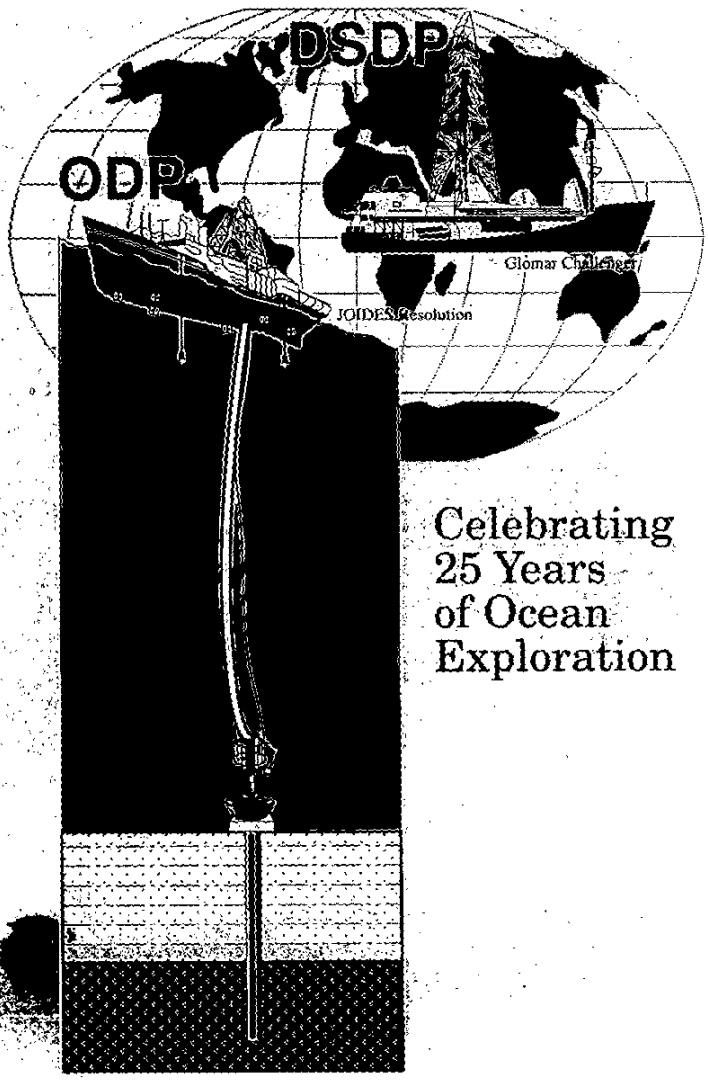
JOIDES Journal

Joint Oceanographic Institutions for Deep Earth Sampling
Volume 20, Number 2, June 1994

A Guide to the Ocean Drilling Program



Celebrating 25 Years of Ocean Exploration

Cover : Between 1968 and 1983 the drillship *Glomar Challenger* sailed more than 375,000 miles during the 96 voyages of the Deep Sea Drilling Project (DSDP). These expeditions provided new understanding of earth history and plate tectonics. In 1983, the Ocean Drilling Program (ODP) was born. With an expanded international component, ODP has built on the discoveries of the previous fifteen years with the drillship *SEDCO/BP 471*, known as the *JOIDES Resolution*.

Cover graphic by Bill Collins, JOIDES Office

The *JOIDES Journal* is edited by the staff of the JOIDES Office.

Note: Due to space limitations in this Special Issue, the JOIDES Office could not include an ODP/JOIDES Directory. Consult the most recent regular edition of the *JOIDES Journal* for Directory Information.

Changes of address, requests for additional copies of the current issue and available back issues should be requested from:

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ODP Open Discussion Bulletin Board

The ODP LISTSERVER is a discussion bulletin board service to which individuals subscribe via Internet. It permits exchange of information among all subscribers. Currently the list administrator, Linda Weatherford, sends a report of the previous week's shipboard scientific and operations activities to all subscribers. Site summaries are distributed as soon as they are received at ODP from the ship. Periodically, an updated cruise schedule and brief descriptions of upcoming cruises are sent out. Any subscriber may send files to the list administrator for distribution. A file sent to the list address will be reviewed before being distributed. Anyone with an Internet address can subscribe. At present there are subscribers in the US, Canada, Europe, Australia and Japan. There is no charge for subscribing to the listserver.

To subscribe, send a brief message to Linda Weatherford (Weatherford@nelson.tamu.edu) requesting that you be added to the ODP-L subscription list.

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Joint Oceanographic Institutions for Deep Earth Sampling

University of California, San Diego, Scripps Institution of Oceanography

Canada-Australia Consortium

Columbia University, Lamont-Doherty Earth Observatory

European Science Foundation: Belgium, Denmark, Finland, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey

France: Institut Français de Recherche pour l'Exploitation de la Mer

Germany: Bundesanstalt für Geowissenschaften und Rohstoffe

University of Hawaii, School of Ocean and Earth Science and Technology

Japan: Ocean Research Institute, University of Tokyo

University of Miami, Rosenstiel School of Marine and Atmospheric Science

Oregon State University, College of Oceanic and Atmospheric Sciences

University of Rhode Island, Graduate School of Oceanography

Texas A&M University, College of Geosciences and Maritime Studies

University of Texas at Austin, Institute for Geophysics

United Kingdom: Natural Environment Research Council

University of Washington, College of Ocean and Fishery Sciences

Woods Hole Oceanographic Institution

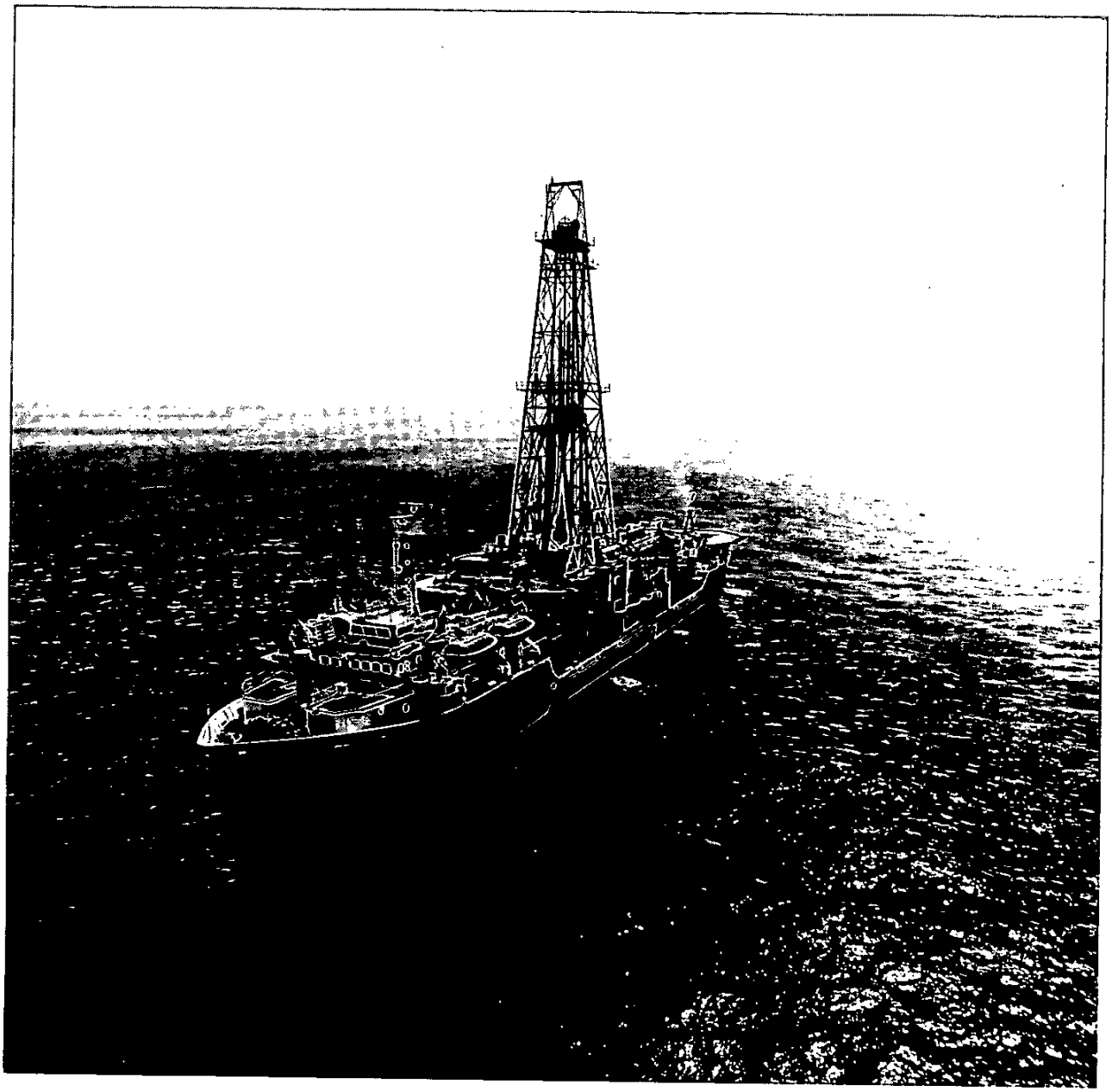
Preface

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 listed in the text, or contact the JOIDES Office for more information.

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



OCEAN DRILLING PROGRAM

Organization and 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 is funded by the United States 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, 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 United States (US) oceanographic institutions which provides management support to large multi-institutional research programs.

The overall scientific objectives of ODP are established by the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), an international organization of advisory committees and panels representing US 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 (ODP-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 Earth Observatory Borehole Research Group (ODP-LDEO) manages wireline logging operations. ODP-LDEO is responsible for obtaining electronic measurements in the drillholes, 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 under contract to ODP-LDEO.

The ODP Site Survey Data Bank (SSDB) is also located at Lamont-Doherty Earth 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.

At NSF, 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 the international partners.

International Participation

Memorandum of Understanding

A prerequisite for participation in ODP is a Memorandum of Understanding (MOU) 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 page 3).

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

Joint Oceanographic Institutions, Inc.

Joint Oceanographic Institutions, Inc. (JOI) is a consortium of ten US oceanographic institutions that 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 US 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 US science community's participation in ODP, through a separate program.

The ten JOI institutions are:

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

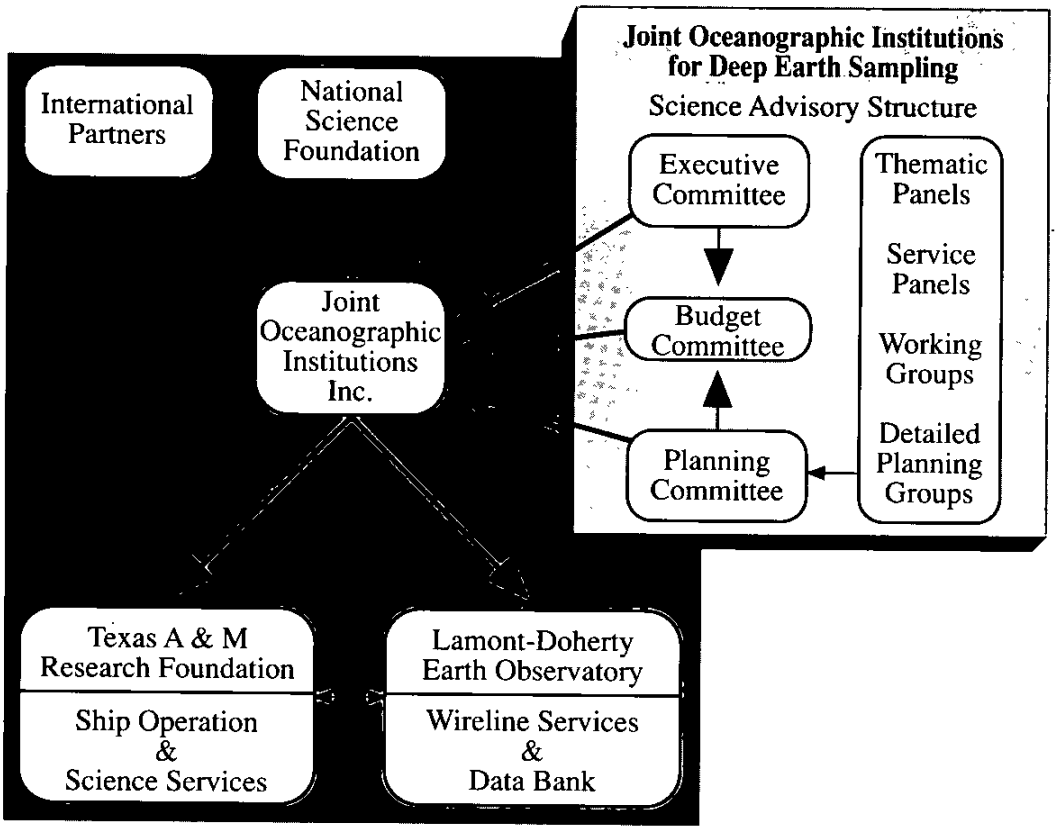


Figure 1. Management structure of the Ocean Drilling Program.

Memorandum of Understanding

Between the National Science Foundation in Washington, D.C., for the United States of America and the Organizations ((**ORGANIZATION**)) of the Participating Countries ((**COUNTRY**)) in the Ocean Drilling Program as a Regular Member

The Ocean Drilling Program (ODP) is a multinational program of scientific research in the oceans which uses drilling and logging to improve fundamental understanding of the geological history, structure and evolution of the oceanic lithosphere (sediments and crust). The Ocean Drilling Program is a successor to the Deep Sea Drilling Project, which began in 1968, and the International Phase of Ocean Drilling, which began in 1975. During the period October 1983 - October 1984, the National Science Foundation, through its contractors, refitted the *JOIDES Resolution* for scientific ocean drilling and for scientific program operations. Early in US Fiscal Year 1985, the initial nine-year phase of ocean drilling began. By 1991, eight international partners representing 20 nations had become regular supporting members of the ODP.

The Ocean Drilling Program is conducted by contractors, responsible to the National Science Foundation, who carry out the functions of science planning, science operations, and vessel operations. The Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES) is the international body responsible for developing scientific plans and providing general scientific direction for the Ocean Drilling Program. A Science Planning Contractor organizes and provides administrative support to JOIDES. In May 1990, JOIDES published a *Long Range Plan* which identifies scientific priorities and calls for continued international cooperation in ocean drilling extending to the year 2002. JOIDES has subsequently endorsed use of the *JOIDES Resolution* as the primary facility for ODP coring and logging through at least 1998. Facilities, including any alternate or additional drilling platforms utilized through 1998, during subsequent years are to be determined by availability, cost, and scientific requirements identified by JOIDES planning.

Accordingly, the National Science Foundation and the ((**ORGANIZATION**)) endorse continued cooperation in ocean drilling activities during the period 1 October 1993 to 30 September 2003, in accordance with the following articles:

Article 1 - Membership Status

The ((**ORGANIZATION**)) elects to be a regular member with rights, privileges, and financial commitments as defined. All cooperative activities under this agreement, including exchange of technical information, equipment and data, shall be conducted in accordance with international law, as well as the international obligations, national laws and regulations of each party and within the limits of available funds.

Article 2 - Duration

The ((**ORGANIZATION**)) endorses continued cooperation in ocean drilling activities, with commitment, in principal, as a regular member to support of Ocean Drilling Program coring and logging programs in the period 1 October 1993 to 30 September 1998. Subsequent support is to be determined based on available technologies, facilities and membership costs in the period 1998 to 2003.

Article 3 - Scientific Planning

Scientific planning and direction of the Ocean Drilling Program shall be the responsibility of JOIDES. The ((**ORGANIZATION**)) will be a member of JOIDES with the right to be represented on each committee, panel, or working group thereof. International membership and representation in JOIDES is restricted to regular members, including consortia, but excluding the individual members of consortia. The contractors will submit, to the Executive Committee of JOIDES, the annual program plan and budgets for approval prior to their adoption by the National Science Foundation.

Article 4 - Ocean Drilling Council

The ((**ORGANIZATION**)) 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 for 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 be scheduled in conjunction with the JOIDES Executive Committee meeting for review and approval of the annual program plans and budgets.

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

Article 5 - Intellectual Property Rights

(Negotiated and included as appropriate to each partner.)

Article 6 - Right to Make Proposals; Data Privileges

The ((**ORGANIZATION**)) will have the right:

a) to make proposals to JOIDES of scientific projects or technical objectives of special interest to the ((** ORGANIZATION**)).

b) to participate in the analysis, and have access to the data, of geophysical and other site surveys performed in support of the program.

c) to engineering plans, data or other information developed under contracts supported as program costs, subject to Article 1 limitations.

Site surveys may be contributed by the ((**COUNTRY**)) as its scientific interests and available resources allow. Site survey requirements will be identified by JOIDES.

Article 7 - Visa and Customs Facilitation

The National Science Foundation will facilitate 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 8 - Participation on Board the ODP Drillship

The Science Operations Contractor, with the advice of JOIDES, selects the scientific team for each cruise. It is expected that approximately half of the scientists invited to serve as Co-Chief Scientists will be representatives of the United States. It is expected that a scientist representing the ((**COUNTRY**)) will be invited to serve as Co-Chief Scientist on an equal numerical basis with all other non-US partners. The ((**COUNTRY**)) has the right to have a scientist represented in the shipboard scientific staff on each cruise of the ODP drillship. Normally, space will be available for two scientists representing the ((**COUNTRY**)) on the research cruises of the ODP drillship. It is recognized that some cruises may be of special scientific interest to ((**COUNTRY**)) scientists and increased participation by scientists of the ((**COUNTRY**)) on these cruises may be appropriate. At a minimum, total participation over the term of the Ocean Drilling Program will be proportional to the ((**COUNTRY**)) contribution to Program costs.

Article 9 - Initial Reports of the Ocean Drilling Program

Scientists from the ((**COUNTRY**)) will have access, through the ((**ORGANIZATION**)), to Ocean Drilling Program data and core samples. The)(**ORGANIZATION**)) 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 Proceedings of the Ocean Drilling Program or their equivalent. One hundred copies of each volume of the official scientific publications will be provided to the ((**ORGANIZATION**)) for free distribution among scientific establishments in the ((**COUNTRY**)). These volumes may be published in the ((**COUNTRY**)) in full or in part, without payments to or additional agreements with the United States. The ((**ORGANIZATION**)) will provide the National Science Foundation with copies of all publications from the ((**COUNTRY**)) that are based on program material.

Article 10 - Financial Contribution

The ((**ORGANIZATION**)) will support the Ocean Drilling Program with financial contributions payable to the National Science Foundation in US dollars in amounts and periods to be specified by Annex A* to this Memorandum of Understanding.

The financial contribution of all participants will be commingled 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 United States scientific undertakings are not program costs and will not be funded from commingled accounts.

Article 11 - Salaries, Travel, and Expenses

Salaries, travel and expenses for participants representing the ((**COUNTRY**)) will be borne by the ((**COUNTRY**)). Costs of accommodations for ((**COUNTRY**)) scientists and members of technical parties aboard the drillship are program costs and will be funded by the Ocean Drilling Program. The National Science Foundation's contractors will render the ((**COUNTRY**)) scientists needed assistance when going from an airport to the drillship.

Article 12 - Consultation

Meetings of the National Science Foundation and representatives of the ((**COUNTRY**)) 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 13 - 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 — JOIDES Joint Oceanographic Institutions for Deep Earth Sampling

Science Planning

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 USSR 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 Canada-Australia Consortium: Natural Resources Canada; Australian Geological Survey Organization, Australia
- Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Federal Republic of Germany;
- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), France
- Ocean Research Institute of the University of Tokyo (ORI), Japan
- Natural Environment Research Council (NERC), United Kingdom
- The European Science Foundation Consortium for Ocean Drilling (ECOD), consisting of Belgium, Denmark, Finland, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey

In addition to the ten US institutions and the international partners, many US 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 organizational structure 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 oceanographic and marine research institutions, or other organizations, which have an interest in the study of the sea floor, and the capability of carrying out such studies.

Each organization designated for participation on EXCOM by the Board of Governors shall provide one voting member. The US members of the Executive Committee (EXCOM) are the Deans or Directors of the ten US oceanographic institutions. The Executive Committee members from non-U.S institutions or countries are designated by the participating country. The President of JOI, the Director of the Science Operations Subcontractor, the Director of the Wireline Logging Services Subcontractor, the Planning Committee (PCOM) Chairperson and an appointee of the NSF are non-voting liaison members of the Executive Committee.

EXCOM approves scientific and operational plans developed by PCOM, and sets policies for the achievement of the program's objectives. EXCOM also evaluates and assesses ODP accomplishments compared to established goals and objectives.

The Chairpersonship of EXCOM rotates with the JOIDES Office among the JOIDES institutions, excluding the Science Operator and Wireline Logging Service Operator institutions. Plans are for the Chair position to alternate between US and non-US institutions each term. The term of office is usually two years.

EXCOM operates under Terms of Reference, which are included on page 10.

Budget Committee

The Budget Committee (BCOM) consists of three EXCOM members and two PCOM members. A balance of three US and two non-US BCOM members is maintained. BCOM provides JOIDES overview and first review of the ODP Program Plan which is submitted in draft form to NSF. BCOM meets periodically, according to a Program Plan and budget timetable, and consults with JOI and the subcontractors if budget problems arise. BCOM provides a report to EXCOM at their summer meeting, at which time EXCOM approves the final ODP Program Plan.

BCOM operates under Terms of Reference, which are included on page 10.

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 is responsible for:

- establishing the general track of the vessel at least four years in advance of drilling
- soliciting, monitoring, coordinating, and evaluating drilling proposals
- recommending names of leg Co-Chief Scientists to the Science Operator (who makes the final selection)
- establishing scientific plans and providing scientific guidance for the annual Program Plan
- establishing an infrastructure appropriate to the definition and accomplishment of tasks defined by EXCOM and included in the annual Program Plan
- drafting the mandates of the various panels and working groups and naming their members
- communicating with the panels and working groups by assigning PCOM members as non-voting liaison members as well as having panel chairmen meet with PCOM annually
- fostering communications among the science community, the panels, the Science Operator, and itself

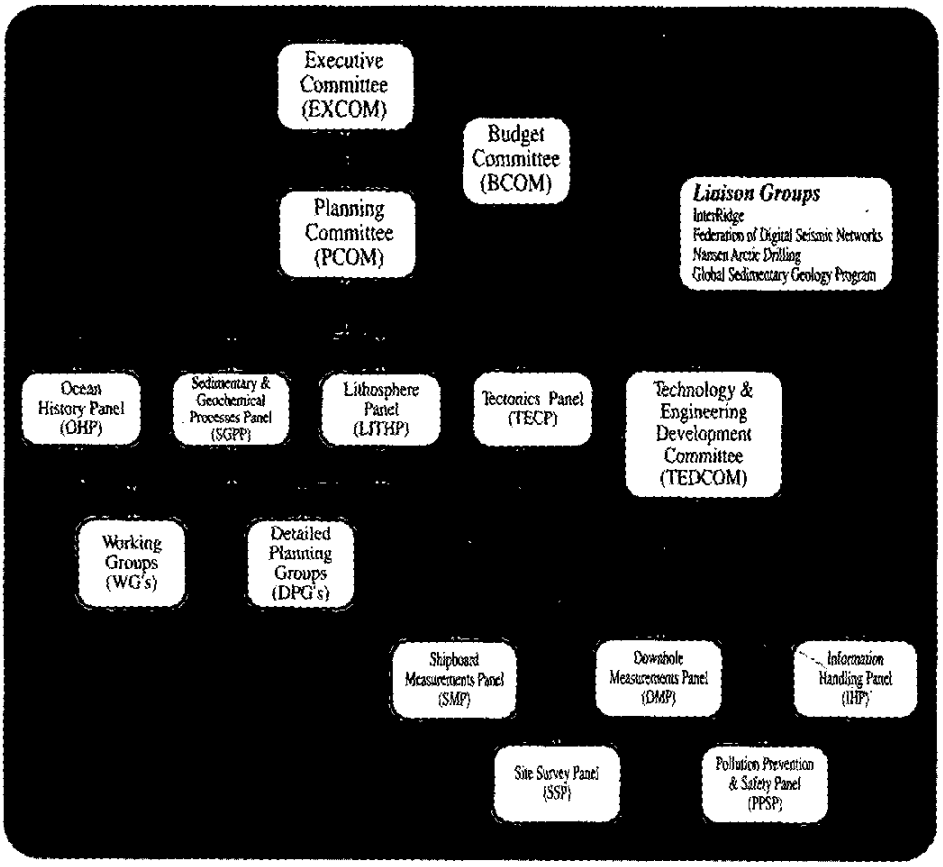


Figure 1. JOIDES Science Advisory Structure.

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. If a PCOM member is a proponent or Co-Chief of a drilling proposal, the proposal is reviewed independently by the Thematic Panels and the PCOM member is not involved in any substantive advisory role or in any final voting on the proposal at PCOM meetings. One quarter of the PCOM members rotate off the Committee annually, so that its membership is replaced every four years.

The PCOM Chairpersonship rotates with the JOIDES Office among the JOIDES institutions, excluding the Science Operator and Wireline Logging Service Operator institutions. Plans are for the JOIDES Office to alternate between US and non-US institutions each term. The term of office is usually two years. The PCOM Chairperson convenes the panel meetings and approves their meeting dates, locations, and agendas.

PCOM operates under Terms of Reference, which are included on page 11.

JOIDES Science Advisory Structure

The science advisory structure is headed by the Planning Committee and consists of: four Thematic Panels; five Service Panels; a Technology and Engineering Development Committee; and ad hoc Detailed Planning Groups and Working Groups and Liaison Groups.

Terms of Reference for the JOIDES Science Advisory Structure (see page 11) includes mandates and guidelines for each panel. Each committee, panel, Detailed Planning Group, and Working Group operates under a mandate, along with guidelines as to membership and frequency of meetings. The JOIDES panel meeting schedule guideline is shown in Figure 2. Standing panel mandates, guidelines, and their amendments to them shall be proposed by the Planning Committee for approval by the Executive Committee. The Planning Committee may ask panels to take up topics not in their original mandates. Considerable overlap in thematic coverage is expected to evolve. Mandates, guidelines and duration of operation for the short-lived Detailed Planning Groups and Working Groups will be specified by PCOM as required.

At the 1987 annual PCOM meeting, a special subcommittee met to evaluate the science advisory structure. As a result of PCOM'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 the Conferences on Scientific Ocean Drilling (COSOD) priorities, offer fair treatment of proposals, facilitate long-range planning and provide the best technical advice to PCOM.

Thematic Panels

Thematic Panels are established by the Planning Committee to identify long-range scientific 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. Thematic Panels are responsible for meeting at least twice a year to review and evaluate 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 (LITHP), Ocean History Panel (OHP), Sedimentary & Geochemical Processes Panel (SGPP), and the Tectonics Panel (TECP).

Thematic Panels operate under the Terms of Reference of the Science Advisory Structure of JOIDES (see page 12).

Detailed Planning Groups

Detailed Planning Groups (DPGs) are short-lived planning groups which may be created by PCOM as required for specific tasks, in response to requests by the Thematic Panels or by PCOM itself. The purpose of a DPG is for generating concrete drilling prospectuses from groups of highly-ranked proposals united by a common theme or themes. Mandates, guidelines, and duration of operation are specified by PCOM as required (see the Terms of Reference of the Science Advisory Structure of JOIDES, page 14).

DPGs are composed of a balance of US and non-US members, and proponents and non-proponents. The size of the DPG should be commensurate with the charge of the group. DPGs provide written documents to those Thematic Panel(s) specified by PCOM and are disbanded by PCOM when their function is complete. The DPG documents are transmitted to PCOM with the written evaluation of the appropriate Thematic Panel.

Working Groups

Working Groups are short-lived planning groups which may be created by PCOM, in response to requests by the Thematic Panels or by PCOM itself, for more intensive study of ways to implement an important scientific theme or themes by ocean drilling (see the Terms of Reference of the Science Advisory Structure of JOIDES, page 15). The Working Groups will be held to the minimum necessary membership and travel expenses. Working Groups provide written documents to those Thematic Panels specified by PCOM. The Working Group documents are transmitted to PCOM with the written evaluations of the appropriate Thematic Panels

Technology and Engineering Development Committee

The Technology and Engineering Development Committee (TEDCOM) is responsible for recommending the proper drilling tools/techniques to meet the objectives of any targets in the scientific plan. TEDCOM

identifies, within a proper time frame, the drilling tools and techniques to be developed, and monitors the progress of their development. TEDCOM operates under the Terms of Reference of the Science Advisory Structure of JOIDES (see page 14).

Service Panels

Service Panels provide advice and guidance to the JOIDES advisory structure , and to the various entities responsible for processing, curating, and distributing 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 programmatic changes, these must be approved by PCOM for recommendation to JOI.

The five Service Panels are the Downhole Measurements Panel (DMP), Information Handling Panel (IHP), Pollution Prevention and Safety Panel (PPSP), Site Survey Panel (SSP), and the Shipboard Measurements Panel (SMP). The Service Panels, beyond their help to the JOIDES Advisory Structure, are not directly involved with the selection of drilling targets or the definition of cruise objectives. However, the DMP may review and make recommendations on JOIDES proposals which emphasize downhole scientific programs and tools.

Service Panels operate under the Terms of Reference of the Science Advisory Structure of JOIDES (see page 15).

Liaison Groups

Liaison Groups (LGs) have been established by JOIDES as a formal means of communications with any national or international geoscience program that has an interest in ocean drilling. To date, Liaison Groups have been established with: the Global Sedimentary Geology Program (GSGP), the Federation of Digital Seismic Networks (FDSN), InterRidge, and the Nansen Arctic Drilling Program (NAD).

Travel Costs Associated with Panel/Committee Meetings

- Travel by US panel members is paid for by the JOI/United States Science Support Program (JOI/USSSP) and does not come from commingled funds in the Ocean Drilling Program.
- Travel by non-US JOIDES panel members and guests is paid for by their country.
- Travel by the EXCOM and PCOM chairmen is paid out of ODP commingled funds.
- Travel by non-member country panel members comes from commingled ODP funds.
- Travel by scientists employed by either JOI, the Science Operator, or by the Wireline Services Operator is included in that institution's ODP budget.

JOIDES Office

Conduct and support of JOIDES activities is provided through the JOIDES Office. This office, under the direction of the PCOM Chairperson, is responsible for coordination of PCOM, ten advisory bodies, and DPGs and WGs. The office also integrates advice from the panel structure in a manner suitable for policy decisions by EXCOM.

The Chairperson of PCOM is the head of the JOIDES Office. Besides chairing the various meetings of the Planning Committee, he/she also attends meetings of EXCOM, PPSP, and other panels, committees, DPGs, or Working Groups. The JOIDES Office rotates approximately every two years among the institutional members of JOIDES, excluding the Science Operator and Wireline Logging Service Operator institutions. Plans are for the JOIDES Office to alternate between US and non-US institutions. When in the US, the office will rotate among the US institutions.

Administrative functions of the JOIDES Office include: overseeing the preparation of a Science Plan for the annual ODP Program Plan; compiling summaries of the reports of meetings of the JOIDES committees and panels and distributing these in a timely manner to JOIDES members, JOI, NSF and, when appropriate, to the scientific/technical community; providing administrative services the JOIDES Advisory Structure.

The JOIDES Office also produces the *JOIDES Journal*. The *JOIDES Journal* records the activities of all elements of the JOIDES structure and keeps the scientific community informed of the JOIDES planning process. The *JOIDES Journal* provides communication among the JOIDES committee and advisory panels, JOI, ODP-TAMU, ODP-LDEO, NSF, international members, and individual earth and ocean scientists.

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 monthly activity reports of the JOIDES Office to JOI, and attending meetings as directed by the PCOM Chairperson.

A non-US Executive Assistant to PCOM Chairpersons at US institutions and a US Executive Assistant to PCOM Chairpersons at non-US institutions assists with PCOM planning activities, agendas, and reports; assists the Site Survey Panel in coordination of international site survey planning; assists with international meetings; and attends PCOM panel and other meetings as directed by the Chairperson. The Executive Assistant monitors JOIDES scientific proposals. In the past, the Executive Assistant has been appointed by JOI following recommendations from EXCOM. When the JOIDES Office is at a non-US institution, the Executive Assistant will be appointed by JOI following the recommendations from the US Science Advisory Committee (USSAC).

An Office Coordinator manages the JOIDES Office and is responsible for setting up a budget system, filing system, and communications system for the office. He/she maintains records on panel meetings and activities, and assists the Science Coordinator with the *JOIDES Journal*. The Office Coordinator also attends meetings and prepares reports as directed by the PCOM

JOIDES PANEL MEETING SCHEDULE

JAN — **DEADLINE** for submission of proposals to JOIDES Office.

FEB — THEMATIC PANELS review proposals submitted for the January 1 deadline. The top 15 or so proposals or generic ideas, regardless of location, are "globally" ranked. This ranking is used to determine proposals eligible for site survey review and inclusion in a drilling prospectus. It does not preclude proposals submitted for the July deadline from being added to the prospectus.

MAR — IHP, SMP, TEDCOM, DMP: IHP, SMP, and TEDCOM meet and, where necessary and in addition to their regular business, review the technical feasibility of any highly- ranked proposal flagged by the Thematic Panels.

APR — SSP reviews the 7 or so top-ranked proposals from the Spring Thematic Panel meetings. SSP advises proponents of specific data requirements for each proposed site based on SSP guidelines and proposed site objectives.
PPSP reviews safety packages for scheduled legs (i.e., starting October) and may preview proposals with potential safety problems.

MAY — PCOM determines a four-year outlook based on Thematic Panel ranking.

JUN

JUL — **DEADLINE** for submission of proposals to JOIDES Office and site survey data to ODP Site Survey Data Bank.

AUG — SSP reviews data packages of proposals that are highly ranked and within the area of operations as defined by PCOM in April. SSP advises PCOM on the site survey readiness of each candidate proposal.

PCOM: Based on proposal maturity and scientific priority, a short list of 10-12 proposals is compiled into a proposal prospectus.

SEP — THEMATIC PANELS review proposals submitted for the July 1 deadline. Panels also prioritize proposals included in the prospectus set by PCOM in August and add to the prospectus any other proposals ranked highly enough to be considered for drilling.

OCT — DMP, IHP, SMP, TEDCOM: DMP, in addition to its regular business, will review a logging prospectus prepared by LDEO/BRG for those proposals being considered for scheduling the following year.

PPSP completes it's review of scheduled proposals and, if necessary, previews proposals identified as having potential safety problems.

NOV — **DEADLINE** for the completion of data packages for prospectus proposals.

SSP reviews data packages of proposals in the prospectus. SSP then advises PCOM on site-survey readiness of each prospectus proposal.

DEC — PCOM sets the scientific drilling plan for operations starting in the next fiscal year.

Figure 2. Annual Timeline for JOIDES Advisory Structure Meetings.

Terms of Reference for the JOIDES Executive Committee for the Ocean Drilling Program

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 seafloor and an adequate capability in terms of scientific humanpower and facilities to carry out such studies.
3. The membership of this committee is now comprised of one representative of each of the six non-US countries or consortia with an active Memoranda of Understanding (MOU) with the National Science Foundation (NSF) [Canada/Australia Consortium, European Science Foundation, France, Germany, Japan, and the United Kingdom] and one representative of each of the ten existing US institutions [University of Miami, University of Washington, Oregon State University, University of Hawaii, University of Rhode Island, University of Texas at Austin, University of California at San Diego, Texas A&M University, Woods Hole Oceanographic Institution and Columbia University]. 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-US country participants, the existence of a valid MOU with NSF is a prerequisite to membership.

   Membership of any member may be canceled by the Board of Governors on the recommendation of the JOIDES Executive Committee or in the event of a non-US 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 the affirmative vote of at least two-thirds of all members, including members from at least three non-US 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 Committee, and all subcommittees thereto, shall keep written records of their proceedings.
8. Members of this Committee, and members of subcommittees duly appointed thereby, while acting within the Terms of Reference, shall be indemnified, and held harmless by the corporation from and against any and all liabilities, damages and demands, losses, costs and expenses arising from acts or omission related to performance as committee members.
9. These Terms of Reference, upon ratification by members of the existing JOIDES Executive Committee and adoption by JOI, Inc. will supersede all previous JOIDES agreements.

Ratified by EXCOM: 15 September 1988

Adopted by JOI Board of Governors: 15 September 1988

Terms of Reference for the JOIDES Budget Committee for the Ocean Drilling Program

1. General Purpose. The Budget Committee 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 reviewed 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. 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. The Budget Committee (BCOM) consists of three EXCOM members and two PCOM members, one of whom is the present PCOM Chairperson. A balance of three US and two non-US BCOM members is maintained. The second PCOM member is ideally the immediate past PCOM Chairperson. 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

Revised by EXCOM/JOIBOG: June 1993

Terms of Reference
JOIDES Science Advisory Structure for the Ocean Drilling Program

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) and Working Groups (WGs) may be approved by the Planning Committee as requested by the panels or by the Planning Committee itself.

2. Committees, Panels, Detailed Planning Groups, and Working Groups

Each committee, panel, Detailed Planning Group and Working 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, the Science Operator and Wireline Services Operator on plans designated to optimize the scientific productivity and operational efficiency of the drilling program.

More specifically, the Planning Committee is responsible for:

a. long-term planning on the order of five to ten years utilizing input from COSOD-type conferences and Thematic Panel input

b. developing a general science plan and general track of the drilling vessel about four years in advance of drilling

c. fostering communications among and between the general community, the panels, the Science Operator, the Wireline Services Operator and itself

d. soliciting, monitoring, and coordinating the evaluation of drilling proposals

e. 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 Chairpersons 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. *Robert's Rule of Order* govern its meetings.

3.6 Vote and Quorum. Within the framework of the Memoranda of Understanding with each non-US participating country (or consortium designee), it is intended that the US 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-US members and at least two-thirds of the US members.

3.7 Chairpersonship. The PCOM Chairpersonship rotates with the JOIDES Office among the JOIDES institutions, excluding the Science Operator and Wireline Logging Service Operator institutions. Plans are for the JOIDES Office to alternate between US and non-US institutions each term. The term of office is usually two years.

4. Thematic Panels

4.1 General Purpose. Thematic Panels are mainly, but not exclusively, process-oriented. 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 US institutions and one member from each non-US 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 chairpersons 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 to be forwarded to the proponents by the JOIDES Office, for each proposal reviewed

c. make recommendations for necessary site surveys needed to achieve the scientific objectives of a target 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 close contact with the appropriate DPGs and provide PCOM with written evaluations of the recommendations of 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 shore-based 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 (LITHP) 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 (TECP) 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 prompted 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 (OHP) 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, ocean paleoproductivity, 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 (SGPP) 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, disconformities, 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 ocean 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 recommending to PCOM drilling tools and techniques to meet the objectives of the scientific plan and for monitoring the progress of their development through liaison with the ODP-TAMU Engineering development department.

Members of this committee are nominated by TEDCOM and approved 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 (DPGs) 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. DPGs will be composed of a balance of US and non-US members, and proponents and non-proponents. The size of the DPG should be commensurate with the charge of the group. DPGs provide written documents to those Thematic Panel(s) specified by PCOM. The ODP 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 Chairperson, if necessary. The DPG Chairperson is appointed by PCOM.

The DPGs are composed of a number of members from US institutions, and should maintain full representation, if possible, from the non-US 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. Working Groups

7.1 Purpose. Working Groups (WGs) are short-lived groups which may be created by the Planning Committee, in response to requests by Thematic Panels or by the Planning Committee itself, for developing drilling strategies for major scientific objectives that are not sufficiently covered by available drilling proposals or Thematic Panel White Papers. The specific mandate of any WG is defined by PCOM at the time the WG is formed. Whereas Detailed Planning Groups develop a detailed drilling prospectus based on highly-ranked proposals, WGs develop White Papers that serve as guidelines for new, specific drilling proposals. WGs provide written documents to the JOIDES Office, which forwards them to all Thematic Panels for evaluation. The Reports are then transmitted to PCOM for further evaluation and eventually published in the *JOIDES Journal*.

7.2 General Mandate for Working Groups. WGs are typically charged with:

- establishing and setting into priority scientific objectives and drilling strategy for a certain scientific theme or themes
- identifying target areas where specific objectives can be addressed and strategies can be used
- identifying survey information necessary to establish the geologic context
- identifying technological requirements to implement the strategy

7.3 Membership. PCOM chooses WG members for their expertise and experience with respect to 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 Chairperson, if necessary. WG Chairpersons are appointed by PCOM. WGs are composed of a balance of US and non-US members. The size of WGs should be commensurate with the charge of the group.

8. Service Panels

8.1 General Purpose. Service Panels provide advice and services to the JOIDES Advisory Structure, and to the various entities responsible for 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 programmatic 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.

8.1.1 Membership. PCOM appoints the chairman and panelists and keeps membership, including representation from the non-US JOIDES institutions, under review. The Chairperson serves at the pleasure of PCOM, and members serve at the pleasure of PCOM or their non-US appointing member. Representation from all non-US members should be maintained. Panel membership, not to exceed 15, should be maintained as small as is allowed by the range of expertise necessary to meet mandate requirements.

8.2 Site Survey Panel: Mandate.

8.2.1 General Purpose. The general purpose of the Site Survey Panel (SSP) 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.

8.2.2 Mandate. The Site Survey Panel is mandated to:

a. review site survey data packages prepared by the ODP Site Survey Data Bank and to make recommendations as to their adequacy to the Planning Committee in light of the needs defined in mature proposals of the Detailed Planning 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

8.3 promote the logging of all data used for planning
8 drilling targets with the ODP Data Bank

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

3 Pollution Prevention and Safety Panel: Mandate.

8.3.1 General Purpose. The general purpose of the Pollution Prevention and Safety Panel (PPSP) 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.

8.3.2 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.

8.3.3 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 Chairperson is a non-voting member of the Panel and normally attends meetings.

8.4 Information Handling Panel: Mandate.

8.4.1 General Purpose. The general purpose of the Information Handling Panel (IHP) is to [illegible] information and advice to the of the scientific community for t[illegible] to data, samples and publication and to assist program managers in setting priorities.

8.4.2 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 various micropaleontology reference centers

c. the types and contents of the data bases 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 repositories 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 Micropaleontological Reference Centers

8.5 Downhole Measurements Panel: Mandate.

8.5.1 General Purpose. The general purpose of the Downhole Measurements Panel (DMP) is to advise JOIDES on methods and techniques for determining the physical state, chemical [illegible]

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).

8.5.2 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 scientific desirability and technical feasibility of proposed programs

d. monitor progress reports, results, tools and techniques from US and international downhole instrumentation development groups

e. solicit and expedite new logging capabilities and experiments

f. evaluate new technology and recommend future measurement directions

8.5.3 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.

8.6 Shipboard Measurements Panel: Mandate

8.6.1 General Purpose. The Shipboard Measurements Panel (SMP) is concerned with the inventory, operation, condition of scientific instrumentation onboard the *JOIDES Resolution* and data handling for onboard measurements.

8.6.2 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 *JOIDES 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:

1. underway geophysical equipment
2. equipment for handling core samples
3. physical properties, paleomagnetics and geotechnical measurements

d. petrological, mineralogical, sedimentological, biological, paleontological, micropaleontological, organic and inorganic geochemistry analysis and such equipment as microscopes for performing these measurements

e. computers managing data from shipboard equipment (in consultation, if necessary with the Information Handling Panel

f. utilization of laboratory space on the *JOIDES Resolution*

8.6.3 Membership. The panel will consist of members from US institutions and from non-US JOIDES members or consortiums. Representation from all non-US 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 *JOIDES Resolution*.

8.6.4 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.

8.6.5 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 *JOIDES Resolution* would be valuable.

Ratified by EXCOM: 15 September 1988

Adopted by JOI Board of Governors: 15 September 1988

Revised by EXCOM/JOIBOG: May 1989, October 1989, June 1990, June 1993, January 1994

Conflict of Interest

From the *ODP Policy Manual*:

- If any member of a panel or committee is a proponent of drilling sites, the proposal must be reviewed independently by the Thematic Panels. He/she is not to be involved in any substantive advisory role or in any final voting on the proposal.
- Any panel member involved in the review of a proposal is asked to reveal to the panel Chairperson any interests, affiliations, or relationships that might affect his or her review. Those are then taken into account by the panel in making decisions or recommendations based on the reviews.
- If a PCOM member is a proponent or Co-Chief of drilling sites, the proposal must be reviewed independently by Thematic Panels and the PCOM member is not to be involved in any substantive advisory role or in any final voting on the proposal at PCOM meetings.

The 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
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 (see Figure 1).

Conferences on Scientific Ocean Drilling

The Conference on Scientific Ocean Drilling (COSOD) and the Second Conference on Scientific Ocean Drilling (COSOD II) were initiated by the JOIDES Executive Committee who selected a steering committee to oversee the preparation of each conference. 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. The mandate of the Conference, put forth by the JOIDES Planning Committee, was to "make recommendations for future scientific and technological objectives for the Ocean Drilling Program, bearing in mind the scientific and technical progress of the ODP to date." Attendance by more than 350 people was fifty percent US scientists and fifty percent non-US scientists.

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 (see back cover for contact information).

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, 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 onshore 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. Long-range plans 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, the *ODP Long Range Plan* (LRP) was published in 1990. The LRP specifically outlines 16 major scientific ocean drilling objectives that the program wants to address in the 1989-2002 time period. These scientific objectives were distilled from a four-year scientific planning process that included workshops and panel discussions as well as two major international conferences—Conferences on Scientific Ocean Drilling I and II, (COSOD I and II).

The LRP adopts a three-phase implementation strategy to achieve its scientific objectives. Phase I is the period 1989-1992, Phase II is 1993-1996, and Phase III is 1997-2002. Included in the description of the scientific objectives to be pursued during each phase of the LRP are plans for acquiring or developing the necessary technology to achieve the scientific goals. In addition, a budget is included for each year to estimate how much funding will be necessary to realize these goals.

Phase I was implemented with the help of a "Strategy Committee," an ad hoc subcommittee of the Planning Committee. This group identified six of the sixteen LRP scientific objectives as high-priority for Phase I, set up formal Liaison Groups with other earth science research groups in the US and abroad and tried to develop a framework for scientifically monitoring progress toward LRP objectives.

PCOM, in combination with the Thematic and Service Panels, has begun the process of updating the LRP. The most important aspects of the revision process will include: (a) identifying the main scientific and technological accomplishments of Phase I, (b) determining realistic timetables for ongoing technology development, (c) refocusing the scientific goals for Phase II and III in the light of recent scientific and technological results, and (d) forecasting realistic budgets for the Phase II and III implementation plans. In addition, a new phase, Phase IV, must be added to allow for achieving the deep drilling objectives that will not be realized in Phases II and III, and to include new objectives generated by recent discoveries.

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.

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 schematically illustrates how a proposal moves through the JOIDES planning process to reach the stage of actual drilling. "Guidelines for for the Submission of ODP Proposals" are described in detail on page 21.

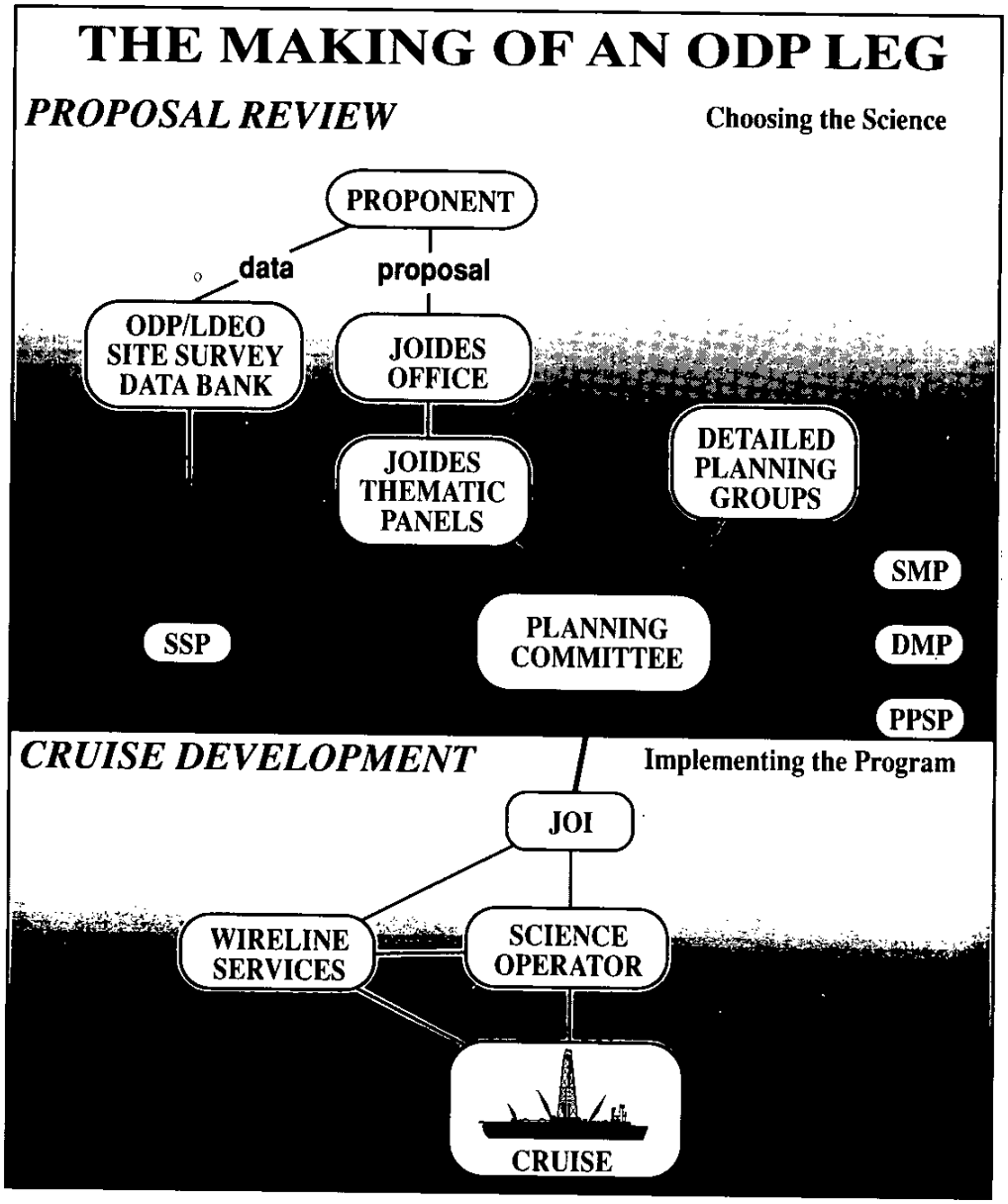


Figure 1. JOIDES science planning process which illustrates the development of an ODP leg from proposal to final drilling.

Guidelines for the Submission of ODP Proposals

Introduction

The purpose of the JOIDES scientific advisory structure is to formulate the most productive ocean drilling plan possible for answering scientific questions about present-day and past processes of the earth. Drilling is based on proposals from the entire earth science community.

The Planning Committee (PCOM) monitors and directs the proposal review process, reviews recommendations made by advisory panels, decides the fate of proposals, sets ship tracks, and schedules drilling legs in two continuous and interrelated planning phases: setting a general four-year ship track based on highly-ranked proposals, and detailed scheduling two years in advance based on further Thematic Panel prioritization of the four-year plan, maturity of existing programs, and logistical considerations. PCOM depends primarily on the four Thematic Panels for advice on scientific objectives. Detailed Planning Groups (DPGs) may also be formed and mandated by PCOM to help Thematic Panels translate broad thematic programs and highly ranked proposals into concrete, prioritized drilling plans. The Service Panels, the Science Operator, Wireline Logging Services, and Site Survey Data Bank also provide advice on optimum, safe drill sites.

Submission Requirements

There are two options by which proponents can get their ideas into the system: (1) a letter of intent, or (2) a proposal.

Letter of Intent

A letter of intent is a three to four page outline of an idea(s) for scientific ocean drilling. It may be submitted as an alternative to a full proposal and will be forwarded to the Thematic Panels for comment. Based on panel response, the preparation of a formal proposal may be recommended.

Proposal

An ODP drilling proposal must contain an abstract (400 words or less) and the following information to be accepted and forwarded to the Thematic Panels for review:

- Scientific objectives preferably linked to COSOD or *ODP Long Range Plan* themes (these documents are available from the JOIDES Office or JOI)
- Drilling sites that are tied to the stated scientific objectives and justified by appropriate site survey data
- Completed ODP Site Summary Forms (see section on "Site Summary Form," page 22)

Ten hard copies of the entire proposal, revision, or addendum must be sent to the JOIDES Office. The JOIDES Office would also appreciate receiving a copy of the proposal via electronic mail or on floppy disc.

Revisions to proposals normally supersede any previous revision or addenda and are therefore subject to the same requirements as original proposals. Revisions should also indicate how they differ from the previous version. Addenda are normally supplemental information to an original proposal or revision. Addenda are not subject to the same requirements as original proposals or revisions except that proponents are required to supply ten copies to the JOIDES Office.

Deadlines for Proposal Submission

January 1

A proposal or letter of intent submitted for this deadline will be reviewed in the Spring. The JOIDES Office will return comments, recommendations, and data package requirements to proponents in April.

July 1

A proposal or letter of intent submitted for this deadline will be reviewed in the Fall. The JOIDES Office will return comments, recommendations, and data package requirements to proponents in October.

Thematic Review

Proposals (including revisions and addenda) submitted to the JOIDES Office are accepted if proposal submission requirements outlined above are met. Proponents will then receive an acknowledgment. Although it is unlikely that all panels have interest in any specific proposal, all Thematic Panels are requested to review all proposals in order to maintain a fair, proposal-generated and thematically-controlled drilling program. Informational copies of proposals are sent to JOI, the Science Operator, and the Site Survey Data Bank.

Thematic evaluations are based on individual panel mandates, White Papers, the *ODP Long Range Plan*, experience and judgment of panel members, and long-term scientific strategies of panels. Thematic review will broadly encompass five areas. These are:

- Thematic relevance
- Scientific merit and interest
- Scientific feasibility
- Preliminary technical feasibility
- Proposal completeness

JOIDES Thematic Panels will be asked to consider each proposal in terms of the following criteria and recommend to the proponent(s) any necessary action. The panels will return each review to the JOIDES Office with category addressed and status indicated. Written comments may also be supplied to justify recommended action or to assist revision where necessary.

Criteria for Thematic Panels Review

A. Thematic Relevance

A1. Highly relevant to top thematic objectives

A2. Relevant to thematic objectives

A3. Portions are relevant, interdisciplinary approach required

A4. Could be relevant with minor revisions
A5. Not relevant to thematic objectives

B. Scientific Merit and Interest
B1. Objectives
B1.1 Well formulated
B1.2 Needs revision
B1.3 Poorly formulated
B2. Location
B2.1 Appropriate
B2.2 Not appropriate

C. Scientific Feasibility
C1. High probability of achieving scientific objectives
C2. Needs more supporting data to achieve objectives (e.g., will need other sorts of data to interpret drill results)
C3. Insufficient data to assess scientific feasibility
C4. Scientific feasibility highly questionable

D. Preliminary Technical Feasibility Assessment
D1. Technology in hand and tested
D2. Technology in hand, untested
D3. Technology under development
D4. Technology not available
D5. Recommend proposal be reviewed by IHP, DMP, SMP, or TEDCOM

E. Proposal Completeness
E1. Abstract
E2. Site location map
E3. Survey coverage map
E4. Regional geological setting
E5. Balanced cross section (where appropriate)
E6. Site summary forms
E7. Other deficiencies as specified in the review comments

Recommended Action

F. Recommendation to proponent
F1. Proposal is of high priority, no further action necessary
F2. Proposal is of high priority, but recommend revision as indicated
F3. Proposal is of low priority, but could become high priority
F4. Proposal is of low priority, and unlikely to become high priority

Based on preliminary assessment by the Thematic Panels, proposals may be forwarded to Shipboard Measurements Panel, Downhole Measurements Panel, or the Technical and Engineering Development Committee for review and technical assessment. The Thematic Panel reviews are collated by the JOIDES Office and returned to the proponents.

Proposal Selection

The planning process is highlighted by the following three milestones:

April

All "active" proposals (those submitted within the past 3 years) are considered and ranked by the Thematic Panels. A four-year outlook is determined by the Planning Committee. This outlook includes confirmation of the ships schedule for the current fiscal year, the area of operations for the next fiscal year, and possible future areas of operation.

August

Based on scientific priority, proposal maturity, and area of operations as set in April, the Planning Committee compiles a "short list" or prospectus of 10-12 proposals.

December

Following a review and ranking of proposals in the prospectus, and any other proposals added to the prospectus in the Fall by the Thematic Panels, PCOM sets the drilling schedule for the next fiscal year.

Site Survey Review

In April the Site Survey Panel reviews the seven or so top-ranked proposals from the Spring Thematic Panel meetings. SSP provides advice to proponents on specific data requirements for each proposed site based on data submission requirements and proposed site objectives (see section on the "Site Survey Target Types and Data Standards," page 25).

The JOIDES Office will ask proponents of proposals that have been highly ranked and are in the area of operations, as set by the Planning Committee, to submit a site survey data package to the ODP Site Survey Data Bank by a July or November deadline. Following the deadlines, SSP will review these proposals and provide advice to proponents on how to improve their data packages, and provide comments to the Planning Committee on the status of the site survey data package. Note: **SSP reviews only data submitted to the ODP Site Survey Data Bank.**

The time required for a thematically-prioritized proposal to become part of a drilling plan depends to a large degree on completeness of required site survey data. Proponents are therefore urged to submit as complete a data package as possible, as early as possible, once their proposals are highly ranked. If there are survey data is still to be collected, the timing of cruises, firmness of funding, and period required for data processing before submission should all be noted.

The Site Survey Panel also makes recommendations to the Planning Committee on those proposals which may have potential safety problems. These proposals are identified and proponents may be asked to present the data in the form of preview to the Safety Panel at the panel's earliest convenience. Details on the safety preview can be found in the section "Guidelines for Safety Review," page 30.

Site Summary Form

Site survey information is an integral part of a drilling proposal. It provides the framework to place the proposed drilling in a regional context, it provides data

ODP Site Summary Form

Fill out one form for each proposed primary and alternate site and attach to proposal.

Title of Proposal:	
Site-specific Objective(s) (List of general objectives must be inc. in proposal)	

Site Name:								
Area:								
Lat./Long.:								
Water Depth:								
Sediment Thickness:								
Total penetration:								
	Sediments				Basement			
Penetration:								
Lithology(ies):								
Coring (circle):	1-2-3-APC	VPC*	XCB	MDCB*	PCS	RCB	Re-entry	HRGB
Downhole measurements								
Estimate of days on site								

*Systems currently under development

Target(s) (see Proposal Submission Guidelines): A B C D E F G H (circle)

Site Survey Information (see Proposal Submission Guidelines for details and requirements):

		Check	Details of available data and data that is still to be collected
01	High res. seismic refl.		
02	Deep penetration seis. refl.		
03	Seismic velocity		
04	Seismic grid		
05a	Refraction (surface)		
05b	Refraction (near bottom)		
06	3.5 kHz		
07	Swath bathymetry		
08a	Side-looking sonar (surface)		
08b	Side-looking sonar (bottom)		
09	Photography or video		
10	Heat flow		
11a	Magnetics		
11b	Gravity		
12	Sediment cores		
13	Rock sampling		
14	Water current data		
15	OBS microseismicity		
16	Other		

Weather, Ice, Surface Currents:

Seabed Hazards:

Territorial Jurisdiction:

Proponent Name, Address, Ph., Fax, Email:	
Date:	

by which to assess the chances for success, and provides information for operational purposes. To be able to accurately assess the supporting data in relation to the scientific objectives, the proposal must contain a listing of the existing or proposed data. This information is contained in the ODP Site Summary Form (see previous page). The Site Summary Form is available in electronic form from the JOIDES Office.

Notes for the Completion of the Site Summary Form

Title of Proposal: This should be the same as the title at the front of the proposal.

Site-Specific Objectives: This should be a short description of the objectives for this site. (e.g. Cenozoic history of (1) deep water chemistry, (2) carbonate productivity. End member of depth transect). If this site is to be an alternate to some other site, state that here.

Site Name: This is generally an alpha-numeric code such as MAT-13. Alternate sites should have a different Site name such as MAT-14. If sites are changed in subsequent revisions or addenda, a different site name must be used.

Area: A name commonly used to describe the area, such as Blake Outer Ridge.

Lat. and Long.: Latitude and longitude coordinates can be in any format but degrees, minutes and decimal minutes are preferred. Alternate sites can be represented by a range of positions such as shot points along a line.

Water Depth: Water depth should be given in meters.

Sedimentary Thickness: An estimate of the thickness, in meters, of the total sedimentary package should be given.

Total Penetration: An estimate of the predicted total penetration, in meters, to be achieved at this site should be given.

Penetration: Expected total penetration in sediments and/or basement, in meters, should be given.

Lithology(ies): Brief list of anticipated lithology(ies) should be given.

Coring: Proponents are asked to check the type of coring device they expect to use to best address their scientific objectives. Proponents are also encouraged to contact the Science Operator for detailed information on coring options.

RCB: The Rotary Core Barrel recovers medium to hard crystalline rocks. The RCB is rotated from the surface and uses a four-roller cone bit to cut the core. The inner barrel remains stationary to minimize core disturbance.

APC: The Advanced Piston Corer recovers soft ooze and sediments. The hydraulically activated system instantly releases 28,000 pounds of force, plunging a knife-edged cutting shoe into the formation to recover an undisturbed core. A magnetic orientation system references the core to magnetic north. In some cases more than one coring run is required at a given site.

XCB: The Extended Core Barrel continues coring in firm sediments after piston coring is no longer effective. A saw toothed cutting shoe can either extend beyond or retract within the bit. In many formations this trimming technique produces better core quality then roller cone bits alone.

MDCB: The Motor Driven Core Barrel recovers interbedded materials including hard and fractured rocks. Large quantities of seawater are pumped through a multi-lobed motor that produces higher torque and speed at the cutting shoe. Diamond-impregnated or surface-set cutting shoes trim the core.

PCS: The Pressure Core Sampler recovers core at in-situ pressures up to 10,000 PSI. The hydraulically activated system retrieves core in a removable pressurized chamber. Once on deck, the chamber can be transferred to another pressurized enclosure for scientific testing and evaluation.

VPC: The Vibra Percussive Corer uses percussion and vibration to recover unconsolidated sediments. Like the piston corer, the VPC is hydraulically activated. Seawater drives the percussion unit to create high-frequency vibration. The hammering action helps the tool penetrate compressed and unconsolidated sediment such as sands.

Re-Entry Cone: A re-entry cone is used if a hole is to be entered more than once such as in the case of a bit change or deployment of downhole equipment.

HRGB: A hard-rock guide base provides lateral support for the bottom hole assembly and constrains the drill bit while it spuds in. It is used where surficial sediments are thin, (less than a few meters thick) or non-existent.

Downhole Measurements: Proponents should list their requirements for downhole logging tools. Detailed information on available logging tools are given in *Wireline Logging Services Guide: A brief description of logging tools*, available from ODP-LDEO. Proponents could contact the Borehole Research Group for more information (see page 35).

Estimated days on site: An estimate of the number of days on site to achieve objectives should be given. This includes time taken for drilling, logging, and any other experimental operations. This should be viewed a as very preliminary estimate. To assist the proponent, guidelines have been prepared for estimating ODP coring and logging times (see ODP Technical Note No. 1: *Preliminary Time Estimates for Coring Operations*, available from ODP-TAMU). In this publication, drill string and wireline trip time curves reflect actual operating times on ODP Legs 103 through 108. 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. These curves, along with procedures for approximating coring and logging times, are available to assist proponents in developing realistic drilling time

estimates. 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.

Target: See section on "Site Survey Target Types And Data Standards ."

Site Survey Information: See section on "Site Survey Target Types And Data Standards."

Weather, Ice Surface Currents: Information on any weather conditions such as hurricane windows and currents, either near-surface or deep, which might have a serious impact on the viability of a drill site, is also required at this stage. Information on ice conditions must be provided with high-latitude proposals.

Seabed Hazards: Note any potential seabed hazards such as telephone cables, shipwrecks, or waste disposal sites that may be encountered.

Territorial Jurisdiction: The territorial jurisdiction of the area in which the ship will be drilling should be given.

Site Survey Target Types and Data Standards

Proponents should be aware that the comments below are only guidelines. The Site Survey Panel's advice to PCOM on the acceptability of a data set is based on scientific judgment, not on successful box checking. In particular, SSP seeks to determine: (1) are the regional and site-specific survey data of sufficient quality and quantity that it will be possible to pick the best possible sites at which to address the scientific questions posed in the proposal? and, (2) if a site is drilled, is the regional and site-specific survey data of sufficient quality and quantity that it is likely to be possible to extrapolate the results from this borehole over a usefully broad portion of the ocean, and/or to apply the results from this borehole to related questions and analogous sites worldwide?

1. Target Types

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

These guidelines cover drilling targets in more than 200 m of water. **Proposed sites in less than 200 m of water, regardless of target type, are governed by additional shallow water hazard survey requirements.** See the *Guidelines for Shallow Water Hazards Surveys, Report of the Shallow Water Drilling Working Group* (available from the JOIDES Office) for details on these specialized surveys.

Target A: Paleoenvironment or fan, generally APC/XCB penetration into undeformed sediments.

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, fore-arc, or sheared margin.

Target D: Greater penetration than a few hundred meters in a deep ocean environment. May or may not include basement penetration.

Target E: Sediment thicknesses of less than a few hundred meters on oceanic crust; typically with basement as a primary objective.

Target F: Bare-rock drilling, e.g. ridge crest, fracture zone ridge.

Target G: Topographically elevated feature. Elevated features with widely varying sediment thicknesses, e.g., seamount, fracture zone ridge. Basement is often an objective.

Target H: Offset drilling into Tectonic Windows.

2. Types of Survey Data

The most commonly used techniques for site surveying are conventional and swath bathymetry, magnetic and gravity field measurements, coring and dredging, heat flow, single and multichannel seismic reflection profiling, side looking sonar, and crustal seismic refraction and wide angle reflection sonobuoy measurements. All survey methods are not appropriate for all sites, and specific combinations are chosen to get the maximum useful information for the minimum cost.

The following matrix (see Table 1, page 27) shows site survey guidelines for each target environment. Sites that lack a data type characterized as "X: required" will generally not be scheduled for drilling. Lack of a data type characterized as "Y: recommended" will not keep a site off the drilling schedule; however, if data of a recommended type does exist, the proponents are expected to submit the data for use by the ODP community in site selection and post-drilling interpretation. For data types marked as "X*" or "Y*", the Site Survey Panel will advise, on a site by site basis, whether the specific data type is required or recommended to support the proposed science.

Data in support of each proposed site must be submitted to the ODP Site Survey Data Bank. For details on the proper format and annotation of the data packages, refer to the section on "Guidelines for Data Submissions," page 28.

The major data categories are:

1. High-resolution seismic reflection: Acquisition and processing are designed for optimal imaging of the shallow (<1 second) section. Digital acquisition is preferred. For target type B, high-resolution seismics may be required where there is concern about slumping or shallow gas. For target types D and E, basement objectives must be clearly imaged using either high-resolution or deep-penetration seismics, as appropriate. For target type H, high resolution seismic data and/or 3.5 kHz data will be required if sites are proposed to spud into sediment pockets. For target type F, regional high-resolution seismics and/or 3.5 kHz are recommended to identify potential backup sites in sediment pockets.

Seismic reflection data should penetrate at least as deep as proposed total depth of drilling.

2. Deep-penetration seismic reflection: Acquisition and processing are designed for optimal imaging of the deep (>1 sec) section (i.e. multichannel seismic with a large-volume, low frequency source and a long enough streamer to provide adequate multiple suppression). For target types D and E, basement objectives must be clearly imaged using either high-resolution or deep-penetration seismics, as appropriate. For target type H, a regional MCS or OBS-refraction survey (not necessarily including lines exactly over the site) is recommended to determine the regional crustal structure before tectonic dismemberment.
3. Seismic velocity determination: Seismic velocity data is used to determine sediment thickness at proposed sites. Proponents are urged to submit sound velocity data that include a brief description of how they were derived, where they apply, and an estimate of their accuracy. SSP suggests that the data presentation include a graph of two-way travel time below seafloor vs. calculated meters below seafloor.
4. Grid of intersecting seismic lines: A seismic grid and/or crossing lines over the proposed site. Required density of the seismic grid depends on each particular situation.
5. Refraction: Sonobuoy or ocean bottom seismometer refraction profiles; tomographic imaging; expanding spread profiles or wide-angle refraction profiles. For target type H, a regional MCS or OBS-refraction survey is recommended to determine the regional crustal structure before dismemberment. For target types F and H, near-bottom source/near-bottom receiver seismic imaging is an experimental technique that holds great promise as a site survey tool. SSP is following the development of this technology with great interest, and may upgrade this data type to "required" at a future date.
6. 3.5 kHz: High-frequency data to resolve small-scale features and give some indication of sediment type. For target type H, high-resolution SCS data and/or 3.5 kHz data will be required if sites are proposed to spud into sediment pockets. For target type F, regional SCS and/or 3.5 kHz data are recommended to identify potential backup sites in sediment pockets.
7. Swath bathymetry: As from a multi-narrow-beam echo sounder or an interferometric side-looking sonar system. Required for all bare-rock drilling sites. May be required for any site with steep or complex topography. Areas where slumping may occur should have swath bathymetry and/or side-looking sonar data.
8. Side-looking sonar imagery: Acoustic reflectivity from towed sonar devices is needed on fans and in topographically complex terrains. Areas where slumping may occur should have swath bathymetry and/or side-looking sonar data.
9. Video or still seafloor photography: Visual imagery from a towed vehicle or submersible is required for siting bare-rock guide bases, and may be desirable to understand the tectonic or geological setting of specific non-bare-rock sites.
10. Heat flow: Pogo-type profiles or piston core heat flow measurements in detail, with in situ thermal conductivity for highest accuracy, as appropriate to the scientific problem.
11. Magnetics and gravity: Regional magnetics if magnetic age of crust is important. Gravity for subsidence studies; SEASAT data may complement regional gravity picture. For target type H, a regional magnetic survey is required to determine the age of the oceanic crust and the plate kinematic history of the site.
12. Sediment Cores: Cores should be taken near all paleoenvironmental sites. All re-entry sites should be supported by cores, core descriptions, and geotechnical measurements (contact the Science Operator for geotechnical requirements). The two limiting factors for re-entry operations are sufficient sediment thickness, and the ability to wash through the sediment section. Sediment cores will be required for Target Type F and H only if back-up sites are proposed in sediment pockets.
13. Rock sampling: Dredging, submersible sampling, and/or rock coring may be required when basement drilling is included in the objectives. For target type H a closely-spaced, precisely positioned suite of samples is required in the immediate vicinity of the drill sites, as well as a less-dense suite of samples over a broader region; samples must be analyzed for geochemical and/or petrological and structural characteristics. For target type B and C, the recommended rock sampling refers to outcrops in nearby canyons or other exposures, where available.
14. 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.
15. OBS Microseismicity: Microseismicity as determined from ocean bottom seismometers is recommended in regions where active basement faulting is expected.

3. Commercial Data

Proponents should be aware that, in addition to SSP's data requirements, they will eventually have to meet the additional requirements of the Pollution Prevention and Safety Panel (see the Ocean Drilling Program Guidelines for Pollution Prevention and Safety, *JOIDES Journal* Volume 18, Special Issue, October 1992, available from the JOIDES Office; for a brief overview of safety reviews see page 30 of this issue). As part of a safety review, proponents should present to PPSP maps of commercial well locations near their proposed drill sites, and information regarding nearby hydrocarbon occurrences (production data, reservoir and source intervals, shows, etc). Seismic ties to nearby commercial wells, and heat flow data with which to assess potential hydrocarbon maturation may also be requested. As it can take considerable time to acquire such information from commercial sources, proponents are urged to begin the effort as early as possible.

		DRILLING ENVIRONMENT (TARGET TYPE)							
		A	B	C	D	E	F	G	H
	DATA TYPE	Paleo environment or Fan (APC/XCB)	Passive Margin	Active Margin	Open Ocean Crust (>400 m sediment)	Open Ocean Crust (<400 m sediment)	Bare-rock Drilling	Topo-graphically Elevated Feature	Tectonic Window
1	High Resolution Seismic Reflection	X	Y, X*	Y, X*	X or 2	X*	Y, X*	Y, X*	X* or 6
2	Deep Penetration Seismic Reflection		X	X	X or 1	X*	Y, X*	Y, X*	Y or 5a
3	Seismic Velocity Determination		X	X	X*	X*		X*	
4	Grid of Intersecting Seismic Profiles	Y, X*	X	X	Y, X*	Y, X*	Y*	Y, X*	
5a	Refraction (surface source)		Y, X*	Y, X*	Y, X*	Y, X*	Y, X*	Y, X*	Y or 2
5b	Refraction (near bottom source and receiver)						Y*		Y*
6	3.5 kHz	X	X	X	X	X	Y, X*	X	X* or 1
7	Swath Bathymetry	Y, X*	Y, X*	X	Y*	Y, X*	X	Y, X*	X
8a	Side-looking Sonar (shallow towed)	Y*	Y, X*	Y		Y*	Y	Y, X*	Y
8b	Side-looking Sonar (near-bottom towed)	Y, X*	Y, X*	Y, X*		Y*	Y, X*	Y, X*	Y, X*
9	Photography or Video			Y			X	Y, X*	X
10	Heat Flow		Y, X*	Y, X*		Y, T	Y		
11a	Magnetics		Y	Y	Y, X*	Y, X*	Y, X*	Y	X
11b	Gravity		Y	Y	Y*	Y*	Y*	Y	Y
12	Sediment Cores	X	Y, R	Y, R	R	R, T	X*	Y, X*, R	X*
13	Rock Sampling		Y	Y		Y, X*	X	Y, X*	X
14	Water Current Data	X*	X*	X*			X*	X*	X*
15	OBS Microseismicity						Y*		Y*

X = Required

X* = May be required for specific sites

Y = Recommended

Y* = May be recommended for specific sites

R = Required for re-entry sites

T = Required for high temperature environments

Table 1. Site survey data-type requirements for each drilling environment (Target Type).

Guidelines for Data Submission to the ODP Site Survey Data Bank

Introduction

Site survey data in support of ODP drilling proposals should be sent to: Manager, ODP Site Survey Data Bank, Lamont-Doherty Earth Observatory, Palisades, New York 10964, USA; phone: (914) 365-8542; fax: (914) 365-8159; Internet: odp@ldeo.columbia.edu.

Submitted data are archived by the Data Bank for use by JOIDES panels, Working Groups, and by individuals involved in scientific ocean drilling. The Data Bank also acts as the operational arm of both the Site Survey Panel and the Pollution Prevention and Safety Panel. The Data Bank's various functions are outlined in detail in *An Introduction to the ODP Site Survey Data Bank* available upon request from the Data Bank.

The Data Bank is dealing with many active proposals at any given time. Therefore, it is vital that the Data Bank staff be able to identify which proposal each piece of data supports, which sites the data covers, and how the data were processed. Additionally, the data must be in an easily reproducible form so that copies can be distributed as needed. The following guidelines should assist proponents in the preparation of their data packages, and help them avoid some of the pitfalls that have been encountered in the past. Any questions regarding these guidelines, or concerning data types not mentioned, should be referred to the Manager of the Site Survey Data Bank.

All data submitted by proponents to the Site Survey Data Bank are considered proprietary to the Ocean Drilling Program, unless they are freely available from other data repositories (e.g., National Geophysical Data Center). Data are made available to panels and individuals in the JOIDES community on a need-to-know basis only. Members of the Site Survey Panel and the Pollution Prevention and Safety Panel are given access to any pertinent site survey data deemed necessary to carry out their mandated tasks. In addition, site survey data are provided to the Science Operator and to members of the shipboard scientific party. Requests for data in support of pre-cruise planning or post-cruise studies will be honored; all data requests not considered essential to ODP operations will be denied.

After the drilling leg, these restrictions remain in effect unless explicit permission is given by the proponent to relax them. All post-cruise data requests not originating from a shipboard scientific party member will be honored only after the original proponent has been consulted. These restrictions do not hold for the vast library of freely available "background" digital geophysical data held at the Site Survey Data Bank, and all JOIDES scientists seeking data for ODP purposes are encouraged to continue the practice of requesting data from the Data Bank in support of their drilling or site survey proposals.

Recommended Data Formats

Letters and Inventories

Each package of data sent to the Data Bank should contain a cover letter and an inventory of the items which are being submitted. The letter should outline which proposal the data is being submitted for, what each piece of data is, which site or sites it supports, and what navigation it ties into (cruise name and date). By looking at the inventory, the Data Bank staff can clearly ascertain if anything is missing from the package, and can contact the data depositor immediately.

Navigation

Arguably, the most important part of any site survey package is a good navigation map which ties all of the data submitted into a geographic reference frame. Ideally, the scale and projection for all submitted maps (shiptracks as well as all other maps) will be the same, allowing the plots to be overlain for comparison. Electronic files of the navigation data itself can also be submitted, allowing the Data Bank to make the appropriate plots.

Paper Maps

- Latitude and longitude must be clearly annotated on each map. It should be clear whether the units are degrees/minutes or decimal degrees. At least two Lat/Lon annotations must appear on each axis. Maps should be large enough so that details of the cruise tracks are visible, and track annotations are legible. The Data Bank can reproduce submitted paper maps up to 36 inches wide, and maps printed on a translucent material up to 42 inches wide.
- Ideally, all maps will be at the same scale and will use the same map projection. Problems with inconsistencies in scale and projection arise especially when data is being submitted from several institutions. A common format for the navigation plots should be agreed upon by all institutions submitting data for a given proposal.
- Navigation and data records should be annotated in the same units. MCS lines are usually annotated in shotpoints, CDPs, or both, but are not interchangeable; care must be taken to distinguish one from the other, and each should be labeled clearly. Analog records are usually annotated in time-of-day. Indicate whether this is GMT or Local time. If the latter, indicate the time zone offset. If one cruise collects several types of data, each with a different type of annotation, cruise navigation plots should be submitted for each annotation type.
- Navigation on paper should be rolled, not folded. During the duplication process, folds may appear as lines on the copies, potentially obscuring information.

Electronic Navigation

- Often it is more convenient to submit electronic files of the navigation data, and have the Data Bank create the navigation plots. Data can be submitted

in MGD77 format, or as a tab delimited ASCII file. Data may be submitted on 9 track tape or DAT, or may be sent via e-mail or ftp if it is practical.

For ASCII data files, the following format works well:

Cruise #1 Line #1

Lat	Lon	Date	Time	Shot point	CDP
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
Lat	Lon	Date	Time	Shot point	CDP

Cruise #1 Line #2

Lat	Lon	Date	Time	Shot point	CDP
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
Lat	Lon	Date	Time	Shot point	CDP

etc.

Digital Seismic Data

Digital seismic data should be processed to a reasonable level of quality; the more processing the better. Profiles at each step of the processing should be part of the data package, and a description of the processing should appear either on the profile or be included in the cover letter of the data package. Also indicate which cruise or ship the data was collected on, the date it was collected, and the date it was processed. If reprocessed lines are submitted later, please indicate which old version has been superseded.

- Seismic profiles must be tied to a navigation plot which is annotated in the same units as the seismic profile (shotpoints, CDP, or time-of-day).
- Profiles should also have a vertical scale in seconds, an indication of direction (e.g. which end is north), and an indication of horizontal distance (km/inch, etc.).
- If possible, send profiles on a translucent material such as mylar or vellum. This yields the best quality copies.
- Unmarked copies of seismic lines are needed by the Data Bank, as colored annotations will obscure data on any copies which are made. If it is necessary to include an interpretation of a seismic line to emphasize a specific feature, an unmarked copy of the line should be submitted as well.
- Seismic profiles may be fan-folded vertically, but should not be folded horizontally. Horizontal folds may appear to be part of the data when the line is reproduced.

Analog Seismic or Echosounder Data

The format for analog records is essentially the same as for digital records. The records will usually be annotated in time-of-day, and navigation data with this same annotation needs to be provided. Vertical and horizontal scales should be noted, as well as an indication of the direction that the profile runs. It is preferred that the profiles be submitted on translucent material (mylar or vellum), but 3.5 kHz records may also be sent as 35 mm film negatives or microfilm.

Swath Bathymetry

Swath bathymetric maps should be submitted on a translucent material, along with a track chart showing the survey path. Please note that the Data Bank has no easy way to reproduce large sized, color maps. Four copies of these should be submitted. Alternatively, the swath bathymetric data can be submitted electronically, allowing the Data Bank to produce color maps using the MB-System software written by David Caress at LDEO. Contact the Data Bank Manager for details on data file formats.

Side Scan Sonar

These data should be submitted as large photographic negatives, from which prints can be made.

Gravity and Magnetics

Digital magnetic tapes of underway geophysical data values (topography, magnetics and gravity) merged with smoothed, final navigation may be submitted. MGD77 is the preferred data format, and DAT tape the preferred medium. Magnetic and gravity maps should be printed on a translucent material which allows easy copying. Descriptive information (e.g., units, contour intervals, etc.) should be clearly noted on the maps. The guidelines regarding scale, projection and annotation of navigation maps (see above) apply here as well.

Velocity Data

Information on the velocity structure of proposed drill sites is needed for safety evaluation and operational planning purposes. The SSP notes that:

Accurate conversion of seconds of travel time observed in seismic profiles to predicted meters of sub-seafloor depths at each drill site is essential to operational, safety, and scientific concerns. Consequently, proponents are urged to submit sound velocity data that includes a brief description of how they were derived, where they apply, and an estimate of their accuracy. SSP suggests that the data presentation include a graph of two-way travel time below seafloor vs. calculated meters below seafloor.

Miscellaneous Considerations

All page sized figures, tables, reports, etc., should be printed on 8.5 x 11 inch paper. If A4 paper must be used, text and figures should still be restricted to an 8.5 x 11 inch region to allow copying at the size submitted.

Guidelines for Safety Reviews

Introduction

All drilling operations involve some risk of accident or pollution. This has been recognized throughout the history of the Deep Sea Drilling Project (DSDP) and Ocean Drilling Program (ODP). Policies to minimize drilling hazards originally developed during DSDP have been continually updated and implemented for ODP.

The value of the scientific objectives that are sought in ODP must be balanced against potential hazards so that ODP will achieve these objectives without falling below acceptable standards of safety and pollution prevention. With diligent planning and careful operational procedures, it is possible to minimize risks and achieve desired goals.

Adherence to the old adage of "an ounce of prevention is worth a pound of cure" offers the surest route to safety and prevention of pollution. Money and time spent on extra care in preliminary site surveys, choice of site locations, and in planning drilling operations may forestall an accident that could cause loss of life, property and damage to the environment, and could also cause termination of this major international scientific endeavor.

The diverse sites planned for ODP drilling involve additional hazards not encountered in previous DSDP drilling. Holes are now planned for deeper sediment penetration, in shallower water on continental margin sites. Moreover, *JOIDES Resolution* continues to operate in a riserless mode. It follows that ODP must continue to face drilling hazards inherent in operating without a drilling riser to the surface, with lack of return circulation, and without standard blowout preventors. Although improved seismic surveys, an expanded borehole logging program and advanced hydrocarbon monitoring capabilities will provide additional information for decisions on safety and pollution matters, it is evident that emphasis on pollution prevention and safety must increase with time.

Special Issue No. 7 (October 1992) of the *JOIDES Journal* was devoted to a complete presentation of the Guidelines for Pollution Prevention and Safety of ODP. These guidelines were developed by the JOIDES Pollution Prevention and Safety Panel (PPSP). PPSP is composed of petroleum geologists, geophysicists, engineers, and organic geochemists drawn from industry, government, and academia, who are recognized authorities in the fields of marine research and offshore oil exploration. They provide independent advice to ODP.

Both the JOIDES Pollution Prevention and Safety Panel (PPSP) and the ODP-TAMU Safety Panel give advice and make recommendations that are incorporated in the final decision on whether a specific site will be drilled. This decision is made in the course of a safety review. In questioning site proponents, reviewing data and discussing problems, there is no distinction between the two panels. However, panels arrive at their decisions independently and unless their conclusions are identical, the more conservative decisions and advice are followed.

During the safety review, Co-Chief Scientists document safety conditions extant at proposed sites and the Safety Panels examine these data. Failure by Co-Chief Scientists to meet their responsibility of providing adequate data for review will result in rejection of a drill site by the Safety Panels.

Procedures

Safety Panel reviews vary from leg to leg, depending on geological setting of drill sites and quality and quantity of available data. The following guidelines provide the overall scope of the review, that must include a synthesis of geological, geochemical and geophysical data at each site. For detailed information on safety guidelines and review procedures consult the *JOIDES Journal* Special Issue No. 7 (October 1992) Guidelines for Pollution Prevention and Safety of ODP. available upon request from the JOIDES Office or JOI.

Material for the review is presented in two stages. The first consists of material mailed to panel members at least two weeks prior to the review meeting. This material should acquaint members with location, structure, stratigraphy and potential safety problems at drill sites and must include Safety Review Check Sheets for each site. This mailed documentation allows panel members to search their own files for information on potential hydrocarbon and other hazards at proposed sites. The second stage is formal presentation of all pertinent data at the Safety Review Meeting. Avoiding reference to data that may indicate drilling hazards in the course of this presentation can be a significant deterrent to panel approval. Bringing such data into the open, where its merits can be judged in light of overall safety aspects of a site, is the best policy for Co-Chief Scientists presenting data. It should be noted that proposals to drill on structural highs will generally be amended with recommendations to relocate the site on the flank of the structure. The Safety Panels are also inclined to relocate drill sites to intersections of seismic lines, especially where sedimentary sections are thick and where traps are likely to occur.

Much of the data needed for safety reviews is also required to support submission of a mature drilling proposal. Data which should be submitted to the ODP Site Survey Data Bank and submittal formats are described in the section "Guidelines for Data Submission," on page 28.

Schedule for Safety Review

Program schedule requires safety reviews at least six months before a drilling leg begins. The review can be conducted even earlier, as this may allow collection of additional data at rejected sites or new data for alternate sites.

Safety Previews

If, early in planning, proponents of a drilling leg anticipate serious safety concerns, they should request a safety preview. This entails submission of initial reconnaissance information and allows a preliminary assessment of problems before major commitments of time and money are made. The preview should be done at a scheduled Safety Review Meeting. The matter should be discussed with the PPSP chairperson in order to make necessary arrangements.

Safety Panel Recommendations

At the Safety Review Meeting, the panels will advise Co-Chief Scientists that a site: (a) is approved as proposed, (b) should be moved to a safer location that is still compatible with the scientific objectives, or (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.

Both the JOIDES and ODP-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.

Documentation For Safety Reviews

Documentation Required for Material Mailed to Panel Members Prior to the Review Meeting

1. Regional map showing bathymetry, latitude and longitude, nearest land areas and proposed site locations.
2. Track chart showing proposed sites and specific lines or line segments included for review.
3. Cross-tied seismic reflection lines of sufficient length and detail to define closures. The following annotations should be included on these lines:
   a. Site number, location and penetration depth
   b. Traverse direction
   c. Horizontal scale in kilometers
   d. Vertical scale in seconds or meters
   e. Course changes
   f. Identification of important reflections;
   g. Cross-line intersection points

   Seismic events should be legible to the depth of proposed penetrations. Seismic data may be presented as records or photographic prints. Suitable annotated negatives of prints must be sent to the ODP Site Survey Data Bank.
4. Sketch of major structural elements, sediment thicks and thins, and areas of distinctive reflection character.
5. Safety Review Check Sheets. Material submitted for each site should be indexed and annotated to enable ready identification of structural features, line locations, line directions, wells, grab samples, cores, etc.

Documentation Required for the Formal Safety Review

At the Safety Review Meeting, Co-Chief Scientists should present scientific objectives of the leg using regional maps, sections and published material as appropriate. This presentation should provide a comprehensible regional picture within which scientific objectives and safety hazards at each site can be evaluated. Co-Chief Scientists will present geologic characteristics and potential hazards for each site. Required items for all sites include:

1. All available bathymetric data.
2. Track charts with locations of geological, geophysical and geochemical data; seismic lines to be reviewed; site locations.
3. Structure maps, sedimentary thickness maps and maps of estimated depth to base of clathrate horizons.
4. Seismic reflection data sufficient to defend the safety of each site. In the event a site is moved, it is necessary to base the new location on additional seismic data. Documentation should be available for alternate locations. Drilling below the depth of resolution of seismic data will not be approved. Interval velocity information should also be provided.
5. Seismic refraction, gravity and magnetic data.
6. Hydrocarbon occurrences at nearby boreholes or exploration wells should be tabulated. Oil companies should have been encouraged to release such data. Potential source rocks should have been identified and mapped.
7. International jurisdiction and extent of nearby oil leases.
8. Lithologic descriptions of available cores and dredges, together with existing analyses of sediments and bottom water for presence of hydrocarbons.
9. Regional geologic maps and cross-sections for consideration of possible relationship of onshore and offshore geologic sections. Reservoir data should also be made available, if possible.

Shallow Water Hazards Surveys

During their October 1992 meeting, concern regarding potential for gas blowouts in shallow water settings caused the JOIDES and ODP-TAMU Safety Panels to disapprove a number of proposed drill sites on the New Jersey shelf. The special blowout danger in shallow water drilling is that gas, with its attendant threats of fire and explosion, will reach the sea surface at or in close proximity to the drilling vessel. In ODP drilling, this danger is compounded by the drillship's lack of a blow out preventer (BOP) and limited capability to use weighted drilling mud to contain gas release on a scale comparable to a standard oil and gas exploration rig.

Shallow Water Drilling Working Group Report Guidelines

It is PCOM's conviction that passive margin drilling must play a central role in the study of the history of relative sea level variations and that these studies are of scientific merit. This conviction led to PCOM's establishment of a Shallow Water Drilling Working Group. The responsibility assigned this group was to determine the specifications of shallow water hazards surveys necessary to minimize potential for gas blow outs in sedimented shelf drilling.

The Shallow Water Drilling Working Group (SWDWG) met in February 1993. Attendees included representatives of PCOM, PPSP, ODP-TAMU, SSP, TEDCOM, and industry, with members of SEDCO-FOREX, site survey companies, well control specialists and major oil companies. Important written contributions to this meeting were made by Deminex; Vernon Greif, Sedco-Forex; Colin Leach, US Minerals Management Service; Joar Saettem, IKU, Norway; Well Control and System's Design; Alister Skinner, British Geological Survey; and Peter Trabant, Marine Geohazards consultant.

The SWDWG produced a report adopted by PCOM in December 1993. Complete copies of this report are available upon request from the JOIDES Office. The main conclusions of the SWDWG's Report are:

1. Open-hole drilling in shallow water is reasonably safe if proper hazards surveys are conducted and combined with proper data processing and interpretation
2. Hazards surveys must be a requirement for ODP drilling on sedimented shelves in water depths of 200m or less
3. Sub-bottom penetrations at those depths, without BOP and mud-weight capabilities, must be limited to 1000 m
4. Operational procedures for shallow water drilling such as: dropping the drill string, monitoring the seabed for gas escape, and safety contingency plans must be developed
5. Interpretation of the survey data in terms of shallow gas hazards should be made by experts in the field who are also not associated with the scientific proposals justifying the program
6. ODP's slim, open-hole drilling from a dynamically-positioned vessel is a relatively safe method for shallow water operations but blowouts must be avoided

The guidelines developed by the SWDWG are open to change. Regulatory and scientific differences make change a necessity. Evolution of geophysical equipment used in high-resolution hazards surveys is in a constant state of flux. In general, state of the art equipment will be required for ODP shallow water surveys. The JOIDES Office will ensure that the guidelines are reviewed and updated as necessary.

Shallow Water Site Survey Objectives

The objective of a shallow water gas hazards survey (SWGHS) is to identify occurrence of gas, from the sea-floor down to at least 1000 m, at a site proposed for ODP drilling. SWGHS is required at proposed sites to allow the Science Operator (ODP-TAMU), together with the JOIDES PPSP and the ODP-TAMU Safety Panel, to properly evaluate the safety aspects of a site and to determine whether drilling should be undertaken or not.

ODP-TAMU shall be involved with the proponents in the planning of Shallow Water Gas Hazards Surveys and shall be responsible (both technically and fiscally) for quality control during data acquisition, processing, and interpretation of Shallow Water Gas Hazards Surveys of highly-ranked proposals that PCOM may wish to schedule for drilling. Funds to conduct Shallow Water Gas Hazards Surveys (including ship time, data acquisition, and data processing) are the responsibility of the proponent(s).

Shallow water is defined as water depths less than 200 m. The reason for selecting this depth is that experience in the oil industry has shown that gas blowouts at greater depths are not catastrophic to the drill rig, whereas blowouts from depths of less than 200 m can be.

It is assumed that prior to the SWGHS proponents will have acquired seismic data sufficient to justify the scientific objectives and to specify actual drill sites to address the science objectives. The SWGHS specifications are designed so that safety aspects of specific sites can be evaluated. In general the SWGHS will provide the proponent with images of the scientific targets that are better than those acquired previously. The proponent should bear in mind that sites may have to moved for safety reasons and that alternate sites could be picked from the SWGHS, providing the area covered by the survey is large enough to do this.

Requirements for Shallow Water Hazards Surveys

A shallow water hazard survey will have seven general requirements:

1. Accurate navigation
2. A dense survey grid
3. Side scan surveys to identify sea-floor features
4. High resolution MCS imaging of the sub-surface down to at least 1000 m
5. Independent quality control of MCS data acquisition
6. High-resolution imaging of the sub-surface down to about 100 m
7. Independent interpretation of the data by an expert in the field of shallow gas

The current requirements for SWGHSs are described in detail in the Shallow Water Drilling Working Group's Report (available upon request from the JOIDES Office), proponents should consult the details of this report prior to planning any shallow water hazards survey.

Program Facilities

Science Operator: Texas A & M University

Introduction

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

As Science Operator, ODP-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, ODP-TAMU (under guidance from the JOIDES community) was responsible for the lease-procurement and conversion of the drillship *Sedco/BP 471*, 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 page 41 for more detailed descriptions of shipboard facilities).

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

Ship Operations

ODP-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.

ODP-TAMU subcontracts with Overseas Drilling Limited for operation of the drillship, a company owned by British Petroleum and Sedco Forex, a division of Schlumberger.

Cruise Staffing

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

Co-Chief Scientists

ODP-TAMU is responsible for final selection of two Co-Chief Scientists for each cruise, based on recommendations made by the Planning Committee. ODP-TAMU coordinates with the Co-Chief Scientists through pre-cruise and post-cruise meetings. Approximately half of the scientists selected as Co-Chief Scientists will be representatives of the United States, and the other half in equal representation from the international partners.

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 ODP-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

ODP-TAMU maintains and supports shipboard laboratories designed to meet the needs of the shipboard scientific staff (see page 41).

Data Collection and Dissemination

This function includes storing, archiving, and disseminating cores and other scientific data collected during the course of the program. ODP-TAMU is curator of all cores obtained by ODP and by DSDP. Cores are maintained at three repositories in the United States on the East, West and Gulf coasts, located at Lamont-Doherty Earth Observatory, Scripps Institution of Oceanography, and ODP-TAMU respectively. Cores are also maintained in a repository at Bremen in Germany. These repositories have scientific laboratory and computer facilities to accommodate visiting scientific investigators.

Prime scientific data is archived in databases maintained by ODP-TAMU (see section on "Data Distribution Policy," on page 50, for more details).

Publications

ODP-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

describing shore-based results and synthesis papers (see section on "Publications Policy," page 47, for more details).

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.

ODP-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 ODP-TAMU, mainly through *Geotimes* and *Eos* articles, and Preliminary Reports.

In addition, ODP-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

ODP-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; development of pressure core sampling; research on the operating limits for deployment of long drill and casing strings; and the adaptation of mining-type diamond coring to ocean drilling.

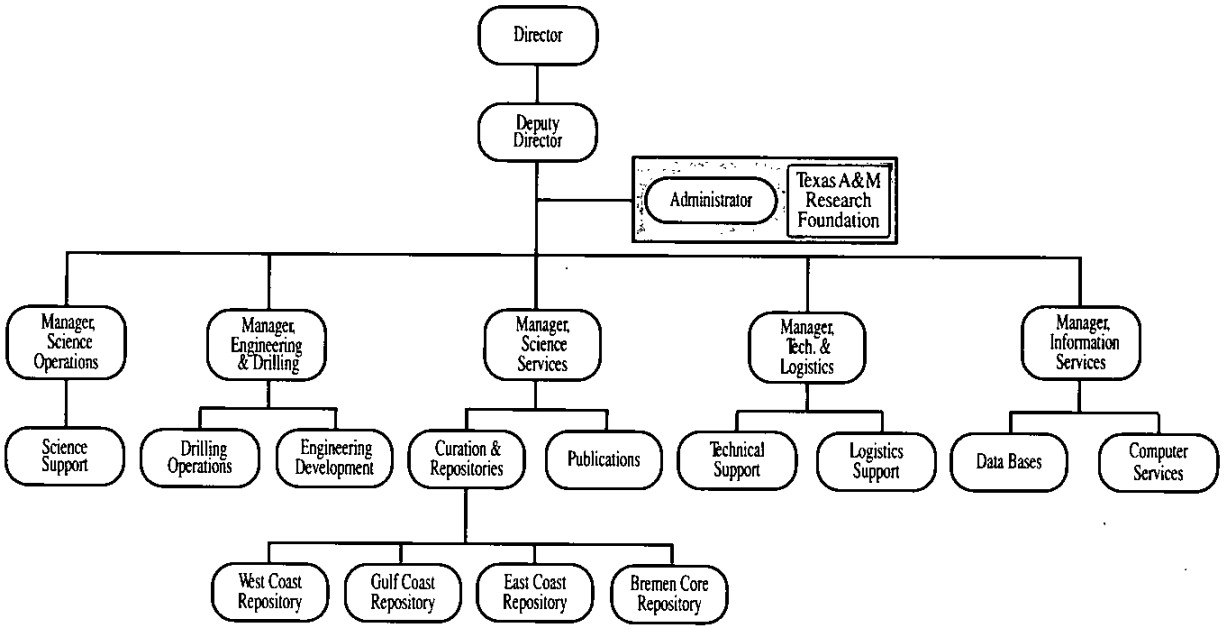


Figure 1. Management structure of Texas A&M University, the ODP Science Operator.

Wireline Logging Services: Lamont-Doherty Earth Observatory

As contractor for ODP wireline logging, the Borehole Research Group (BRG) at Lamont-Doherty Earth Observatory is to supply a suite of logging services. This involves the acquisition, processing, and presentation in usable scientific form to JOIDES scientists of in situ logging measurements. ODP-LDEO is charged to provide state-of-the-art "oil industry" logging capabilities and specialty logs customized to the needs of JOIDES scientists. ODP-LDEO also provides data analysis and distribution services in order to help JOIDES scientists use these logs to solve their particular scientific problems.

Structure of the Logging Service

The management structure of the Borehole Research Group at ODP-LDEO is shown in Figure 1.

The Logging Services for ODP consists of three major components:

1. Standard Logging. Schlumberger, the industry leader, provides standard logging services onboard the *JOIDES Resolution* on every ODP leg. See the section on "Wireline Logging: Standard Tools," page 36.
2. Specialty Logging. Specialty logging tools are available from Schlumberger or coordinated through BRG by request of the Downhole Measurements Panel. See section on "Wireline Logging: Additional Tools," page 37.
3. Log Analysis Support Service and Database. Log analysis centers at Lamont-Doherty in the United States, Leicester University in England, and Institut Méditerranéen de Technologie in France provide data processing, analysis, and interpretation services for ODP scientists' use after leaving the ship. These centers are designed to help scientists develop interpretative skills to solve geological problems with the assistance of in situ downhole measurements. The BRG at Lamont-Doherty is solely responsible for the log database and data distribution.

To carry out the logging program at sea, a minimum of three logging personnel are required on each ODP leg:

1. One ODP-LDEO logging scientist
2. One Schlumberger field engineer to operate their tools
3. One logging scientist from the JOIDES scientific community

Together they assist the Co-Chief Scientists in the design, implementation, and subsequent interpretation of the logging program on each leg.

On certain legs, an ODP-LDEO logging engineer is required to run specialty tools. In addition, first time Lamont logger trainees are staffed when space is available.

ODP Wireline Logging Policy

1. **All sites 400 m or deeper shall be logged** as planned in the pre-cruise prospectus. Any deviation from this policy must be cleared through the ODP-TAMU Director. Excluding exemption by PCOM (via the ODP-TAMU Director), undue hazard to drilling equipment as determined by the Operations Superintendent, unavailability or malfunction of logging equipment, or expiration of leg operating time. (The word "site" implies that logging may be omitted in a given hole if the interval has been or will be logged in another hole at the same site.)

Note: Despite the above policy, most holes less than 400 m deep are being logged as a result of specific requests by interested scientific parties.

Holes deeper than 400 mbsf will be logged through-pipe with radioactive logs if open-hole logging is not possible. Such situations include obstructed drill strings, bit release failures, and bridged holes. Such logging will not be attempted if, in the Operations Superintendent's opinion, it represents an undue risk to the drill string.

All XCB holes planned deeper than 750 mbsf will be logged in two stages. This is primarily to prevent loss of hole and logs due to failed XCB or other obstruction of the drill string. Expected total depth, geologic horizons, hole conditions and common sense will be factors in choosing the first logging point. The lockable flapper valve should be run in all XCB holes.

2. It is the **responsibility of the Co-Chief Scientists** to see that the logging schedule is followed to the best of their ability as planned in the pre-cruise prospectus.
3. The **ODP Operations Superintendent is the official representative of the Ocean Drilling Program** and has the responsibility of seeing that the PCOM drilling and logging objectives are followed during the cruise operations.
4. In general, the **"standard" Schlumberger logging suite is required in every hole logged**. The Planning Committee decides whether exceptions are appropriate for individual sites. To decrease use of ship time, several types of logging tools are combined into each logging run. As of March 1993, standard logging consists of three logging runs (Figure 2):

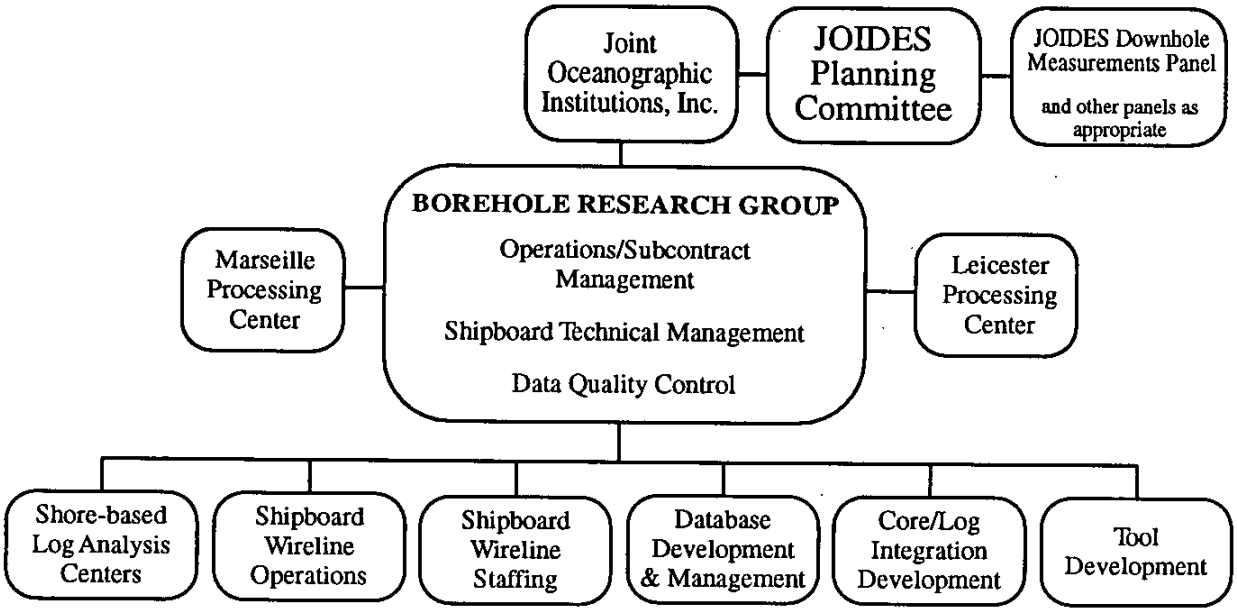


Figure 1. Management structure of the Borehole Research Group at Lamont-Doherty Earth Observatory, the ODP Wireline Logging Services Contractor.

Run 1: Neutron-Density-Sonic-Resistivity Combo

a. Natural Gamma Ray Spectrometry
b. Array Sonic
c. Compensated Neutron
d. Lithodensity (with caliper)
e. Phasor Induction/Spherically Focused Resistivity

When it is necessary to optimize data recovery in shallow holes and safeguard against losing radioactive sources within poor hole conditions, then Run 1 will be split into two separate runs: a-b-c and b-d-e.

Run 2: Geochemical

a. Natural Gamma Ray Spectrometry
b. Compensated Neutron (source only)
c. Aluminum Activation
d. Induced Gamma Ray Spectroscopy

Run 3: Formation Microscanner

a. Natural Gamma Ray Spectrometry
b. General Purpose Inclinometer
c. Formation Microscanner

Wireline Logging: Standard Tools

Each tool string consists of a combination of logging tools. The natural gamma ray spectrometry tool (NGT) is run with each tool string to allow for accurate depth correlation between logging runs.

The Schlumberger Cyber Service Unit (CSU) and Multitask Acquisition & Imaging System (MAXIS) computers are on the ship for log data acquisition. The MAXIS is Schlumberger's state-of-the-art wireline log data acquisition system; it provides increased data acquisition rates, enhanced processing capabilities, and permits ODP to run the newest logging tools currently available.

Run 1: The Neutron-Density-Sonic-Resistivity Combination tool string measures formation density, velocity, deep, intermediate, and shallow resistivity, natural gamma ray radiation, apparent porosity and hole size in a single logging pass. Sonic velocity data can be used with density measurements to calculate an impedance log and generate synthetic seismograms. These wavelet logs are used in turn to tie the seismic record to the log and core data.

All logs are valuable for lithologic and petrophysical information of the hole. Other measurements, such as porosity, permeability and clay mineral content, can be derived from these logs.

Run 2: The Geochemical tool string measures relative concentrations of Si, Ca, Fe, S, H, Cl, K, U, Th, and Al on the ship. Shore-based processing provides dry oxide weight percentages of these major rock-forming elements along with Gd and Ti. These elemental logs can be used to infer lithologic information from the hole.

Run 3: The Formation Microscanner (FMS) provides oriented, two-dimensional, high resolution images of the variations in microresistivity around the borehole wall. The general purpose inclinometer tool (GPIT) allows for the orientation of the microresistivity measurements from accelerometry measurements and from the declination and inclination components of the Earth's magnetic field vector. Applications of the FMS include the following: correlation of coring and logging depth, orientation of cores and location of the cored sections when recovery is less than 100%, mapping of sedimentary structures, and interpretation of depositional environments.

Wireline Logging: Additional Tools

In addition to the standard tools, other types of logging tools are run at selected sites. The Downhole Measurements Panel is responsible for recommending the most useful tools for each site, and the Planning Committee makes the final recommendation on which tools are to be run. These additional tools may be Schlumberger tools, ODP-LDEO specialty tools, or tools provided by a member of the ODP community ("third party tools"). Schlumberger tools are run by the Schlumberger engineer under the supervision of the ODP-LDEO logging scientist. ODP-LDEO specialty tools are run by the ODP-LDEO Logging Scientist. Third party tools are run by ODP-LDEO and/or specialists on a given leg.

Schlumberger Specialty tools:

- Well Seismic Tool (WST)*
- Array Seismic Imager (ASI)*
- Dipole Shear Sonic Imager (DSI)*
- Digital Borehole Televiewer (BTT)*
- Total Magnetic Moment Tool/Magnetic Susceptibility (GHMT)**

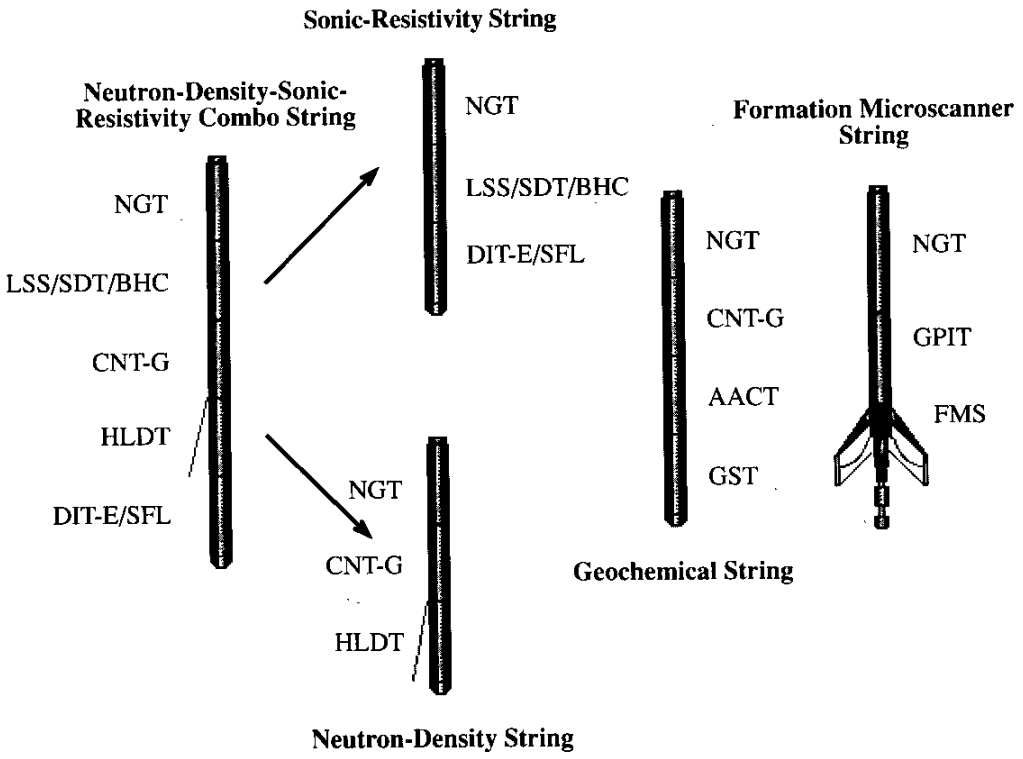


Figure 2. Schematic configurations of the Schlumberger tool strings operated in the Ocean Drilling Program.

Specialty/Third Party Tools:

- (BGR) High-Resolution/High-Temperature Magnetometer*
- (DMT) Digital Borehole Televiewer (slimhole and high-temperature tools)*
- High (BRGM) & Low (Lamont TLT) High Resolution Temperature Tools*
- (CSMA) High-Temperature Resistivity *
- Becker/Morin Packer Flowmeter*
- Wireline Heave Compensator

**Specialty tools are funded through proposals by interested shipboard scientists.*

***Pending evaluation, modification, and funding.*

The Conical Side Entry Sub (CSES) is a specially designed section of drill pipe used to assist logging operations in unfavorable hole conditions. The CSES is only useful in formations that are soft and/or non compacted allowing the drill string to "wash over" the logging tool string in the borehole. The CSES can also be used to move the logging tool string up or downhole in the protection of the drill string. The CSES does not permit rotation of the drill string once the logging tools and wireline are loaded into the drill string.

Shipboard Log Analysis

The Downhole Measurements Lab (DHML) computing facilities onboard the *JOIDES Resolution* currently consists of SUN and Macintosh systems. These computers transfer ASCII data from Schlumberger's MAXIS acquisition system to programs such as KHOROS on the SUN and *Kaleidagraph* and *Deltagraph* on the Macintosh. Once a data tape has been copied for use on these systems, the ODP-LDEO and JOIDES Logging Scientists can perform preliminary interpretation in the course of preparing the logging chapters of the shipboard reports. *GeoFrame*, an interactive analysis software from Schlumberger-GeoQuest, is used for FMS processing and interpretation.

Post-Cruise Analysis

The full complement (FMS, conventional, and geochemical) of log analyses is performed after each cruise at log interpretation centers at ODP-LDEO, Leicester University, and Institut Méditerranéen de Technologie. These include:

- Depth correlation and shifting of all conventional logs to sea floor
- Processing (where necessary) of acoustic data from transit times
- Processing of geochemical data into element and oxide weight percent
- Depth shifting and additional processing (where necessary) of FMS data
- Processing of dipmeter data

Also, expertise and facilities at Lamont, Leicester, and Marseille will be available for post-cruise log analysis by interested scientists.

ODP Well Log Data Distribution Policy

See section on "Data Distribution Policy: Wireline Log Data Distribution Policy" on page 54 in this issue for more information on data distribution and contact information for the Borehole Research Group.

ODP Logging Resources

CD-ROM. ODP-LDEO creates a CD-ROM for distribution with each ODP Initial Reports Volume. The CD-ROM includes:

- Processed conventional logs (ASCII format)
- Processed FMS images (PBM format)
- Processed Dipmeter data (ASCII format)
- BRG tool temperature data ASCII format)
- Sonic waveforms (ASCII format)

Multimedia Logging Kiosk. This is an interactive information kiosk for shipboard scientists that combines computerized graphics and animation, video, and sound to convey up-to-date information about the Wireline Logging Service, logging tools and operations, and logging data. Presently, this kiosk provides detailed information about (1) Schlumberger and Specialty tools: their principal applications, limitations, physics of design, log presentation, physical specifications, ODP applications and references; and (2) data distribution: a complete listing of what data is available to date, in what format(s), and how to obtain it. This multimedia presentation will soon be available in Macintosh and PC formats on the shipboard computer system in the DHML and on the logging data CD-ROM in each *Initial Report* Volume on a space available basis.

Logging Workshops and Special Sessions. Logging workshops will be held at an ODP log interpretation center (Lamont, Marseille, Leicester), or on the *JOIDES Resolution*. Logging research and results will be presented at special sessions of major scientific meetings consisting of invited and contributed talks and posters.

Publications

Schlumberger, 1989. *Log Interpretation Principles/Applications.*

Lamont-Doherty Borehole Research Group, *Wireline Logging Manual for the Ocean Drilling Program,* Vols. 1- 6. 1990.

Lamont-Doherty Borehole Research Group, bibliography of ODP logging-related papers and abstracts.

ODP Site Survey Data Bank: Lamont-Doherty Earth Observatory

Introduction

The ODP Site Survey Data Bank is located at Lamont-Doherty Earth Observatory, in Palisades, NY. The Data Bank has served the JOIDES community since 1975 as the repository of site survey data for ODP drilling legs. The Data Bank archives and distributes site survey data to the various JOIDES panels, working groups, and to individuals involved with scientific ocean drilling. The Data Bank has a staff of three full time employees: a Manager, a Data Archivist, and a Draftsperson.

Data Bank Policy

All data submitted by proponents to the Site Survey Data Bank are considered proprietary to the Ocean Drilling Program, unless they are freely available from other data repositories (e.g. NGDC). Data are made available to panels, working groups, and individuals in the JOIDES community on a need-to-know basis only. Members of the Site Survey Panel and the Pollution Prevention and Safety Panel are given access to any pertinent site survey data deemed necessary to carry out their mandated tasks. In addition, site survey data are provided to the Science Operator and to members of the shipboard scientific party. Requests for data in support of pre-cruise planning or post-cruise studies will be honored; all data requests not considered essential to ODP activities will be denied.

After the drilling leg, these restrictions remain in effect unless explicit permission is given by the data provider to relax them. All post-cruise data requests not originating from a shipboard scientific party member will be honored only after the original proponent has been consulted. These restrictions do not hold for the vast library of freely available "background" digital geophysical data held at the Site Survey Data Bank, and all JOIDES scientists seeking data for ODP purposes are encouraged to continue the practice of requesting data from the Data Bank in support of their drilling or site survey proposals.

Mandated Tasks

- **Assisting the Site Survey Panel (SSP).** The Data Bank assembles data submitted for each drilling proposal into packages that are evaluated by the Site Survey Panel. The Data Bank acts as the primary operational arm of this panel.
- **Assisting the Pollution Prevention and Safety Panel (PPSP).** The Data Bank assists the Pollution Prevention and Safety Panel by preparing data packages and other information submitted by proponents and Co-Chief Scientists prior to each meeting of the panel. The Data Bank also advises proponents and Co-Chief Scientists concerning the creation of safety reports for their proposed sites.
- **Assembling each leg's Operations Data Package.** For each drilling leg, the Data Bank provides both Co-Chief Scientists, and the Science Operator, with a package of site survey data which is relevant to cruise operations. These operations data packages contain sub-bottom and bathymetric 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.
- **Preparing Data Packages for Panels and Working Groups.** The Data Bank also assembles data packages for use by JOIDES Panels and Working Groups to aid in the proper planning and evaluation of drilling operations.
- **Providing Data to Science Operator.** The Data Bank provides data to the Science Operator upon request to aid in the planning of future drilling legs.
- **Providing Data to Interested Investigators.** Upon request, the Data Bank provides site survey data to investigators engaged in the planning of future drilling legs. Data is also available to scientists working on completed drilling legs, who need to understand the geological/geophysical context into which the cores fit. Investigators are welcome to visit the Data Bank and utilize its resources in their studies. Appointments, which should be made well in advance, are available by contacting the Data Bank Manager at LDEO.

Facilities and Tools

Computer Hardware

- **Sun Workstation.** The Data Bank has a SUN workstation for creating plots of cruise data, and for accessing the LDEO geophysical data bases. This workstation is equipped with a DAT drive, and this is the preferred format for tapes which are submitted to the Data Bank. However, using resources at LDEO, 9 track and Exabyte tapes, and CD-ROM disks may also be read. Data transfers over the Internet are also possible.
- **Color Versatec.** The primary output device used by the Data Bank is a color Versatec plotter, which can produce output up to 36

inches wide. This plotter accepts PostScript files, and investigators are encouraged to submit copies of their plots electronically, as well as on paper.

- **Internet and the World Wide Web.** The Data Bank, through LDEO and Columbia University, is connected to the Internet. E-mail to the Data Bank can be addressed to odp@ldeo.columbia.edu. FTP transfer of data to/from LDEO is possible. Please contact the Data Bank Manger for details. Currently under investigation is the use of the World Wide Web to provide on-line access to some Data Bank information. Again, please contact the Data Bank Manger for details.

Computer Software

- **Generic Mapping Tools.** The maps, charts and plots produced by the Data Bank are usually created using the Generic Mapping Tools (GMT) software created by Päl Wessel (University of Hawaii) and Walter Smith (NOAA). Using this software, the Data Bank can create maps which mix data submitted electronically with data extracted from the LDEO data bases. These maps can then be stored on tape and be distributed to investigators electronically.
- **MB-System.** Swath bathymetry data can now be submitted electronically as well. The Data Bank can manipulate the data using the MB-System developed at LDEO by David Caress. Maps created using this software can be archived and distributed electronically as well. For information regarding the format of data files, contact the Manager of the Data Bank.

Computer Databases

- **MGG.** Location at LDEO affords the Data Bank access to Lamont's cleaned MGG data bases. This includes a subset of data available through NGDC that has been screened and edited at LDEO to remove crossover and other errors. This is the primary data set used by the Data Bank for production of track charts, bathymetric maps, and plots of cruise magnetic data.
- **Other Geophysical Data Sets.** Other information available to the Data Bank for incorporation in site survey data packages includes the LDEO heat flow and sonobuoy records. Currently there are more than 20,000 heat flow records which are being standardized and compiled, as well as a set of 5,000 sonobuoy solutions from previous Lamont cruises.
- **4D Database of submitted Data.** The Data Bank maintains an inventory of all material submitted to it using a data base written in 4th Dimension. This data base allows the tracking of data at several levels including by proposed site, geographic region, and by proposal. Reports can be produced for use by panels and drilling proponents.

Data Availability

Underway geophysical data are stored digitally at the Data Bank in NetCDF format, and are available in the form of magnetic tapes, paper plots, or electronically via Internet data transfers. 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 seismic data are usually provided in analog form, and are reproduced on paper using the diazo process. 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 swath bathymetry data are presented in the form of large contour maps.

In addition to data collected explicitly for ODP, the Data Bank can access the Lamont data bases mentioned above. These data are a valuable supplement to the site survey data submitted by drilling proponents, and can be included in packages prepared for JOIDES panels and individual investigators upon request.

Proponents should be aware that they have the prime responsibility for obtaining and providing data in support of their drilling proposals (for information on the proper format for sending data to the Data Bank, refer to the section on "Guidelines for Data Submissions to the ODP Site Survey Data Bank," page 28). The Data Bank is, however, frequently able to supplement the data holding 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.

Requests for data should be addressed to the Data Bank Manager, ODP Site Survey Data Bank, Lamont-Doherty Earth Observatory, P.O. Box 1000, Rt. 9W, Palisades, New York 10964, USA; Internet: odp@ldeo.columbia.edu.

Shipboard Facilities: *JOIDES Resolution*

Introduction

In March 1984, the drillship *Sedco/BP 471* was contracted by the international Ocean Drilling Program's Science Operator (Texas A&M University) from a Sedco subsidiary, Underseas Drilling Incorporated (now Overseas Drilling Limited). The drillship underwent major modification to convert her to the scientific research vessel, known to the scientific community as *JOIDES Resolution*.

JOIDES Resolution is a dynamically-positioned drilling ship with a length of 471 ft. (143 m), beam of 70 ft. (21 m), draft of 27.6 ft. (8.4 m), and displacement of 16,596 long tons. The vessel is of the flush deck type with a forecastle (Fo'c'sle) and Poop deck. Forward of the 202-ft. (62-m) derrick is a seven-story module (the "lab stack") containing scientific work areas. Crew accommodations and navigation facilities are located forward. Electrical generation, propulsion machinery, and a heliport are located aft. Drilling equipment, machinery, tools, and supplies are located amidships.

Special Features and Operational Capabilities

The scientific research vessel is a completely self-sustained unit carrying sufficient fuel, water, and stores to enable her to remain at sea for 70 days. Emergency reserves for an additional 35 days are carried onboard. Navigational capabilities include SATNAV, LORAN C, and GPS (Global Position System); the latter providing precise satellite positioning and thus enhanced accuracy of drillsite location. Her ice-strengthened hull makes the drillship capable of navigation in medium ice conditions and she can withstand air temperatures of -18°C to 43°C and sea temperatures of -2°C to 27°C. Her ABS Ice Class 1B rating affords *JOIDES Resolution* the highest ice classification of any drillship currently in service.

Dynamic Positioning System

The drilling, propulsion, and positioning equipment are diesel-electric powered, and twin propellers give her an average cruising speed of 11 knots between sites. Special features of the research vessel's design make her a particularly valuable platform for deep-sea drilling, in particular her computer-controlled dynamic positioning system. This system employs an acoustic referencing device to maintain the ship over a specific location, using 12 thrusters, each capable of producing 22,600 lb (100,525 newtons) of thrust. When operating in conjunction with the main screws of the ship, the thrusters enable the drillship to move in any direction. Four hydrophones are mounted within the hull and continually receive signals transmitted from a sonar beacon on the ocean floor. These signals are fed into a computer that calculates the position of the ship relative to the beacon, based on the delay times of the arriving signals. The computer automatically controls the thrusters and main propulsion unit to maintain the ship's heading and location over the hole. Under normal operating conditions, the system can safely maintain the ship at a desired surface location within 2% of water depth.

Drill String Deployment

A 22 ft. (7 m) diameter well, the "moonpool," is located on centerline amidships, under the derrick, to provide an area for running drilling equipment to the seabed. On site, *JOIDES Resolution* can deploy as much as 30,000 ft. (9150 m) of drill string and maintain her position in up to 27,000 ft. (8200 m) of water. The drill pipe is stored on an automatic pipe-racker and is transported to the drill floor in stands of 27.4 m from three storage bays. On the rig floor, a mechanical device, the "iron roughneck", makes up the drill string by spinning stands of pipe together. A reentry cone, lowered through the "moonpool" and set on the seafloor, enables drilling equipment to re-enter holes several times.

To date, operations have been carried out in water depths ranging from 38 m to 5969 m. The longest drill string that has been suspended was 6919 m in length and over 320 re-entries have been made into existing holes.

Ship-to-Shore Communications and Auxiliary Transport

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, regardless of atmospheric conditions and communications windows. In areas where satellite communication is not possible, contact is maintained via the ship's continuous-wave and limited single-side-band capabilities.

A 21 m x 21 m helipad, located aft, facilitates equipment and personnel transfers. *JOIDES Resolution* is also equipped with a motor-driven, inflatable Zodiac launch to enable ship-to-ship personnel transfer in high seas and the deployment and recovery of various instruments.

Living Quarters

A maximum scientific and technical crew of 50 can be accommodated within the two- and four-person cabins, located on the Fo'c'sle (forward of the laboratories) and Main decks. The Main deck also house the ship's library and hospital.

Research Facilities

JOIDES Resolution (Figure 1) offers shipboard scientists the world's most advanced research equipment in operation at sea with dedicated facilities for studies in sedimentology, paleontology, petrology, geochemistry, geophysics, paleomagnetics, and physical properties accommodated within its twelve laboratories, which span seven decks of the ship. Within these laboratories, standard analytical studies are conducted on a continuing basis as well as detailed programs by individual scientists.

The Poop Deck (Aft) - Figure 2

The Underway Geophysics Laboratory is located on the Poop Deck, immediately forward of the fantail.

Navigation, bathymetric, magnetic, and seismic data are recorded and processed within this facility.

For ODP's specific needs, the GPS is the most reliable onboard navigation system, providing worldwide, continuous, highly accurate, three-dimensional position and velocity data.

Bathymetric data is collected by two onboard systems, the 3.5 kHz (underway) or 12 kHz (on-site) precision depth recorders. A Proton Precession Magnetometer provides underway magnetic data.

Single-channel seismic data are collected and processed using the vessel's three types of water guns (one Seismic Systems, Inc. P-400, two Seismic Systems, Inc. S-80's, and two Hambrick Industries HW-200's). The S-80 is ODP's standard sound source for reflection profiling. A Bolt 1500 air gun is also onboard but its current use is limited to VSP (vertical seismic profile) experiments. Three Teledyne streamers are available for mounting on the fantail; each 100 m-long streamer contains sixty hydrophones and may be towed up to 500 m behind the ship. The streamer output is transformer-coupled to the ship via the tow cable and the hydrophone elements are combined to produce a single signal.

Deck 7 (Lab House Top) - Figure 3

The Downhole Measurements Laboratory is located atop the "lab stack." This laboratory contains the logging control room and space for ODP's downhole instrumentation. Logging facilities are provided by the Borehole Research Group at Lamont-Doherty Earth Observatory with a prime subcontract to Schlumberger. Geophysical logs are recorded using probes that are lowered on the end of a wireline through the drill pipe and into the previously-drilled borehole. These Schlumberger logging tools are combined into multiple-strings for efficient operations. At present, three standard tool combinations are in operation; the seismic stratigraphic, the litho-porosity, and the geochemical combinations (for more information on logging see page 36).

ODP is responsible for other downhole instrumentation, which currently includes a Core Orientation System, the TAM Straddle Packer, the WSTP (in situ pore Water Sampler and Temperature/Pressure measurement instrument), the Kuster Sampler and Kuster Pressure gauge, and the ADARA temperature tool.

Deck 6 (Bridge) - Figure 4

The Bridge Deck houses the Physical Properties, Core, and Paleomagnetic Laboratories.

The Physical Properties Laboratory represents a facility dedicated to monitoring the physical and mechanical properties of recovered core. Since the properties of sediments and rock change with time after recovery, immediate onboard measurement is crucial for any sampling program.

The Physical Properties Laboratory is equipped with a Multi-Sensor Track (MST) to enable calculations of: (1) density, via measurement of gamma ray attenuation through the core (GRAPE device), and (2) acoustic impedance, using the P-Wave Logger. The MST also allows mineralogic investigation of the core, using the magnetic susceptibility meter and natural gamma ray spectrometer. A Thermal Conductivity System permits heat flow analyses and temperature measurements and a Penta-Pycnometer allows an evaluation of index properties (bulk density, water content, grain density, porosity, and void ratio). Split-core measurements are conducted on the Vane Shear to provide soft-sediment shear-strength data and on the Digital Sediment Velocimeter and Hamilton Frame Velocimeter for acoustic impedance calculations in conjunction with density data.

The Core Laboratory is divided into the Core Entry Area, Core Splitting Room, Core Photo Area, and Sedimentology Laboratory (i.e., the Core Sampling and Description areas). The Core Laboratory is equipped with a splitter and cut-off saws to accommodate various sampling and curatorial requirements. Grain size analyses are performed using the Lasentec laser particle analyzer. Four Zeiss microscopes (two standard WL microscopes and two stereomicroscopes) in the Core Laboratory enable the onboard study of smear slides in addition to lithological and paleontologic identifications. Core photography, an integral part of the descriptive and archive program, is a routine and continuous procedure.

The Paleomagnetics Laboratory is equipped for measurement of magnetic remanence (using spinner and cryogenic magnetometers) and volume magnetic susceptibility of split (or whole) cores and discrete samples. Cores may be geographically oriented as they are taken, using the Multishot Core Orientation tool, which requires a special nonmagnetic drill collar as part of the bottom hole assembly. Such shipboard measurements make these analyses immediately available for integration with other shipboard data and help to minimize the effects of oxidation, mechanical disturbances, and exposure to high magnetic fields that may occur between coring and shore-based sampling.

Deck 5 (Fo'c'sle) - Figure 5

The Fo'c'sle Deck houses the Chemistry, Paleontology and Microscope, and Thin Section Laboratories in addition to the research vessel's X-ray facilities.

The first priority in the Chemistry Laboratory is hydrocarbon monitoring, using one of the three onboard gas chromatographs or the Rock Eval unit. The Carle gas chromatograph is used for rapid analysis of methane/ethane ratios while one of two Hewlett Packard gas chromatographs is configured as a natural gas analyzer and is equipped with three chromographic columns that allow hydrocarbon separations as well as stationary gas separations. The second Hewlett Packard is generally a dedicated research tool used for hydrocarbon analysis of liquid extracts. The Rock-Eval, a microprocessor-based instrument for whole-rock pyrolysis, is used to evaluate type and maturity of organic carbon, calculate petroleum potential, and detect oil shows. Amounts of organic carbon and C/N and C/S ratios are determined using the CNS Elemental analyzer and the value of inorganic carbon as measured by the CIC Coulometer.

The Chemistry Laboratory also contains facilities to conduct interstitial water analyses utilizing pH and alkalinity determinations, atomic absorption measurements, ion chromatography, and spectrophotometry.

The Paleontology Preparation and Microscope Laboratories contain all of the standard equipment and supplies needed to process micropaleontological samples and to conduct petrologic description. Equipment includes an automatic point counter, photomicrographic systems, image printers, centrifuges, cameras, ovens, three stereomicroscopes, and ten microscopes that permit both reflected and transmitted light microscopy and camera adaptation for smear and thin slide descriptions.

The video screen printers available in the Microscope Laboratory (a black-and-white Mitsubishi printer and a color Hitachi printer) provide "photo-documentation" of specimens more rapidly and inexpensively than possible with regular photographic techniques. Although the resulting images are not of publication quality, they are valuable for study and interpretation.

The Thin Section Laboratory is equipped with both a Buehler Petro-Thin thin-sectioning system and a Logitech LP-30 lapping machine. The sections are polished on a Logitech WG-2 polishing system. Special support equipment includes a thin section cut-off saw, an impregnation unit for porous or friable specimens, a vari-speed diamond saw to accommodate delicate or critical samples, and a Zeiss standard WL binocular microscope for monitoring slide preparation.

The XRF and XRD Laboratory contains state-of-the-art equipment chosen for its stability in a shipboard environment. An Applied Research Laboratory 8400 hybrid spectrometer is used for X-ray fluorescence and a Philips ADP 3520 for X-ray diffraction analysis. Both instruments are fully microprocessor-controlled, feature auto-sample loading, and are supported by standard sample preparation equipment (enclosed shatterbox, fusion fluxer, ashing furnace, mixer mill, motorized agate mortar and pestle, sample crusher, Scientech balance, hydraulic press, and desiccator cabinet).

Deck 4 (Main) - Figure 6

The Main deck houses *JOIDES Resolution's* Computer Room, Computer User Room, Science Lounge, and administrative offices.

The computer system is composed of a central minicomputer cluster (MicroVax 3500 machines) and a collection of about 100 microcomputers and workstations (IBM PC compatibles, Apple Macintoshes, and Suns) located conveniently throughout the ship. Shipboard computers are linked via ethernet to maximize data transfer.

Deck 3 (Upper 'Tween) - Figure 7

Deck 3 contains the shipboard Photography Laboratory and an Electronics Workshop.

The Photography Laboratory functions as a self-contained unit, capable of producing black and white prints and color transparencies of cores, seismic records, and other visual data. Equipment includes 35 mm and 45 mm camera systems, copy stand, and video camera.

Decks 2 and 1 (Lower 'Tween and Hold)

Cores are stored in refrigerated storage lockers in the Lower 'Tween and Hold decks.

Deck 2 also houses the research vessel's gymnasium.

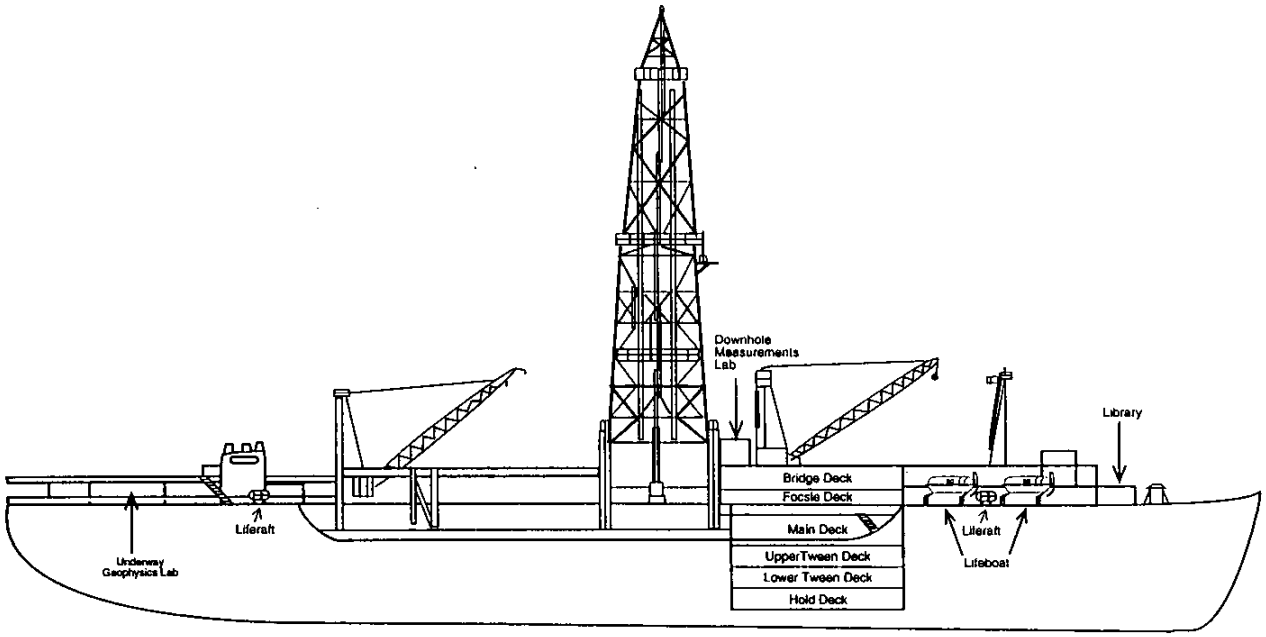


Figure 1. Cutaway schematic of the *JOIDES Resolution*

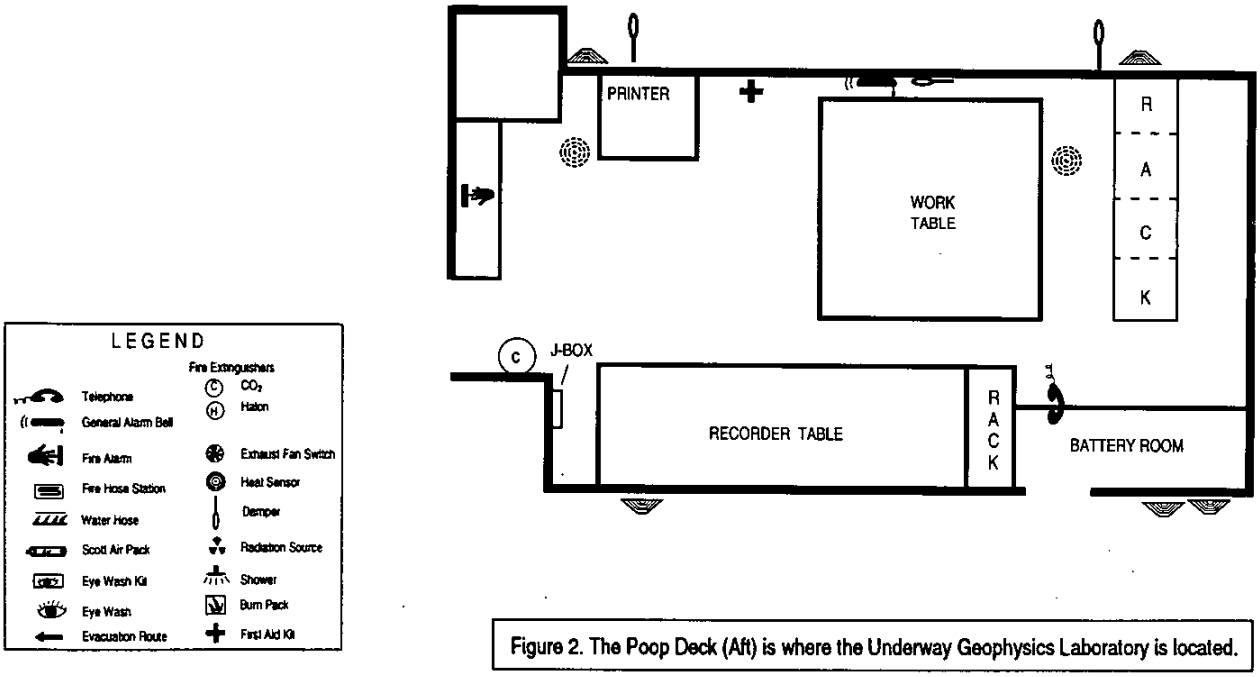


Figure 2. The Poop Deck (Aft) is where the Underway Geophysics Laboratory is located.

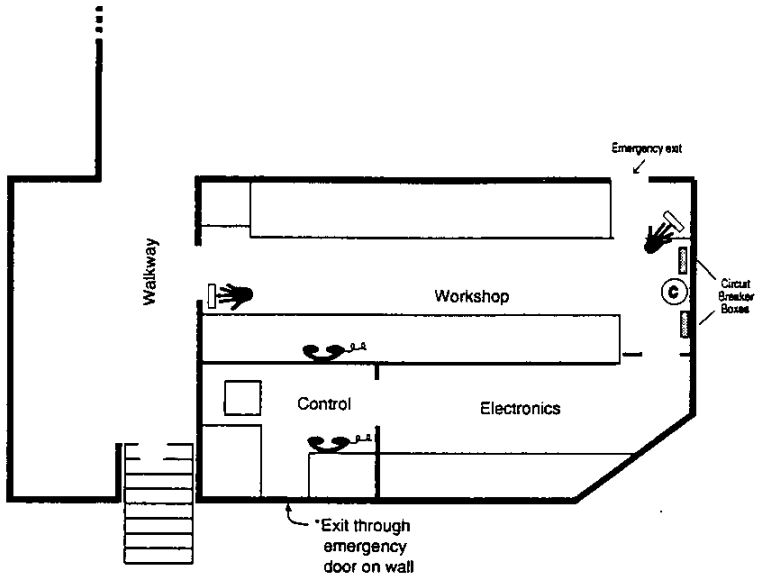


Figure 3. Deck 7 (Lab House Top) is where the Downhole Measurements Laboratory is located, atop the "lab stack."

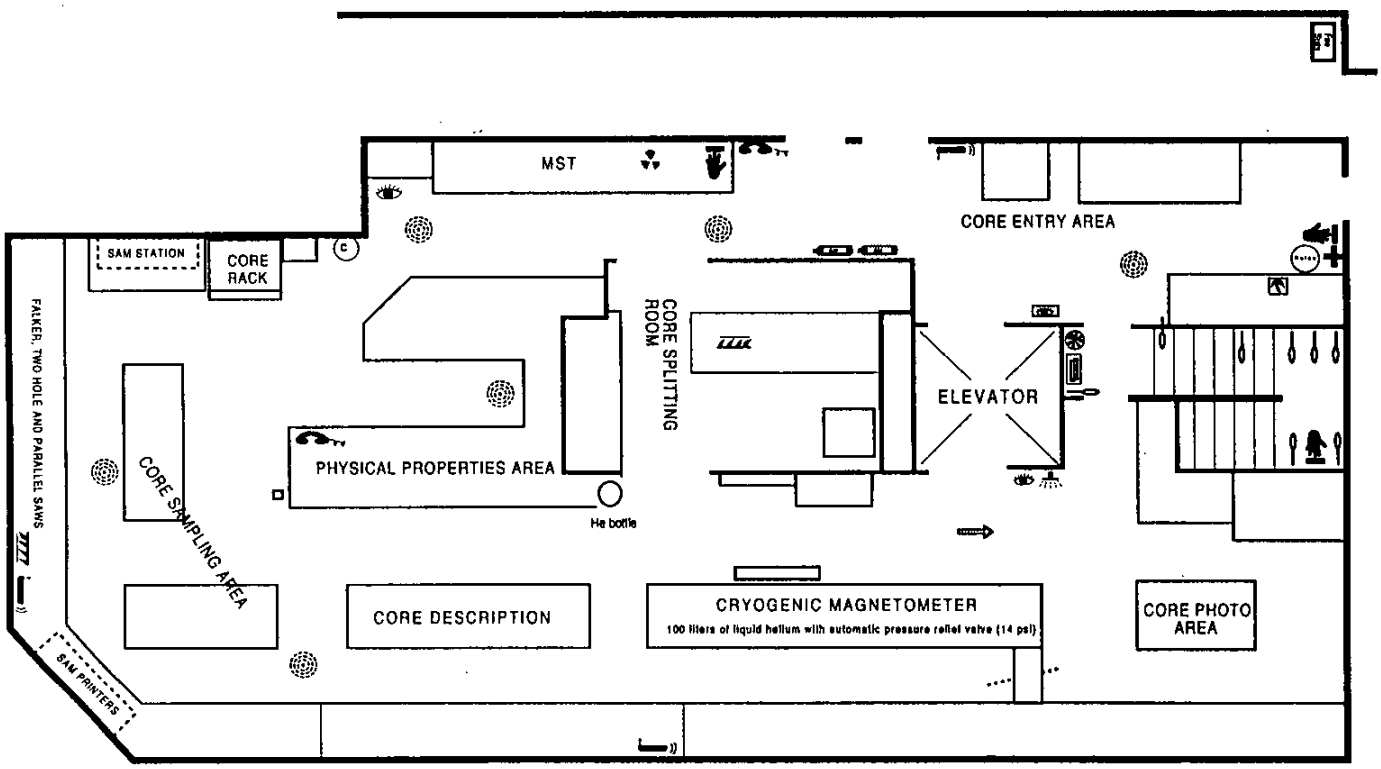


Figure 4. Deck 6 (Bridge Deck) houses the Physical Properties, Core and Paleomagnetics Laboratories.

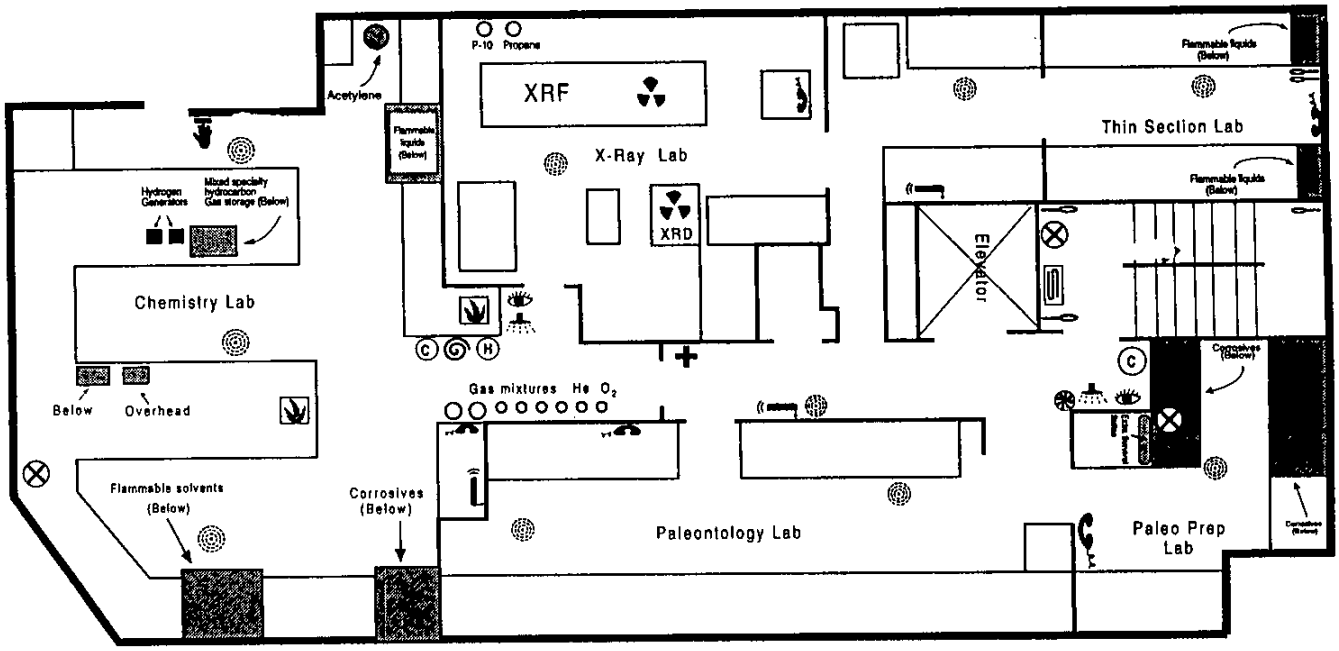


Figure 5. Deck 5 (Fo'c'sle) houses the Chemistry, Paleontology Preparation and Microscope, Thin Section, and XRF/XRD Laboratories.

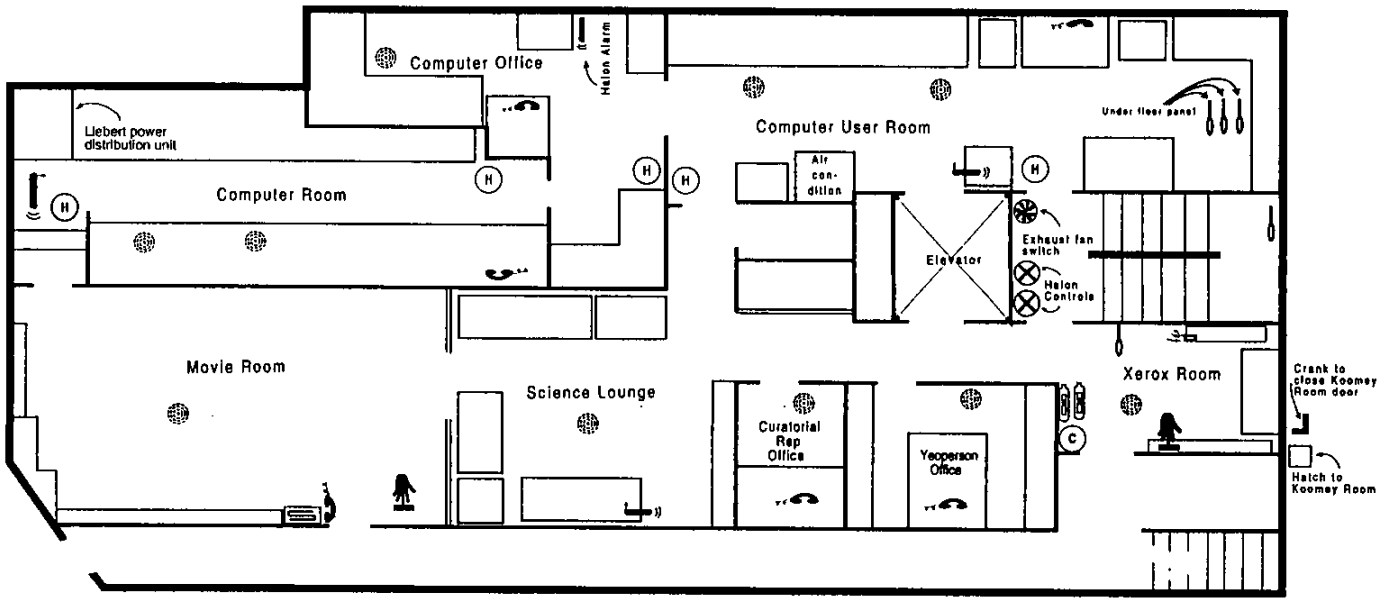


Figure 7. Deck 4 (Main) houses the Computer Room, Computer User Room, Science Lounge and administrative offices.

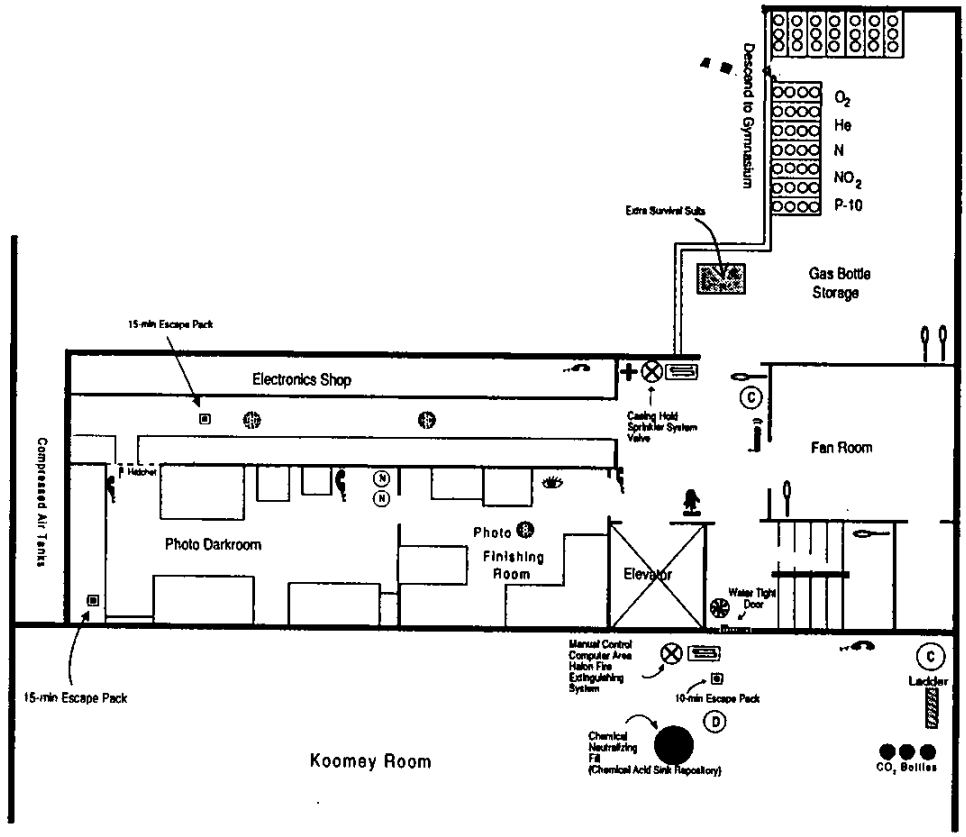


Figure 8. Deck 3 (Upper 'Tween) contains the shipboard Photography Laboratory and Electronics Workshop.

Data Acquisition and Distribution

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 (ODP-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 ODP-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

Two press releases are generated every cruise; one pre-cruise and one post-cruise. These releases are targeted to the general media, public and trade journals. Such releases are short, quote the researchers, and address one or two salient points rather than attempts to summarize the entire cruise. Press releases are written by the Co-Chief Scientists, ODP-TAMU Staff Scientist and ODP-TAMU Public Relations Specialist. Press Releases are subject to approval by ODP-TAMU, JOI, and NSF.

Cruise-related press conferences are held when a cruise produces information which is of outstanding public interest. Such conferences generally include interviews of the Co-Chief Scientists and shipboard participants. They occur immediately before the ship's departure or immediately upon the ship's arrival. These conferences are coordinated by the Public Relations Specialist at ODP-TAMU.

Formal Reports

Cruise-related articles are prepared for publication in *Eos* and *Geotimes* and represent press releases to the scientific community. The *Eos* article is written by the Co-Chief Scientists before the end of the cruise and can be moderately technical. A draft *Geotimes* article is written by the Co-Chief Scientists and the ODP Staff Scientist before the end of the cruise and is completed onshore. This article is more of a general-interest article and so is less technical than the *Eos* article. Both articles are published two or three months after the end of the cruise, and authorship is attributed to the entire shipboard science party.

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 shipboard science party.

Specific Geological Articles

This type of article must have its authorship and theme agreed to by a consensus of the shipboard science party before the end of the cruise. The Co-Chief Scientists will examine such a manuscript to ensure that the agreement about theme and authorship has been fulfilled before it is submitted for outside publication. Authors are responsible for:

1. alerting the editors(s) of the non-ODP publication that the paper also may be reprinted in the *Scientific Results* (*SR*) portion of the ODP *Proceedings* volume for that leg
2. obtaining waivers of copyrights and/or permissions required
3. submitting finished, reproducible copy of the published paper to the *SR* volume. Authors may, alternatively, expand and/or rewrite such papers for submission to the *SR* volume in the normal fashion.

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 that contain high-quality data not yet ready for final interpretation.

Initial Reports

This portion of a volume is published 10 to 12 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, and an external science specialist. In addition, an ODP staff editor is assigned to the volume and is available to help clarify English-language expression where necessary.

Proceedings (US $45 each, plus postage), *Prospectuses*, and *Preliminary Reports* can be obtained from: Publications Distribution Center, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-2016; fax: (409) 845-4857; Internet: Merrill@nelson.tamu.edu.

Miscellaneous Reports

Technical Notes

A series of *Technical Notes* is published that covers technical subjects such as preliminary time estimates for coring operations, laboratory procedures aboard the *JOIDES Resolution*, and handbooks for specific science disciplines. The following notes are in print:

No. 1: *Preliminary Time Estimates for Coring Operations* (Revised 1986)

No. 3: *Shipboard Scientists' Handbook* (Revised 1990)

No. 6: *Organic Geochemistry on the* JOIDES Resolution—*An Assay* (1986)

No. 7: *Shipboard Organic Geochemistry on* JOIDES Resolution (1986)

No. 8: *Handbook for Shipboard Sedimentologists* (1988)

No. 9: *Deep Sea Drilling Project Data File Documents* (1988)

No. 10: *A Guide to ODP Tools for Downhole Measurements* (Revised 1993)

No. 11: *Introduction to the Ocean Drilling Program* (1988)

No. 12: *Handbook for Shipboard Paleontologists* (1989)

No. 13: *Stone Soup—Acronyms and Abbreviations Used in the Ocean Drilling Program* (1993)

No. 14: *A Guide to Formation Testing Using ODP Drill-String Packers* (1990)

No. 15: *Chemical Methods for Interstitial Water Analysis Aboard* JOIDES Resolution (1991)

No. 16: *Hydrogen Sulfide-High Temperature Drilling Contingency Plan* (1991)

No. 17: *Design and Operation of a Wireline Pressure Core Sampler (PCS)* (1992)

No. 18: *Handbook for Shipboard Paleomagnetists* (1993)

No. 19: *Revised Hydrogen Sulfide Drilling Contingency Plan* (1993)

No. 20: *Science Prospectus—FY93-FY94 Atlantic Program* (1993)

No. 20/2: *Science Prospectus—FY95 Program* (1994)

No. 21: *Design and Operation of a Drill-in-Casing System (DIC)* (1993)

No. 22: *Safety Procedures on Board the* SEDCO/BP 471 (JOIDES Resolution) (1993)

Technical Notes (free) can be obtained from: Publications Distribution Center, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-2016; fax: (409) 845-4857; Internet: Merrill@nelson.tamu.edu.

Other ODP-Related Publications

Cumulative Index to 96 DSDP Volumes Available

A cumulative index to all 96 volumes of the *Initial Reports of the Deep Sea Drilling Project* is now available from ODP-TAMU. The index is presented in two formats: an electronic version on CD-ROM, and a printed version. Both are packaged together in a sturdy slipcase.

The index is in three parts:

1. a subject index
2. a paleontological index
3. a site index

The three parts reflect the interwoven nature of the marine geoscience subdisciplines.

The electronic version of the index is the more complete of the two, containing up to eight hierarchies of entries. The 1072-page printed index volume contains three hierarchies of entries and was condensed from the electronic version. Both versions of the index were prepared by Wm. J. Richardson Associates, Inc.

The CD-ROM containing the electronic index was manufactured under the auspices of the Marine Geology and Geophysics Division of the National Geophysical Data Center, National Oceanic and Atmospheric Administration, US Department of Commerce. In addition to the three-part index, the CD-ROM contains:

1. a bibliography of authors and titles
2. citations to DSDP exclusive of the *Initial Reports*
3. proposals to DSDP
4. site-summary information
5. an inventory of DSDP underway geophysical data
6. an inventory of downhole-logging data
7. data-documentation files.

Many persons contributed to the indexing project, including those at Scripps Institution of Oceanography and Texas A&M University. The US National Science Foundation funded preparation and publication.

Index sets (US $50) can be obtained from: Publications Distribution Center, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-2016; fax: (409) 845-4857; Internet: Merrill@nelson.tamu.edu.

Other Items Available from ODP-TAMU

- Ocean Drilling Program brochure (English, French, Spanish, German or Japanese)
- *ODP Sample Distribution Policy*
- Brochure describing Micropaleontology Reference Centers
- *Instructions for Contributors to Proceedings of the ODP* (Revised 1992)
- *ODP Engineering and Drilling Operations* (New)
- Multilingual brochure with a synopsis of ODP (English, French, Spanish, German, and Japanese)
- ODP posters (ship and coring systems)
- *ODP After Seven Years of Field Operations* (Reprinted from the 1992 Offshore Technology Conference proceedings)
- Brochure: *On Board* JOIDES Resolution
- Brochure: *Guide to Third-Party Tools*
- Brochure: *Downhole Measurements in the Ocean Drilling Program—A Scientific Legacy*
- Video: Windows *to the Past—Discovering Earth's Future* (20 minutes)

These items can be obtained from: Public Information Office, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-9322; fax: (409) 845-0876.

Wireline Logging Services

The Borehole Research Group at Lamont-Doherty Earth Observatory publishes a *Wireline Logging Manual for the Ocean Drilling Program* (Vols. 1-6. 1990) containing wireline logging techniques and applications. A bibliography of ODP logging-related papers and abstracts is also available. To receive a copy of these publications, please contact Borehole Research Group, Lamont-Doherty Earth Observatory, Palisades, New York, 10964, USA; phone: 914-365-8805; fax: 914-365-3182; Internet: borehole@ldeo.columbia.edu.

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. Subscription to the *JOIDES Journal*, changes of address, requests for additional copies of the current issue and available back issues should be requested from: Joint Oceanographic Institutions Inc., 1755 Massachusetts Ave., NW , Suite 800, Washington, DC, 20036-2102, USA; phone: (202) 232-3900; fax: (202) 232-8203; Internet: joi@brook.edu.

Data Distribution Policy

ODP and DSDP Samples

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 shore-based 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
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

DSDP and ODP 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; ODP Legs 100-110, 113, 114, 119, 120, 149, and 150) are housed at the East Coast Repository at the Lamont-Doherty Earth 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 (ODP Legs 11, 112, 115-118, and 121-148). Interstitial water, gas and frozen organic geochemistry samples collected by ODP are also stored at the Gulf Coast Repository.

Cores collected by ODP from the Atlantic and Antarctic Oceans and the Mediterranean and Black Seas beginning with ODP Leg 151 are housed at the Bremen Core Repository. At present, the Bremen Core Repository stores ODP Legs 151-154.

A reference library of thin sections, smear slides, photographs of all cores, microfilm of prime data, 35 mm color slides of all cores, laser disc of the color core slides (for rapid viewing of the cores), and copies of the resulting publications are kept at each repository. These reference materials are maintained for visiting researchers to use. Thin sections and smear slides may be borrowed for short periods of time by sending a request for them to the ODP Curator.

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. Repository staff will assist visitors with sampling according to the JOIDES/NSF sampling distribution policy and may delegate the actual sampling to the visiting scientist.

Distribution of Samples and Geophysical 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 specialized equipment that may be required. The ODP staff are able to accommodate most requests that require specialized sampling techniques or equipment, however these needs must be identified prior to the cruise so the technical staff can insure that adequate supplies or machinery are in place on the ship for that particular cruise. 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. Funding for sample-related activities must be secured by the investigator, independently of requesting the samples.

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. At present, manuscripts must be submitted by 16 months post-cruise.

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. They may invite participation from shore-based investigators prior to the cruise, or if necessary, they may even solicit requests from shore-based scientist during the cruise to study materials that were unexpectedly recovered. The curatorial representative assigned to the cruise will help the Co-Chief Scientists by providing the correct forms and advise them on the JOIDES/NSF policies. 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 investigators 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. Requesters 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 requester 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 requester 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 requester's resume and bibliography to the Curator. If the requester 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 submit such requests

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. Over 10,000 preparations that include foraminifers, calcareous nannofossils, diatoms, radiolarians, and lithology slides are available for visiting scientists to study.

Located at eight sites on four continents, Micropaleontological Reference Centers provide scientists around the world an opportunity to examine, describe and photograph microfossils of various geological ages and provenance. The collections contain specimens from four fossil groups—foraminifers, calcareous nannofossils, radiolarians and diatoms—selected from sediment samples obtained from DSDP. These samples have been prepared, divided into eight identical splits, and distributed to each MRC. All fossil material maintained by MRCs remains the property of the US National Science Foundation and is held by the MRCs on semipermanent loan.

Samples from DSDP and ODP Legs 1 through 144 were processed under the supervision of John Saunders, Supervisor of the Western Europe Center, William Riedel, Supervisor of the facility on the US West Coast, Annika Sanfillipo, present Supervisory of the West Coast Reference Center and Brian Huber MRC Curator. Future plans are to continue processing additional samples from ODP legs.

Establishment of identical paleontological reference collections around the world will help researchers to unify studies on pelagic biostratigraphy and paleoenvironments, and to stabilize taxonomy of planktonic microfossils. Researchers visiting these centers may observe quality of preservation and richness of a large number of microfossils, enabling them to plan their own requests for either ODP or DSDP deep-sea samples more carefully. Visitors to MRCs also may compare actual, prepared faunas and floras (equivalent to type material) with figures and descriptions published in DSDP *Initial Reports* or ODP *Proceedings* volumes.

Facilities at MRCs

All MRCs maintain complete, identical collections of microfossil specimens.

In addition, the following materials and equipment are available for visitor use:

- Secure storage and display areas
- Binocular microscope and work space
- Reference set of *DSDP Initial Reports* and *ODP Proceedings* volumes
- Lithologic smear slides accompanying each fossil sample
- microfiche listings of samples available

For more information about MRCs, or to schedule a visit, contact the supervisor on site.

US East Coast: Lamont-Doherty Earth Observatory, Palisades, New York 10964, USA; Supervisor: Ms. Rusty Lotti; phone: (914)365-8419; fax: (914) 365-2312.

US National Museum: US National Museum of Natural History, Dept. of Paleobiology, Smithsonian Institution, Washington, D.C. 20560, USA; Supervisor: Dr. Brian Huber; phone: (202) 786-2658; fax: (202) 786-2832, Internet: MNHpB007@sivm.si.edu.

US Gulf Coast: Texas A&M University, ODP/Texas A&M University, 1000 Discovery Drive, College Station, Texas 77845, USA; Supervisor: Dr. John Firth; phone: (409)845-0507; fax: (409) 845-0876; Internet: firth@nelson.tamu.edu.

US West Coast: Scripps Inst. Oceanography, La Jolla, California, 92093, USA; Supervisor: Dr. William Riedel; phone: (619) 534-4386; fax: (619) 534-0784; Internet: wriedel@ucsd.edu.

New Zealand: Institute of Geological and Nuclear Sciences, Ltd., 3rd floor, State Insurance Building, Andrews Ave., Lower Hutt, New Zealand; Supervisor: Dr. C.P. Strong; phone: (04) 569-9059; fax: (04) 569-5016.

Russia: Institute of the Lithosphere, Staromonet 22, Moscow 109180, Russia; Supervisor: Dr. Ivan Basov; phone: 231-48-36.

Japan: National Science Museum, 3-23-1 Hyakunin-cho, Shinjuku-ku, Tokyo, 160, Japan; Supervisor: Dr. Y. Tanimura; phone: 81-03-5332-7165, fax: 81-03-3364-7104.

Western Europe: Natural History Museum, CH-4001 Basel, Switzerland; Supervisor: curator TBA; phone: 061-29-55-64.

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. Requesters 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.

Whole-Round Core Samples

ODP permits routine whole-round core sampling of soft sediments onboard the drillship for two major programs: the interstitial (pore) water and occasional whole-round sampling for consolidation testing. 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 subsampled onboard for other investigations.

The routine shipboard sampling program for interstitial water (IW) 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 (head space technique). Vacutainer samples are taken if gas pockets are observed.

Core 2: 50 cm^3 sized samples may be taken from the working half for interstitial water, and the immediately adjacent 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 5 cm long whole round is taken for interstitial water (IW) analyses, and a headspace sample (10 cm^3) for gas analysis is taken from the working half adjacent to the 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 10-12 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.

Sample Requests

All requests received at ODP are entered in the Sample Investigations Data Base. Anyone may request a search. Some common types of searches include: on-going research from particular holes or legs, current research in a specified field of interest, or publications resulting from DSDP or ODP samples.

For details contact: Chris Mato, Assistant Curator, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas, 77845, USA; phone: (409) 845-4819; fax: (409) 845-1303; Internet: chris@nelson.tamu.edu.

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 Librarian.

Please consult the Data Librarian, 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.

Wireline Log Data Distribution Policy

The ODP Wireline Log Data Base is comprised of log data from legs, including both original and processed data, conventional Schlumberger logs and specialty tools (borehole televiewer, multichannel sonic, and temperature), borehole images and sonic waveforms. The entire database is catalogued through a Macintosh-based system which is updated routinely and which allows for the information about the logs recorded at each hole to be easily accessed. In addition, the data management program contains information on over 800 data requests fulfilled to date.

Data Distribution Onboard

All of the logging data acquired on each ODP leg are available onboard to each member of the scientific party. A form to request analog/digital data is distributed onboard or mailed to each scientist after the end of the leg.

Currently, digital data is available onboard in three formats: DLIS, LIS, and ASCII. Original data acquired by MAXIS (acoustic, nuclear, and electrical, including FMS) are available in DLIS format, while data acquired by the CSU (geochemical) are available in LIS format. In addition, Formation Microscanner data are made available as soon as possible after preliminary processing in a Portable Bit Map format compatible with a number of graphic applications on different computer platforms (Macintosh, SUN, VAX, IBM/PC). After preliminary processing and editing by the logging scientist(s), all data is transferred to the ship's main VAX cluster for distribution to all shipboard scientists.

Schlumberger contractually supplies eight copies of blueprints from each logging run. These are distributed to:

- Co-Chief Scientists
- ODP-TAMU staff scientist
- ODP-LDEO logging scientist
- JOIDES logging scientist
- ODP-LDEO permanent archive
- Log interpretation centers at Marseille and Leicester

Data Distribution On-Shore

The original logging data is available at ODP-LDEO about three weeks after the end of the cruise. Each data request must be made using the appropriate form, specifying log type and format.

Schlumberger Data. Schlumberger digital data include conventional (acoustic, nuclear, geochemical, electrical) and Formation MicroScanner logs. The original, unshifted and unprocessed data is available in LIS/DLIS format (LIS prior to Leg 149). The processed conventional logs are available in LIS or ASCII format. Schlumberger sonic waveforms are available in LIS/DLIS (LIS prior to Leg 149) or ASCII format. Conventional logs are also available in analog format on blackline at the metric scale 1:500.

The processed Formation MicroScanner/ Dipmeter data are available in LIS (Legs 129-140 and Leg 143 onward), ASCII (Legs 135-140 and Leg 143 onward), and PBM formats (Legs 139 and 143 onward). Formation MicroScanner/ Dipmeter data are also available in analog format on blacklines at two different scales (metric 1:6 and 1:40).

Other Data. Multichannel Sonic data are available in BRG or binary format. Analog Borehole Televiewer data are available in analog form only (Xerox copies of original Polaroid photographs); Digital Borehole Televiewer data are available on TK50 cartridges. Most temperature data are available as ASCII files of temperature and pressure versus time.

CD-ROM. Starting with Leg 143, the processed well log data is available on CD-ROM (a Leg 139 CD-ROM will be soon available as well). The ODP-BRG CD-ROM includes:

- Processed FMS data in LIS (Log Information Standard) format (Leg 143 only)
- FMS image raster files in PBM (Programmable Bit Map)
- Dipmeter data (ASCII format)
- Conventional logs (ASCII format)
- BRG temperature tool data (ASCII format)
- Text/information files (ASCII format)

All of the above data are available free of charge to members of the scientific community. Any request, however, not conforming to the standards listed in the request form (i.e., particular graphic presentation, multiple formats or media for the same data set, etc.) will be subject to charge.

Any request of data from commercial firms (i.e., oil companies, consulting agencies etc.) and government agencies should be addressed to the National Geophysical Data Center in Boulder, Colorado, where

the unprocessed data are sent after the one-year moratorium.

As of June 1, 1994, any initial data request must be accompanied by an explanation of the use of well logs in that particular research. In addition, any subsequent request will have to be accompanied by documentation (such as a list of published papers) of any previous application of well logs.

The scientific community at large has access to the logging data one year after the end of each leg. Interested scientists, however, can obtain the logging data before the 1-year moratorium upon approval of the Co-Chiefs and the shipboard party; like the rest of the shipboard party these scientists will have the obligation of submitting a scientific or data report for the *ODP Scientific Results* volume.

Requests should be addressed to: Cristina Broglia or Susan Brower, Borehole Research Group, Lamont-Doherty Earth Observatory, Route 9W, Palisades, New York 10964, USA; phone: (914) 365-8343/8673; fax: (914) 365-3182; Internet: chris@ldeo.columbia.edu; Internet: sbrower@ldeo.columbia.edu.

Wireline Log Data Requests and Communications via Electronic Mail

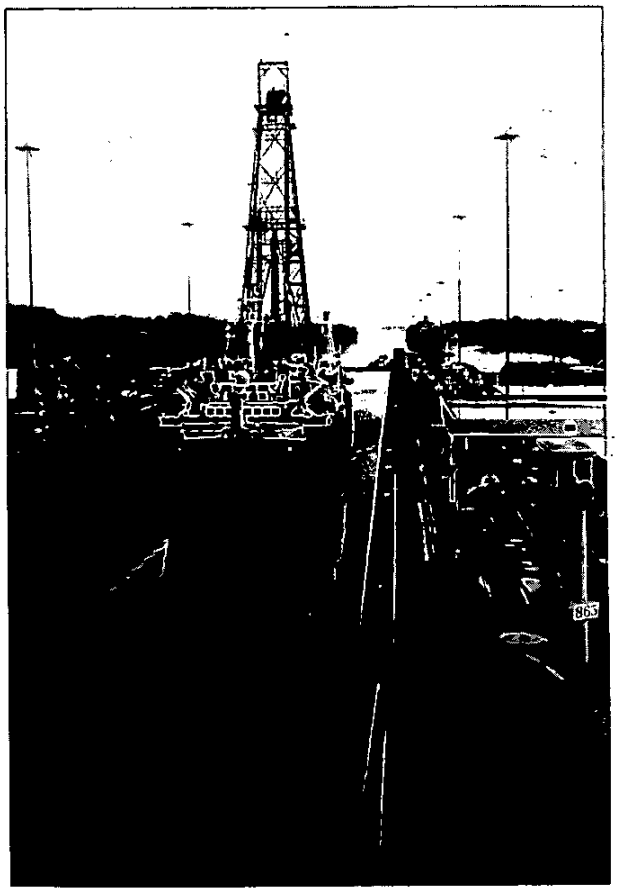
The Borehole Research Group can receive data requests and queries electronically by two paths. The first path is through our mailbox on Omnet. The address of this mailbox is "borehole." It is checked every day. The second path is over Internet. Lamont-Doherty has a T3 class connection to the Internet so data file transfer over the net is a practical option in addition to handling electronic mail. Data transfer via ftp can be arranged. The primary contact points for outsiders are the following:

- **borehole@ldeo.columbia.edu** (general purpose account)
- chris@ldeo.columbia.edu (**Cristina Broglia,** Data Services Supervisor, for database, ODP log publication, and log analysis related questions)
- sbrower@ldeo.columbia.edu (**Susan Brower,** Database Assistant, for data requests and data distribution related questions)
- beth@ldeo.columbia.edu (**Elizabeth Pratson,** Senior Log Analyst, for log analysis related questions)
- barnes@ldeo.columbia.edu (**Deborah Barnes,** Graphics Coordinator, for CD-ROM and multimedia development/status)
- filice@ldeo.columbia.edu (**Frank Filice,** Technical Operations Manager, for questions related to Schlumberger services, and specialty and third party tools)
- pkh@leicester.ac.uk (**Peter Harvey,** Chief Scientist in charge of Leicester operations)
- pezard@imtmer1.imt-mrs.fr (**Philippe Pezard,** Chief Scientist in charge of Marseille operations)

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, shore-based 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.



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 ODP-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 ODP-TAMU. Contact ODP-TAMU for information on volume availability 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. 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. Descriptive data are available as paper or microfilm copies of original data sheets generated aboard *JOIDES Resolution*. Underway geophysical data are on 35 mm microfilm; all other data are on 16 mm microfilm.

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 moratorium) are available, as well as all core photos taken by DSDP and ODP (Legs 1 through current post-moratorium leg). Photos of ODP/DSDP cores and seismic lines can be obtained from the ODP Database office. Seismic line, whole core, and close-up photographs are available in black and white 8X10 prints. Whole core color 35 mm slides are also available.

All DSDP and most ODP data are contained in a computerized database. Data can be searched on most specified criteria. This data can be provided on Macintosh- or PC-formatted disks, magnetic tape, hard-copy printouts, or through Internet file transfer.

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 submit a data request, contact the ODP Data Librarian, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-8495; fax: (409) 845-4857, Internet: database@nelson.tamu.edu.

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.

Cumulative Index to 96 DSDP Volumes Available

A cumulative index to all 96 volumes of the *Initial Reports of the Deep Sea Drilling Project* is now available from ODP-TAMU. The index is presented in two formats: an electronic version on CD-ROM and a printed version. Both are packaged together in a sturdy slipcase.

The index is in three parts: (1) a subject index, (2) a paleontological index, and (3) a site index. The three parts reflect the interwoven nature of the marine geoscience subdisciplines.

The electronic version of the index is the more complete of the two, containing up to eight hierarchies of entries. The 1072-page printed index volume contains three hierarchies of entries and was condensed from the electronic version. Both versions of the index were prepared by Wm. J. Richardson Associates, Inc.

The CD-ROM containing the electronic index was manufactured under the auspices of the Marine Geology and Geophysics Division of the National Geophysical Data Center, National Oceanic and Atmospheric Administration, and US Department of Commerce. In addition to the three-part index, the CD-ROM contains:

1. A bibliography of authors and titles,
2. Citations to DSDP exclusive of the *Initial Reports*,
3. Proposals to DSDP,
4. Site-summary information,
5. An inventory of DSDP underway geophysical data,
6. An inventory of downhole-logging data
7. Data-documentation files

Many persons contributed to the indexing project, including those at Scripps Institution of Oceanography and Texas A&M University. The US National Science Foundation funded preparation and publication.

Index sets (US $50), *Proceedings* (US $45 each, plus postage), *Prospectuses*, *Preliminary Reports* and *Technical Notes* (free) can be obtained from: Publications Distribution Center, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845, USA; phone: (409) 845-2016; fax: (409) 845-4857; Internet: Merrill@nelson.tamu.edu.

Data Available from the National Geophysical Data Center (NGDC)

NGDC acts as a parallel archive for marine geological and geophysical data produced by the DSDP and the ODP. NGDC provides access to the full suite of underway geophysical data and borehole logging data collected by both the DSDP and the ODP. NGDC also offers the full suite of sediment and hard-rock data from all 96 legs of the DSDP, and for Legs 101-129 of the ODP on two CD-ROM sets described below.

The ODP CD-ROM Version 1.0 Data Set

The ODP CD-ROM version 1.0 data set was produced by NGDC with support from, and in cooperation with, JOI/ODP through a contract with NSF. This CD-ROM set was released in April of 1992 and contains data for Legs 101-129 of the ODP.

Data Set Disc Contents

The discs contain computerized data files compiled by ODP, including sediment and hard-rock analyses and descriptions, and underway geophysical measurements between sites. Downhole logging data are not included. Some data types, including paleontology are not included in version 1.0 but are planned for future versions as data are compiled.

A more complete list of data types included is given below.

- Age Profile
- Borehole Interstitial Water (101-113 only)
- Carbon/Carbonate
- CoreLog
- Gas Chromatography (GECE)
- GRAPE
- 2-minute GRAPE
- Hard-Rock Visual Descriptions (Coarse & Fine)
- Hard-Rock Thin Section Descriptions
- Index Properties
- Interstitial Water Chemistry
- Paleomagnetism - Intensity & Susceptibility
- Rock Evaluator
- Sedimentary Lithology
- Site Summary
- Smearslide Descriptions
- Strength
- Velocity
- X-ray Fluorescence
- Underway Geophysical Data
- Data Documentation Files
- Data Codes Files, Standards
- Graphic Display Tool Kit
- On-Line User's Manual

Data Set Access Software

Access software for the CD-ROM set is provided on floppy diskette for both PC-compatible and Macintosh platforms. The access software is a combination of custom menu-driven software developed and written at NGDC and commercial software, *Record ReferenceBook*™ by Dataware Technologies, Inc. Access software for the ODP CD-ROMs differs substantially from that provided with the DSDP CD-ROM data set, which allowed selection only by geographic area, leg, hole, core, or presence of a specified suite of analysis types. The ODP software offers a menu-driven interface offering selection by the value of any parameter (e.g., weight percent calcium carbonate) in any data file, as well as by words or phrases in text or comments fields, by geographic area, and by leg, hole, core, etc. The graphic geographic selection routine includes a new zoom feature to enlarge an area of interest. A graphic downhole display utility is also provided to view numeric data. Future releases of access software with more features are planned.

System requirements: PC-compatibles must have a CD-ROM reader, a minimum of 640K RAM (500K free RAM), *Microsoft Extensions*™ version 2.1 or higher, and graphics capability; EGA or better is required to run the downhole display tool kit routines. Macintosh platforms are required to have a CD-ROM reader and ISO-9660 drivers. Both monochrome and color graphics are supported.

Data Set Availability

The version 1.0 CD-ROM data set is nearly out of print as of May 1994, please call NGDC for availability. The ODP CD-ROM version 1.0 CD-ROM set is provided by JOI/ODP at no cost to licensed owners of the DSDP CD-ROM data set. NGDC can also provide selected data files on a variety of media or via Internet from the CD-ROM. ODP is planning a cooperative project with NGDC to produce a new version 2.0 CD-ROM containing updated data for Legs 101-129 and new data from Legs 130-150.

The DSDP Version 1.0 CD-ROM Data Set

In 1989, with support from and in cooperation with JOI/USSSP, NGDC released all of the computerized DSDP data files in CD-ROM form. The DSDP version 1.0 CD-ROM set consists of two discs and custom, menu-driven, access software developed by NGDC for both PC-compatible and Macintosh platforms. With the release of this CD-ROM data set, for the first time, any researcher with a personal computer and CD-ROM reader can access the full suite of computerized DSDP data compiled by the DSDP Data Management Group.

Data Set Disc Contents

Sediment and Hard-Rock Data:

- Age Profile
- Carbon-Carbonate
- Core Depth Recovery

- Density-Porosity
- G.R.A.P.E.
- Grain Size
- Hard Rock-Major Element Chemistry
- Hard Rock-Minor Element Chemistry
- Hard Rock-Thin Section Descriptions
- Hard Rock-Visual Descriptions
- Interstitial Water Chemistry
- Paleomagnetism-AFD
- Paleomagnetism-Discrete Sediment
- Paleomagnetism-Hard Rock
- Paleomagnetism-Long Core Spinner
- Paleontology (22 fossil groups)
- Penetrometer
- SCREEN
- Site Summary
- Smear Slide Data
- Vane Shear
- Visual Core Descriptions
- X-ray Mineralogy (6 files)

Reference Files:

- Age Codes Dictionary
- Bibliography of the Initial Reports
- Core Photograph Index
- Cumulative Index (Paleontology, Site, Subject)
- Documentation Files for all Data & Reference Files
- Fossil Codes Dictionary (by fossil group)
- Microfilm Index
- Sediment Chemistry Reference Table

Downhole Logs and Underway Geophysics:

Logging Data: In the LIS format for DSDP Legs 1, 4, 5, 8, 46, 48, 50, 51, 57, 60, 61, 63-71, 74-76, 78, 80-84, 87, 89, 95, 96.

Geophysical Data: Bathymetry, magnetics, and navigation in the MGD77 format, for Legs 4-96 of the DSDP (navigation only for Legs 4, 5, 10, 11 and SEG-Y single-channel seismic data are not included)

Other Files: Documentation Files, Inventory Files, Laboratory and Shipboard Subsampling Records, Shaded Relief Images.

Data Set Access Software

Both PC-compatible and Macintosh access software are provided with the DSDP CD-ROM set on an accompanying floppy diskette. Log display software, courtesy of TERRASCIENCES Inc., for viewing and working with logging data in the LIS format is also provided with the data set.

The select/retrieval software developed by NGDC is not intended to be a database management system, but rather to allow quick selection of data interest, visual inspection of data in a readable form, and transfer of data to other media. The select/retrieval programs are designed to allow quick access to the data along four logical "paths": Geographic Area, Leg, Hole/Core, and Type of Data. The end result of each "path" is to view or copy data for a selected Leg, Hole, or Core.

Data Set Availability

JOI/USSSP is providing the DSDP CD-ROM data set, through NGDC, at no charge to academic researchers and research institutions within the United States. There will be a charge for data sets distributed to requesters outside the United States, and to scientists in private industry who were/are not affiliated with DSDP/ODP.

The current price for this item (DSDP CD-ROM data set: 2 CD-ROMs and software) is $102.00, product number 993A27001. An additional $10.00 is required for non-USA shipping. This price will be current through September 30, 1994.

For ordering information contact:

Robin R. Warnken, National Geophysical Data Center, NOAA/NESDIS/NGDC Mail Code E/GC3, 325 Broadway, Boulder, Colorado, USA 80303-3328; phone: (303) 497-6338; fax: (303)497-6513; Internet: rwarnken@ngdc.noaa.gov.

Technical questions should be addressed to: Carla J. Moore, National Geophysical Data Center, 325 Broadway, Boulder, Colorado, USA 80303-3328; phone: (303) 497-6339; Internet: cmoore@ngdc.noaa.gov.

JOI/USSSP contact: Ellen S. Kappel, Joint Oceanographic Institutions, 1755 Massachusetts Ave., NW, Suite 800, Washington, DC, 20036-2102, USA; phone: (202) 232-3900; fax: (202) 232-8203; Internet: joi@brook.edu.

Complete information on DSDP/ODP and other, related marine geological and geophysical data available from NGDC is available via Internet through anonymous ftp (ftp.ngdc.noaa.gov), NGDC's Gopher server (gopher.ngdc.noaa.gov), and through NGDC's Mosaic server (URL = http://www.ngdc.noaa.gov).

National ODP Structures

United States of America

The National Science Foundation (NSF) is responsible for overseeing ODP and provides the US contribution to the internationally-funded program. In addition, NSF provides support for US drilling-related science activities. In order to encourage the development of mature drilling proposals, and of innovative 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 onboard ship, 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 new concepts for drilling.

NSF accepts unsolicited proposals from US scientists and institutions at any time, but there are two main target dates: May 1, and November 1. Proposals requiring ship time must meet the May 1 target date to be considered for field programs during the following calendar year.

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

1. Planning activities such as US workshops and funding for the travel of US panel members to JOIDES panel meetings.
2. Site development, including data syntheses and site augmentation. Site augmentation includes support for US scientists to participate in non-US site surveys, support for assembling data that would otherwise not be available for planning purposes, support for drilling-related science on ships of opportunity, and support for innovative or non-routine downhole experiments.
3. Support for participation of US scientists in specific drilling legs, includingfunding for salaries and travel of US shipboard scientific party members, and limited post-cruise research.
4. Development of downhole instrumentation, which may include a wireline re-entry system.
5. Education and public information, including logging schools, graduate student fellowships, and a distinguished lecturer series.

Results symposia that highlight ODP's contribution to

National ODP Structures

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 continued to develop interest through participation in ODP, although it was unable to join the Program as a full member until October 1985. UK membership of ODP is funded and administered by the Natural Environment Research Council (NERC).

A UK ODP Science Committee (ODPSC) comprises JOIDES panel members, NERC members and officers, EXCOM alternate , ODPSPSC Chair, and other UK scientists. Industrial partners (if any) are represented by assessors. The ODPSC considers overall policy issues relating to ODP and JOIDES panel meetings, and briefs EXCOM and PCOM representatives.

To complement UK membership in ODP, NERC established and maintains a directed-mode science program in 1987, to encourage and fund participation in cruises and to support shore-based and other ancillary activities. All proposals for funding are judged on perceived scientific merit in open competition and are subject to international peer review. The program is administered by the UK ODP Science Program Steering Committee (ODPSPSC) which advises NERC on high-priority research that is worthy of support within the funds available. Guidance to ODPSPSC is also provided by the ODPSC.

In addition, the ODPSPSC considers applications for a small number of Special Research Fellowships to provide postdoctoral scientists of unusual promise 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.

The aim of UK ODP Science Program is to encourage multidisciplinary, multi-institutional proposal involving NERC institutes, universities and agencies. Four broad areas of activity have been identified:

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 aims to improve understanding of the essential regional framework to be tested by subsequent 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 also encouraged.

Japan

Japan has been a full member of ODP since October 1985. The Monbusho (Ministry of Education, Science, and Culture) funds the ODP in Japan. The University of Tokyo's Ocean Research Institute (ORI) is responsible for science operation of the program. The present MOU between ORI and NSF extends Japan's participation to September 1998.

There are two national committees equivalent of EXCOM and PCOM. ORI Director, Prof. T. Hirano Chairs the National Executive Committee which has 22 members from universities, research institutions, and Monbusho. The committee meets twice a year to discuss budgetary issues and science plans. The National Planning Committee, chaired by Prof. A. Taira (ORI), meets at least twice a year to compose scientific plans including long-range plans. The members are current ODP Panel representatives, liaisons to InterRidge, ION, and OD21*, and other scientists to cover the broad spectrum of ODP sciences. *(* - OD21 is a proposal by Science and Technology Agency of Japan to build a riser-equipped drilling vessel for international scientific community to be available in the 21st Century.)*

Five special working groups serve to discuss detailed science plans, which are:

1. Paleoenvironments
2. Subduction zone dynamics
3. Mantle dynamics
4. Seismic tomography
5. Downhole measurements

Administrative decisions for ODP are made following recommendations of the Geodetic Council, an advisory board to the Cabinet organized by the Monbusho. The ODP national program is reviewed by the Special Committee for Deep Ocean Floor Investigation (Chair: Prof. S. Uyeda), a subcommittee of the Geodetic Council.

The National Science Museum of Japan has been designated as one of the three permanent loan institutions of Micropaleontological Reference Centers to serve the international community. ORI's ODP-related activities include the following:

1. To publish and distribute the ODP *Newsletter* and other information to about 700 addresses, and distribute ODP *Proceedings*
2. To hold workshops and symposia to discuss recent scientific results from ODP cruises
3. To ensure access to *Tansei Maru* and *Hakuho Maru* of ORI for ODP site surveys
4. To promote developments of new downhole instruments towards establishing ocean floor laboratories

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 Français 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 shore-based work, syntheses, etc. Specific support is also provided by other agencies (such as ORSTOM, IFP, and BRGM) to their scientists involved with ODP.

Federal Republic of Germany

The Federal Republic of Germany (FRG) 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-US 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 für F[illegible]

(BMFT), the federal ministry of research and technology. The DFG represents the Federal Republic on the ODP Council. The Bundesanstalt für 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 totaling approximately DM 4 Mio 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, multibeam echo sounders, and conventional geological and geophysical gear. The FRG has a worldwide involvement in ODP and research related to the program as done in all major oceans.

The annual German ODP-Colloquium is the forum where scientific results from German participation in ODP legs and other ODP-related activities are presented and scientific plans are discussed. The colloquium is open to international participation. The *ODP-Rundbrief*, a circular, is distributed every three or four months by BGR to inform the German ODP community on the latest drilling results and other ODP-matters which may be of special interest to them.

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, Finland, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland and Turkey.

In April 1986 the decision was reached that the "ESF Consortium for Ocean Drilling (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 nonvoting 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.

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 shared 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 broadly 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 intragovernmental discussions. In Canada, this Council is chaired by a senior official of the Natural Resources Canada.

In Australia, the Council is chaired alternately by a senior official of the Australian Geological Survey Organization (AGSO) or senior representative of the Australian Research Council (ARC) and includes additional representation from AGSO, ARC, and the Australian Vice-Chancellors Committee (AV-CC). The Canada-Australia Consortium is represented by a Consortium Board comprised of the chairmen of the National Committees, the chairmen of the Councils, and a secretary to the Consortium Board. This Board represents the interests of the Consortium in ODP. The Consortium office is currently housed at the Australian ODP Secretariat.

Funding for the Ocean Drilling Program in Canada is provided by the Natural Resources Canada/Geological Survey of Canada (NRC/GSC) 21.6%; Department of Fisheries and Oceans (DFO) 21.6%; and the Natural Sciences Engineering and Research Council (NSERC) 56.8%. 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*. Canadian funding for ODP is currently under review and Canada has cut its current contribution to 1/4 of a full membership. The Canada-Australian Consortium has a current 7/12 membership of ODP for 1993-1994 and the Consortium is actively seeking additional partner(s).

Funding for the Ocean Drilling Program in Australia is provided by the Australian Research Council 60%; Australian Geological Survey Organization 32%; and Australian Vice-Chancellors Committee 8%. Since joining ODP, Canada has placed 44 scientists onboard the *JOIDES Resolution*, and Australia has placed a total of 33 scientists onboard the *JOIDES 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 900 and an annual Australian ODP Newsletter is published in *The Australian Geologist*. A 1993 Australian Research Council review of Australian Participation in ODP concluded that Australia must continue to participate in the program at its current level. The establishment of a new consortium with Australia, Canada and other partner or partners is the current priority of the Canada-Australia Consortium.

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Publication Statement

The *JOIDES Journal* is edited at the JOIDES Office.

The *JOIDES Journal* is printed and distributed by the Joint Oceanographic Institutions (JOI), Inc., Washington, D.C., for the Ocean Drilling Program (ODP) under the sponsorship of the National Science Foundation and participating countries. The material is based upon research supported by the National Science Foundation under Prime Contract OCE 83-17349.

The purpose of the *JOIDES Journal* is to serve as a means of communication among the JOIDES advisory structure, the National Science Foundation, the Ocean Drilling Program, JOI subcontractors thereunder, and interested earth scientists. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

The information contained within the *JOIDES Journal* is preliminary and privileged and should not be cited or used except within the JOIDES organization or for purposes associated with ODP. This journal should not be used as a basis for other publications.

Publication History

The *JOIDES Journal* is published in yearly volumes which normally consist of three issues published in February (No. 1), June (No. 2), and October (No. 3). Publication commenced in 1975 with Volume I and has continued since then.

In addition, there are occasional special issues of the *JOIDES Journal* which are listed below:

Special Issue No. 1: Manual on Pollution Prevention and Safety, 1976 (Vol. II)
Special Issue No. 2: Initial Site Prospectus, Supplement One, April 1978 (Vol. III)
Special Issue No. 3: Initial Site Prospectus, Supplement Two, June 1980 (Vol. VI)
Special Issue No. 4: Guide to the Ocean Drilling Program, September 1985 (Vol. XI)
Special Issue No. 4: Guide to the Ocean Drilling Program, Suppl. One, June 1986 (Vol. XII)
Special Issue No. 5: Guidelines for Pollution Prevention and Safety, March 1986 (Vol. XII)
Special Issue No. 6: Guide to the Ocean Drilling Program, December 1988 (Vol. XIV)
Special Issue No. 7: Ocean Drilling Program Guidelines for Pollution Prevention and Safety, Oct., 1992 (Vol. 18)
Special Issue No. 8: Guide to the Ocean Drilling Program, June 1994 (Vol. 20)

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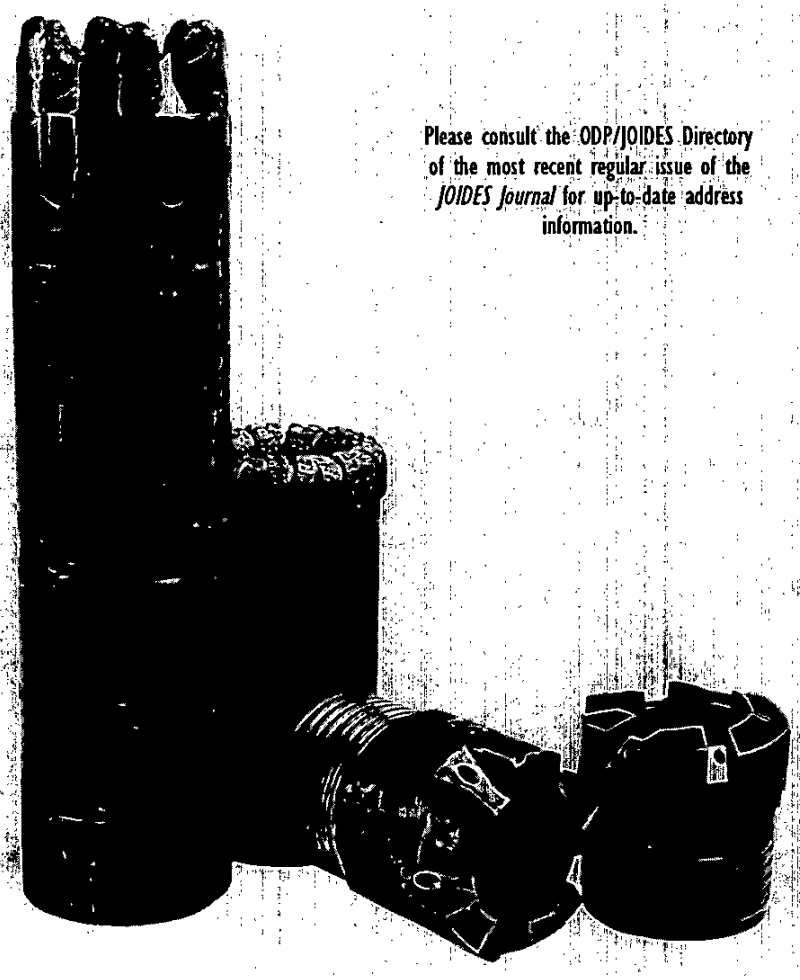

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