either as a shipboard scientists or as a shorebased researcher, is open to all members of the scientific community in Japan, regardless of their institutions. Information is sent by ORI, in such forms as an ODP Newsletter and short communication notes, to about 400 names within the scientific community. Publications from JOIDES and ODP/TAMU, such as the JOIDES Journal and ODP Proceedings volumes are distributed by ORI, mainly to institutional libraries, as well as to a few key people. Workshops and symposia are also held at ORI to summarize ODP cruise results, and to lead to the formation of site and technological proposals.

ORI is in charge of site survey plans using the research vessels TANSEI MARU and HAKUHO MARU. A new research vessel about 100 m long, and equipped with several updated devices for navigation and investigation, is being built to replace the HAKUHO MARU. ORI is promoting devel-

opment of long-term downhole instruments, such as downhole seismometers and downhole thermometers with pressure sensors, which are planned to be installed in ODP holes in the Sea of Japan and Nankai Trough to establish long-range ocean floor laboratories.

UNITED KINGDOM

The United Kingdom has been a member of the international scientific ocean drilling community since the inception of the DSDP International Phase of Ocean Drilling in 1975. The UK has maintained and developed this interest through participation in ODP, although it was unable to join the Program as a full member until October 1985.

UK membership in ODP is managed through the Natural Environment Research Council (NERC) which provides the bulk of the membership funds, the remainder coming from UK-based oil companies. An ODP Management Committee maintains general oversight of UK participation and recommends policy. It reports formally to the NERC Council through its Earth Sciences Committee, as well as to the various agencies on the committee which contribute to the costs of ODP membership.

An ODP Science Committee is responsible for coordinating the interests of the UK marine scientific community. It reports to the NERC Earth Sciences Committee and to the ODP Management Committee. Members are the national representatives on the JOIDES Panels, other UK scientists selected for their expertise, and representatives of agencies who support the costs of ODP membership. The Committee provides a forum for general liaison between the UK EXCOM and PCOM representatives, and the other UK JOIDES Panel members. It also maintains oversight of policy issues relating to meetings, and briefing of representatives.

Panel representatives are responsible for convening scientific workshops to develop proposals in the appropriate JOIDES themes or regions, and for ensuring that opportunities for participation in ODP are made known to the widest possible audiences.

As well as providing the bulk of the ODP subscription funds, NERC meets all travel costs. NERC also considers applications for other support from UK scientists participating in ODP, via research grants and studentship schemes, and through bids for time on NERC ships.

To complement UK membership in ODP, NERC established an ODP Special Topic research program in April 1987. The Special Topic program encourages shore-based research and other ancillary activities. All proposals for funds are judged on perceived scientific merit in open competition and are subject to peer review.

The Special Topic program is administered by a Grants Committee which reports to the NERC Earth Sciences Committee, and to the ODP Science Committee, with which there are linking members. The aim of ODP Special Topic is to encourage multi-disciplinary, multi-institutional proposals involving NERC institutes, higher educational institutes, universities, polytechnics and industry. Four broad areas of activity have been identified namely:

1. Coordinated UK shipboard and onshore research on upcoming legs, and provision of support for this;

2. Regional geological and geophysical studies in support of drilling proposals from the UK scientific community. Such work would aim to improve understanding of the essential regional framework to be tested by subsequently drilling;

3. Construction and operation of instruments for innovative downhole experiments or logging, either in existing DSDP or ODP holes, or in ODP holes as they are drilled;

4. Post-cruise synthesis studies.

Applications in other appropriate areas are welcome.

In addition, the Committee is prepared to consider applications for Special Research Fellowships to provide post doctoral scientists of unusual promise

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and ability with opportunities for research on problems of their own choice, which are compatible with the research interests of ODP, thereby contributing to the overall ODP research effort.

Such applications are considered in open competition with research grant applications. Only the most exceptional proposals are successful.

U.S.A.

The National Science Foundation (NSF) is responsible for overseeing ODP and provides the U.S. contribution to the internationally funded program. In addition, NSF provides support for U.S. drilling-related science activities. The total U.S. science budget for ODP in FY 1988 was $8.4M. Of this total, $4.7M funded unsolicited proposals for drilling related research, and $3.7M underwrote U.S. Science Support Program (USSSP) activities managed by JOI.

In order to encourage the development of mature drilling proposals, and of inovative experiments and technology related to drilling, NSF funds proposals in three categories:

1. Regional geological and geophysical studies well in advance of drilling. Work should concentrate on high-priority areas which address thematic goals identified by the COSOD reports, as well as priorities identified by JOIDES long-range plans. In general, priority will be given to studies in geographical regions which will be drilled two to three years following the research cruise. Three to four field programs are supported each year.

2. Downhole geophysical or geochemical experiments related to a specific drilling program conducted onboard the drillship. To the extent that these experiments require time and facilities onboardship, they must be independently endorsed by JOIDES and included in the scientific plan for the proposed leg.

3. Feasibility studies and initial development of general-use downhole instruments, new techniques, or nd concepts for drilling.

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NSF accepts unsolicited proposals fr U.S. scientists and institutions at any time, but there are three main target dates: February 1, June 1, and October 1. Proposals requiring ship time must meet the February 1 or June 1 target dates to be considered for field programs during the folowing calendar year.

The U.S. Science Support Program (USSSP) undertakes activities on the basis of scientific and policy recommendations of the U.S. Science Advisory Committee (USSAC). These activities include:

1. Planning activities such as U.S. workshops and participation on JOIDES panels and funding for the travel of U.S. panel members to JOIDES panel meetings.

2. Site development, including data syntheses and site survey augmentation. Site survey augmentation includes support for U.S. scietists to participate in non-U.S. site surveys, support for assembling data that would otherwise not be available for planning purposes, and support for drilling related science on ships of opportunity.

3. Support for participation of U.S. scientists in specific drilling legs and funding for salaries and travel of U.S. shipboard scientific party members.

4. Development of downhole instrumentation, which may include a wireline re-entry system, and vertical seismic profiling.

5. Education and public information, including logging schools, graduate student fellowships, and storage and dissemination of ocean drilling data.

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